Annual report of the Supervising Surgeon General of the Marine Hospital Service of the United States : 1897

Contributors

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MARINE HOSPITAL SERVICE
1798 U S 1870


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ANNUAL REPORT

OF THE

SUPERVISING SURGEON-GENERAL

OF THE

MARINE-HOSPITAL SERVICE OF THE UNITED STATES

FOR THE

FISCAL YEAR 1897.

WASHINGTON:
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MARINE HOSPITAL SERVICE
1798 ★ U ★ S ★ 1871

OPERATIONS

OF THE

UNITED STATES MARINE-HOSPITAL SERVICE.

1897.

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REPORT TO THE SECRETARY.

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL M. H. S.,
November 1, 1897.

HON. L. J. GAGE,
Secretary of the Treasury.

SIR: I have the honor to transmit herewith the report of the Marine-Hospital Service of the United States for the fiscal year ended June 30, 1897, being the twenty-sixth annual report of the Service and the ninety-ninth year of its existence.

In addition to the statistical information pertaining to the fiscal year, the operations of the Service to the present date, being near the close of the quarantine season, are included.

MEDICAL CORPS.

One board has been convened for the examination of applicants for admission into the Medical Corps. The number of applicants for permission to appear before this board was 37. Thirty-one presented themselves, 6 of whom passed successful examinations.

APPOINTMENTS AND PROMOTIONS.

During the fiscal year 5 successful candidates were appointed to the grade of assistant surgeon and 4 assistant surgeons were promoted after examination to the grade of passed assistant surgeon.

Two passed assistant surgeons were promoted after examination to the grade of surgeon.

RESIGNATIONS.

One surgeon has resigned during the fiscal year.

CASUALTIES.

Since my last report the corps has lost by death one of its older surgeons, W. H. H. Hutton. A brief statement of his services is included in the following announcement:

CIRCULAR LETTER ANNOUNCING THE DEATH OF SURG. W. H. H. HUTTON.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., June 29, 1897.

To the Medical Officers of the United States Marine-Hospital Service:

It is with regret I have to announce to the medical officers of the Service the death, on the 14th of this month, after a lingering illness, of Surg. William Henry Harrison Hutton.

Surgeon Hutton was born in York, Jefferson County, Ohio, February 28, 1838. At the beginning of the late civil war he enlisted in Company K, Twentieth Regiment Illinois Volunteers. After about a year's service with his regiment he was discharged, and reenlisted in Company D, One hundred and fourth Illinois Volunteers, in which regiment he served until the spring of 1864, when, in consequence of a wound received at Pittsburg Landing, he was sent to Chicago, Ill., and in a few months recovered sufficiently to be placed in charge of the office of the Desmanes Eye and Ear Hospital, under the United States Army, where he remained until March 7, 1865, when he was mustered out of the volunteer service. By his bravery he won promotion at the battles of Chickamauga and Missionary Ridge.

He attended his first course of medical lectures at the Alabama Medical College, at Mobile, and on March 16, 1875, was graduated from the Chicago Medical College, Chicago, Ill., receiving from this institution the first prize of the faculty for the best graduating thesis.

He was appointed assistant surgeon in the Marine-Hospital Service May 8, 1875, and was promoted to the grade of surgeon October 20, 1876. Surgeon Hutton, during his connection with the Marine-Hospital Service, served as commanding officer at the following stations: New York, Cincinnati, New Orleans, Detroit, Louisville, Mobile, and Baltimore.

In addition to the above duties he rendered valuable service at Brunswick and Waycross, Ga., and Camp Perry, Florida, in 1888, in enforcing the quarantine and other measures during the yellow-fever epidemic of that year, and again at Brunswick, Ga., during the yellow-fever epidemic in 1893. At Camp Perry he installed and was in command of the first detention camp, which proved so successful in the management of the epidemic at that time raging in Jacksonville.

He was also placed in charge of the quarantine establishment at Sandy Hook, New Jersey, during the cholera scare in 1892, and later in the same year rendered efficient services in the establishment of the quarantine flotilla at Cape Charles. In 1894 he was detailed to inspect the quarantine stations along the Florida coast, and had temporary charge of the Gulf quarantine during a part of the same year. For thirty-five years Surgeon Hutton has been serving his country in various capacities in war and pestilence, and always with a conscientious devotion to its interests and with a zeal worthy of emulation. He was ever ready to obey a summons to duty, and oftentimes was a volunteer when epidemics threatened the country.

In his death the Service loses one of its oldest and most efficient officers.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Another casualty occurred during the latter part of the yellow-fever epidemic of 1897—the death from injuries of P. A. Surg. W. D. Bratton. The sad circumstances of his untimely death are narrated in the following correspondence:

SABINE PASS, TEX., *October 2, 1897.*

DEAR SIR: I am sorry to have to inform you that Dr. Bratton is dead. He died to-day between 10 and 11 o'clock, from the effects of a fall through the hatch of the ship *Albania*, which happened late yesterday evening. He superintended the washing down of the vessel during the day. About 4 o'clock in the evening he came to my room in the quarantine building and told me that the work was finished, and expressed his satisfaction with the work of my crew. After talking with me a few minutes he remarked that he would go down and take another view of the hold of the vessel and then get ready to go up (to town). I left the station a short time after this interview. About 8 o'clock I was sent for to see him. It seems that he went aboard the vessel and fell through a hole open for ventilation. He fell 12 or 14 feet, striking his head on an iron knee, cutting a gash about 3 inches deep to the

skull. He was unconscious when they found him, and remained so until he died. I could discover no fracture. The hemorrhage was considerable. It is thought by Mr. Allbright and others that it was at least two hours after his fall before he was discovered, all thinking that he had gone to town, until the captain of his launch made inquiries for him. Drs. Holliman, Clendenning, and myself did everything we could for him, and greatly regret the unfortunate accident.

Yours, respectfully

A. N. PERKINS,
State Health Officer.

DR. G. M. MAGRUDER,
Passed Assistant Surgeon, M. H. S., Galveston, Tex.

U. S. MARINE-HOSPITAL SERVICE,
DISTRICT OF THE GULF,
Sabine Pass, Tex., Surgeon's Office, October 5, 1897.

SIR: In obedience to your telegraphic order of the 3d instant, I left Galveston for Sabine Pass on the afternoon train of the same date. While waiting in Houston for the east-bound train, I received notification of Dr. Bratton's death, and immediately procured a casket and secured the services of an undertaker. We arrived at Sabine at 11 o'clock on the morning of the 4th instant, and the body, which had been kept on ice pending my arrival, was embalmed, placed in a zinc-lined casket, which was hermetically sealed, and forwarded by express on the same afternoon to his father at Winnsboro, S. C.

I had left Dr. Bratton at Sabine Pass only two days before, and at that time he was in the best of spirits, much gratified at his being able to return to duty at a time when all the officers of the corps were needed, having full confidence in the complete restoration of his health after a year or two more in New Mexico, buoyant at the prospect of soon visiting his friends in South Carolina, whom he had left a year ago doubting whether he would ever return, and enthusiastic in the hope that his darling scheme of bringing about in some way the establishment of a Government hospital for the treatment of cases similar to his own, somewhere in the elevated region of Albuquerque, would be gratified.

In view of the above, his sudden death seems doubly sad.

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

THE SUPERVISING SURGEON-GENERAL,
Washington, D. C.

The following circular letter gives a brief summary of the life work of this young officer:

CIRCULAR ANNOUNCING DEATH OF P. A. SURG. W. D. BRATTON, UNITED STATES MARINE-HOSPITAL SERVICE.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL, M. H. S.,
Washington, D. C., October 12, 1897.

To the Medical Officers of the United States Marine-Hospital Service:

I have the painful duty of announcing to the officers of the Service the sudden death of P. A. Surg. William D. Bratton, which occurred at Sabine Pass, Tex., on the 2d instant, under peculiarly distressing circumstances.

In the pressing need of medical officers for active work during the present yellow fever epidemic in the South, Passed Assistant Surgeon Bratton, though an invalid,

and therefore on waiting orders, promptly volunteered his services to meet the emergency, and the tender was accepted in the spirit in which it was made. He was ordered to Sabine Pass to assume charge of Service matters relating to the quarantine service at that port, where he arrived and reported himself on duty the 28th ultimo. On the 1st instant he had been superintending the disinfection of a vessel and returning to the ship to reassure himself upon the work done, he fell through a ventilating hole, striking his head on an iron knee, producing concussion of the brain. He remained undiscovered for several hours, and when found was unconscious and remained so until death occurred, eighteen hours after the unfortunate accident.

William Du Bose Bratton was born in Fairfield County, S. C., June 23, 1860, the son of Gen. John Bratton, of Winnsboro, in that State. His early education was acquired in Mount Zion School, Winnsboro, and at Abbeville, S. C. In 1874 he was matriculated at the Carolina Military Institute at Charlotte, N. C., remaining two years, and then entered the University of the South at Sewanee, Tenn., where he received the degree of B. S. in 1880, after a three years' course. He at once began the study of medicine and was graduated at the Medical College of South Carolina March 1, 1884, and for the year following was house surgeon at the Charleston City Hospital.

He was commissioned as assistant surgeon April 1, 1885, and assigned to duty at New York. His subsequent stations while in that grade were San Francisco, Cal., as medical officer of revenue cutter *Corwin* for service in Alaskan waters, and then for temporary duty at Port Townsend, Wash. He was commissioned a passed assistant surgeon April 2, 1888, and again assigned to duty as medical officer on the revenue cutter *Bear* for service in Alaskan waters. In May, 1889, he was ordered to duty in command of the Service at Portland, Oreg., where he remained two years, and was then assigned to duty at Chicago, Ill. In 1893 he was placed in command of the Service at Buffalo, N. Y., where he remained till January 9, 1894.

In the fall of 1893 he first became aware of a condition of his health which gradually disclosed a tuberculous character, and after the Bureau had been officially informed of it he was sent to Wilmington, N. C., for its favorable climate, where he remained several months, doing meanwhile temporary service at Delaware Breakwater Quarantine; but later he was placed on "waiting orders" (January 1, 1895), taking up his residence in Arizona, and finally at Albuquerque, N. Mex., to obtain the advantages of the Southwestern arid region. After a two years' residence there, he reported, in March, 1897, his gradual return to a state of health which justified him in asking for an early restoration to active duty, but further delay was advised in order that he might have the benefit of a longer residence, and, if possible, a permanent cure.

Passed Assistant Surgeon Bratton, during the period of "waiting orders," became much interested in the climatic treatment of consumptives, and wrote several reports on the arid region of the Southwest as the best locality for such work, recommending the establishment of a sanitarium in that section for the treatment of patients of this Service suffering from the disease.

His literary and scientific attainments were of a high order, and his studious habits and keen faculties enabled him to maintain in the Service a reputation for unusual professional knowledge and skill in practice. Officially, devotion to duty was always a paramount consideration with him, and his conscientiousness in respect thereto was a marked characteristic of his work.

Personally, he was of modest and reserved manner, yet frank and manly in his demeanor, and actuated by a high sense of honor in all relations with his associates. He was in every respect a noble officer.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

The passed assistant surgeon reported in the last Annual Report as being upon waiting orders because of tuberculosis has since died from injuries incurred in the line of duty, as previously detailed.

Of the two assistant surgeons incapacitated by the same disease one, who had been on waiting orders since April 1, 1894, reported himself sufficiently improved to take active service, and was reassigned to duty July 21, 1896; the other, who had been on waiting orders since December 1, 1895, also asked for active service, and was placed on duty January 11, 1897. Both have continued on the active list ever since the last-mentioned dates.

MEASURES FOR THE RELIEF OF THE LEGAL REPRESENTATIVES OF ASST. SURG. JOHN W. BRANHAM (DECEASED).

Referring to the comments in my last Annual Report upon the above-named measure, it is gratifying to be able to announce that a bill has passed the Senate and has been favorably reported from the Committee on Commerce of the House of Representatives, and it is hoped that during the coming session of Congress the bill will be passed by the House.

CUMULATIVE LEAVE FOR MEDICAL OFFICERS.

The propriety of granting cumulative leave to medical officers was referred to in my last Annual Report, and the draft of a bill for the consideration of Congress was given in connection with other documents on the subject. This measure, somewhat modified verbally, but retaining the substance of the original draft, passed both Houses and received the approval of the President February 19, 1897. The text of the law is as follows:

That the Secretary of the Treasury is hereby authorized, in his discretion, to grant to the medical officers of the Marine-Hospital Service, commissioned by the President, without deduction of pay, leaves of absence for the same period of time, and in the same manner, as is now authorized to be granted to officers of the Army by the Secretary of War.

A Department circular was issued August 28 following, defining by regulations the scope of this law, and the same provisions will be incorporated in the revised regulations of the Service now in course of preparation. It is confidently anticipated that this method of granting leaves to commissioned officers will result in promoting efficiency in the operations of the Service.

OFFICERS DETAILED TO ATTEND MEDICAL AND PUBLIC HEALTH ASSOCIATIONS.

Since date of last report the following details have been made:

Surg. Preston H. Bailhache detailed to represent the Service at the meeting of American Medical Association at Philadelphia, June 1–4, and American Public Health Association, Oct. 26–30, 1897.

Surg. H. W. Sawtelle, to represent the Service at meeting of Pan-American Medical Congress, held in the City of Mexico, November 16–19, 1896.

Surg. George W. Stoner, to attend the meeting of the American Medical Association at Philadelphia, June 1–4, 1897.

Surg. Fairfax Irwin, to attend the meeting of American Medical Association at Philadelphia, June 1–4, 1897.

P. A. Surg. J. S. Kinyoun, detailed to represent the Department at the Second International Conference on the Hygiene of Railways and Vessels, held at Brussels, Belgium, September, 1897. Also detailed to represent the Department at the International Leprosy Conference, held in Berlin, October, 1897.

P. A. Surg. H. D. Geddings, detailed by the President as technical delegate on the part of the United States to the International Sanitary Conference convened at Venice, Italy, February 16, 1897. Also to represent Department at the Twelfth International Medical Congress held in Moscow, Russia, August 19–26, 1897.

P. A. Surg. George B. Young, to represent the Service at the meeting of the Tri-State Medical Association, held at Memphis, Tenn., November 17–18, 1896.

In addition to the above there should be mentioned my own attendance at the second annual meeting of the Association of Surgeons of the Southern Railway, held at Lookout Mountain, Tenn., June 29 and 30, 1897, and address, by special invitation, upon "The interstate quarantine law and its relation to the railroads of the United States," which has since been published by the association. At the same meeting Passed Assistant Surgeon Kinyoun contributed a paper upon the "Disinfection of the railway coach."

I also attended the Pan-American Medical Congress in the City of Mexico, November, 1896, and, by invitation, delivered one of the four general addresses before the congress, the subject being "International obligations with regard to epidemic diseases." The report of the Service delegate who accompanied me, describing the work of the congress, appears in its appropriate place. The address appears under the head of "Contributed articles," together with the report of the committee on international quarantine, presented by myself as chairman.

In response to special invitations, also, personal addresses were delivered before the following-named societies, viz:

Before the Cleveland Medical Society of Cleveland, Ohio, December 18, 1896. Subject, "Public health service in the United States," published in the Cleveland Journal of Medicine for February, 1897.

Before the District of Columbia Medical Society, Washington, D. C., March 31, 1897. Subject, "Bubonic plague," published elsewhere in this report.

Before the section of hygiene at the meeting of the British Medical Association, Montreal, Canada, September 1–4, 1897. Subject, "The

quarantine system of the United States," published in the Sanitarian of Brooklyn, November, 1897.

Invitations were also accepted by myself to contribute articles as follows:

Article on "Bubonic plague, malignant polyadenitis," in the American Journal of the Medical Sciences for March, 1897.

"Some lessons from the yellow-fever epidemic," in the Forum for November, 1897.

REPORT OF SURG. P. H. BAILHACHE UPON THE MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, AT PHILADELPHIA, PA.

WASHINGTON, D. C., *November 1, 1897.*

SIR: I have the honor to submit herewith my report of the twenty-fifth annual meeting of the American Public Health Association, which convened in Philadelphia, Pa., on the 26th of October, 1897, and continued in session until the 30th, when it adjourned to meet in Ottawa, Canada, next year, at a date to be fixed by the executive committee.

The attendance was not so large as last year, the members present from Canada, Mexico, and our country having fallen off about one-half.

Papers were read upon a variety of subjects pertaining to public health, probably the most important of which were the "Report of the committee on steamship and steamboat sanitation;" "The study of yellow fever from a medico-geographical point of view;" "Report of committee on sanitation;" "Paper on drainage, plumbing, and ventilation of public and private buildings;" "Report of committee on car sanitation;" several papers on "Water supply and drainage;" "Report of the committee on disinfectants;" several papers on "Formaldehyd as a disinfectant," on "The diagnosis of smallpox," on "The barber shop as a menace to the public health;" "Report of committee on transportation of diseased tissues by mail;" "Report of the committee on health legislation;" "Recent experiments relating to the etiology of yellow fever;" "Investigation of water supply by the United States Geological Survey;" "Report of committee on disposal of garbage and refuse," "Uniform and cooperative health laws," "Uniform sanitary law," etc.

The paper on the "Study of yellow fever from a medico-geographical point of view," contributed by the president and secretary of the supreme board of health of Mexico, gave rise to considerable discussion, during which the present epidemic of yellow fever in the Southern States was touched upon, and a point of special interest as to the origin of the disease was given to the subject by a member of the association from Louisville, Ky., who stated that "on August 14 a man came to Louisville from Ocean Springs, where the epidemic is thought to have started, displaying marked symptoms of yellow fever. He subsequently died in a private sanitarium after having shown every symptom of yellow fever. Notice was sent to the authorities at New Orleans, and the latter were advised to investigate the disease at Ocean Springs. This was done; but in the face of the positive diagnosis of the man who had died at Louisville, the disease at Ocean Springs was decided not to be yellow fever. A week later new cases developed in Ocean Springs, and the epidemic was recognized."

The report of the committee on health legislation, accompanied by "A bill to establish a department of health, and to define its duties," was presented near the close of the session, and referred to the executive committee. In presenting this report, its acting chairman stated that the American Medical Association had accepted this bill at its meeting in Philadelphia in June last, which was an error. That association simply received the report, and continued the committee. When the executive committee returned the report and recommended favorable action by the

association, I immediately arose and protested against such action, not upon the merits of the bill, but upon the ground that it was improper for an association composed of members from foreign countries (Canada and Mexico) to recommend Congressional legislation for the United States, and citing the action of the Pan-American Medical Congress, which met in the city of Mexico in November, 1896, as a precedent, it being the sense of that body that it would be improper for a Pan-American Medical Congress to take action in reference to special health legislation for any particular country. I also called attention to the fact that there was but a handful of members present. Effort was made to have the bill referred back to the committee for further consideration, but an amendment to that effect was lost by a vote of 19 to 7, and the report was finally accepted. It will be observed that the total vote of the members present favoring the report of the "Committee on health legislation" was 19. The membership of the association averages about 800.

The day following the close of the session a trip to the State and national quarantine stations located on the Delaware River was participated in by members desiring to see the protection provided for the city of Philadelphia.

Respectfully, yours,

PRESTON H. BAILHACHE,
Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF THE SECOND PAN-AMERICAN MEDICAL CONGRESS, HELD IN THE CITY OF MEXICO, NOVEMBER, 1896, WITH REMARKS ON THE DRAINAGE WORKS OF THE VALLEY AND CITY OF MEXICO.

[By Surg. HENRY W. SAWTELLE, United States Marine-Hospital Service.]

The Second Pan-American Medical Congress was formerly opened in the evening of November 16, 1896, in the City of Mexico at the National Theater by the President of the Republic, who delivered a cordial address of welcome to the delegates. The theater was elegantly decorated with the flags of the different republics represented in the congress, and the assembly was a brilliant one. At this session the president of the congress read his address, which was followed by a speech on some of the relations of law and medicine, and the inaugural session closed with an eloquent and scientific address by our illustrious American physician, Prof. William Pepper, whose delicate and kindly allusions in reference to the advances made by Mexico under the administration of General Díaz aroused much enthusiasm. The following countries were represented, namely: Peru, Venezuela, Costa Rica, Ecuador, Guatemala, Colombia, Nicaragua, Spanish West Indies (Havana), Mexico, Canada, and the United States of America. The official languages of the congress included English, French, Spanish, and Portuguese, but the Spanish language was generally spoken at the meetings. Many interesting papers were presented and discussed at the various sections, which will be published in the transactions. I transmit herewith the official programme containing the titles and extracts of many of the papers and other pertinent information relative to the business of the congress. At an intermediate general session in the evening of November 17 addresses were delivered in the chamber of deputies on State medicine and quarantine, by special invitation. These addresses were given by Dr. Juan Santos Fernandez, of Havana, Cuba, on yellow fever; Dr. E. P. Lachapelle, Montreal, Canada; Dr. Walter Wyman, Surgeon-General Marine-Hospital Service of the United States, on "International obligations with regard to epidemic diseases;" and Dr. Rafael Lavista, of Mexico.

In the section on general hygiene and demography, marine hygiene and quarantine, Dr. Suiter, of New York, presented a paper on the subject of public health, in which he expressed a decided opposition to the movement in respect to the creation of a department of health for the United States, and commended the conduct of the

Marine-Hospital Service in its present management of sanitary affairs, suggesting that the powers and duties of the Service could be so amplified as to comprehend the whole subject of public sanitation. He further added that, "with the fundamental principles embodied in the act creating the existing Service as a basis, a system may be evolved which will furnish an object lesson to the world." At an extra session of this section a resolution was offered relating that it would be unwise to establish a department of public health for the United States, to be located in Washington, but it was subsequently withdrawn, it being the sense of the meeting that it would be improper for a Pan-American Medical Congress to take action in reference to special health legislation for any particular country.

For some unexplained reason the report of the committee on public health department was read in the section on obstetrics and gynecology, and referred to the executive committee, though it was not read before that committee, but referred to the secretary of the congress to be included in his report of the proceedings, to be read on the final day. On the final day it was simply referred to, together with other matters, by title—was not read—but the report of the secretary was adopted.

There was no display of surgical instruments, therapeutic agents, or apparatus of any kind designed for use in connection with sanitary work.

The delegates were received by the President of the Republic at the Palace of Chapultepec, and by the honorable city council at the municipal palace. This reception concluded with a grand serenade and fireworks on the Plaza de la Constitucion. A reception was also tendered by the board of directors of the "Jockey Club." These receptions were largely attended. At the concluding session the usual expressions of thanks were spoken for the many courtesies and elaborate entertainments extended to the delegates by the Government and citizens of Mexico, and Dr. William Pepper was elected president of the Third Pan-American Medical Congress, Caracas, Venezuela, being designated as the place of meeting in December, 1899.

With this brief review of the congress I conclude with the remark that, while much was accomplished in the interest of the various branches of medicine, surgery, and sanitary science, it should also be noted that the intermingling of the representatives of the people of the Republics of the Western Hemisphere, who have so many interests in common, can not fail to establish more intimate and cordial relations with each other, thus enabling them to work together more effectively in the cause of country and humanity.

DRAINAGE WORKS OF THE CITY OF MEXICO.

In connection with this report I venture to refer briefly to the great sanitary and engineering work now under way providing for the drainage of the valley of Mexico and the Mexican capital city. As a delegate to the medical congress, I inspected the canal and tunnel by special invitation of the board of directors, to whom I am indebted for a copy of their report. From this report it will be seen that the tunnel was completed in 1894, and the canal is now nearly completed. It appears that several attempts have been made to secure an outlet outside of the valley, but were suspended before any progress was made on account of political disturbances. Enrico Martinez completed the colossal cut of Nochistongo, which at the present day still carries off the waters of the Cuautitlan River, thereby diminishing the dangers of inundation of the city. The present work is a modification of that proposed by the Spanish Government, and which was followed also by Captain Smith, of the American engineers, in 1849. Work was commenced in 1885 under a special commission appointed by the President of the Republic, $400,000 being placed at its disposal per annum. This amount was increased by the Government sufficient to pay the expenses of the commission. In 1887 the city council contracted a loan in London of £2,400,000, which has served to cover the expenses of construction up to the present date. This work consists of three parts, (1) a canal which starts from

the gate of San Lazaro in the city, length 47 kilometers 580 meters, and ends close to the town of Zumpango, the uniform slope of the bottom of the canal being at the rate of 0.187 meter per kilometer; (2) a tunnel 10,021.79 meters in length with a sufficient slope for a current of 18 cubic meters per second, with necessary ventilating shafts provided for the canal and tunnel; (3) the reconstruction of all of the sewers of the city so that they may be flushed daily if required. The necessary water to accomplish this will be provided by collecting the waters that accumulate and form the swamps of Chalco and Xochimilco into the Viga and Derivation canals, which extend to the southern end of Twelfth street, close to the old Piedad gate, where a powerful pump will be established, which will elevate 1,000 liters of water per second, forcing it through a steel tube of 1.08 meters in diameter with a pressure of 12 hectograms per square centimeter. This pumping plant will be run by a triple expansion condensing engine. The water forced by this pump will enter the city sewers, and finally will be carried out of the valley, as refuse water, through the Grand Canal and tunnel into a natural ravine, thence into the Tula River.

This city is situated in the valley of Mexico, a plateau containing about 1,700 square miles, with an elevation of about 7,500 feet above the level of the sea, surrounded by mountains, thus forming a basin within which are five lakes. It contains about 350,000 inhabitants. The streets are broad, regularly laid out, paved, and lighted, and the city contains many fine buildings, which are built low compared with the metropolitan cities of other countries, the style of architecture being due perhaps to the fact that water is found a few feet below the surface in many places. At present the sewage of the city is drawn by suction pumps and emptied into Lake Texcoco just beyond the eastern limits of the city. The lake is about 2 feet above the level of the city in the rainy season. Upon the completion of the project of sanitation in the city and valley, and with the plant in full and successful operation, this beautiful city will at once rank among the most healthful on the continent.

REPORT OF P. A. SURG. J. J. KINYOUN, DELEGATE TO THE INTERNATIONAL CONFERENCE ON HYGIENE OF RAILWAYS AND VESSELS.

BRUSSELS, *September 10, 1897.*

SIR: In compliance with Bureau orders of July 29, 1897, I have the honor to submit the following report on the second International Conference relating to the sanitary service and hygiene of railways and vessels, which has just closed its sessions:

As announced in its prospectus, the conference was to meet on September 6 and to continue for three days.

On the assembling of the delegates and members the conference was opened with the usual formalities by the minister of agriculture and public works, Monsieur de Bruyn. His address of welcome was felicitously responded to by Dr. Braehmer, of Berlin, for and on behalf of the German delegates, Dr. Csatary for Hungary, and Dr. Ricchi for Italy.

About 150 members were present, and about as many more were enrolled.

Delegates were sent by the Government of the United States, Russia, Hungary, and Holland. The members were from 11 countries, viz: United States, Great Britain, France, Germany (Prussia and Baden), Italy, Hungary, Servia, Spain, Holland, and Belgium, the majority of the members being from the latter place. Many of the delegates came in a semiofficial capacity, as they were representing railroads which were under the control of their respective countries.

The committee on organization had, previous to the meeting, given notice that certain topics would be the subjects of discussion, the programme of which was as follows:

A. Organization of the medical service.—What is the best method of organization of the railway medical service?

The following questions were made the order of the day by the Amsterdam Congress of 1895, with a view of ascertaining the advantages and disadvantages that

may result from their settlement: (*a*) Should the medical service form an integral part of the management, the physicians being considered as agents? (*b*) Should the medical service be attached to the fund for the relief of the employees and be simply approved by the management?

B. Guaranties of the efficiency of the employees.—(1) The influence of the predisposition to disease with regard to the admission of candidates into the several departments of the railway service; (2) the reexamination of employees; (3) the qualitative determination of the color sense; (4) the defects of vision from the point of view of railways and vessels; (5) feigned troubles of the eye and ear.

C. Hygienic precepts and measures.—(1) The manner in which infectious diseases are spread and propagated by the passenger, employee, and means of transport; (2) should intoxicating drinks be allowed the employees of railways? (3) the results of measures directed against overwork of employees of railway companies as shown by the record of the past ten years; (4) the organization of the medical relief service in case of accidents.

The three parts of the programme were given over to the several sections of the conference, Dr. Brachmer, of Berlin, becoming the chairman of Section I; (*a*) Dr. ———, of Section II, and Dr. Csatary, of Section III.

The work of Sections I (*a*) and II (*b*) being so nearly alike, it was decided that it would serve the purpose better by combining these and hold the sessions in common; so this was done, Section I being the subject of consideration the first day.

Quite a number of valuable and interesting reports were made on the organization of the medical services of the railways. Full reports were made concerning the medical service on the Prussian railways by Dr. Brachmer; on the railway medical service of Baden by Dr. Blume; on the Belgian railways by the chief director, M. Jul. Janssens; on the French railways by Dr. Bardot; the Italian railways by Drs. Ricchi and Roncaldier; on the Hungarian railways by Dr. L. Csatary; and of the medical service of Spanish railways by Dr. De Castro Lopez.

The majority of the essayists were firmly convinced that the successful administration of the medical services of railways depended largely upon the fact of being a part of the administration. Because the duties of the physician were so intimately connected with the personnel of the railway that it could not be disassociated without injury. The medical examination of candidates for admission into the service, the medical inspection of the personnel, the sanitary surveillance of the stations, shops, etc., and rolling stock, the rendering of medical aid to the employee and his family, to respond in cases of accident and emergency—all went to emphasize the fact of the importance of the medical service under the state control of railways. This appeared to be the prevailing sentiment among not only those having papers on the subject, but of others.

One of the best systems of a medical service was that of the Hungarian railways, as described by Dr. Csatary, the director in chief of the Hungarian state railways.

The consensus of opinion was that the state should own and operate the railways, and that they should be operated for other purposes than simply for carrying passengers and transporting freight. The railway problem on the Continent is quite another affair than that of the United States or of Great Britain and faithfully reflects the sentiments of the majority of the people, which are for centralization and paternalism. It was agreed that a candidate for admission into the railway service should be physically sound, and especially no one should be admitted who has any pronounced defect of sight (color and visual sense) or of hearing. The above position is certainly a logical one when viewed from their standpoint, as these employees become a part of their civil service and may be, perhaps, more in cases of military necessity. The discussion of the papers was quite long drawn out and many times confusing, owing to the writer's imperfect knowledge of the languages in which the discussion was carried on. The above question was discussed by such men as Dr. Van Keerberghen, De Ghilage, Lebrun, Niiel Snellen-Guye, and Zwaandemaeker, and others. This closed the work of the first section.

The second section had, as before stated, the consideration of the subject of the defects of the eye and ear, and with special reference to the railways and vessels. These subjects excited a lively interest among the greater part of the delegates because of the fact that this formed the nucleus around which Snellen and others brought the delegates of the first congress together.

The subject of visual acuity was well treated; so also was that of the ear. But when it came to the question of determining the color sense it was another matter. In the two sessions of this section (B) there were more methods demonstrated for determining the color sense than it was thought possible. Nearly everyone had some modification to make in the Holmgren test which he believed was better than all others. There were special instruments and apparatus, lamps, colored yarns (in skeins and balls), disks, colored papers, and many other such devices; in fact, nearly everyone had his own system. Only two countries had adopted the Holmgren test for determination of the chromatopsic sense.

All these methods set forth appeared to have for their object the determination of the railway employees' ability to distinguish the red and green lights, such as are used in the railway service, and not so much in a qualitative as in a quantitative sense.

It is not to be said, however, that some of these methods are not without value; on the contrary, some of the modifications of the Holmgren test were very good, especially those for determining the color sense quantitatively or for measuring the rate of color perception.

The interest of the section was concentrated around the paper of Professor Snellen, who discussed the subject of chromatopsy in a clear, concise, but comprehensive manner. His conclusions were that in determining the visual sense one should always determine the color sense, both as to quality and quantity, and as much regard should be shown this examination as that for form vision. The methods for determining the variation of the color sense were on the lines of those devised by him for form vision, where the letters or disks are colored. These disks, as I understood it, were not to be depended on alone, but were to supplement the Holmgren test in determination of the variation from the normal. His position was rather in advance of others, save the delegates of the United States, in saying that he thought no candidate for the railway or vessels service should be received if his color sense was absent or impaired.

There was quite a difference of opinion as to the necessity of such a sweeping rule as laid down by Professor Snellen, especially from a source whence you would least expect it. The English railway physicians were quite averse to having such a rule adopted for the railways which they represented, claiming that, while such was correct theoretically, it had been shown by years of practical experience that it was wholly unnecessary; that their system of railway management must be judged on its merits. It was sufficient for the employee to be able to distinguish colored lights (qualitatively). In other words, they did not wish to accept the findings of the oculists as final.

The consensus of opinion regarding the examination of the personnel of vessels for color sense was not ascertained. Some of the members, particularly those from England, were divided in their opinion as to what should constitute a test of this qualification and to what persons on board ship should it apply.

Under the rulings of the board of trade all persons engaged in the navigation of the vessel shall have normal color vision, but it does not apply to others.

Some of the members—Beaumont and Bickerton—advocate more stringent rules than are now in force, while others are content with the present system as interpreted and applied by themselves.

There is now strong pressure being brought to bear on the board of trade to have some modifications made in the regulations regarding the examination for color-blindness. There is quite a sentiment among the British shipping against the rules of the board of trade regarding the enlistment of men. It is remarked that there is too much centralization and paternalism; that the shipping interests were the

better judges of their needs, and could manage their affairs on lines of practical experience rather than on those of theory.

Dr. James D. Gatewood, surgeon, U. S. N., read a very interesting paper on the "Physical examinations and sanitation in the United States Navy," in which he treated the subject of the examinations of the applicants for enlistment for form and color vision. He states that during the years 1895 and 1896 16,747 persons were examined for enlistment, and 511, or 3.05 per cent, were found to be color-blind. Of these, 717 were negroes, of whom 2.23 per cent were color-blind. This brings up the subject of the percentage of color-blindness among the railway employees and the personnel of vessels. I was unable to obtain any statistics which carry weight, as they varied from one and a fraction per cent to over 4 per cent, the variation depending upon the person making the examination, the method employed, and for what purpose the examination was made. Surgeon Gatewood also offered a resolution to the effect that an international committee be appointed, one from the several countries, whose duty it would be to bring about some standard for form and color vision to be applied to the personnel of the vessels of the respective countries, and to report at the next conference. This was referred to the committee of organization, to be reported on in the general sessions. Of its final disposition I will speak later on.

A number of papers were also read on the examination of candidates and employees for defects in hearing, which elicited a brief discussion. The conclusions of these were that reexaminations of the employee should be made at least every five years, and that no one having an appreciable defect in hearing should be accepted as a candidate for appointment, nor any employee continued in a position where acuteness of hearing is essential for the proper discharge of his duty. The age of candidates for employment in the railway service should not be less than nineteen years.

The third section was convened under the chairmanship of Dr. Louis Csatary, of Budapest. The subjects considered by this section were matters pertaining to the hygiene and sanitation of railways and vessels, with special reference to their transmission of infectious disease.

There were several reports made of the sanitary services of the railways of the several countries, those of Hungary, Belgium, Italy, and Prussia being the most complete in the details of organization for effective service. The methods of administration were about the same for all countries. The medical relief to employees and their families, the sanitary inspections, the relief measures in case of accidents, were modeled after the military services of their respective countries, and while they no doubt render a satisfactory service, I seriously doubt if the systems would be practical for the railroads of the United States. In the matter of the inspection of passengers and employees for the prevention of infectious diseases, or in the disinfection of the railway coach, nothing new was developed. The same regulations and methods are advocated as were enforced in 1892 when the cholera was epidemic. In Belgium some improvements have been made within the last two years which are worthy of note. At several places along the lines, at terminal points, there have been established disinfecting apparatus for the purification of the railway coach. Here the coaches which have been infected are sent for purification. In a country having such a small area this system may answer the purpose.

Relief measures on the several railways differ somewhat in their application, but are all alike in principle. The medical service on some roads has a quasi attachment to the administration, while in others it is made a part, the duties performed by the physician in either case being practically the same. The duties are medical inspections of candidates; reexaminations of employees; the sanitary supervision of the stations and passengers, of employees, and means of transport; the control of the spread of infectious diseases of man and domesticated animals through the agencies of the railways; medical and surgical relief to the employees, and in some instances to the family of the employees; to give instruction to the chiefs of station and to those engaged in the movement of trains what to do in cases of accident; to respond in case of accidents and render the medical and surgical aid as required.

There was only one paper besides the one by Surgeon Gatewood contributed on hygiene or sanitation of vessels, and that was one by the medical officer of health for Westminster, Lorden, under the title of the "Medical inspection of the canal boats," of which there was no discussion.

In the general session on the last day (September 9) the chairmen of the several sections submitted to the president, Dr. Nüel, the reports or resolutions which had been adopted or agreed upon. Dr. Braehmer, from the first section (A), reported that it was the sense of this conference that (1) "The medical service of the railways should be a part of the administration; (2) that the candidate for employment in the railway service should undergo a rigid medical examination, that he should be physically sound, and have no defect in form or color perception or in hearing; (3) that reexamination should be made from time to time."

The resolution of Surgeon Gatewood was reported back, with the statement that it was approved by all in substance, but there were many present who wished to give it a wider scope and make it to include the railway services as well.

Professor Snellen was appointed chairman of the committee which was to appoint the members in each country and report on this subject at the next meeting.

The third section had but one recommendation to make, and that was with reference to the prescription of the number of hours of labor for engineers and firemen, which was in substance that for engineers and firemen on express trains the maximum hours of labor should be eight hours, followed by twelve hours' rest; for engineers and firemen on ordinary trains, twelve to fourteen hours' labor and twelve hours' rest; for all other employees, chiefs of station, etc., twelve hours' labor and twelve hours' rest.

With regard to the subject of the transmission of infectious diseases by railways and vessels, and other subjects pertaining to the hygiene and sanitation of these services, it was recommended that these be subjects of discussion at the next meeting in 1900. The place of the next meeting is Paris, in 1900, under the presidency of Dr. Bruardel, and Drs. Bardot and Chevalleau, secretaries-general.

In order to stimulate the interest in the next conference, a committee consisting of one member from each of the countries here represented was appointed to cooperate with the president and secretaries in bringing together those interested in the objects and aims of this conference.

Thus ended the second session of the international conference relating to the sanitary service of railways and vessels (with the part relating to vessels omitted). It was a railroad meeting pure and simple, and from its organization and everything connected with it, it will remain as such. As a conference dealing with subjects of international concern it has not been, in my humble opinion, a great success so far as it relates to the United States or Great Britain. As a continental affair perhaps it does fill the requirements of a railway convention and satisfies those persons who conceived the idea of making it international. The same ground is already covered by the International Congress of Hygiene and Demography, and many of the subjects now being considered by this conference have already been made a part of its work. So far as I can see, there is no reason for its independent existence, and it should not be recognized as such, but be relegated to the International Congress of Hygiene and Demography, where it properly belongs.

So far as I could learn, there were but few persons present who were in any way interested in maritime hygiene or appeared to know anything about it.

Their efforts to improve the railway service of Europe should meet with a hearty approval and support, for there is no place where it is more needed than here. There is room for improvement in everything. Their efforts in ameliorating the conditions of the traveler is to be commended by the American traveling public.

I am, sir, respectfully, yours,

J. J. KINYOUN,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF P. A. SURG. J. J. KINYOUN, DELEGATE TO INTERNATIONAL LEPROSY CONFERENCE, BERLIN.

BERLIN, PRUSSIA, *October 20, 1897.*

SIR: I have the honor to submit the following report on the proceedings of the International Leprosy Conference held in Berlin from October 11 to 16, inclusive:

The causes which led the German Government to call together the representatives of the several countries to discuss the leprosy question were principally due to the recent light thrown on this subject by the investigations of Koch and the German leprosy commission on the prevalence of leprosy in the German Empire and in the contiguous countries; also by reason of the fact of the awakened interest in the subject of leprosy, on account of the agitation by the leading leprologists of the world in their demands that some such international meeting was a growing necessity.

The conference was formally opened by the cultus minister, the minister of the interior, and the secretary of state for Prussia, who gave a cordial welcome for and in behalf of the Government to the delegates and members. The objects of the conference were fully explained by Professors Virchow and Lassar for the committee on organization and Dr. Von Kohler for the imperial board of health.

The following countries sent official delegates: Austria-Hungary, Belgium, Denmark, Greece, Germany (all the States), Portugal, Russia, Turkey, Roumania, United States of America, United States of Colombia, Holland, Hawaiian Republic, Japan, Italy, Norway, Sweden, Switzerland, and Servia.

England and France, while represented by members and delegates from societies, had no official delegates.

The failure of England to participate was the subject of no little comment, but was not wholly unexpected.

In addition to the government delegates and those from scientific societies, there were a goodly number of eminent specialists present in a private capacity. The proceedings of the conference can, for the sake of convenience, be considered under the following heads: (1) General considerations regarding leprosy; (2) etiology and pathology; (3) prophylaxis.

The first day was devoted to the organization and the discussion of the general propositions.

Prof. Rudolph Virchow was chosen president, Dr. Armaur Hensen vice-president, and Prof. E. Ehlers (Copenhagen) general secretary. Professor Lassar continued to act as recording secretary.

In addition to the above, six honorary secretaries were appointed: P. S. Abraham, of London; E. Arning, of Hamburg; A. V. Bergman, of Riga; E. Dubois Havenith, of Brussels; J. J. Kinyoun, of Washington, and G. Thebreige, of Paris.

The subjects considered on the first day were intended to serve as a basis for the subsequent discussions, as it was not the intention to consume the short time at the disposal of the conference in reading voluminous reports or papers dealing with the several phases of the subject, but rather to utilize the time to a better advantage in ascertaining the views of the members by a free discussion. This was a conference, not a congress.

Papers were read, mostly in abstract (the originals having been printed), by Neisser, of Breslau, on the etiology and pathology of leprosy; by Besnier (Paris) on the etiological factors concerned in the spread of the disease, particularly in France; by V. Petersen (St. Petersburg) on the contagiousness of leprosy as observed in Russia; by Neuman (Vienna) on the spread of leprosy in certain provinces of Austria, and on the control of leprosy in Norway, by Hansen.

Neisser's conclusions were that leprosy is a contagious disease caused by the bacillus lepræ; it was transmitted from person to person, but under certain circumstances might infect places (habitations) and indirectly infect persons. The infection was through the skin or mucous membrane. The bacilli appears not to possess any great

degree of vitality outside the body. Not every body exposed to the infection contracted the disease. The susceptibility to the disease was always increased when the vital forces of the body were lowered. Leprosy was essentially a disease of the poor and the ill-nourished. Insanitary conditions and poor food were, in his opinion, the greatest promoters of the spread of the disease. V. Petersen's and Neuman's remarks dwelt particularly with the origin and spread of the disease in their respective countries (Russia and Austria), and conclude that the disease was introduced from without, and since its introduction showed a steady increase in the number of cases. Heredity did not play any part in the propagation or spread of leprosy, but it was due to the association of the healthy with the sick.

Besnier (Paris), while admitting the disease was contagious, thought that it was slightly so in France, particularly in Paris and environs, where there were quite a number of imported cases. It was next to impossible to obtain anything approaching an approximate estimate of the number of cases of leprosy in the countries represented, firstly, on account of the number not being known to the reporters, and, secondly, to the fact that the data obtained were taken mainly from the discussions, there being no printed statistics at the time available. I give them for what they are worth. I am of the opinion that the estimate in most cases is far below the actual number:

India (approximate)	130,000
Japan (approximate)	20,000
Gurian (approximate)	2,000
Dutch East Indies (approximate)	1,000
Dutch West Indies (approximate)	26
Russia (approximate)	1,200
Norway (approximate)	700
Hawaii (approximate)	2,500
Africa (English) (approximate)	2,589
Orange Free State (approximate)	34
Transvaal (approximate)	65
Denmark, Iceland	156
Denmark, West Indies	62
United States (approximate)	250
Canada (approximate)	75
Holland	17
Roumania	208
Sweden (approximate)	100
Italy (approximate)	250
France (approximate)	100
Germany	17
Marquesas Islands, Spain (approximate)	250
Australia	17
Greece (approximate)	120
Herzegovina (approximate)	120
Servia	32
Finland	57

Leprosy appears to be as widely distributed as tuberculosis, and behaves much in the same manner. Climatic conditions appear to influence it, but only when the hygienic conditions are poor.

The subject of the introduction of leprosy into the several countries elicited quite a discussion, every country denying the charge of having leprosy (originally), but ascribed it to some time when a case was introduced from without. The Crusades came in for a share of the blame for its introduction into Europe, but many leprologists date the introduction of the disease to the Jews of Spain, among whom the disease prevailed, who were scattered all over Europe by their persecution. This

brought up the subject of pre-Columbian leprosy in America. Ashmead (New York) claims to have demonstrated that leprosy existed in America in the pre-Columbian period, and submits photographs of bone lesions which have been discovered in the ancient Peruvian graves. Further, this hypothesis is borne out by the specimens of Peruvian pottery of the Incan period. Professor Virchow, in commenting on the photographs and specimens of pottery, said that he did not attach much importance to the bone lesions, because tuberculosis might also be the cause, but the lesions of the lower extremities as shown in the figures of the pottery did suggest leprosy, and thought it highly probable that they represented the lesions of anæsthetic leprosy.

Dr. Buzzi, who had lived for many years in South America, and had while there studied leprosy, was firmly convinced that leprosy did not exist in America before the Spanish conquest, and the first case was traced to a leper who had come from Spain and died there. The only authorities who differ with those present regarding the contagiousness of leprosy are the Indian commission for leprosy and Jonathan Hutchinson. The latter still holds to his original theory that fish is the cause of the disease, while the findings of the former are regarded more of a political than of a sanitary nature.

Kaposi (Budapest) called attention to the fact that there were cases of tubercular leprosy, in which the bacilli could not be demonstrated. Several of such cases had come under his observation in recent years. He said that while the finding of the bacilli made by diagnosis doubly sure, not finding it was no criterion that the disease was not leprosy.

Professor Petrini (Bucharest) reports the same experiences; so, also, has Dr. Hausen (Norway).

Arning (Hamburg) thought that there had been an error in technique. So far as his experience had gone, he had never failed to find the bacilli in cases of tubercular leprosy, but in many cases of the anæsthetic form it was absent from the skin.

In future cases both Unna and Arning thought that the authors should state the method and technique employed.

Dr. Alvarez (Hawaii) agrees with the former speakers, and calls attention to the fact that many cases of tubercular leprosy, especially of the first stages, appear not to have the bacilli present, but on careful examination he had never failed to find them. His method was to remove a small portion of the suspected tissues and grind it in a mortar, then add water and centrifugalize strain the sediment for the bacilli. This method had given him uniform results.

Hallopeau (Paris) calls attention to the several nervous manifestations of leprosy, many forms of which are quite obscure. The recent researches of Zanebaco on this form of lepraic infection leaves but little doubt as to the nature of these affections, classed as Morvan's disease, syringomyelia, and ainhum. They are all different forms of leprosy of the nervous system.

At first Zanebaco's work was discredited, but since he has gone into the country where the cases described by him reside and demonstrated the presence of the lepra bacillus, there is little more to be said. Further, that several of the cases described as Morvan's disease and syringomyelia have since developed the typical symptoms of leprosy.

Dyer (New Orleans) reports similar results in three cases of syringomyelia which developed into leprosy.

Kalindrino (Bucharest) holds a different view. He claims that syringomyelia is a separate and distinct disease, but admits that syphilis and leprosy may affect the cord and produce similar symptoms. In one case he examined post-mortem no bacilli could be found in any of the tissues. In general the tropic lesions are different from those of leprosy, and were of a different character than those of leprosy; these could be differentiated by the Rœntgen ray.

Jeauselme (Paris) gave a very interesting demonstration of the lesions of the nervous system in cases of syringomyelia and other affections produced by the bacillus Lepræ. In some of these cases the affection was *a centra*; the bacilli were

not found in the skin during life. He also affirms that where the lepra bacillus is found in the skin of the head and face they are also to be found in the mucous from the nose and throat. It was exceptional to not find them. In some cases the lesions wholly or partially disappear.

THE PATHOLOGY OF LEPROSY.

The bacillus of Hansen was accepted as the cause of leprosy. Neisser (Breslau) claimed that the bacilli gained entrance to the body through the skin, first affecting the epithelioid cells, and from these were distributed to the various tissues. He thought that the life history was altogether intracellular. Unna (Hamburg) on the other hand entertained the opposite view—that its rôle was extracellular, and the forms sometimes seen as within the cells were more apparent than real. The contentions of these schools and time will not be consumed in going further into the details. Herman (London) makes the assertion that the life history of the germ is both intra and extra cellular.

Babes (Bucharest), Dehio (Dorpat), and Hansen hold this latter view.

Dehio thinks the mode of invasion is through the sweat glands ultimately by affecting the larger trunks of the nerves, and that there is a predilection for the bacilli to seek out the nervous tissue.

The general eruption of leprosy is due to the invasion of the peripheral nervous system by the bacilli.

Von Duhring, of Constantinople, and Petersen, of St. Petersburg, were of the opinion that in many cases of leprosy the bacilli were more qualitative than quantitative; there were various degrees of virulency of the germ.

IN WHAT WAY IS THE DISEASE SPREAD?

All agree that the bacillus is the cause of the disease, the bacillus gaining entrance into the system. The dermatologists almost to a man believed in skin infection, while others thought that the disease could be contracted much in the same manner as that of tuberculosis. Santon (Paris) suggests the respiratory tract.

The skin of cases of tubercular lesions give off enormous numbers of the bacilli, both in the desquamative processes and the discharge from ulcers. The mucus of the nose and mouth have also been shown to contain the bacilli in large numbers.

Koch first called attention to the presence of the bacilli in the mucus and the possibility of its being one of the ways the disease may be spread. His observations have since been confirmed by V. Petersen, Schaffer, and Sticker.

Sticker (Geissen) says that the majority of cases of tubercular leprosy of the face have lepra bacilli in the mucus of the nose. He had made an extensive study of such cases in India and was convinced that the mucus was the cause of the contagion. He had inoculated monkeys and apes with the mucus of such cases with a hope of inducing a similar lesion in their nasal mucous membranes, but had failed. Lenture experiments with this material had been negative with the exception of one case where there was an apparent growth. The results so far obtained lead him to believe that the organism could be cultivated.

Schaffer (Breslau) gave a summary of the results of his investigations in demonstrating the bacilli in the nose and mouth; not only this, but also he had detected the bacilli in large numbers in the air of hospital wards where leper cases were treated. He thinks that the mucus of leper cases is a source of infection. Lassar (Berlin) concurs in this view. Arning thinks the bacilli thrown off in the mucus are dead.

Heredity in cases of leprosy has lost ground, although there appears that a few cases are contracted in that way. Virchow says that the present state of our knowledge does not allow us to say that the disease is never transmitted from mother to child, but that it was his opinion that few cases were contracted in this way. The same might be said of tuberculosis.

TREATMENT OF LEPROSY.

Little progress has been made in the treatment of leprosy. Serotherapy after the method of Carasquilla tried by such men as Hansen, Dehio, Neuman, Dontrelepont, Hallopeau, Arning, Alvarez, and Breiger has been found to be of little or no value. Improvement took place in a few cases after the first injections of the serum, but after this the cases remained stationary or became worse.

Lassar and Arning were of the opinion that, notwithstanding the nonsuccess of these efforts, it should be given a further trial before passing final judgment. Professor Carasquilla presented reports which were flattering for the treatment, and the photographs of the cases under treatment with the serum certainly did show an improvement. Hygienic treatment of the disease had so far given the best results in ameliorating the condition of the patient and making him comfortable.

ON THE PREVENTION OF LEPROSY.

This topic was the principal feature of the conference, and elicited a free discussion and interchange of opinion among the members and delegates. The chief interest centered in Hansen's address on the management of leprosy in Norway. Hansen proceeded to show the deplorable condition of the lepers in 1857, when the first measures were instituted to prevent its spread. While the measure undoubtedly held the disease in check, it was far from being perfect. The law made it obligatory that all lepers should be isolated in leper institutions, and the regulations governing these were so harsh and severe that they became retroactive and people began to conceal their sick. Only the poor outcasts were then taken care of by the State. The proper management of leprosy in Norway began in 1880, when the laws and regulations were modified, and were more in keeping with the dictates of humanity. The leper asylums were transformed into hospitals, where sick people could be treated, and, if not to be cured, be made comfortable. Compulsory isolation of every case of leprosy is required, and is accomplished in one of two ways: (1) In leper hospitals; these institutions receive all cases sent them from the different communes, which are charged a certain sum for indigent cases; those who are able to pay for their treatment must bear the expense. The system is much like the care and treatment of the insane in the United States. (2) If a case of leprosy occurs in a family of affluent circumstances, it is not required to go to the hospital, but may be isolated at home, provided that there are facilities for so doing. He is provided with a separate domicile, and articles of furniture and clothing, and sometimes a separate attendant; but this latter is not the usual custom, the wants of the patient being administered to by a member of the family. The supervision of the case is left to the family physician, with an occasional inspection by the State inspector. While domiciliary isolation is discouraged as much as possible, experience of the past seventeen years shows that it is reasonably safe. Only a few cases of infection have been traced to this system, and they were in all probability due to a faulty administration.

The domiciliary cases are yearly growing less, as the families of the cases find it more difficult to care for their sick on account of the popular dread of the disease.

Since 1880 there has been a persistent effort made by Dr. Hansen and his colleagues to educate the people with regard to the contagiousness of the disease and its hygienic treatment, and it is gratifying to note how well it has borne fruit. It is now quite difficult for persons afflicted with the disease to have the creature comforts in their homes, not only for themselves but their families, on account of the great difficulty in obtaining domestic service, not to speak of the social ostracism. This forces the people to send their cases to the hospitals, where provision is made for their care and treatment much better than they have at home.

Friends of the patients are allowed to visit them at stated intervals. This can be done without danger, because the attendants of these institutions rarely have been infected. Under proper hygiene the disease will not spread.

Dr. Hansen at the close of his remarks submitted resolutions, which will be given later on.

The following is a brief summary of the measures taken against leprosy by the several countries. I regret it is not more complete, as not all the countries represented gave their methods.

Russia.—Only within the past few years have any measures been taken against the disease. In some of the Baltic provinces attempts are now being made to segregate and isolate the cases. Leper hospitals are now being constructed. The disease is and has been slowly spreading. Legal measures are to be instituted.

Sweden.—There is no legal isolation of lepers, although it is practiced in several parts of the country. The patient is forced to go to a hospital by reason of his infirmity or by public opinion. Where the disease is isolated, even in this partial manner, it is decreasing. In other parts of the country, where there is no restraint, it is increasing.

Germany.—Legal measures have been instituted against leprosy, and compulsory isolation of cases will be carried out; hospitals have been constructed at Memel, where there are now fourteen cases under treatment. The families of the cases will be kept under observation for several years (undergoing an examination once every six months) to be sure that other cases do not occur.

Austria.—No legal restraint; in certain provinces the disease is spreading.

Roumania.—No legal restraint; the disease is slowly spreading.

Italy.—No report.

France.—No legal restraint. Besnier thinks the cases in Paris are not a menace. Cases treated in the hospitals like any other skin affection; no harm has come from it.

No attempt was made to explain the cases in Brittany—100—where the disease is stationary or shows slight increase.

Portugal.—Compulsory isolation of lepers when known, only the poorer classes coming under this category.

Algeria.—No legal measures; disease spreading, especially among the Jewish population.

Greece.—No legal measures; cases not isolated; disease perhaps spreading; if so, very slowly.

Turkey.—Cases of leprosy in Constantinople are isolated, if occurring among Turks and Greeks. Disease has been prevented from spreading among these populations, but not so among the Jews, where the disease is spreading.

Denmark—West Indies.—Legal isolation; disease declining.

Iceland.—Legal isolation on the principle of Hansen's system will be instituted in 1898.

Holland.—No legal measures in Europe, but slight attempt to carry out such in the colonies. Disease either stationary or shows a tendency to increase.

United States of Colombia.—Legal measures of isolation.

Mexico.—No legal measures. (?)

England.—No general legal measures; cases managed by the local health authorities; treated in hospitals with good results.

Burmah.—The disease is constantly increasing; no legal measures.

Hawaii.—Legal isolation of every case found. The severity of the law reacts against its proper enforcement, leads to concealment of cases, and the further extension of the disease. The disease has, however, been held in check.

United States.—One State has a law for the isolation of lepers (Louisiana); law not enforced. The number of cases are increasing in New Orleans. Cases of Norwegian lepers in Minnesota are not spreading; becoming less.

Canada.—Legal isolation of leprosy; disease becoming less.

From the above brief synopsis it will be seen that where isolation is carried out the disease is not only held in check but may be suppressed.

It was the prevailing sentiment, concurred in by all save the French delegates, that a case of leprosy is a menace, and sooner or later, if the case is not put under restraint, that other cases will occur therefrom.

Ashmead, of New York, sent a resolution to be read at the conference which proposed to establish an international leprosy commission to deal with the disease. This commission was to be given full power to deal with leprosy as they saw fit.

The conference was of the opinion that it had no power to recommend to any government the steps which, through its representatives, it should take with regard to the disease, but rather it was to determine what was necessary in dealing with leprosy, and rests its case right there. Accordingly, the resolution was not adopted.

The resolution of Hansen, as first proposed by him, appeared to satisfy all the members of the conference save the French and English.

Besnier and Thibierge took the position that the resolution was too sweeping in its character, and that until they were convinced that the disease was more contagious than it appeared to be in their own country, they were averse to assenting to any such proposition.

Thibierge was of the opinion that the system as practiced in Norway was an excellent one where there was a foci or the disease was spreading, but that where the contrary obtained, that the measures had better be left with the authorities of the individual country affected.

Abraham, of London, took a similar position regarding the administrative details of the legal measures against leprosy, especially any proposed for India. He was of the opinion that laws and regulations applicable to European countries could not be enforced among 300,000,000 people having over 130,000 lepers scattered among them. The attitude toward the Indian government's plague measures emphasized this fact. If they would resist, even to riot, measures against a disease (plague) which was carrying them off by the thousands, what would be the results following an attempt to isolate cases of leprosy, a disease which they do not think is contagious?

In theory isolation is quite the thing; in practice it is quite another.

The conclusions of the conference were embodied in a report which was handed in and read by the honorary secretaries, and subsequently amended to meet the objections of the French member.

As the report now stands it is more of a compromise measure. It contemplated compulsory notification and isolation of every case of leprosy, whereas the amended report allows a wide latitude of discretion in dealing with individual cases.

It is, in my opinion, unfortunate that such views prevailed.

The dermatologists took advantage of the situation in having a resolution passed to establish an international leprosy society or committee, of which the following is a copy, and is self-explanatory:

"That the Leprosy Conference, assembled in Berlin in 1897, shall appoint a commission, composed of 20 members, with power to increase its membership.

"1. Which shall confer and prepare the plan for an international leprosy society."

The following is the report of the secretaries, as finally adopted:

[Report of the Secretaries of the International Conference for Leprosy.]

"At the close of the debates of the International Leprosy Conference, Berlin, 1897, the secretaries have the honor to present the following report of the general conclusions of the conference. They believe that such a resumé will be especially desirable for those members who have been delegated by their respective governments, and who have to make reports on the results of the conference. As might be expected, a considerable portion of the discussion has related to the bacillus leprae, which the conference accepts as the virus of leprosy, and which for upwards of twenty-five years has been known to the scientific world through the important discovery of Hansen and the able investigations of Neisser.

"The conditions under which the bacillus grows and develops are still unknown,

as well as the way of its invasion into the human system, but from the discussion of the conference it seems probable that unanimity of opinion will soon prevail in reference to its modes of subsequent dissemination within the human body.

"Very interesting observations have been brought forward in connection with the elimination of the bacilli in large quantities by means of the skin and the nasal and buccal mucous membranes of lepers. It is desired that such observations be confirmed where opportunities occur.

"The question is of great importance to those who are intrusted with the care of the public health, as leprosy is now acknowledged to be a contagious disease. Every leper is a danger to his surroundings, the danger varying with the nature and extent of his relations therewith, and also with the sanitary conditions under which he lives. Although among the lower classes every leper is especially dangerous to his family and fellow-workers, cases of leprosy frequently appear in the higher social circles.

"The theory of heredity of leprosy is now further shown to have lost ground in comparison with the at present generally accepted theory of its contagiousness.

"The treatment of leprosy has only had palliative results up to the present time.

"Serum therapy has so far been unsuccessful. In view of the virtual incurability of leprosy and the serious and detrimental effects which its existence in a community causes, and considering the good results which have followed the adoption of legal measures of isolation in Norway, the Leprosy Conference, as a logical issue of the theory that the disease is contagious, has adopted the following resolutions proposed by Dr. Hansen and amended by Dr. Besnier:

"'(1) In such countries where leprosy forms foci or has a great extension, we have in isolation the best means of preventing the spread of the disease.

"'(2) The system of obligatory notification, of observation and isolation as carried out in Norway, is recommended to all nations with local self-government and a sufficient number of physicians.

"'(3) It should be left to the legal authorities, after consultation with the medical authorities, to take such measures as are applicable to the special social conditions of the districts.'

"PHIN. S. ABRAHAM, *London.*
"ED. ARNING, *Hamburg.*
"A. VON BERGMAN, *Riga.*
"E. DUBOIS-HAVENITH, *Brussels.*
"J. J. KINYOUN, *Washington.*
"G. THIBIERGE, *Paris.*
"EDV. EHLERS, *Copenhagen, General Secretary.*"

In view of the fact that our knowledge of the prevalence of leprosy in the United States is fragmentary and unsatisfactory (only one fact is clear—that we have no inconsiderable number among us), it would be apropos to accurately determine first the actual status before contemplating any action; therefore it would appear to be the logical sequence to first ascertain the true status of the disease in the United States by at once instituting an inquiry. I would therefore recommend that steps be taken to ascertain the facts regarding the disease, and to ascertain whether it is necessary for further legal measures to be taken by the State and national authorities against the disease.

Respectfully, yours,

J. J. KINYOUN,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE HOSPITAL SERVICE.

AID TO OTHER BRANCHES OF THE PUBLIC SERVICE.

(1) *Aid to the Life-Saving Service.*—During the year ended June 30, 1897, there were 1,687 applicants for the positions of keepers and surfmen of the Life-Saving Service examined physically, and 68 were rejected on account of physical defects. Two hundred and forty-two

claims for pensions and other benefits provided by the act of May 4, 1882, made by keepers and members of crews of the Life-Saving Service, have been passed upon in the office of the Surgeon-General.

(2) *Aid to the inspection service of steam vessels.*—During the year 936 pilots were examined with regard to their ability to distinguish colors, and 24 rejected on account of color-blindness.

(3) *Aid to the Revenue-Cutter Service.*—Three officers and seven candidates for the position of cadet were examined physically. Three hundred and ninety-five seamen were examined prior to enlistment and 13 rejected.

(4) *Aid to the Light-House Service.*—One candidate for appointment was examined physically and passed.

(5) *Aid to the Immigration Service.*—Medical officers of the Marine-Hospital Service have been specially detailed for medical inspection of immigrants at the following ports: Portland, Me., Boston, New York, Philadelphia, Baltimore, New Orleans, San Francisco, and Portland, Oreg. The regular officers on duty at other ports are available for this service when occasion requires. The following summary of reports received shows the number of immigrants inspected and rejected during the fiscal year 1897:

Portland, Me.—Number of immigrants inspected, 428; rejected, none.
Boston, Mass.—Number of immigrants inspected, 11,605; number rejected, 22.
New York, N. Y.—Number of steerage passengers inspected upon arrival, 199,190. Of these there were physically examined and sent to hospital for treatment, 1,203.
Philadelphia, Pa.—Number of immigrants inspected, 11,097; rejected, 9.
Baltimore, Md.—Number of immigrants inspected, 6,686; rejected, none.
New Orleans, La.—Number of immigrants inspected, 1,358; rejected, none.
Portland, Oreg.—Number of immigrants inspected, 125; rejected, none.
San Francisco, Cal.—Number of immigrants inspected, 1,658; two rejected.

TENNESSEE CENTENNIAL EXPOSITION.

Near the close of the past fiscal year the State of Tennessee inaugurated a national exposition at Nashville in commemoration of the centennial of the settlement of that State.

The General Government had appropriated money for an exhibit of its various departments, and in the Treasury Department exhibit space was allotted to this Service.

The division of marine hospitals was represented by a complete hospital outfit of ward and operating room furniture, sterilizing apparatus, etc., and the hygienic laboratory prepared for professional and lay inspection enlarged views of the various pathogenic bacteria, results of investigation of water supplies, practical experiments with the X-ray apparatus, and charts illustrative of mortality statistics.

A medical officer was detailed to inaugurate the exhibit, and later it was placed in charge of a noncommissioned officer, who remained throughout the exposition.

The exhibit created great popular interest, and it was visited by

thousands. But for the lack of space a much larger exhibit could have been arranged to illustrate the quarantine functions of this Service. It is expected that a similar exhibit will be prepared for the Trans-Mississippi Exposition to be held at Omaha next year.

REVISION OF THE REGULATIONS.

The present regulations for the government of the Service have been in operatior since November 10, 1889, and while new conditions have been met by the issue of circulars, it has been evident for some time that a revision is needed. I therefore convened a board of medical officers serving in the Bureau, who, under special instructions, have been engaged during the past year, as their other Bureau duties would permit, in making revision and additions to the regulations. The work has been completed, has been carefully revised by myself, and will soon be presented to yourself and the President for approval.

OFFICIAL NOMENCLATURE OF DISEASES.

During the past fiscal year the decennial revision of the Nomenclature of Diseases, prepared by the Royal College of Surgeons of London, has been issued to the officers of the Service. This standard nomenclature has been in use in the Service since 1874. Its employment by English-speaking peoples is of material assistance in the study of disease from a statistical standpoint.

HOSPITAL RELIEF FOR OFFICERS AND CREWS OF REVENUE-CUTTER SERVICE.

There being some difference of opinion as to the extent of the professional relief to be furnished officers and crews of the Revenue-Cutter Service, after consultation with the Chief of the Revenue-Cutter Service and the Assistant Secretary of the Treasury, the following regulations were issued. They remove all doubt existing among officers of both services as to the exact extent to which relief can be furnished under varying circumstances, and are in accord with an opinion of the Attorney-General.

[Department Circular No. 157, 1896.]

REGULATIONS FOR ADMISSION OF OFFICERS AND CREWS OF REVENUE-CUTTER SERVICE TO BENEFITS OF MARINE-HOSPITAL SERVICE.

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C., November 18, 1896.

To Medical Officers and Acting Assistant Surgeons of the Marine-Hospital Service, Collectors of Customs, and others:

The following regulations are hereby issued for your guidance with regard to the admission to the benefits of the Marine-Hospital Service of the officers and crews of the Revenue-Cutter Service:

I.—*Certificate.*

1. The officers and crews of the Revenue-Cutter Service will receive hospital or office treatment as hereinafter provided on certificate signed by the commanding officer or executive officer of a revenue cutter without regard to length of service;

the certificate shall contain description of person. Officers on leave or waiting orders to sign their own certificates.

II.—*Hospital relief.*

(*a*) Any such officer or seaman whose condition absolutely requires treatment in hospital will be admitted to hospitals at stations of the first class, and to all contract hospitals enumerated in the annual circular entitled "Contracts for care of seamen," subject to the provisions of the said circular with regard to the transfer of patients from a contract to the nearest marine hospital.

(*b*) No admission to hospital will be granted at any port not mentioned in said circular.

(*c*) At all ports mentioned in the circular where no specific arrangements for treatment in hospital are made, the regulations governing admission at third-class (emergency) stations will be enforced.

III.—*Office relief.*

(*a*) Office treatment will be furnished at all stations where there is a medical officer or acting assistant surgeon of the Marine-Hospital Service.

(*b*) At all other stations office relief will be granted only in case of emergency and under the provisions of the regulations relative to third-class (emergency) stations.

(*c*) No office relief will be granted at any station not mentioned in the annual circular, and in all other respects the regulations of the Marine-Hospital Service will be complied with.

All regulations inconsistent herewith are hereby rescinded.

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Approved, by direction of the President:
J. G. CARLISLE, *Secretary.*

NEW MARINE HOSPITAL AT THE PORT OF NEW YORK.

I desire to renew the previous recommendations regarding the necessity of the establishment of a marine hospital at the great port of New York. At the close of the present fiscal year the lease which was entered into for a short period will terminate, and the service will again be in position of seeking quarters for its important work at our largest port of entry.

ADVISORY BOARDS.

The increase of work of the Surgeon-General's Office, both in amount and in variety of subjects to be considered, has caused me to organize from the official staff two advisory boards, whose duty is to prepare the data and give such other consideration to the subjects referred to them as may be necessary for appropriate action.

"The Service Board" consists of the chief of the quarantine division, the acting medical purveyor, and the acting chief clerk, and considers matters referred to it relating to the Marine-Hospital Service work and its personnel. "The Sanitary Board," consisting of the chief of the quarantine division, the director of the laboratory, the assistant director of the laboratory, and the chief of the division of statistics, considers referred matters relating to the quarantine and public-health service.

This plan has proved to be of material assistance and brings the several divisions of the office into closer relations with each other.

TONNAGE TAX.

Under date of December 3, 1896, the President issued a proclamation revoking a former proclamation (dated January 26, 1888), and in effect requiring again the collection of tonnage due from vessels of Germany. The following is the text of the proclamation:

BY THE PRESIDENT OF THE UNITED STATES.

A PROCLAMATION.

Whereas, by a proclamation of the President of the United States dated January twenty-sixth, eighteen hundred and eighty-eight, upon proof then appearing satisfactory that no tonnage or light-house dues or any equivalent tax or taxes whatever were imposed upon American vessels entering the ports of the Empire of Germany, either by the Imperial Government or by the Governments of the German Maritime States, and that vessels belonging to the United States of America and their cargoes were not required in German ports to pay any fee or due of any kind or nature, or any import due higher or other than was payable by German vessels or their cargoes in the United States, the President did thereby declare and proclaim, from and after the date of his said proclamation of January twenty-sixth, eighteen hundred and eighty-eight, the suspension of the collection of the whole of the duty of six cents per ton, not to exceed thirty cents per ton per annum, imposed upon vessels entered in the ports of the United States from any of the ports of the Empire of Germany by section 11 of the act of Congress approved June nineteenth, eighteen hundred and eighty-six, entitled "An act to abolish certain fees for official services to American vessels, and to amend the laws relating to shipping commissioners, seamen, and owners of vessels, and for other purposes;" and

Whereas the President did further declare and proclaim in his proclamation of January twenty-sixth, eighteen hundred and eighty-eight, that the said suspension should continue so long as the reciprocal exemption of vessels belonging to citizens of the United States and their cargoes should be continued in the said ports of the Empire of Germany, and no longer; and

Whereas it now appears upon satisfactory proof that tonnage or light-house dues, or a tax or taxes equivalent thereto, are in fact imposed upon American vessels and their cargoes entered in German ports higher and other than those imposed upon German vessels or their cargoes entered in ports of the United States, so that said proclamation of January twenty-sixth, eighteen hundred and eighty-eight, in its operation and effect contravenes the meaning and intent of said section 11 of the act of Congress approved June nineteenth, eighteen hundred and eighty-six:

Now, therefore, I, Grover Cleveland, President of the United States of America, by virtue of the aforesaid section 11 of the act aforesaid, as well as in pursuance of the terms of said proclamation itself, do hereby revoke my said proclamation of January twenty-sixth, eighteen hundred and eighty-eight, suspending the collection of the whole of the duty of six cents per ton, not to exceed thirty cents per ton per annum (which is imposed by the aforesaid section of said act), upon vessels entered in the ports of the United States from any of the ports of the German Empire; this revocation of said proclamation to take effect on and after the second day of January, eighteen hundred and ninety-seven.

In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the city of Washington this third day of December, in the year of our Lord one thousand eight hundred and ninety-six, and of the Independence of the United States the one hundred and twenty-first.

[SEAL.] GROVER CLEVELAND.

By the President:

RICHARD OLNEY, *Secretary of State.*

PROVISION MADE BY CONGRESS FOR SHELTER FOR DECK CREWS ON WESTERN RIVERS.

The hardships suffered by the deck crews of Western steamboats by reason of want of proper shelter in cold weather formed the subject of a number of reports from the medical officers of this Service stationed on the Ohio and Mississippi rivers, as may be seen in my last annual report (p. 22), and the recommendations which I made to ameliorate this unfortunate condition were favorably considered by the Committees on Commerce in both Houses of Congress, and in the act approved March 3, 1897, the following provision covering this matter is found:

> On and after June thirtieth, eighteen hundred and ninety-eight, every steamboat of the United States plying upon the Mississippi River or its tributaries shall furnish an appropriate place for the crew, which shall conform to the requirements of this section, so far as they shall be applicable thereto, by providing sleeping room in the engine room of the steamboats properly protected from the cold, winds, and rain by means of suitable awnings or screens on either side of the guards or sides and forward, reaching from the boiler deck to the lower or main deck, under the direction and approval of the Supervising Inspector-General of Steam Vessels, and shall be properly heated.

It is confidently believed that this law will prevent much suffering from disease and frostbite, with which the deck crews on our Western steamboats have been afflicted each winter because of unnecessary exposure due to heartless neglect of owners and masters.

REVISION OF UNIFORM REGULATIONS.

During the fiscal year a board of officers was convened for revising the uniform regulations, and their report, made to me in June, 1896, was approved by the Secretary of the Treasury and the new regulations promulgated by circular letter dated July 31, 1896. This revision was made necessary for the purpose of improving the uniform equipment of the officers and employees of the Service and clearly defining the character and use of same.

MARINE HOSPITALS AND RELIEF FURNISHED.

During the fiscal year ended June 30, 1897, the total number of patients treated by the Service was 54,447, of which number 12,154 were treated in hospital, the remainder, 42,323, being dispensary or out-patients. Ninety-seven seamen of the merchant marine were examined before shipment as to their physical fitness, and 5 of the number were rejected.

Although the total number of patients treated was 673 in excess of the total number treated during the previous fiscal year, the total expenditures from the Marine-Hospital fund were $21,000 less than for the previous year. The total expenditures for 1896 were $16,000 less than for the preceding year (1895), so that for the fiscal year ending June 30, 1897, the total expenditures were $37,000 less than the expenditure for the year 1895. This saving has been accomplished

chiefly by systematic inspections and close surveillance of the operations at each port, and by circular instructions preventing unnecessary admission to and undue detention in contract hospitals. This saving has been effected without restricting proper relief to the beneficiaries of the Service, and although liberal provision has been made to keep the hospitals well supplied with the best obtainable furniture, instruments, and other appurtenances.

The following changes of relief stations have been made during the past fiscal year, viz: Green Bay, Wis., discontinued and Sturgeon Bay, Wis., designated as a relief station of the third class in place of same.

MARINE HOSPITALS—STATEMENT BY STATIONS OF REPAIRS MADE.

The following is a statement of repairs and alterations made during the fiscal year at the several marine hospitals:

Marine hospital at Baltimore, Md. (*erected 1877*).—Surg. George Purviance makes the following report of repairs and improvements at this hospital station:

Repainting interior of all the buildings and repairs to plastering the same, $1,718; repairs to heating apparatus, $407; repairs to roofs, $132.50, and various minor repairs at a total cost of $285.

Marine hospital at Boston, Mass. (*erected 1860*).—Surg. H. W. Austin makes the following report of repairs and improvements at this hospital station:

A new electric elevator has been put in the main hall of the building, the car rising from the first floor to the fourth, at a total cost of $2,227.21; general repairs to the heating apparatus have been made at a total cost of $563; a new board fence has been built around the north line of the reservation at a cost of $345; a hot-water boiler in the basement of the hospital has been replaced by a new one at a cost of $138; the tin roofs on the north and south verandas, third floor, have been repaired at a cost of $55; general repairs to the various buildings of the station have been also made at a cost of $341.38; a large number of elm trees have been planted on the hospital grounds.

Marine hospital at Cairo, Ill. (*erected 1885*).—Surg. P. C. Kalloch makes the following report of repairs and improvements at this hospital station:

Repairs to heating apparatus, $850; general repairs to buildings made necessary by the cyclone of March 5, 1897, $200. General repairs to the buildings and grounds have been made at a further cost of $109.95.

Marine hospital at Chicago, Ill. (*erected 1873*).—Surg. H. R. Carter makes the following report of repairs and improvements at this hospital station:

An extension to the building, for use as an operating room, built under a special appropriation, was finished November 30, 1896, and has been occupied as such from that date. Its total cost was $7,939. It is lighted with electricity and thoroughly equipped with all modern surgical instruments. A stone wall 4 feet high and a wooden fence have been built on two sides of the reservation—north and south—at a total cost of $3,618. A concrete sidewalk was laid on Clarendon avenue, west boundary of the reservation, and completed in the present fiscal year at a cost of

$2,020, which was paid for by a special appropriation from Congress. The work in front of the reservation on Clarendon avenue, consisting in macadamizing the eastern half of it, was under contract to be built before the close of the fiscal year, but on account of delays from municipal work proceeding at the same time it had not been completed according to the time limit, but its finish was expected within thirty days of the close of the fiscal year. Contract price for this work was $1,170, which was paid for by a special appropriation. Minor repairs to the building have been made at a total cost of $61.30.

Marine hospital at Cincinnati, Ohio (erected 1884).—Surg. W. A. Wheeler makes the following report of repairs and improvements at this hospital station:

Both hospital wards were painted on the outside; and the executive building, which includes as well the operating room, assistant surgeon and steward's quarters, have been painted on the inside at a total cost of $745; the brick walk in front of the hospital (Pearl street entrance) was relaid with stone at a cost of $515; steam boilers and all steam pipes throughout the building were renovated at an expense of $303.70; an area way around the east ward to protect and preserve the foundation was constructed at a cost of $945, which was paid for by a special appropriation; minor repairs have been completed at a cost of $49.50.

Marine hospital at Cleveland, Ohio (erected 1852).—Surg. D. A. Carmichael makes the following report of repairs and improvements at this hospital station:

Repairs to roofs of buildings have been made at a cost of $344; painting the inside of the hospital building at a cost of material, $328.14; repairs to heating apparatus, $623; alteration in building attached to hospital for use as steward's quarters, $206.90; general repairs to the hospital building, plastering, maple flooring in fourteen rooms, plumbing, etc., have been completed at a cost of $2,300.20; general repairs to the building have been made at a cost of $449.50.

Delaware Breakwater.—Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and Preservation of Marine Hospitals, 1899," the medical officer in command recommends that the following is necessary:

General repairs to hospital building, $500.

Marine hospital at Detroit, Mich. (erected 1857).—P. A. Surg. C. T. Peckham, in temporary charge of the station, makes the following report of repairs and improvements at this hospital station:

The isolation ward provided for by act of Congress has been completed at a cost of $1,090, and heating apparatus for same provided at a cost of $195; repairs to plumbing have been made at a cost of $645.26; painting outside of hospital and officers' quarters, $564.18; a new range for the hospital kitchen has been provided at a cost of $258.30.

Marine hospital at Evansville, Ind. (erected 1891).—P. A. Surg. P. M. Carrington makes the following report of repairs and improvements at this hospital station:

A new hot-water boiler for the officers' quarters has been provided at a cost of $175; general repairs have been made to various parts of the building at a cost of $190.93; numerous shade and fruit trees have been planted without cost to the Government.

Marine hospital at Key West, Fla. (*erected 1840*).—P. A. Surg. G. M. Guiteras makes the following report of repairs and improvements at this hospital station:

The piles supporting the wharf and isolation ward and other smaller buildings were renewed and the end of the wharf extended 8 feet at a cost of $496.90; repairs to plumbing in the operating room and dispensary have been made at a cost of $183; various repairs have been made by the hospital attendants at a cost of material only.

Marine hospital at Louisville, Ky. (*erected 1852*).—P. A. Surg. W. P. McIntosh makes the following report of the repairs and improvements at this hospital station:

A new isolation ward, provided by act of Congress, has been erected and equipped at a cost of $1,500. This is a portable pavilion ward. Laundry machinery and equipment have been purchased and a room provided for same at a total cost of $870; sidewalks have been laid around the reservation by hospital attendants at a cost of $309 for material; new floors have been laid in officers' quarters at a cost of $225; a covered porch on the south side of the hospital has been erected at a cost of $176; miscellaneous repairs have been completed at a cost of $240.50.

Marine hospital at Memphis, Tenn. (*erected 1885*).—P. A. Surg. G. B. Young makes the following report of repairs and improvements at this hospital station:

No work of any importance has been undertaken during the year. Only minor repairs have been made at a total cost of $259.45.

Marine hospital at Mobile, Ala. (*erected 1843*).—Surg. R. D. Murray makes the following report of repairs and improvements at this hospital station:

The east and south walls of the building, and a portion of the frieze and parapet on the front of the building and the corner, were torn down and rebuilt; repainting entire outside woodwork; repairs to blinds, porticos, and doors; replastering in halls; painting roof, have been completed at a total cost of $1,829. Repairs to the heating apparatus have been finished at a cost of $35.29, and repairs to the water supply pipes were made to the amount of $42.73.

Marine hospital at New Orleans, La. (*erected 1885.*)—Surg. H. W. Sawtelle makes the following report of repairs and improvements at this hospital station:

A new laundry and power house has been completed, as provided for by act of Congress, at a total cost of $4,936; a steam laundry plant complete has been installed in this building at a cost of $1,963.56; painting officers' quarters, executive building, and kitchen building has been done at a cost of $480; a Schillinger pavement has been laid to connect the kitchen building with the main driveway at a cost of $140; the heating apparatus has been repaired at a cost of $224.70; general repairs have been made at a cost of $226; other repairs at a cost of material only ($301.21) have been made by hospital attendants.

Under the head of new construction and unusual repairs for the ensuing fiscal year, for which a special appropriation by Congress must be made, the medical officer in command reports the following needed improvements: Junior officers' quarters, $3,000.

Marine hospital at Port Townsend, Wash. (*erected 1895*).—P. A. Surg. Wm. G. Stimpson, in temporary charge, makes the following report of repairs and improvements at this hospital station:

A cistern, 14 feet in diameter and 15 feet deep, has been completed at a cost of $283.55; the hospital has been wired for electric lighting at a cost of $483.50; combination gas and electric fixtures have been placed in the building at a cost of $945.20; a new wrought steel range was supplied for the hospital kitchen at a cost of $472; fire extinguishers and hose have been supplied at a cost of $183.75; general repairs have been made to the buildings at a total cost of $121.25.

Marine hospital at Portland, Me. (*erected 1869*).—Surg. F. W. Mead makes the following report of repairs and improvements at this hospital station:

New sinks have been placed in the hospital dining room and dispensary, and hot water boiler in the laundry, at a cost of $208; general repairs of a minor character only have been made in addition to this at a cost of $35.34.

Marine hospital at St. Louis, Mo. (*original portion erected 1858; new wards added 1885*).—P. A. Surg. J. O. Cobb, in temporary charge, makes the following report of repairs and improvements at this hospital station:

The roofs, which were damaged during the severe storm of October, 1896, were repaired at a cost of $333.50; the boiler house has been repaired at a total cost of $415; extensive repairs, general in character, have been made to the various buildings constituting the station, at a total cost of $1,547; painting interior and exterior of the several buildings has been completed at a cost of $1,287; miscellaneous repairs, covering many small items, have been made at a total cost of $1,260.70, making a total of $4,843.20 as the expenditures for repairs for this station.

Marine hospital at San Francisco, Cal. (*erected 1875*).—Surg. James M. Gassaway makes the following report of repairs and improvements at this hospital station:

Repairs to three boilers have been made at a cost of $200 for material; to buildings, $224.90 in lumber; $119.06 for painting and fittings; other repairs have been made to the buildings at a cost of material only, amounting in the whole to $483.02; six rooms have been constructed for attendants' quarters in the old laundry building at a cost of $300, which was provided for by special act of Congress.

Marine hospital at Vineyard Haven, Mass. (*erected 1895*).—P. A. Surg. W. J. S. Stewart makes the following report of repairs and improvements at this hospital station:

The terracing and improvements of the grounds, including the building of a macadamized road and seeding the grounds, has been completed at a cost of $1,070; moving the three old buildings to the rear of the present hospital building, $260; wire fence around the entire reservation, including gates and turnstiles, $160; minor repairs have been made at a cost of $77.

Marine hospital at Wilmington, N. C. (*erected in 1859.*)—Surg. John Vansant makes the following report of repairs and improvements at this hospital station:

The most important improvement has been the construction of a new ward building, for which the sum of $7,000, appropriated by Congress, was available. It is a

frame structure 85 feet by 48 feet, with cellar or basement, containing two wards, one for white patients (14) and one for colored patients (6); kitchen, patients' dining room, lavatory, smoking room, dispensary, and nurses' room. It is expected this building will be completed within a few weeks after the close of the fiscal year, and when occupied will relieve the heretofore inadequate and crowded condition of the old hospital building. Minor repairs only have been made during the fiscal year at a cost of $50.

CARE OF SEAMEN.

The provisions made for the care of seamen for the fiscal year ending June 30, 1898, at all ports where relief is furnished, are set forth in the following circular:

[Department Circular No. 83. 1897. Marine-Hospital Service.]

CONTRACTS FOR THE CARE OF SEAMEN, ETC.

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL, U. S. M. H. S.,
Washington, D. C., June 9, 1897.

The following contracts for the care of seamen entitled to relief from this Service, for the fiscal year ending June 30, 1898, are published for the information of accounting officers of the Treasury Department, disbursing agents, medical officers of the Marine-Hospital Service, acting assistant surgeons, and customs officers. This circular is to be regarded as official notification of the acceptance of the proposals made by the parties designated, and must be cited, giving its number and date, on all bills for the treatment and maintenance of seamen and for the burial of deceased patients as the authority for any expenditure incurred under its provisions. Charges will be allowed for the day of admission of a hospital patient, but not for the day of discharge or death. The right is reserved by the Secretary of the Treasury to terminate any contract whenever the interests of the Service require it. All relief must be furnished in accordance with the Revised Regulations of the Marine-Hospital Service; and, in consequence of the largely increased expenditures for relief and of the limited sources of income, it has become necessary to give notice that, as provided in the Regulations, no allowance will be made for expenditures incurred at any other station than those named in this circular.

Upon admission to a contract hospital of a patient with disease or injury which, in the opinion of the medical officer, the acting assistant surgeon, or physician in charge of the case, will require more than twenty days' treatment in hospital, the collector of customs or other officer issuing the permit will at once request authority from the Marine-Hospital Bureau to transfer such patient to the nearest marine hospital, provided the patient's condition, in the opinion of the medical officer, the acting assistant surgeon, or physician in charge of the case, is such as to admit of transportation.

The attention of collectors of customs, medical officers, acting assistant surgeons, or other physicians in charge of patients of the Marine-Hospital Service at contract stations is hereby called to the necessity of discharging patients promptly upon the termination of the necessary hospital treatment and without awaiting the expiration of the period authorized in the permit.

The term "contagious diseases" wherever occurring in this circular, specific contracts excepted, includes only those diseases which, under usual municipal regulations, are required to be treated in a special hospital for contagious diseases.

WALTER WYMAN,
Supervising Surgeon-General U. S. Marine-Hospital Service.

Approved.

O. L. SPAULDING,
Acting Secretary of the Treasury.

Albany, N. Y.—The medical attendance to be furnished by an acting assistant surgeon; Albany Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day, and to provide for the burial of deceased patients, at $15 each.

Apalachicola, Fla.—Dr. J. D. Rush to furnish medical attendance and medicines, at $30 a month; Martha Campbell to furnish quarters, subsistence, and nursing, at $1 a day, and to provide for the burial of deceased patients, at $12.50 each.

Ashland, Wis.—St. Joseph's Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at 87 cents a day; contagious diseases, $1 a day, and to provide for the burial of deceased patients, at $9 each.

Ashtabula, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. Henry Whelpley to furnish quarters, subsistence, and nursing, at $1 a day; contagious diseases, $1.50 a day; Gregory & Burwell to provide for the burial of deceased patients, at $11.50 each.

Astoria, Oreg.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day.

Baltimore, Md.—Hospital patients to be cared for in the United States Marine Hospital; F. M. Denny to provide for the burial of deceased patients, at $16.50 each.

Bangor, Me.—The medical attendance to be furnished by an acting assistant surgeon; Helen M. Stratton to furnish quarters, subsistence, and nursing, at $1 a day; Abel Hunt to provide for the burial of deceased patients, at $10 each.

Bath, Me.—The medical attendance to be furnished by an acting assistant surgeon. Hospital care and treatment will be furnished only to patients who are unable to bear transportation to the United States Marine Hospital at Portland, Me.

Beaufort, N. C.—The medical attendance to be furnished by an acting assistant surgeon; Charles L. Duncan to furnish quarters, subsistence, and nursing, at $1 a day; contagious diseases, at $2 a day, and to provide for the burial of deceased patients, at $15 each.

Bismarck, N. Dak.—The medical attendance to be furnished by an acting assistant surgeon; Lamborn Hospital to furnish quarters, subsistence, and nursing, at 90 cents a day; contagious diseases, at $2 a day.

Boston, Mass.—Hospital patients to be cared for in the United States Marine Hospital at Chelsea, Mass.; burial of deceased patients at the hospital cemetery; burial of foreign patients, at $10 each.

Bridgeport, Conn.—Bridgeport Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at $1 a day.

Brownsville, Tex.—The medical attendance to be furnished by an acting assistant surgeon.

Brunswick, Ga.—The medical attendance to be furnished by an acting assistant surgeon; Johanna Foley to furnish quarters, subsistence, and nursing, at 90 cents a day; Charles G. Moore to provide for the burial of deceased patients, at $15 each.

Buffalo, N. Y.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; Buffalo Hospital (Sisters of Charity) to furnish quarters, subsistence, nursing, and medicines, at 80 cents a day; contagious diseases, at $2 a day; and to provide for the burial of deceased patients, at $10 each.

Burlington, Iowa.—Mercy Hospital to furnish quarters, subsistence, medical attendance, nursing, and medicines, at 85 cents a day.

Cairo, Ill.—Hospital patients to be cared for in the United States Marine Hospital; W. E. Batty & Son to provide for the burial of deceased patients, at $6 each.

Cambridge, Md.—The medical attendance to be furnished by an acting assistant surgeon; Dorothy Cornish to furnish quarters, subsistence, and nursing, at 60 cents a day.

Charleston, S. C.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; St. Francis Xavier's Infirmary to furnish quarters, subsistence, nursing, and medicines, at 95 cents a day; and to provide for the burial of deceased patients, at $12 each.

Chattanooga, Tenn.—The medical attendance to be furnished by an acting assistant surgeon; Hamilton County Hospital to furnish quarters, subsistence, nursing, and medicines, at 60 cents a day; contagious diseases, at $2 a day; L. J. Sharp & Co. to provide for the burial of deceased patients, at $15 each.

Chicago, Ill.—Hospital patients to be cared for in the United States Marine Hospital; Bartlett & Co. to provide for the burial of deceased patients, at $15.50 each.

Cincinnati, Ohio.—Hospital patients to be cared for in the United States Marine Hospital; dispensary at the hospital, southeast corner of Third and Kilgour streets; Edward Busse & Co. to provide for the burial of deceased patients, at $13 each.

Cleveland, Ohio.—Hospital patients to be cared for in the United States Marine Hospital; Flynn, Abel & Froelk to furnish ambulance service, at $1.50 for each patient, and to provide for the burial of deceased patients, at $14 each.

Corpus Christi, Tex.—The medical attendance to be furnished by an acting assistant surgeon; James E. Ellis to furnish quarters, subsistence, and nursing, at $1 a day.

Darien, Ga.—The medical attendance to be furnished by an acting assistant surgeon; patients requiring hospital treatment will be furnished transportation to Brunswick, Ga.

Delaware Breakwater, Del.—Hospital patients to be cared for in the United States Marine Hospital; Henry F. Conwell to furnish coffins, at $9 each.

Detroit, Mich.—Hospital patients to be cared for in the United States Marine Hospital; out-patients to be treated at the dispensary, No. 90 Griswold street; J. W. Maney & Co. to provide for the burial of deceased patients, at $9 each.

Dubuque, Iowa.—The medical attendance to be furnished by an acting assistant surgeon: Finley Hospital to furnish ambulance service, quarters, subsistence, nursing, and medicines, at 86 cents a day; M. M. Hoffman to provide for the burial of deceased patients, at $14 each.

Duluth, Minn.—The medical attendance to be furnished by an acting assistant surgeon; St. Luke's Hospital to furnish quarters, subsistence, nursing, and medicines, at 75 cents a day; John W. Stewart to provide for the burial of deceased patients, at $15 each.

Edenton, N. C.—R. Dillard, M. D., to furnish quarters, subsistence, nursing, medical attendance, and medicines, at $2 a day. For out-patients $1 will be allowed for each medical examination, and 25 cents additional for each time medicine is furnished; L. F. Ziegler to provide for the burial of deceased patients, at $10 each.

Elizabeth City, N. C.—The medical attendance to be furnished by an acting assistant surgeon.

Ellsworth, Me.—The medical attendance to be furnished by an acting assistant surgeon; hospital care and treatment will be furnished only to patients who are unable to bear transportation to the United States Marine Hospital at Portland, Me.

Erie, Pa.—The medical attendance to be furnished by an acting assistant surgeon; Hamot Hospital Association to furnish quarters, subsistence, nursing, and medicines, at 71 cents a day. Care and treatment of cases of contagious diseases to be furnished by the health department of the city of Erie, at $2.85 a day; V. Heidt to provide for the burial of deceased patients, at $15 each.

Escanaba, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Delta County Hospital to furnish quarters, subsistence, and nursing, at 86 cents a day.

Eureka, Cal.—The medical attendance to be furnished by an acting assistant surgeon; Maria Anderson to furnish quarters, subsistence, nursing, and medicines, at $1 a day; Mel Engles to provide for the burial of deceased patients, at $14 each.

Evansville, Ind.—Hospital patients to be cared for in the United States Marine Hospital; Henry Klee & Son to provide for the burial of deceased patients, at $11.50 each.

Fernandina, Fla.—The medical attendance to be furnished by an acting assistant surgeon; A. G. Webster to furnish quarters, subsistence, and nursing, at $1 a day; R. M. Henderson to provide for the burial of deceased patients, at $12 each.

Fredericksburg, Va.—The medical attendance to be furnished by an acting assistant surgeon; Amelia Parrott to furnish quarters, subsistence, and nursing, at 90 cents a day; contagious diseases, at $2 a day; George Nossett to provide for the burial of deceased patients, at $12.50 each.

Gallipolis, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Harriet J. Kinder to furnish quarters, subsistence, and nursing, at 80 cents a day; and to provide office quarters for the acting assistant surgeon, at $10 a month; Hayward & Son to provide for the burial of deceased patients, at $15 each.

Galveston, Tex.—The medical attendance to be furnished by a medical officer of the Marine Hospital Service; St. Mary's Infirmary to furnish ambulance service, quarters, subsistence, nursing, and medicines, at $1 a day; contagious diseases, at $2 a day; and to provide for the burial of deceased patients, at $10 each.

Georgetown, S. C.—The medical attendance to be furnished by an acting assistant surgeon; hospital care and treatment will be furnished only to patients who are unable to bear transportation to Charleston, S. C.

Gloucester, Mass.—The medical attendance to be furnished by an acting assistant surgeon.

The Government Hospital for the Insane, District of Columbia.—Under act of Congress, March 3, 1875, to furnish quarters, subsistence, nursing, medical attendance, and medicines, at $4.50 a week, for each insane patient admitted upon the order of the Secretary of the Treasury.

Grand Haven, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Anna Farnham to furnish quarters, subsistence, and nursing, at $1 a day; James Barns to provide for the burial of deceased patients, at $15 each.

Hartford, Conn.—The Hartford Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at $1 a day; G. W. Woolley & Son to provide for the burial of deceased patients, at $13 each.

Jacksonville, Fla.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. Eugenie Barr to furnish quarters, subsistence, and nursing, at 99 cents a day; F. S. Tyler to provide for the burial of deceased patients, at $9 each.

Juneau, Alaska.—The medical attendance to be furnished by an acting assistant surgeon; St. Ann's Hospital to furnish quarters, subsistence, nursing, and medicines, at $2 a day; C. W. Young to provide for the burial of deceased patients, at $27.50 each.

Key West, Fla.—Hospital patients to be cared for in the United States Marine Hospital; Otto & Boza to provide for the burial of deceased patients, at $7 each.

La Crosse, Wis.—The medical attendance to be furnished by an acting assistant surgeon; St. Francis's Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day.

Little Rock, Ark.—The medical attendance to be furnished by an acting assistant surgeon; Little Rock Infirmary to furnish quarters, nursing, and medicines, at $1 a day; F. Baer to provide for the burial of deceased patients, at $10 each.

Louisville, Ky.—Hospital patients to be cared for in the United States Marine Hospital; Schoppenhorst Brothers to provide for the burial of deceased patients, at $15 each.

Ludington, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. H. D. Linsley to furnish quarters, subsistence, and nursing, at 80 cents a day.

Machias, Me.—The medical attendance to be furnished by an acting assistant surgeon; S. W. Hill to furnish quarters, subsistence, and nursing, at $1 a day; E. M. Buckman to provide for the burial of deceased patients, at $8 each.

Manistee, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Mercy Hospital to furnish quarters, subsistence, nursing, and medicines, at 90 cents a day; Switzer & Merkle to provide for the burial of deceased patients, at $11 each.

Marquette, Mich.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day, and to provide for burial of deceased patients, at $15 each.

Marshfield, Oreg.—The medical attendance to be furnished by an acting assistant surgeon; John Snyder to furnish quarters, subsistence, nursing, and medicines, at $1.20 a day.

Memphis, Tenn.—Hospital patients to be cared for in the United States Marine Hospital; E. D. Thompson & Co. to provide for the burial of deceased patients, at $6.98 each.

Milwaukee, Wis.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at 80 cents a day; George L. Thomas to provide for the burial of deceased patients, at $14 each.

Mobile, Ala.—Hospital patients to be cared for in the United States Marine Hospital; Bèroujou, Sands & Co. to provide for the burial of deceased patients, at $11.70 each.

Nashville, Tenn.—The medical attendance to be furnished by an acting assistant surgeon; Nashville City Hospital to furnish quarters, subsistence, nursing, and medicines, at 90 cents a day.

New Bedford, Mass.—The medical attendance to be furnished by an acting assistant surgeon; patients requiring hospital care and treatment, if able to bear transportation, will be sent to the United States Marine Hospital at Vineyard Haven, Mass.

Newbern, N. C.—The medical attendance to be furnished by an acting assistant surgeon; Susan A. Collins to furnish quarters, subsistence, and nursing, at $1 a day; H. W. Simpson to provide for the burial of deceased patients, at $15 each.

New Haven, Conn.—The medical attendance to be furnished by an acting assistant surgeon; The General Hospital Society of Connecticut to furnish quarters, subsistence, nursing, and medicines, at $1 a day, and to provide for the burial of deceased patients, at $15 each; New Haven board of health to furnish all necessary care and treatment in case of any contagious disease, at $3 a day.

New London, Conn.—The medical attendance to be furnished by an acting assistant surgeon; Memorial Hospital Association to furnish quarters, subsistence, nursing, and medicines, at $1.50 a day; hospital care and treatment will be furnished only to patients who are unable to bear transportation to the United States Marine Hospital at Stapleton, N. Y.

New Orleans, La.—Hospital patients to be cared for in the United States Marine Hospital; T. J. McMahon & Sons Co. to provide for the burial of deceased patients, at $8.50 each.

Newport, Ark.—The medical attendance to be furnished by an acting assistant surgeon; Duff & Butler to furnish quarters, subsistence, and nursing, at $1 a day; T. R. Duffer to provide for the burial of deceased patients, at $9 each.

Newport, R. I.—The medical attendance to be furnished by an acting assistant surgeon; Newport Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day; Robert C. Cotterell to provide for the burial of deceased patients, at $11.50 each.

Newport News, Va.—The medical attendance to be furnished by an acting assistant surgeon.

New York, N. Y.—Hospital patients to be cared for in the Marine Hospital, Stapleton, Staten Island, New York; out-patients to be treated at the dispensary, near the "New Barge Office," Battery; John T. Oates to provide for the burial of deceased patients, at $9.25 each.

Norkfolk, Va.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; St. Vincent's Hospital to furnish quarters, subsistence, nursing, ambulance service, and medicines, at 83 cents a day; A. E. Hall & Co. to provide for the burial of deceased patients, at $12.50 each.

Ogdensburg, N. Y.—The medical attendance to be furnished by an acting assistant surgeon; City Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day; the city of Ogdensburg to care for contagious cases, at $3 a day; Nutall & Murphy to provide for the burial of deceased patients, at $9.23 each.

Oswego, N. Y.—The medical attendance to be furnished by an acting assistant surgeon; Oswego Hospital to furnish quarters, subsistence, nursing, and medicines,

at $1 a day; John F. Dain & Son to provide for the burial of deceased patients, at $15 each.

Pensacola, Fla.—The medical attendance to be furnished by an acting assistant surgeon; Anderson & Renshaw to furnish quarters, subsistence, nursing, and medicines, at $1 a day; Northup & Wood to provide for the burial of deceased patients, at $14.50 each.

Philadelphia, Pa.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; German Hospital to furnish ambulance service, quarters, subsistence, nursing, medicines, and one interne, at $1 a day, and to provide for the burial of deceased patients, at $15 each.

Pittsburg, Pa.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; Mercy Hospital to furnish quarters, subsistence, nursing, medicines, and a resident physician, at 94 cents a day, and $2 a day for contagious cases; Burns & Giltinan to provide for the burial of deceased patients, at $13 each.

Port Huron, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Port Huron Hospital and Home to furnish quarters, subsistence, and nursing, at $1 a day; J. W. Kelly to provide for the burial of deceased patients, at $8 each.

Portland, Me.—Hospital patients to be cared for in the United States Marine Hospital; S. S. Rich & Son to provide for burial of deceased patients, at $9.50 each.

Portland, Oreg.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; out-patients to be treated at the dispensary, Marquam Building; St. Vincent's Hospital to furnish quarters, subsistence, nursing, and medicines, at 75 cents a day; contagious diseases at $2 a day; F. S. Dunning to provide for the burial of deceased patients, at $9.50 each.

Portsmouth, N. H.—The medical attendance to be furnished by an acting assistant surgeon; Cottage Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day.

Port Tampa, Fla.—The medical attendance to be furnished by an acting assistant surgeon; W. H. Mudge to furnish quarters, subsistence, and nursing, at $1 a day.

Port Townsend, Wash.—Hospital patients to be cared for in the United States Marine Hospital; Port Townsend Undertaking Company to provide for the burial of deceased patients, at $19 each.

Providence, R. I.—The Rhode Island Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at $1 a day, and to provide for the burial of deceased patients, at $12 each.

Richmond, Va.—The medical attendance to be furnished by an acting assistant surgeon; out-patients to be treated at the Marine-Hospital Office, custom-house building; "Retreat for the Sick" Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day; James McDonough & Co. to provide for the burial of deceased patients, at $15 each.

Rockland, Me.—The medical attendance to be furnished by an acting assistant surgeon. Hospital care and treatment will be furnished only to patients who are unable to bear transportation to the United States Marine Hospital at Portland, Me.

Rome, Ga.—The medical attendance to be furnished by an acting assistant surgeon; Martha Battey Hospital to furnish quarters, subsistence, and nursing, at $1 a day.

Saginaw, Mich.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at 90 cents a day; contagious diseases, at $2 a day.

St. Louis, Mo.—Hospital patients to be cared for in the United States Marine Hospital; J. H. Gebken to provide for the burial of deceased patients, at $11.50 each.

St. Paul, Minn.—The medical attendance to be furnished by an acting assistant surgeon; St. Luke's Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day; and to provide for the burial of deceased patients, at $4 each.

San Diego, Cal.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; Nonsectarian Hospital to furnish quarters, subsist-

ence, nursing, and ambulance service, at 75 cents a day; W. W. Whitson & Co. to provide for the burial of deceased patients, at $13.50 each.

Sandusky, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Good Samaritan Hospital to furnish quarters, subsistence, and nursing, at $1 a day; and to provide for the burial of deceased patients, at $15 each.

San Francisco, Cal.—Hospital patients to be cared for in the United States Marine Hospital; out-patients to be treated at the Marine Hospital Office, Rooms 1-3, Appraiser's building; burial of deceased patients to be at the hospital cemetery; burial of foreign seamen, at $10 each.

San Pedro, Cal.—Randolph W. Hill, M. D., to furnish quarters, subsistence, nursing, medical attendance, and medicines, at 90 cents a day; contagious diseases, at $1.50 a day; and to provide for the burial of deceased patients, at $7 each.

Sault Ste. Marie, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. Annie Little to furnish quarters, subsistence, and nursing, at $1 a day; J. Vanderhook to provide for the burial of deceased patients, at $15 each.

Savannah, Ga.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; St. Joseph's Infirmary to furnish quarters, subsistence, nursing, and medicines, at $1 a day; the city health officer, in conjunction with the medical officer in command of the station, to care for all seamen sick with a contagious or infectious disease, except yellow fever, at the city pesthouse, without expense to the Marine-Hospital Service; W. D. Dixon to provide for the burial of deceased patients, at $7 each.

Seattle, Wash.—The medical attendance to be furnished by an acting assistant surgeon; Providence Hospital to furnish quarters, subsistence, nursing, and medicines, at 57 cents a day; Barney & Stewart to provide for the burial of deceased patients, at $4.40 each.

Shreveport, La.—The medical attendance to be furnished by an acting assistant surgeon; the Shrevepert Sanitarium to furnish quarters, subsistence, nursing, and medicines, at 95 cents a day.

Solomons, Md.—The medical attendance to be furnisned by an acting assistant surgeon; M. F. Morrison to furnish subsistence, nursing, fuel, and lights, at $1 a day; T. M. White to provide for the burial of deceased patients, at $7.50 each.

Sturgeon Bay, Wis.—The medical attendance to be furnished by an acting assistant surgeon.

Superior, Wis.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at 90 cents a day; Patrick O'Reilly to provide for the burial of deceased patients, at $15 each.

Tacoma, Wash.—The medical attendance to be furnished by an acting assistant surgeon; Fannie C. Paddock Memorial Hospital to furnish quarters, subsistence, nursing, and medicines, at 55 cents a day, and to provide for the burial of deceased patients, at $15 each.

Tappahannock, Va.—W. G. Jeffries, M. D., to furnish quarters, subsistence, nursing, medical attendance, and medicines, at Tappahannock; Dr. W. J. Newbill at Carters Creek, and Dr. W. S. Christian at Urbana, each at $1.50 a day.

Toledo, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; St. Vincent's Hospital to furnish quarters, subsistence, nursing, and medicines, at 80 cents a day; contagious diseases, at $2 a day, and to provide for the burial of deceased patients, at $15 each.

Vicksburg, Miss.—The medical attendance to be furnished by an acting assistant surgeon; Vicksburg City Hospital to furnish quarters, subsistence, nursing, and medicines, at $1 a day; J. Q. Arnold to provide for the burial of deceased patients, at $12 each.

Vinyard Haven, Mass.—Hospital patients to be cared for in the United States Marine Hospital; Hinckley & Renear to provide for the burial of deceased patients, at $12 each.

Washington, D. C.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; out-patients to be treated at the dispensary, No. 3, B street SE.; Providence Hospital to furnish quarters, subsistence, nursing, interne attendance, and medicines, at 75 cents a day, and to provide for the burial of deceased patients, at $15 each.

Wheeling, W. Va.—The medical attendance to be furnished by an acting assistant surgeon; Wheeling Hospital to furnish quarters, subsistence, nursing, and medicines, at 75 cents a day.

Wilmington, N. C.—Hospital patients to be cared for in the United States Marine Hospital; Walter E. Yopp to provide for the burial of deceased patients, at $11.50 each.

At the following-named ports hospital or other relief will be furnished only under the provisions of the Regulations for the Marine-Hospital Service as to third-class stations: Barnstable, Mass.; Beaufort, S. C.; Belfast, Me.; Burlington, Vt.; Castine, Me.; Cedar Keys, Fla.; Chatham, Mass.; Dennis, Mass.; Eastport, Me.; Edgartown, Mass.; Hyannis, Mass.; Perth Amboy, N. J.; Provincetown, Mass.; Sag Harbor, N. Y.; Salem, Mass.; Sitka, Alaska; Somers Point, N. J.; Waldoboro, Me.; Wilmington, Del.; Wiscasset, Me.

The rate at ports not specifically provided for by this circular will, in each special case, be fixed by the Department, upon the recommendation of the proper officer, in accordance with the Regulations.

The rate of charge of seamen from vessels of the Navy and Coast Survey, admitted to hospital under the provisions of the Regulations, and of foreign seamen admitted under the act of March 3, 1875, is hereby fixed at the uniform rate of $1 a day.

At all ports not otherwise specified the dispensary is located at the custom-house or marine hospital.

PURVEYING DIVISION.

In the purveying division 500 requisitions for medical and other supplies to meet the needs of the 21 marine hospitals and 53 additional relief stations of the Service have been filled. In addition to this 11 national quarantine stations, 1 detention camp, and the immigration service at New York have received their supplies through this division.

The 500 requisitions for medical and other supplies were divided as follows:

	Requisitions.
21 marine hospitals 53 relief stations	397
11 quarantine stations	100
1 detention camp	1
The immigration service	2

The following-named pharmaceutical preparations (123 different kinds) were manufactured in the laboratory:

	Grams.
Elixers	965,000
Fluid extracts	598,500
Medicated waters	60,000
Liniments	693,000
Spirits	160,000
Miscellaneous	1,100,000
Sirups	2,018,000
Tinctures	1,150,000
Medicated wines	22,500
Total	6,767,000

I desire to refer again to the matter of the inadequate room in the storage and packing rooms of the purveying division. The same condition exists as to facilities for handling incoming and outgoing supplies as previously reported, and a continuance of this condition only serves to emphasize the need of relief. I therefore renew my recommendation of last year that "an additional storage room be provided, either by the utilization of adjoining property, the building of an additional story on the present packing room, or construction of vaults." I believe that the building of an additional story would offer the best solution of the problem.

Character and cost of supplies purchased by purveying division for issue during the fiscal year ending June 30, 1897.

Medical supplies	$12,191.71
Hospital stores	5,299.59
Hospital sundries	6,994.52
Surgical instruments and appliances	6,843.01
Bedding and clothing	4,162.59
Medical books and journals	1,503.41
Total	36,994.83

These expenditures were divided as follows:

Quarantine service	$4,986.24
Immigration service	713.33
For preventing the spread of epidemic diseases	797.55
Marine-Hospital Service	30,497.71

EQUIPMENT OF HOSPITALS.

During the fiscal year much has been done in providing suitable modern equipment for the hospitals. The development of aseptic surgery has necessitated many changes in the matter of operating-room furniture, instruments, etc., while there has been a corresponding improvement in the furniture for hospital wards. With one or two exceptions, the hospitals of the Service are now fully equipped with the best ward furniture and modern operating instruments. The exceptions are hospitals where improvements in the buildings are contemplated and a new equipment is withheld awaiting their completion.

In addition, microscopes of the most recent pattern, bacteriological outfits, and other modern aids to clinical diagnosis have been furnished to the several stations. In a number of instances these have been placed in direct personal custody of those officers who have made a special study of bacteriology and its allied branches, a plan which, it is believed, will operate to the mutual advantage of the Service and the officer.

The funds available for the support of the Service in the past year have also enabled me to provide a larger quantity of current medical literature to the various stations than has heretofore been possible. Modern progress in medical science is rapid, and it has been necessary to supply the hospitals with the most recent literature, that the medical corps may be kept fully abreast of the times in matters pertaining to their profession.

NEED OF NEW SERVICE AMBULANCE.

For a number of years the desirability of adopting a new ambulance based upon modern ideas has been apparent, and but for the pressure of other work would have received earlier attention. The ambulances which have been in use in this Service for the past twenty years are heavy vehicles intended for two horses. The new ambulance should be a light wagon weighing not over 1,100 pounds, fitted with rubber tires, and for use with a single horse. Plans and specifications are being prepared in the bureau, and it is expected that the old ambulances will be replaced by the new ones within a year.

STEAM DISINFECTING CHAMBERS FOR HOSPITALS.

Among other adjuncts to the sanitary equipment of our hospitals has been the steel-jacketed disinfection chamber for the sterilization of large articles such as mattresses, bedding, etc. The first one of these was installed at the marine hospital at the port of Boston, Mass., in October, 1896, and a report from the medical officer in command of the Service at that station is herewith appended, to show the value of this apparatus as well as to place on record a statement of some practical remarks concerning its operation.

OFFICE OF MEDICAL OFFICER IN COMMAND
MARINE-HOSPITAL SERVICE,
Port of Boston, Mass., January 19, 1897.

SIR: Referring to your letter of the 9th instant (C. E. B.), I have the honor to report that the steam sterilizer which was installed in the basement of this hospital October 14, 1896, has been used almost daily with most satisfactory results. The sterilizer, which is a steel-jacketed cylinder 40 inches in diameter by 8 feet long, has capacity sufficient for four ward mattresses, allowing ample space for steam circulation. The steam is furnished from the heating or power boilers, whichever is most convenient. During the summer, the power boiler, which is in constant use for pumping water and for laundry purposes, will afford ample steam for operating the disinfector. All the hospital mattresses and pillows are occasionally sterilized, and the bedding used by patients suffering from contagious or infectious diseases is sterilized before being used by other patients. It is believed to be especially desirable to frequently disinfect the bedding used in the ward assigned to tubercular patients. The dunnage of patients suffering from measles or diphtheria, or which may be infested with vermin, is put through the sterilizer before it is taken to the baggage room.

Operating of the sterilizer is very simple, but it should be under the charge of some one who understands the management of steam. The gauge on the disinfector is set to blow off at 10 pounds. With 15 to 20 pounds' pressure in the hospital boilers, steam is turned into the jacket until a temperature of 120° to 150° F. is obtained. The valves are then opened, allowing steam to enter the cylinder containing the articles to be cleansed, and the temperature rapidly rises to 220° F. or more. There may be a slight fall from that point because of cooling and condensation, in which case the valve is opened, permitting condensed steam to escape from the cylinder, and live steam run through until the temperature again rises to the desired height. From the time steam is turned into the jacket, about ten minutes are thus consumed.

By carefully regulating the inflow of steam a fairly constant temperature of 220° F. can be maintained for thirty minutes with little if any alteration of the valves.

At the end of one-half hour, steam is shut off from the cylinder, and the valve opened to allow condensed steam to escape, together with all the steam that will go by that passage. The vacuum pump is then started and a negative pressure of 11 pounds obtained. As soon as the pump is stopped the vacuum falls to 9 pounds and there remains for about fifteen minutes.

The temperature in the jacket begins to fall from the moment steam begins to escape from the cylinder and soon reaches 200° F. or thereabouts. There is no tendency for it to fall lower, neither can we raise it to 212°, although there is 10 pounds' pressure of steam.

At the end of fifteen minutes the clothing, mattresses, etc., are removed practically dry. There is a little steam in the various articles, but a few minutes exposure in the atmosphere renders them perfectly dry.

I consider the sterilizer a most valuable acquisition to the equipment of the hospital, in fact it is almost indispensable in a large hospital of this character.

Very respectfully,

H. W. AUSTIN,
Surgeon, Marine-Hospital Service, in Command of Station.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

CIRCULAR LETTERS RELATING TO ADMINISTRATIVE DETAILS.

Following are circular letters issued during the year to medical officers, acting assistant surgeons of the Marine-Hospital Service, and others, relative to administrative details:

EXAMINATION OF APPLICANTS FOR POSITIONS IN THE CIVIL SERVICE.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., January 28, 1897.

To Medical Officers and Acting Assistant Surgeons of the Marine-Hospital Service:

Referring to blank form 394 of the United States Civil Service Commission, application for examination—mechanical trades, engineer department at large, and particularly to the medical certificate contained in said form, which is as follows: "The applicant is required to furnish the following medical certificate, which should be executed, if practicable, by a medical officer of the Marine-Hospital Service," etc., the Bureau has been informed that this implied duty of medical officers of the Marine-Hospital Service was included within said circular by clerical error, and you are directed to decline making such examination.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General Marine-Hospital Service.

EXAMINATION OF APPLICANTS FOR POSITION OF CADET, REVENUE-CUTTER SERVICE.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., April 27, 1897.

To Medical Officers and Acting Assistant Surgeons,
United States Marine-Hospital Service:

You are hereby directed to examine, as to their physical condition, all persons who present themselves with a view to applying for admission, through a civil-service examination, to the position of cadet in the Revenue-Cutter Service, and to report the result of their examinations on the medical certificate which is part of the appli-

cation blank. You will keep a record of these examinations in the book—form 1956, record for the medical examination of seamen.

You are directed to acknowledge receipt of this circular.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General Marine-Hospital Service.

EXAMINATION OF APPLICANTS FOR POSITION OF SURFMAN, UNITED STATES LIFE-SAVING SERVICE.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., May 5, 1897.

To Medical Officers and Acting Assistant Surgeons,
United States Marine-Hospital Service:

You are hereby directed to examine, as to their physical condition, all persons who present themselves with a view to applying for admission, through a civil-service examination, to the position of surfman or keeper in the Life-Saving Service, and to report the result of their examinations on the medical certificate which is a part of the application blank. You will keep a record of these examinations in the book—form 1956, record for the medical examination of seamen.

You are directed to acknowledge receipt of this circular.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General Marine-Hospital Service.

REPORTS OF PERSONNEL FOR THE BIENNIAL REGISTER.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., June 24, 1897.

To Medical Officers and Acting Assistant Surgeons,
United States Marine-Hospital Service:

You are hereby directed to cause to be prepared the following information required for the Biennial Register of the United States for 1897, namely: Full name, including your own, of all officers and employees attached to your station on July 1, 1897, arranged according to degree of importance, alphabetically in each grade, the port or station where serving, place of birth (that is, State or country only), compensation, annual or per diem, according to appointment, and State from which appointed.

You will forward the lists, duly prepared, so as to reach this office not later than the 12th day of July next.

All proper names should be legibly written in full.

You will acknowledge the receipt of this letter.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General Marine-Hospital Service.

LEAVES OF ABSENCE.

TREASURY DEPARTMENT,
OFFICE OF SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., August 28, 1897.

To the Commissioned Officers of the United States Marine-Hospital Service:

The following regulations relating to leaves of absence of commissioned officers of the Marine-Hospital Service are hereby adopted in accordance with a provision in the act of Congress approved February 19, 1897, as follows:

"*Provided*, That the Secretary of the Treasury is hereby authorized in his discre-

tion to grant to the medical officers of the Marine-Hospital Service, commissioned by the President, without deduction of pay, leaves of absence for the same period of time, and in the same manner, as is now authorized to be granted to officers of the Army by the Secretary of War."

All previous regulations and circulars inconsistent with these regulations are hereby revoked.

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Approved.
L. J. GAGE,
Secretary of the Treasury.

LEAVE OF ABSENCE FOR COMMISSIONED OFFICERS OF THE UNITED STATES MARINE-HOSPITAL SERVICE.

1. Commissioned officers of the Marine-Hospital Service on duty shall be allowed, in the discretion of the Secretary of the Treasury, sixty days' leave of absence without deduction of pay or allowance, provided that the same be taken once in two years, and provided further, that the leave of absence may be extended to three months if taken once only in three years, or four months if taken only once in four years. (U. S. Stat., Vol. XIX, p. 102, chap. 239, act of Congress approved February 19, 1897.)

2. The leave year is reckoned frem June 20 to the following June 19, both inclusive. In computing leave of absence expressed in days during any leave year, every day of such absence will be counted; leave expressed in months will be counted in months.

3. All applications for extensions of leave of absence or for delays, and all correspondence regarding them, shall be addressed to the Supervising Surgeon-General and forwarded through the officer in command of the station, who shall note thereon his approval or disapproval of the application.

4. Leaves of absence will be granted in terms of months and days, as "one month," "one month and ten days." Leaves for one month, beginning on the first day of a calendar month, will expire with the last day of the month, whatever its number of days. Commencing on an intermediate day, the leave will expire the day preceding the same day of the next month. The day of departure, whatever the hour, is counted as a day of duty; the day of return, as a day of absence.

5. A leave of absence commences on the day following that on which the officer departs from his proper station. The expiration of his leave must find him at his station.

6. Leaves of absence may be granted by the Supervising Surgeon-General for a period of one month, and when so granted the Secretary of the Treasury shall be promptly notified. Applications for leaves of absence longer than one month will be submitted to the Secretary of the Treasury for action.

7. An application for leave must state the entire length of absence desired, and if for more than one month, its purpose. Commanding officers, in forwarding the application, will indorse thereon any reasons which exist for granting or refusing the leave.

8. No leave of absence exceeding seven days, except under extraordinary circumstances, which will be particularly stated, will be granted to any officer until he has served two years.

9. Verbal permits for less than twenty-four hours are not counted as leaves of absence, but every other absence of whatever duration, with date of departure and return, will be noted on the medical officer's journal and on the pay rolls of the months covering such absence.

10. The commanding officer of a station may take leave of absence not to exceed seven days at one time in the same month, reporting the fact to the Supervising Surgeon-General, provided there are two or more commissioned officers on duty at

said station, and further provided that the Surgeon-General be notified by telegraph before leaving station of the date of departure and address during absence.

11. Paragraph 10 does not apply to commanding officers of quarantine stations during the active quarantine season.

12. The commanding officer of a station may grant leaves of absence not to exceed seven days at one time or in the same month, and he may give permission to apply to Supervising Surgeon-General for extensions of such leaves for a period not to exceed twenty-three days.

13. Leaves of absence shall not be granted to an officer during epidemics, except in case of urgent necessity.

14. Officers will not leave the United States to go beyond the sea without permission from the Secretary of the Treasury.

15. Telegrams making application for leave of absence or extension of leave, or of inquiry whether leave has been granted, and the replies thereto by telegraph, will not be sent or paid for as public dispatches.

16. In determining the period for which an officer is entitled to full pay on leave, time within four successive leave years, terminating with the one in which absence is taken, will be considered. If the absence does not cover the entire period for which the full pay is allowed, the balance thereof will be placed to the officer's credit as belonging to the last year or years of the four considered, and may be made available for future leave.

17. Officers visiting foreign countries, whether on duty or leave, will avail themselves of all proper opportunities to obtain information relating to the operations of the Service. They will report the result of their observations to the Supervising Surgeon-General on their return to duty, or sooner if practicable.

18. An officer ordered to temporary duty while on leave will be regarded as on duty from the day on which he received the order. When the duty is to be performed at a future date he will be on duty from the day on which he starts to obey the order. The date of the receipt of the order in the first case and the date of departure in the second will be promptly reported to the Supervising Surgeon-General. When relieved from such duty, or on the completion thereof, he reverts to the status of leave and will be credited with the time on duty under such order.

19. An officer granted a leave of absence will report to the Supervising Surgeon-General the probable date of his departure and his new address, and thereafter he will immediately report any change in said address.

SICK LEAVE.

20. Application for leaves of absence on account of sickness will be made through the same channels as prescribed for ordinary leaves, and the officer applying will submit to the Surgeon-General a medical certificate, preferably from a medical officer of the Marine-Hospital Service, if such can be conveniently obtained, stating explicitly the nature, seat, and degree of the disease or disability, the cause thereof, if known, and the period during which the officer has suffered from it. The medical certificate must state whether the disease or disability can be satisfactorily treated at the place where the officer is stationed, or whether a change of climate or locality within the United States is necessary to afford more rapid or perfect recovery, in which case the special place or region recommended will be designated, with reasons therefor. The certificate must also state whether the disease or disability requires treatment by a specialist, and if so, the nearest place where it can be obtained; also whether the disease or disability incapacitated the officer from all duty, or whether he can perform special duty, and if so, the kind that he may undertake without endangering his ultimate cure.

21. All absence, with or without leave, will be duly reported to the Secretary of the Treasury by the Supervising Surgeon-General.

22. The Supervising Surgeon-General has the same authority to grant leaves of absence on account of sickness as to grant ordinary leaves. Permission to leave the

port at which the applicant is stationed will be given only when the medical certificate shall state explicity that it is necessary to afford rapid or perfect recovery.

23. On the expiration of a sick leave, if the officer be able to travel, he will proceed to his station. If an extension of such leave be necessary, he will make timely application therefor through the same channel as in the case of a request for extension of ordinary leave, basing his application upon a medical certificate as heretofore prescribed. When he can not procure the certificate of a medical officer he will substitute his own certificate, on honor, as to his condition, which will embrace a full statement of his case. While absent from duty he will make report in the same manner as if on ordinary leave.

24. An officer who starts to join his station at the expiration of a sick leave will be reported upon the pay rolls of his station as "en route to join station from sick leave of absence," during the time necessarily consumed in making the journey to his station. Should he delay en route, or consume more time in the journey than is necessary, the commanding officer will require him to explain in writing the cause of the delay. This explanation will be forwarded to the Supervising Surgeon-General.

25. An ordinary leave will not be changed to a sick leave, unless the officer desiring it make application therefor to the Supervising Surgeon-General. Said application must be accompanied by a medical certificate, given, if possible, by an officer of the Marine-Hospital Service. In all reports concerning absence on account of sickness the officer will state how long he has been absent "sick," and by what authority such leave was granted.

FINANCIAL STATEMENT.

FINANCIAL STATEMENT.

RECEIPTS AND EXPENDITURES, UNITED STATES MARINE-HOSPITAL SERVICE, FOR THE FISCAL YEAR ENDED JUNE 30, 1897.

The balance of the marine-hospital fund available at the commencement of the fiscal year was $53,433.87, and the receipts from all sources $740,637.23.

The expenditures were $538,356.68, leaving on hand at the close of the fiscal year $255,714.42.

SUMMARY—MARINE-HOSPITAL FUND.

Balance July 1, 1896	$53,433.87
Repayment, care foreign seamen, etc	11,320.31
Receipts tonnage tax, collected	729,316.92
Total available during the fiscal year	794,071.10
Expenditures	538,356.68
Balance June 30, 1897	255,714.42

Statement of appropriations, quarantine service, 1897.

Amount appropriated	$131,000.00
Deficiency appropriation	6,000.00
Repayment, care foreign seamen, etc	500.41
Total available during the fiscal year	137,500.41
Expenditures during the fiscal year	137,409.87
Available balance, July 1, 1897	90.54

Summary of expenditures on account of quarantine stations, fiscal year ending June 30, 1897.

Name of station.	Maintenance of stations, officers' salaries, repairs to vessels, etc.	Medical and hospital supplies and miscellaneous.	Total.
Reedy Island	$14,477.41	$327.59	$14,805.00
Delaware Breakwater	9,034.62	139.26	9,173.88
Cape Charles	10,938.18	573.10	11,511.28
Southport	7,467.41	419.31	7,886.72
South Atlantic	13,195.03	540.03	13,735.06
Brunswick	4,769.56	67.58	4,837.14
Gulf	15,976.04	809.64	16,785.68
Tortugas	18,747.64	532.88	19,280.52
San Diego	4,654.57	7.85	4,662.42
San Francisco	23,701.75	1,003.42	24,705.17
Port Townsend	9,614.75	134.70	9,749.45
Miscellaneous		277.55	277.55
Total	132,576.96	4,832.91	137,409.87

Preventing the spread of epidemic diseases.

Summary of expenditures, fiscal year 1897:		
Balance, July 1, 1896		$504,340.45
Amount transferred Supervising Architect, unexpended		3,386.79
Total available		507,727.24
Expenditures:		
Foreign medical service, including Havana, Cuba—		
Salaries, traveling expenses, and miscellaneous	$12,136.13	
Sanitary inspectors in United States—		
Salaries, traveling expenses, and miscellaneous	11,622.79	
San Francisco, Cal.—		
Equipment steamer *Omaha* for disinfecting purposes, and miscellaneous	2,586.93	
Special inspection service, quarantine stations	1,297.83	
Camp Low, New Jersey—		
Keeper and attendants, and removal of station	1,280.00	
Key West, Fla., smallpox epidemic	2,394.88	
Savannah, Ga., storage disinfecting apparatus, etc	193.14	
Waynesville, Ga., use hoisting apparatus, yellow fever epidemic 1893, etc	549.93	
Total		33,052.38
Balance, July 1, 1897		474,674.86

Appropriations for marine hospitals, act March 3, 1891.

Mobile, Ala., amount of appropriation	$1,500.00
Balance, July 1, 1897	1,500.00

Appropriations for quarantine stations, act August 1, 1888.

Stations.	Balance, July 1, 1896.	Expenditures durig fiscal year.	Balance, June 30, 1897.
Cape Charles	$2,809.18	$90.00	$2,719.18
Tortugas	10,246.22	190.00	10,056.22
Port Townsend	2,796.47	2,796.47	.....

Reedy Island quarantine, Delaware River, act March 2, 1895.

Balance, July 1, 1896	$781.48
Expended to June 30, 1896	781.48

Reedy Island quarantine, Delaware River, act June 11, 1896.

Amount of appropriation	$1,200.00
Expended to June 30, 1897	1,200.00

Delaware Breakwater quarantine, act March 2, 1895.

Balance, July 1, 1896	$80.25
Balance, July 1, 1897	80.25

Chesapeake Bay quarantine station, act March 3, 1893.

Balance, July 1, 1896	$6,935.00
Balance, July 1, 1897	6,935.00

Southport quarnantine, act August 18, 1894.

Balance, July 1, 1896	$528.20
Expended to June 30, 1897	528.00
Balance, July 1, 1897	.20

South Atlantic quarantine, act August 1, 1888.

Balance, July 1, 1896	123.16
Expended to June 30, 1897	120.00
Balance, July 1, 1897	3.16

South Atlantic quarantine, act August 5, 1892.

Balance, July 1, 1896	$123.16
Expended to June 30, 1897	120.00
Balance, July 1, 1897	3.16

South Atlantic quarantine, act March 2, 1895.

Balance, July 1, 1896	$1,000.00
Balance, July 1, 1897	1,000.00

South Atlantic quarantine, act June 11, 1896.

Amount of appropriation	$15,750.00
Expended to June 30, 1897 (transferred to Supervising Architect)	15,000.00
Balance, July 1, 1897	750.00

Brunswick, Ga., quarantine station, act March 2, 1895.

Balance, July 1, 1896	$247.30
Expended to June 30, 1897	243.60
Balance, July 1, 1897	3.70

Brunswick, Ga., quarantine station, act June 11, 1896.

Amount of appropriation	$800.00
Expended to June 30, 1897	459.88
Balance, July 1, 1897	340.12

Gulf quarantine, acts March 3, 1891, August 5, 1892, and August 18, 1894.

Balance, July 1, 1896	$1,350.57
Expended to June 30, 1897	3.00
Balance, July 1, 1897	1,347.57

Gulf quarantine station, act June 11, 1896.

Amount of appropriation	$350.00
Expended to June 30, 1897	222.54
Balance, July 1, 1897	127.46

San Diego quarantine station, act June 11, 1896.

Amount of appropriation	$350.00
Expended to June 30, 1897	347.50
Balance, July 1, 1897	2.50

San Francisco quarantine, act August 5, 1892.

Balance, July 1, 1896	$142.10
Expended to June 30, 1897	142.00
Balance, July 1, 1897	.10

San Francisco quarantine station, act March 2, 1895.

Balance, July 1, 1896	$42.13
Expended to June 30, 1897	42.00
Balance, July 1, 1897	.13

San Francisco quarantine, act June 11, 1896.

Amount of appropriation	$5,000.00
Expended to June 30, 1897	4,305.60
Balance, July 1, 1897	694.40

Port Townsend quarantine, act June 11, 1896.

Amount of appropriation	$3,500.00
Expended to June 30, 1896	2,618.90
Balance, July 1, 1897	881.10

REPORTS OF FATAL CASES, WITH NECROPSIES.

REPORTS OF FATAL CASES, WITH NECROPSIES.

ENTERIC FEVER.

CASE 1.

D. M. P.; age, 39 years; nativity, Michigan; admitted to United States Marine Hospital, Detroit, Mich., September 15, 1896; died September 20, 1896.

History.—Patient states that he has been ill for the past two weeks. Complains of pain in back, soreness in abdomen, and headache. Had had no diarrhea, and was constipated on admission. Tongue dry and heavily coated. Appetite gone, prostration very great, slightly delirious, with temperature 39.3° C. and pulse 120 when admitted. Temperature ranged from 38° to 39.8° C. during the first three days in hospital, but on the fourth day suddenly dropped to 36.4° C. simultaneously with occurrence of intense pain in lower part of abdomen, on right side, which continued with a temperature from 36.1 to 37° C. during last two days, with great prostration. Pulse ranged from 76 to 100 during first three days, and from 74 to 88 during last two. Patient died rather suddenly on the 20th.

Necropsy (twenty hours after death).—Post-mortem lividity and rigor mortis marked. Pupils somewhat dilated. General nourishment poor. Heart: Weight, 290 grams; pericardium and valves all normal, but the mitral and tricuspid valves were glued together and almost completely obstructed by firm, fibrinous ante-mortem clots. Lungs: Left, weight, 350 grams; right, weight, 460 grams; marked pleural adhesions on left side, slight ones on right side; small calcified tuberculous nodule found in apex of left lung, otherwise normal. Abdominal contents: On opening the abdomen the omentum and peritoneum were found intensely inflamed, and a small amount of ill-smelling pus and fæcal matter was found in peritoneal cavity. Examination of small intestines shows only two Peyer's patches to be ulcerated, one only superficially, the other the seat of the perforation of the intestine. Other abdominal organs normal. Liver: Weight, 1,520 grams. Kidneys: Left, weight, 125 grams; right, weight, 130 grams. Spleen: Weight, 200 grams.

E. P.

CASE 2.

Cerebral meningitis.

H. J.; aged 28 years; nativity, Norway; was admitted to marine ward of the German Hospital August 12, 1896; died August 23 at 3 a. m.

History.—Had been sick eight days with headache, dizziness, epistaxis, anorexia, diarrhœa, and pain in epigastrium and through limbs and body. On admission temperature was 40.4° C., pulse 103, spleen enlarged, tender in right iliac region, and a few rose spots were seen on the abdomen. Patient rational. Treatment was cool baths (26° C.) every three hours, with whisky after the baths, and irrigation of the bowels once daily with solution of corrosive sublimate, 1 to 10,000. Patient seemed to improve.

August 14.—Temperature in evening, 39.4° C.; pulse, 96; vomited yesterday and to-day.

August 15.—Evening temperature, 38.6° C.; pulse, 96. To-day nervous symptoms observed; muttering delirium, carphologia, and difficulty in speaking, as if the tongue was partially paralyzed. No headache.

August 16.—Evening temperature, 37.4° C.; pulse, 88. From this time to the 20th the pulse and temperature ranged about normal, although the nervous symptoms continued.

August 22.—Decidedly worse. Right parotid gland swollen. Two incisions were made in it without giving him pain, though he was rational, and drawing only blood. Temperature, 38° a. m., 38.8° p. m.; pulse, 120. Died at 3 a. m., August 23.

Necropsy (eight hours after death).—External examination: Body of a man between 25 and 30 years of age. Height, 1.78 meters; circumference at shoulders, 1.02 meters; strongly built, adipose tissue moderate in quantity. Body pale in color except dependent parts, which are bluish-red. Hair of head light in color, short, and straight. No beard except a two weeks, stubble, scattered, of light color. Light-colored, thin mustache. Face broad, high cheek bones, nose straight, front teeth good, lips pale. Eyebrows light, eyes closed, pupils moderately dilated, corneæ transparent. Chest full, abdomen slightly distended. Cadaveric rigidity well established.

Internal examination.—Cranial cavity: Much blood exuded from incision in scalp for opening skull. Skullcap broad (brachycephalic), asymmetrical, left side being broader than the right. Skullcap easily removed. On removing the brain the large sinuses found engorged. Bones 5 to 7 mm. thick. Four thin spots in skullcap, two pacchionian depressions on right of median line and one opposite each parietal eminence. On removing the dura, water from the brain; strong adhesions were found along the longitudinal fissure at the vertex on left side for a space of about 3 cm. No evidence of inflammation at the base of the brain. Blood vessels of the brain distended with blood. On making sections, numerous and large puncta vasculosa appear. The ventricles appear normal—no fluid in any of them; choroid plexus congested. Corpora quadrigemina and pineal gland appear normal. Cerebellum normal, except too vascular. Nothing noteworthy in the pons or medulla oblongata. Thorax: Organs normal as to situation; pericardium almost covered by lungs. A few old adhesions between lung and chest wall, posteriorly, on both sides. No fluid in pleural cavities. Pericardium contained about 5 c. c. of straw-colored fluid. Heart about size of a small fist; right ventricle well covered with fat; right auricle empty; right ventricle contained several white, tough, clots; left auricle and ventricle empty. (Heart was removed from the body before being opened.) Weight of empty heart, 300 grams. Diameter of the aorta, 2 cm.; of pulmonary artery, 2.25 cm. All four sets of valves competent and seem normal. Great vessels and nerves seem normal. Lungs grayish, with dark spots posteriorly (hypostatic congestion); weight of each lung, 450 grams. On section, a frothy reddish fluid exudes. Calcareous nodule, 5 mm. in diameter, found on posterior surface of lowest lobe of right lung. Contents of anterior mediastinum seem normal. Œsophagus seems normal, 1.9 cm. in diameter at narrowest part.

Abdomen: Parietal and visceral layers of peritoneum seem normal. In the lower part of the ileum several large dark patches are seen through the coats of the intestine. Mesenteric glands enlarged. Spleen enlarged, soft, and weighed 360 grams. Kidneys presented same appearance in both; capsules thin and slightly coherent; on section evidences of congestion appear. Suprarenal capsules normal in appearance. Weight of right kidney 230 grams; of left, 225 grams. Ureters size of large goose quill; normal. Bladder contracted, several hemorrhagic spots in mucous membrane at the base; contained about 60 c. c. of urine. Stomach empty and normal in appearance. Diameter of cardiac orifice, 3 cm.; of pylorus, 2.5 cm. Nothing noteworthy about large intestine. Small intestine: Lower part of ileum contained five large cicotrized ulcers and several small ones; mucous membrane congested. Liver weighed 1,975 grams, including gall bladder; of brown color, firm, and normal in appearance. Gall badder full, ducts patulous. Panereas normal in appearance; weight, 95 grams.

G. T. V.

CASE 3.—*Cerebral meningitis.*

J. N.; aged 41 years; native of Maine; was admitted to the marine ward of the German Hospital, Philadelphia, Pa., October 7, 1896; died October 10.

History.—Nothing reliable could be obtained from the patient, as he was delirious on admission, with temperature of 40°, pulse 106, face flushed, and a restless desire to get out of bed, but it was ascertained that he had applied once at the office on the day before admission, at which time he complained only of diarrhea and loss of appetite, which he stated came on four days before, soon after getting wet and chilled. There was no nosebleed, and little or no malaise, the patient refusing to go to hospital. October 8, day after admission, there was no change for the better, face dusky red, tongue pointed, red edges with central coating, eyes bright and restless, pupils neither dilated nor contracted, abdomen tympanitic, but not distended, yet the splenic dullness was obscured. Several small rose spots observed on abdomen; moist râles (mucous) heard posteriorly over the base of the right lung; there were corphologia, subsultus tendinum, and involuntary evacuation of rectum and bladder, the stools being thin and yellow.

Treatment: Cool baths with whisky every three hours, ice cap to head, irrigation of bowels with normal salt solution first, then with bichloride solution 1 to 10,000, and later with digitalis and strychnia. The cool baths acted well so far as reducing the temperature from 40° C. to 37° C., but it had no effect on the delirium and the temperature would not stay reduced, and was 40.2° C. at time of death, 5.15 p. m.

Necropsy (sixteen hours after death).—Body of a male apparently 40 years old; length, 1.69 meters; shoulder circumference, 1.04 meters.

External appearances.—Post-mortem rigidity marked; back of head, ears, back and sides of neck, and back of trunk vary from reddish to dark purple in color. General nourishment fair; muscular development good, especially in the upper extremities. Head has a bald streak from forehead nearly to occiput; hair, eyebrows, eyelashes, mustache, and beard of brown color. Eyes half open; right eye gray, pupil contracted; left eye, cornea covered by a dense leucoma. Nose straight, fairly prominent. Mustache thin; beard, of two or three weeks growth, of darker brown than mustache, over chin and cheeks. Cheeks thin and bony; mouth small, lips slightly separated, showing front teeth irregular in shape and uneven, but sound; jaws tightly clinched. Ears rather large, especially the lobules. Hands horny and muscular. Lividity of scrotum and prepuce, the latter covering and projecting beyond the glands. Two testes in scrotum.

Internal appearances.—Head: Skull cap removed and examined; a symmetrical, left parietal eminence larger and thinner than right; two Pacchionian depressions about vertex almost perforating the skull. Thickness of skull, anteriorly 6 mm., posteriorly 9 mm., sides 3 mm., antero-posterior diameter, outside, 19 cm.; transverse 14 cm.; cranium therefore dolichocephalic, index 73.6. Meninges congested and longitudinal sinus distended with blood, especially posteriorly. Two large masses of Pacchionian bodies on side of the sinus near the vertex. Along the longitudinal sinus, on both sides, but worse on the left, from a point 2.5 cm. in front of the vertex and extending 9 cm. posteriorly, the membranes were all matted together and the brain tissues somewhat softened, though no pus was seen. This area included the Pacchionian bodies, but the adhesion of the membranes existed some distance from them on the left side, extending 2.5 cm. from the median line. Sinuses contained fluid blood, no clots. The left optic nerve, corresponding to the diseased eye, was darker in color and only two-thirds the size of the right nerve. On section of the brain the puncta vasculosa well marked. Lateral ventricles large, but contained no fluid; other ventricles empty. An incision was made from chin to pubes, opening the chest and abdomen. Tongue, œsophagus, larynx, and trachea presented nothing of interest, except there was considerable mucus in the larynx and trachea. Thyroid gland was small; vessels and nerves normal. Chest: Pectoral muscles well developed. On removing the sternum the two internal mammary arteries were seen

on posterior surface. At junction of ensiform with gladiolus was a slight prominence on posterior surface. Innominate veins distended; remains of thymus gland noted. Nerves and arteries seem normal. Pericardium nearly covered by the lungs, which are soft and gray in color in front. Scarcely a gram of clear fluid in pericardium. Heart about the size of the fist of the corpse. Fat especially thick on right auricle, whence it extends down to the apex, which it covers. Small black, soft clot in right ventricle. Diameter of aorta 2.5 cm.; coats somewhat thickened, but no hardness nor roughness present; of pulmonary artery 1.5 cm., coats quite thin; wall of left ventricle 2 cm. thick, of right ventricle 3 mm., of auricles 1.5 mm.; all valves competent. No fluid in pleural cavities and no adhesions. Lower lobes of both lungs dark purple posteriorly, with here and there small areas of black tissue, which on section have a more or less pyramidal shape with the base at the lung surface, evidently inforets. Dark color shades off into red, then gray in front. Lungs float in water. Abdomen: Considerable fat in walls and omentum. No peritonitis. No fluid in cavity. Peritoneum injected over numerous areas in the ileum, afterwards found to correspond with enlarged Peyer's patches. Numerous enlarged mesenteric glands. Cæcum distended with gas; other intestines only moderately full. Vermiform appendix 6 cm. in length; small; caliber nearly obliterated near distal end, where it was twisted or bent on itself, and was contained in the mesocæcum, lying behind and toward the outer side of the cæcum. Lower part of ileum contained 14 enlarged Peyer's patches, the largest measuring 10 by 2 cm., and all sizes below to 1 by 0.5 cm. They were all situated opposite, farthest from, the the mesenteric attachment, their long diameter corresponding with that of the intestine, and there was no ulceration except in two or three cases, where a small circular ulcer was found in a Peyer's patch, as if one or two solitary glands in the patch had sloughed, exposing the submucosa. There were innumerable enlarged solitary glands in the ileum and cæcum. Liver reddish-brown externally, possibly a little swollen. On section lobules show slightly yellowish. Gall bladder moderately full of bile; projects 2.5 cm. beyond the anterior margin of the liver. Ducts patulous. Pancreas seemed normal. Spleen 15 cm. long, 10 cm. wide, and 4 cm. thick; dark purple in color; soft and pultaceous within. Considerable perinphritic fat. Right kidney 12.5 by 6.5 by 4 cm.; capsule nonadherent. Section shows slight congestion. Left kidney measurements same as right; capsule nonadherent; congestion more marked than in right and there was purulent pyelitis, the pelvis containing about 2 c. c. of thin pus with several small hemorrhagic spots in its walls. Suprarenal capsules normal. Right ureter 26.5 cm. long, left 28 cm. Bladder about two-thirds full and contained about 300 c. c. of clear urine; mucous membrane slightly congested and opening of ureters normal. Vasa deferentia, vessiculæ seminales, prostate, and urethra seemed normal. Vesicular seminales contained a mass of jelly-like material. The diaphragm, stomach, duodenum, aorta, and venæ cavæ presented nothing notable. The right psoas magnus muscle of a dark purple color and seemed transformed into a mass of clots and débris easily broken up with the finger (myositis). The left psoas was also affected, but not to the same extent. Cultures were taken from the spleen, and inflamed meninges and a pure culture of the typhoid bacillus was obtained from the spleen, while that from the meninges contained a bacillus answering in all respects, so far as tested, motility, growth on gelatine, potato, staining properties, and failure to ferment grape sugar, to the typhoid bacillus and the staphylococcus aureus.

G. T. V.

Case 4.

E. P. N.; age, 27; nativity, Sweden; admitted to United States Marine Hospital at Baltimore, Md., September 10, 1896, at 2 p. m.; died September 11, 1896, at 6 a. m.

Clinical history.—Patient was removed from his vessel to this hospital in the ambulance on the afternoon of September 10, 1896. As patient was in an unconscious condition, it was impossible to get any clinical history from him. The captain of his boat,

however, said that patient had been sick about ten days, and that he had been out of his mind for several days, and that bleeding from the nose and rectum had occurred several times. On admission to hospital patient was in an unconscious state, at times attempting in an incoherent manner to answer questions. Temperature (axillary) 39.8° C.; pulse very rapid and weak; respiration 45 per minute and labored. Physical examination showed patient to be much emaciated, features presenting a sharp, pinched appearance. Body bathed in a profuse clammy perspiration. Mouth and eyes partly open, and breathing mostly through the mouth, which was dry, and lips and teeth were covered with sordes. Mucous membranes pale. Cornea of right eye presented a hazy appearance, with its pupil contracted, while the left eye was comparatively clear, with a dilated pupil. Both pupils, however, responded to the stimulus of light. Some strabismus in left eye. Tongue coated and covered in places with coagulated blood; edges red. Both nostrils contained blood clots. Patient had a rectal hemorrhage on his way to the hospital. Heart sounds weak and muffled, but no valvular lesions discovered. Lungs apparently normal. Spleen somewhat enlarged. Liver very little, if any, enlarged. Lymphatic glandular enlargement not noticeable. Abdomen somewhat distended. Gurgling in right iliac fossa, and apparently some pain. Very slight papular eruption on abdomen, which fades on pressure. Tache cérébrale present. Bladder catheterized and about 75 c. c. of urine drawn, which was very red, rather turbid, acid in reaction, and contained a trace of albumen. Patient was quite restless when admitted and moved uneasily in bed for a while, but with free stimulation (whisky, nitroglycerin, strychnine, etc.) and a cold sponge bath his temperature was reduced and pulse became stronger and the nervous symptoms were less marked. He took some nourishment during the night, but grew weaker toward morning, and died at 6 a. m. September 11, 1896.

Necropsy (twelve hours after death).—White male; dark hair, blue eyes; height about 5 feet 6 inches; weight about 135 pounds. Rigor mortis marked; livores marked on posterior aspect of body; body much emaciated. Lungs congested, otherwise normal. Heart weighed 360 grams; right ventricle contained a large gelatinous buffy mass; valves apparently normal. Left kidney weighed 240 grams; capsule easily separable; on section it was rather dark in color and congested; right one same as left. Liver weighed 1,980 grams; very much congested; lower surface, which was in contact with the intestines, was very dark in color. On section a dark area was found in right lobe, about 65 mm. in width and extending the entire thickness of the lobe, and rather resistant to the knife. Gall bladder somewhat distended with bile; ducts pervious. Spleen weighed 360 grams; dark in color and congested. On opening the abdomen the intestines were seen to be very dark in color. The large intestines contained considerable quantity of fluid blood. Mucous membrane swollen and inflamed. Small intestines: Catarrhal condition existed throughout and contained clotted blood. The solitary glands ranged in size from a pinhead to a pea. The agminated glands (Peyer's patches) were much enlarged, numerous, and ulcerated in places, being larger and more severe nearer the ileocæcal valve. Some of the patches were 75 mm. long and about one-third as wide. No perforation of the bowel found. Vermiform appendix very long and coiled upon itself. Mesenteric glands enlarged. Bladder contained a small quantity of urine and was apparently normal. Brain was much congested.

J. M. M.
G. W. L.

CASE 5.

Perforation.

J. K.; aged 24; nativity, Norway; admitted to United States Marine Hospital, New York, N. Y., September 8; died September 19, 1896.

History.—Patient has been sick fourteen days. Has been sailing on fishing smack out of the harbor. Complains of chilly sensations, followed by sweating. Tongue

coated, nausea and vomiting, no appetite, bowels loose, urine scanty and high colored. Tenderness of abdomen over left lumbar region. Malarial organisms found in the blood. Patient is quite sick and has the facies of enteric fever. The temperature was running quite high and he was put on milk and large doses of quinine. The diarrhea in three days became characteristic of enteric fever. The vomiting became so very troublesome that all medicine and food were temporarily suspended.

At 2 a. m. of the eleventh day after entry the patient had a severe hæmorrhage from the bowels. The hæmorrhage came on very suddenly and he was very quickly in the stage of collapse. The patient rallied slightly, but the heart never regained its strength. Two days afterwards there was considerable distension of the bowels, with some pain. Patient delirious at times. The liver space was tympanitic. Perforation suspected. Died in collapse in the afternoon.

Necropsy (twenty hours after death).—Vessels of the pia injected, some fluid in subarachnoid spaces. Brain normal. Kidneys normal. Spleen softened and contained a small abscess. A small secondary spleen was embedded in the mesentery near the large spleen. The abdominal cavity contained 300 c. c. fecal matter. In the ileum, near the junction with the colon, were five perforations. Fifteen ulcers, in different stages of ulceration, were found in the ileum. The mucous membrane in upper part of colon and the lower portion of ileum was congested. Mesenteric glands markedly indurated, some of them undergoing softening. All other organs normal.

J. O. C.

Case 6.

D. McC.; age, 24; nativity, Ireland; admitted to the United States Marine Hospital, Cleveland, Ohio, October 7, 1896; died October 28, 1896.

History.—This was an ordinary case of enteric fever, without any complication, the patient simply dying of exhaustion. He was given nothing but milk as a diet, with tonic doses of quinine, and, at the last, stimulants.

Necropsy (twelve hours after death).—Rigor mortis moderate. Heart weighed 275 grams; was pale and flabby, otherwise normal. Lungs: Left weighed 240 grams; right, 290 grams; both were normal. Liver weighed 1,815 grams; fairly normal. Gall bladder normal. Spleen weighed 315 grams; was dark and pulpy. Left kidney weighed 185 grams; right kidney weighed 205 grams. Pyramids congested; cortex pale. Stomach and duodenum normal; the ileum, caput coli, and ascending colon contained a large number of Peyer's patches and solitary follicles in the stage of infiltration, at certain points beginning to break down into ulcerations. Some of the typhoid ulcers were fully 2 inches long and 1⅛ inches in width. Bladder normal, containing about 50 c. c. of urine.

R. W. W.

Case 7.

J. M.; age, 30; a native of Cape Verde; was admitted to the United States Marine Hospital, San Francisco, Cal., October 12, 1896, and died October 22, 1896, at 5.30 p. m.

History.—On entrance he complained of diarrhea, fever, dizziness, and impairment of hearing. His mouth was very dry and his teeth were covered with sordes. His pulse became very weak and temperature high. Cardiac stimulants were of no avail, and the patient became much weaker and finally died.

Necropsy (sixteen hours after death).—Brain and membranes normal; increased amount of cerebro-spinal fluid present. Heart slightly enlarged; aortic and semilunar valves very thin and pierced with small holes, also ulcerations upon them and in their immediate neighborhood; other valves normal. Lungs normal, but rather small. Liver normal. Spleen greatly enlarged and congested; weight, 380 grams;

on section, fibrous masses found around border. Kidneys—left, weight, 230 grams, slightly enlarged and pale; right also pale; weight, 220 grams. Intestines, Peyer's patches ulcerated; rest of intestine normal. Other viscera normal.

J. G.
J. H. V.

DYSENTERY.

Case 1.

E. M.; age, 24 years; nativity, United States; admitted to marine ward, Providence Hospital, Washington, D. C., February 14; died February 27, 1897.

History.—Patient had been sick two or three weeks on a pungy, with a discharge from the bowels of dysenteric character, and on admission to the hospital was very much emaciated, weak, with involuntary evacuations, inability to retain nourishment, and gradually progressed from bad to worse until death.

Necropsy (twenty-four hours after death).—Body of a male, apparently 25 years of age, extremely emaciated; abdomen covered with brown spots, probably the result of local applications. Bed sore over sacrum, and small one on each trochanter; lividity well marked over chest and back. Rigor mortis moderate. No evidence of specific disease. Hair long, dark brown; forehead well shaped; eyebrows heavy, dark brown; eyes brown, deeply sunken, pupils slightly dilated; cheek bones prominent; nose same, well shaped, and deviating markedly to the right; mouth moderate size and well shaped; teeth sound and regular; ears very large and project prominently from the head. About two weeks' growth of dark-brown beard and mustache. Hands show evidences of hard labor. Muscles not very well developed. Incision made from chin to pubes. Abdominal cavity opened. Omentum extremely thin and free from fat. Mesenteric glands slightly enlarged, except in the right iliac fossa, where they were very much enlarged. Spleen about normal in size and color, but rather tough on section, showing increase of connective tissue. Sigmoid flexure of the colon discolored in spots, showing ulceration internal. No evidences of peritonitis. Colon congested throughout, cæcum almost immovable, owing to short mesentery. Appendix 10 centimeters long, pointing downward and inward, nonadherent and apparently normal. Parietal peritoneum over gall bladder stained with bile. Total absence of fat from both kidneys. Suprarenal capsules somewhat indurated, left kidney normal in size. Capsule nonadherent; cortical and medullary portions normal in appearance, perhaps slightly congested. Right kidney slightly larger than the left and paler in color externally; capsule nonadherent on section. It has the same appearance as the left, but pelvis contains slight purulent fluid. Ureters and bladder normal; likewise the vesiculæ and seminals, prostate gland, urethra, and testes. Liver about normal in size, but intensely congested, friable, and dark brown in color. No sign of abscess found on section. Gall bladder normal, well filled with bile. Bile ducts patulous. Pancreas normal and well developed. Stomach normal in size; contained about 100 cubic centimeters of dark greenish fluid. Pylorus admits only one finger. Mucous membrane intensely congested in spots. Evidence of hemorrhage in many places, but no ulcerations; rugæ prominent, hemorrhagic spots on many of them. Entire mucous membrane of the rectum and sigmoid flexure and remainder of the colon to the cæcum contained small ulcers and hemorrhagic infiltration. The principal part of the rectum and lower part of the colon sigmoid flexure almost devoid of mucous membrane. Inflammatory process extended into the ilium nearly to the duodenum, but there was no ulceration in this portion of the intestine.

Chest: Pericardium normal; antemortem clots in the right ventrical. Other chambers empty; heart systole; valves normal. Heart about the size of subject's fist. Lungs slightly congested interiorly, otherwise normal. Left pleural cavity normal. Right contained several old pleuritic adhesions. Two enlarged bronchial glands, which had undergone calcareous degeneration, found on the right side.

Portions of the spleen, liver, and intestine were removed for microscopical examination. Brain not examined on account of cold weather. No heat in post-mortem room.

G. T. V.

CASE 2.

H. S.; aged 30; nativity, Louisiana; was admitted into United States Marine Hospital, Cincinnati, Ohio, November 23, 1896; died December 6, 1896.

History.—Patient came into hospital suffering with severe abdominal pain, diarrhea, and tenesmus. He had been complaining slightly for several days before coming into hospital.

Physical examination: Heart and lungs normal; abdomen very tympanitic and tender; urine, specific gravity, 1,012, acid, dark red, with some albumen. Temperature, 40° C. The stools were very frequent, containing blood and mucus, and the tenesmus was most distressing. Patient's condition did not improve any under bismuth in large doses or rectal irrigations. The pain and frequent stools and tenesmus were only relieved with large doses of morphine hypodermically. Patient grew gradually weaker, had marked hiccough, became delirious, and died at 11 p. m.

Necropsy (twenty-two hours after death).—Post-mortem rigidity marked. Body much emaciated. Brain normal, weight, 1,380 grams. Lungs normal, weight, 570 grams for right lung, 390 for left lung. Pericardium and heart normal. Abdomen: Evidences of acute and old-standing peritonitis present. The two layers of the peritoneum were adherent to each other and to the intestines. The omentum was shriveled up into a small mass, which was adherent to the surrounding tissues. Liver very much enlarged, very hard, and contained large cicatrices and numerous nodules; weight, 2,280 grams. Spleen, capsule thickened and fibrous in places, weight, 315 grams. Kidneys: Right, capsule slightly adherent, cortex somewhat cicatrized, weight, 280 grams; left, normal, weight, 225 grams. Pancreas normal. Stomach enlarged and contained a black-looking liquid. The entire intestinal tract was very much inflamed and round ulcers were found, greatest in number at the sigmoid flexure.

J. W. S.
W. A. W.

CASE 3.

A. T.; age, 28; a native of Austria; was admitted to the United States Marine Hospital, San Francisco, Cal., October 20, 1896, and died October 23, 1896, at 8.15 p. m.

History.—Had been sick for four months and during that time was without medical treatment. On entrance he complained of severe pains in the abdomen and diarrhea, the stools containing blood. Both legs were œdematous and the patient was greatly emaciated. Pulse was very weak. The symptoms gradually became more severe, and the patient died.

Necropsy (fourteen hours after death).—Brain and meninges normal. Heart: Small and pale; weight, 160 grams; some thickening and puckering of one of the segments of the aortic valve just beneath the corpus aranti; other valves normal. Lungs: Some adhesions of the right lung; otherwise normal. Liver slightly congested. Spleen normal. Kidneys: Separate lobe attached to the right kidney; left kidney normal. Intestines: Abdominal cavity full of fluid and the intestines pale; mesenteric glands enlarged; colon one mass of ulcers; remaining intestines normal. Genito-urinary apparatus normal.

J. H. O.

CASE 4.

C. J.; colored; age, 24; admitted to United States Marine Hospital, Memphis, Tenn., February 8, 1897.

Patient gave a history of a typical attack of dysentery some twelve days in duration. Had remained at home practically without treatment. Was very weak on

admission; temperature, 38° C.; pulse, 96. Was put upon .01 gram doses of calomel every hour and given tincture digitalis; fluid diet. His stools quickly improved in character and his pulse also improved. The improvement continued until the night of the 10th, when patient began to have an uncontrollable hiccough. Stools became very dark. Great tympanites, relieved by introduction of rectal tube and injection through it of turpentine, 2 c. c., water, 100 c. c. He was freely stimulated, but to no purpose, and died at 6.30 p. m., February 11, 1897.

Necropsy (twenty hours after death).—A well-developed negro, very well nourished. Abdomen much distended. Scar of bubo in groin. Rigor mortis well marked. Owing to lateness of hour the calvarium was not removed. Thorax: Left lung slightly adherent and somewhat emphysematous. The lower lobe moderately conjested and œdematous. Right lung adherent throughout to costal pleura. Pleural cavity entirely obliterated. In the upper bronchi there was some catarrhal inflammation. No nodules or evidence of deposit of any kind. Heart perfectly normal. Abdomen: Small intestines enormously distended; a plastic peritonitis over descending colon. The small intestines contained a quantity of yellow viscid mucous. In jejunum there were a number of small circumscribed hemorrhagic spots. Ilium markedly congested throughout, especially the Peyer's patches. Mesenteric glands slightly enlarged. Large intestines: Mucous membrane gangrenous throughout its entire extent. Liver cirrhotic throughout. Right kidney small, capsule thickened and adherent, cortex diminished in thickness and pale in color; weight, 180 grams. Left kidney weighed 210 grams and presented the same appearance as its fellow. Bladder normal.

G. B. Y.

REMITTENT FEVER.

Perforation of intestine.

J. F., colored; native of Louisiana; admitted to the United States Marine Hospital at Memphis on December 26, 1896, and died January 3, 1897.

History.—Patient was a well-developed and healthy-looking colored boy. He had been sick for four days with chills and fever. Initial chill came on in the evening and was very severe; had a similar chill every evening up to day of admission. His bowels were very loose from the first. Discharge watery and preceded by pains in the abdomen. Temperature on admission was 40.5° C. Pulse poor; tongue round and flabby, clean and red on edges and moderately furred in center. Neither liver nor spleen noticeably enlarged. Was given tincture digitalis on admission and was ordered quinae every four hours with bismuth and mixture for diarrhea. His temperature on the morning of the 27th 39° C. and pulse 90; bowels loose but less so than on preceding day. His blood showed a large number of very small extra-corpuscular "rosettes" and some granular bodies. The segmentation in rosettes was not as distinct as usual. On admission the diagnosis of intermittent malarial fever was made to conform to official nomenclature, but the blood examination showed at once that the disease was æstivo-autumnal, or, as the nomenclature has it, remittent fever. The possibility of a mixed infection was considered but abandoned. There was an entire absence of tympanites, gurgling, and iliac tenderness. The stools were more watery and paler than typhoid stools, but still quite suggestive of typhoid. While the malarial nature of the case was clearly established, still the fever was a hard one to classify as to the kind of malarial fever present. The history from onset to admission pointed to a double tertian or to the variety of æstivo-autumnal fever marked by quotidian paroxysms.

The appearance of the rosettes and the temperature curve for the first four days indicated the quartan type of æstivo-autumnal fever, while the subsequent temperature curve showed regular tertian remissions. His diarrhea yielded slowly to treatment, declining by the 31st to two passages a day. On the 30th his blood showed both intra and extra corpuscular, small hyaline bodies, and a few large and

actively motile pigment grains or blocks—two or three to each body. The next day only a few extra-corpuscular pigmented bodies could be found. His mental state from about the third day became rather foggy—a fairly typical typhoid state in fact.

On the 1st of January, the sixth day from admission and the tenth since onset of disease, he had several severe attacks of colic, and these recurred on the 2d. On the night of the 2d his pulse failed rapidly, tympanites developed, and it became evident that he had sustained an intestinal perforation. He died at 10 a. m. on the morning of the 3d, just twelve days from date of first attack.

Necropsy, twenty-four hours after death.—Body fairly well nourished. No scars. Calvarium not opened. Lungs normal except for slight congestion. Pericardium contains about 200 c. c. of fluid. Heart rather small, but otherwise normal. Liver, spleen, and kidneys normal in appearance and size. Intestines showed general fibrinous adhesions. About 250 c. c. of fluid present in abdomen. The ileum presented a large number of follicular ulcerations. These ulcerations were all opposite to the attachment of the mesentery. Peyer's patches were not at all involved. The mesenteric glands were not enlarged. Two perforations were present—one 4 cm. from the ileo-cæcal valve and the other 12 cm. There were several ulcers, in which the coats were eroded down to the peritoneum. At about 20 cm. above the ileo-cæcal valve there was an area about 2 by 4 cm. where the entire mucous membrane was eroded. Sections taken through the ulcers showed a typical follicular ulcerative process and an entire absence of any of the microscopic appearances of characteristic typhoidal ulcers.

G. B. Y.

GENERAL TUBERCULOSIS.

Pericarditis—Congestion of lungs—Valvular disease of heart (mitral).

W. F.; aged 54 years; nativity, Georgia; admitted to the United States Marine Hospital, St. Louis, Mo., April 21, 1897; died April 22, 1897.

Clinical history.—This admission was the patient's fourth to this hospital. He was first admitted December 28, 1894, and was treated for cirrhosis of the liver. At this time he had distension in the region of the stomach, with swelling of the lower extremities. Patient had been a hard drinker. Temperature during this admission was normal. Having improved, he was discharged March 11, 1895. On October 27, 1896, patient was admitted and treated for an ulcer (about as large as the palm of a hand) in the right popliteal space. At that time he presented the following conditions: There was effusion into both knee joints, the right being larger than was the left, both being tender. Fluctuation was marked, the patellæ "riding." In view of the long duration of the trouble, a diagnosis of probable tubercular disease was made. He, refusing all treatment of the internal disease of the joint, was discharged November 12, 1896, improved as to the ulcer.

On January 7, 1897, he was readmitted for treatment of the old ulcer in the right popliteal space, it having grown worse since his discharge in November, due to his having neglected to go to the city dispensary for treatment, as he was directed. The condition of the knee joints was about as before, but he still refused all treatment for the trouble, except that by plaster of paris casts, which were applied in the hope that immobilization would encourage absorption of the fluids. Patient was discharged February 1, 1897, the ulcer being entirely well, though the condition of the knee joints was not specially changed by the slight treatment accepted. There were, at no time, symptoms of heart trouble, or other organic disease. His general bodily condition was, however, poor, emaciation being quite marked.

When admitted the last time (April 21, 1897), patient said he had been ill about three weeks, having had repeated chills, a severe cough, considerable expectoration, difficulty in breathing, and fever. This illness was immediately preceded by an assault upon him, during which he was struck in the front of the right side of the

chest with a large lump of coal. (Patients in the ward also said they knew of his having been knocked down and his chest jumped upon about two weeks before his admission.)

Physical examination.—Inspection: Very rapid respiration is to be observed, with considerable excursion of the chest walls. Distressing dyspnœa, incessant cough, and profuse expectoration of a greenish-yellow, very fluid sputum are also present.

Palpation: Tactile fremitus is found to be greatly increased over the whole of the anterior and lateral walls of the right chest, while over the left, also, it is more intense than is the case normally.

Percussion: An absolutely flat note is elicited over the whole of the right chest, while over corresponding parts of the left side the note is hyper-resonant.

Auscultation reveals the heart as laboring very greatly, the first sound, at the apex, being scarcely audible, while the second is of a sharp, clicking character. (No mitral murmur was observed, though the autopsy revealed a mitral lesion of considerable degree.) The aortic second sound is not of a morbid character, though slightly accentuated, the pulmonary being quite like it. On listening over the accessible parts of the anterior and lateral walls of the right side of the chest, there is heard a most intense, harsh, bubbling, rhonchal, inspiratory and expiratory sound. On the left side there are simply the signs of extra work on the part of the left lung, except that at the apex, just below the clavicle, the inspiratory murmur is found to be harsh (not simply an intensified vesicular murmur), really of a rhonchal character, the expiratory sound here also being prolonged and roughened. Owing to the patient's weakness and dyspnœa it is deemed advisable not to disturb him to the degree necessary to make a complete examination of the chest; but the signs observed by listening and percussing as far back as is possible without turning the patient, together with those observed by careful examination of the anterior walls of the chest, justify the diagnosis of probable lobar pneumonia in the right lung, although the signs are not regarded as conclusively excluding, in view of the history, a possible traumatic inflammation.

Treatment was stimulative, strychnine being given frequently. Sponge baths were also given whenever temperature reached 39.2° C. Magendie's solution was given twice to relieve distressing cough. Contrary to expectation, the patient suddenly died at a quarter past 1 o'clock in the afternoon of the day next after admission.

Necropsy (nineteen and one-half hours after death).—Body that of an old man somewhat emaciated. The eyes are closed and the cheeks sunken. There is a recent scar on the skin of the forehead and an old one above and parallel to the left clavicle, the latter being 5 centimeters long.

Post-mortem staining is present over the lower part of the back, but is slight. Rigor mortis still persists in all the limbs. No foreign body is found in any of the orifices. The soft parts covering the skull are divided by an incision carried transversely over the head, and are then reflected back. The skull cap is sawn through with difficulty, it being a centimeter thick in front. There is no left frontal sinus, that on the right side being small. The dura mater is slightly adherent to the skull cap. Its surface is pale, the blood vessels being empty. The vessels of the pia mater are found to be somewhat distended with blood. The brain being removed, there is no appearance of serum or of any other effusion on the basis cranii. There is no sign of injury to the bones of the base. On cutting into the lateral ventricles, they are found to be of normal size and to be moist. Choroid plexuses are of a dark red color. The other ventricles are empty. The consistence of the brain is good, the substance of the cortex being gray, as was also that of the corpora striata and optic thalami. Consistence of the cerebellum is found to be good. Nothing notable is observed. Pons Varolii is of a pinkish color, its consistence also being good. The medulla oblongata is pale. Nothing else worthy of note in connection with the skull cavities.

Thorax and abdomen: An incision is made from the larynx to the symphysis pubis, passing to the left of the umbilicus, some subcutaneous fat being found. The

omentum, containing a little fat, extends down into the pelvis. A few dark vessels are seen in it. No foreign body is found in the abdomen. The diaphragm comes down to the level of the sixth rib.

Thorax: On separating the soft parts from the front of the chest, no sign of ecchymosis is to be found in the tissues. The costal cartilages are hard; being slightly ossified, are difficult to cut. On lifting the anterior wall of the chest, no vessels of any consequence are wounded; no fluid is found in the chest. Both lungs are firmly adherent to the chest walls. On opening the pericardium, 200 c. c. of a turbid, brownish fluid are removed. The left ventricle is firmly contracted, but the other heart chambers are only moderately so. The heart is the size of a big fist. The right and left coronary arteries are tortuous and full of blood. Their walls are a half millimeter thick at a point measuring half their length. The right auricle contains 30 c. c. of black, fluid blood, but no clots. The right ventricle contains 35 c. c. of blood of the same character as that found in the right auricle. The right auriculo-ventricular orifice admits two fingers, and a third, partly. The right auricle is full of soft clots, and, besides this, contains 30 c. c. of fluid blood. The left ventricle is practically empty. On removing the heart, a quantity of blood gushes from the large vessels. The left auriculo-ventricular orifice is abnormally large, admitting the tips of four fingers. Both leaflets of the mitral valve are found to be much thickened, and nodular. On one there is a granular spot covering a space 1 sq. cm. in area. The aortic leaflets are found to be normal, and the valve, therefore, functional. The other valve leaflets are soft, unthickened, and functional. The wall of the left ventricle is 3 cm. thick and is of a red color. The heart weighs 350 grams. The surface of the left lung is closely adherent to the parietal pleura. The adhesions are very vascular, and the operation of removing the organ is an especially bloody one. The anterior half of the left lung crepitates, and the organ, as a whole, floats; but the posterior half, from the apex to the base, is solid and noncrepitating and takes the lowest position in the vessel. Many enlarged glands are found at the root of the lung. On cutting into the posterior solid portion of the lung, the knife is followed by a profuse, serous, frothy fluid. The whole of the cut section of this part is of a mottled, blackish-gray color, except at the apex, which, being also less solidly infiltrated, is pink in color. The anterior, crepitating part of the lung presents, on section, a reddish color, though here also is considerable pigment—(coal dust?). The knife here is not followed by fluid; but a little frothy serum can be squeezed out. The right lung is much softer than is the left. It has shrunk to smaller dimensions since its removal, and crepitates generally. At the postero-external surface of the apex of the right lung is a white chalk-like nodule. Section through the right lung is not followed by any special amount of fluid, though the cut surface is moist. At the right apex a few tubercles are found. The color of the section is a that of a mottled blackish-gray. In places there are decidedly reddened areas, and considerable red serous fluid can be scraped from the cut surface. The base posteriorly is very red. Numerous black nodules are found scattered through the right lung, none being in the left. They are of the size of a buckshot, are very hard, and, when cut, the knife seems to be going through soft sandstone. The left lung weighs 1,180 grams; the right, 720. The stomach is somewhat distended, a few pink vessels being seen on its surface. The intestines are of a grayish color and are slightly distended. The jejunum is found adherent, in a great part of its length, to the posterior abdominal wall, as well as to the ileum, the adhesions being separated only with difficulty. The separated surfaces are only rough—not bloody. The large intestine presents nothing noteworthy. Numerous chalk-like deposits of about the size and shape of a small pea are found sattered through the mesentery, being especially numerous in that of the upper part of the jejunum. The vessels of the mesentery are filled with dark blood.

The upper surface of the right lobe of the liver is adherent to the diaphragm and presents several flat accretions of irregular shape, varying in size from that of the little finger to that of the thumb nail, and are about a half cubic centimeter thick in

the thickest part. These bodies are found to be intimately connected with the capsule of the liver—indeed, seem to be located in that structure. A buckshot, which must have traversed the liver to reach the position it occupies, is removed from the liver hilus. The weight of the liver is 1,730 grams. The gall bladder contains 25 c. c. of a greenish-yellow fluid bile. The ducts are patent. The right kidney is found to be much enlarged, weighing 250 grams; the left weighs 150 grams. Neither organ presents anything worthy of note on section. The suprarenal capsules present nothing noteworthy. The bladder contains 50 c. c. of urine. The spleen is very friable and can only be removed in pieces. It can not be measured accurately or its exact weight obtained.

Because of the disease of the kneejoints present upon and during his second admission, the right joint is examined.

External appearances: There is greater fullness of the soft tissues lying on each side of the patella than is usually seen in the case of a healthy joint. It is evident on palpation that there is thickening of all the tissues about the joint, and more especially of the deeper structures. There is no pitting on pressure. The knee can scarcely be moved because of rigor mortis, but as the joint is bent to the slight degree possible, a little grating is felt.

Internal appearances: The ligamentum patellæ is now cut across and the patella turned up. There is found a considerable amount of a thick, viscid fluid, much like the white of an egg, except as to its color, which is a greenish-yellow. The under surface of the patella is rough. The cartilages of both divisions of the under surface of the bone present a yellow, soft area the size and shape of a lima bean, that on the left surface being somewhat larger than is that on the right. In the middle of the latter area is an umbilicated depression, into which a probe passes to the depth of seven millimeters, passing through and against bone. Though the other surface is soft, it yet can not be scraped away as easily as can the right. As both knees present exactly the same external appearances, and as, antemortem, they were affected in the same way, it is not thought necessary to examine the interior of the left kneejoint.

In some respects this was a peculiar case. Antemortem, the right lung was thought to be the seat of the disease, whereas, though it was invaded by a moderate œdema and this œdema was probably the immediate cause of death, the most important pathological process was located in the posterior half of the left lung. This was not a true lobar pneumonia, though it had some appearances of it; but the location of the trouble in the posterior half of the lung, from apex to base, the anterior part of even the lower lobe being free from infiltration would go to indicate diffuse tubercular inflammation, though tubercles were not certainly recognized. Another peculiarity of the case was the location in the right lung (none being found in the left) of lumps of a carboniferous nature—feeling and cutting like blackboard crayon, and black in color. The man was a coal heaver on a river boat, and there is no question these masses were aggregations of the coal dust he had breathed in. But why should these masses occur in the right lung only and not at all in the left?

The white, chalky deposits found between the liver and diaphragm and the old adhesions found binding the small intestines to each other and to the posterior abdominal wall are simply the evidence, in all probability, of an old peritonitis, caused by the shot found in the liver hilus. This was the trouble no doubt, causing the distension of the belly which was present during the man's first admission. The appearances in the kneejoint opened are too hard to interpret; probably, however, the pathological processes noted were "rheumatic" in their nature, whatever that is. No tubercular process could be recognized, at any rate.

C. E. D.
A. H. G.

TUBERCULOSIS OF PROSTATE GLAND.

S. G.; aged 42 years; nativity, Jamaica; admitted to United States Marine Hospital, Boston, Mass., September 29, 1896; died March 16, 1897.

History.—Has had several attacks of gonorrhœa, the last of which occurred seventeen months ago. Otherwise health has been good. Two weeks ago he began to be annoyed by a frequent desire to micturate and inability to void urine without straining. These symptoms are now present and he also has pain in both hips resembling sciatica. No cough. Appetite fair. Bowels constipated.

Physical examination.—Body fairly nourished. Chest and abdomen negative. No. 25 French sound passes into bladder readily and without much discomfort. Urine contains small quantity of albumen, pus corpuscles, and bladder epithelium.

Clinical history.—Irrigation of the bladder together with internal medication was employed for the relief of the cystitis; but there was something more serious than that, which our treatment failed to reach. With no other than the vesical symptoms the patient's decline was progressive.

December 17, 1896.—There was a free hemorrhage from the bladder which continued at intervals for two days and then stopped.

March 8, 1897.—Until to-day the catheter has been demanded only occasionally; but from this date the urine was drawn at regular intervals. Heretofore the sediment has been moderate in amount, but now the urine has much the appearance of bloody gruel and no amount of irrigation will remove all the detritus.

March 16, 1897.—For the past eight days there has been little change from the condition described above. The vital forces gradually failed and death occurred at 1 p. m.

Necropsy (twenty-four hours after death).—Body that of a negro very much emaciated. Calvarium removed. On the right side in the temporo-sphenoidal region the internal surface of the skullcap was slightly elevated, red, and soft. There were four other similar spots on the same side, each about 2 cm. in diameter. Dura mater adherent to brain along the entire length of longitudinal fissure. Pia mater covered with a gelatinous coat; its vessels were injected. The interior of brain showed no pathological changes. Weight 1,310 grams. Abdominal viscera in normal position. On opening the thorax the lungs filled the pleural cavities, and they did not collapse. External surface mottled gray. Pericardial sac contained 50 c. c. bloody serous fluid. Beneath the pericardium were numerous small white specks 0.5 cm. to 1 cm. in diameter. On section the myocardium was found to be thickly studded with these small granular bodies and they were visible in large numbers beneath the endocardium. Both auricles distended with mixed ante and post mortem clots; left ventricle firm and filled with clotted blood; right flabby and nearly empty. Endocardium of aortic and mitral valves bright red; the arch of the aorta was similarly discolored; weight 335 grams. Both lungs congested posteriorly, but otherwise normal. Spleen so firmly bound to the under surface of diaphragm that it was lacerated in its removal. Two small nodules of splenic tissue in the gastro-splenic omentum. On section the organ seemed tough; the pulp was almost black; weight 170 grams. Pelvis of left kidney filled with urine; ureter dilated sufficiently to admit a lead pencil; capsule adherent; the cut surface was dry and red and the outlines were indistinct; weight 205 grams. The suprarenal capsules resembled pancreatic tissue. The bladder is irregular pyriform in shape, firm to the touch, and its summit extends well above the pubes. The wall was 1.5 cm. in thickness and yellowish white in color. The three layers were distinct and each was thickened. The epithelium was apparently destroyed and its place supplied by connective tissue. The organ contained 200 c. c. of thick reddish gray fluid. With the finger 50 grams of a grumous pultaceous substance, resembling broken-down lung tissue, were removed from a pocket behind the prostate. This gland was next removed and found to weigh 265 grams. It was fairly regular in outline; its length rather exceeded its breadth; firm under the knife; its cut section was yellowish white. Urethral

mucous membrane injected. Right kidney differed in no respect from its fellow. Liver dark brown in color; very soft and friable; blood ran freely from its cut surface; weight 1,730 grams. Gall bladder filled with dark green bile; ducts patulous. Stomach distended with gas. Small intestine presented no abnormalities. The colon contained a considerable quantity of solid fecal matter. Mesenteric glands slightly enlarged. The retro-peritoneal glands formed a sausage-shaped mass on either side of the spinal column extending from the upper border of sacrum to the under surface of the diaphragm.

E. K. S.
H. W. A.

TUBERCLE OF LUNG.

Case 1.

J. M.; age, 21 years; nativity, Austria; was admitted to United States Marine Hospital, New York, May 28, 1896; died October 16, 1896.

History.—Has been sick for sixteen months previously to coming to hospital. First caught a cold and was laid up for seventeen days. Thinking that he was about well, went back to work. Began losing flesh and the cough was very annoying, especially at night. He was soon too weak to work and had to lay off. Marked tuberculosis of apices of both lungs. Later on the left lung became dull over its entire surface and only tubular breathing could be heard.

Had troublesome diarrhœa all the time. Died of exhaustion.

Necropsy (fourteen hours after death).—Brain normal; mesenteric glands enlarged; tubercular ulcers in ileum; kidneys small and hard; liver congested and enlarged; heart not enlarged; one leaflet of tricuspid valve bound tightly to heart wall, preventing closure; other valves normal; left lung tissue so tightly bound down that it was hard to dissect out; the breathing capacity seemed entirely destroyed. Miliary deposits—no cavities. There was very little normal tissue in right lung, the diseased portion being as bad as the left lung. A large caseous deposit, the size of an apple at the apex, was beginning to break down.

J. O. C.

Case 2.

J. W.; colored; female; age, 28; nativity, Mississippi; admitted to the United States Marine Hospital, St. Louis, Mo., November 6, 1896; died January 14, 1897, at 1.45 a. m.

History.—Has had good health until about a year ago, when she began to have a dry cough, which produced pain in chest. She expectorated at first only occasionally. She was admitted to this hospital July 31, 1896, on account of this cough, staying until August 6, 1896, the diagnosis being acute bronchitis. She was discharged as recovered. There is no note of the examination of sputum. Two years ago a part of the left breast, including the nipple, was removed because of a tumor. The patient has had five children. She has been separated from her husband for three years. The patient's mother and a brother are living. Several brothers and sisters have died, but the patient does not know the causes of their deaths. The patient's occupation has been that of chambermaid on river passenger boats. Since leaving this hospital in August the patient's cough has become progressively worse, and the sputum has increased. She has considerable pain in sternal region. Her appetite is poor, and bowels irregular.

Physical examination.—She is in very good flesh. There is slight anemia. The left breast is about half the size of the right and presents a transversely-situated scar 10 cm. long, its middle occupying the usual site of the nipple. Palpation of the chest reveals increased vocal fremitus over both infra clavicular regions. The percussion note has a higher pitch over the right than it has over the left infra clavicular region. Auscultation reveals a considerably roughened respiratory murmur

over both apices, that over upper half of right lung amounting to pronounced bronchial breathing. No râles heard. The heart is normal, apparently, but the pulse is extremely weak. Examination of the urine shows the kidneys healthy. No examination of the generative organs is made, the patient stating that her menstruation is regular and that she has no trouble with the pelvic organs. Although, for lack of a lens of sufficient power, no examination of the sputum for the tubercle bacillus could be made, the diagnosis of tubercle of the lungs was thought certainly justified, on the strength of the history of the patient and the physical signs found on exploring the chest.

Treatment.—The patient was ordered strychnine sulphate 0.003, in solution, before each meal; creosote, beginning with 3 drops, in 5 to 10 c. c. glycerin, after each meal, the dose to be increased 1 drop each day. (The dose reached 27 drops, three times a day, without disturbance of the kidneys; increase beyond this, however, affected her appetite; she took this dose, with occasional reductions to 15 or 20 drops, and again increased, until January 11, when, because her stomach rebelled, the dose was reduced to 15 drops three times a day, which she took until her death.) The patient also ordered cod-liver oil 15 c. c., mixed with an equal amount of malt extract, to be taken one hour and a half after each meal. She was put on a very generous diet of milk, eggs, meat, and corn mush (which she specially craved), and was directed to spend all of each day, rain or shine, out of doors. For her cough she had codein and, occasionally, a dose of morphine at night when her cough was specially distressing. Her bowels were regulated as necessary, sometimes by cascara, sometimes by magnesium sulphate.

The above treatment, modified occasionally, as seemed best, by the withdrawal of the strychnine or the cod-liver oil or decreasing the creosote, and with the occasional prescription of sherry wine to be taken with her meals, was continued throughout her illness. She soon began to gain markedly, her cough and fever lessening and also the amount of her expectoration. Late in November she began to complain of the pain caused by a nodule about the size of a large almond situated deeply between the second and third ribs high up in the axilla, about 12 cm. from the middle of the scar in the left breast. She had noticed it for some time, she said, and it was rapidly growing larger. She claimed that it swelled at the menstrual periods and that the pain from it was then especially severe, radiating down the side of the chest, into the breast, and down the arm. No other tumor could be felt. The skin over it was movable, though it puckered a little when one tried to lift it away from the lump. The tumor was tightly adherent to the ribs between which it lay.

The patient's general condition having improved so much and she being desirous of getting rid of the "cancer," for such she was sure it was, she was chloroformed on December 4, 1896, and the tumor removed. During the process of clearing out possibly infected tissue (it being assumed that the tumor was a possibly cancerous lymphatic gland) the axillary vein was slit longitudinally for a distance of about 2 cm. The flow of blood for a moment was very great, but it was stopped by clamping the vein with hemostatic forceps above and below the wound and the slit was then closed with a continuous fine catgut suture. No further trouble was experienced with the vein and there was no post-operative interference with the venous circulation in the limb. The wound was closed without drainage and healed by first intention, though one small stitch abscess occurred. The tumor removed was, apparently, an enlarged lymphatic gland and was 3.50 cm. long, 2 cm. wide, and 1.50 cm. thick. No microscopic examination of it was made.

Though the immediate results of this operation were good, in that the patient was relieved from the rather severe pain of which she complained and also from her fear of the "cancer," the operation was, on the whole, really a detriment. The patient lost considerable ground as the result of the anæsthetic, loss of blood, and the few days' confinement, and never quite reached again the physical condition in which she was just before the operation. The case shows the unwisdom of operating on tubercular patients.

By the 1st of January the patient's dyspnœa was considerable, her respirations varying from 25 to 35 in the minute. Her temperature was subnormal, and she had occasional attacks of vomiting. All was done that could be done to improve her condition. She was kept out of doors most of each day; and she was given strychnine in large doses (.003 to .004, three times a day) and wine in liberal quantities, as well as a very nourishing diet; yet she failed slowly.

On the morning of the 14th of January she was found in bed when the regular sick call was made, though she could not lie down on account of her great dyspnœa, her respirations numbering 45 to the minute; she was also coughing a good deal. Five minims of Magendie's solution were ordered to be given hypodermically on account of the patient's great distress. This gave her some relief; but at 4 p. m. it was reported that she was in a stupor. Her respirations were very rapid and, in short, she was in an alarming condition. Active stimulation was ordered (strychnine nitrate, hypodermically, 0.004, and again in an hour, and alcohol by mouth). She was reported improved later, but at 7 p. m. she again became worse; she could be aroused only with difficulty from her stupor; her respirations numbered 45 in the minute, and her pulse, though not extremely rapid (90), was very weak (yet not weaker, to a marked degree, than usual). More strychnine (0.004) was ordered hypodermically, the dose to be repeated in half an hour; hot bottles were placed about the patient, and, by means of a tube introduced into the stomach through the nose (as the teeth were tightly shut and she could not be made to open them), 250 c. c. of hot, strong coffee poured into the stomach. Hot milk, with limewater, was given in half an hour in the same way, and half an hour later the coffee was repeated. Another dose of strychnine was given at 9. The result of this treatment was that, at 9 p. m., she could be induced to take hot milk by the mouth in the natural way and was able to answer questions. At 10 p. m. she was so much better in every way it was thought certain that she was out of immediate danger. Orders were left to watch her carefully and to report any change, and to give nourishment and stimulants frequently as directed. All went well until 1.45 a. m., when she turned over and died without a groan.

Necropsy twelve hours after death.—Body that of a colored female, apparently about 30 years old; about 160 cm. tall; no emaciation—in fact, there is considerable subcutaneous fat on body, the limbs being well rounded. No post-mortem stains. Across left breast there is a long scar, as described above, and another extending from high up in left axilla to the junction of the middle and outer third of the first-mentioned scar. The breast is free from nodules, and also the axilla. Rigor mortis is still present to a considerable degree, all the limbs being rigid. The neck, however, is quite flexible. There are no foreign substances in any of the orifices of the body excepting the vagina, from which issues a thin, white, very offensive fluid. The teeth are tightly clinched.

Cranial cavity.—The scalp, having been cut across the top of the head from ear to ear, is reflected forward and backward and the cranial cavity opened by sawing around the skull in the usual way. The scalp is of moderate thickness, and only a little blood exudes from the cut surfaces. The surfaces of the skullcap, both the inner and the outer, are not abnormally roughened. The dura is easily separated from the bone and the skullcap removed. The external surface of the dura mater is smooth. Through the membrane are seen large dark blood vessels in the pia mater. On reflecting it the inner surface of the dura is found smooth and shining. There is only a very small amount of dark clotted blood in the longitudinal sinus. The brain is now removed. The veins in the sulci on the upper convex surface of the hemispheres are much distended with very dark—almost black—fluid blood, which can be pressed about from place to place. Over the whole surface of the cerebrum are to be seen, on close inspection, very fine, bright-red blood vessels, these giving the brain as a whole a pink color. The general consistency of the brain is good. The weight of cerebrum is 1,180 grams. On careful examination no abnormality can be seen at the base of the skull. The membranes are smooth and shining, the large

arteries empty and soft and smooth. The transverse sinuses contain a small amount of dark fluid blood. On incising the hemispheres of the cerebrum in the usual way a few red points present themselves in the white matter, from which a little blood can be pressed with the back of the knife. The lateral ventricles are patent, the anterior and posterior cornua being widely open. The ventricles contain a small amount of clear fluid. The choroid plexus on each side is of a pinkish-red color, and in each is tortuous vein distended with dark blood, and fully as large as the "lead" in an ordinary lead pencil. The pineal gland is of a deep pink color. The corpora quadrigemina and the other great ganglia present, on section, nothing noticeable. The peduncles of the cerebrum, the pons varolii, the fourth ventricle and the valve of Vieussens, and the medula are also carefully examined, but show nothing unusual. The cortex of the cerebellum is of a pink color, because of the presence of numerous fine bright-red blood vessels, like those on the surface of the cerebrum. In the pia mater covering it are also large distended veins. On section, a few puncta vasculosa appear in the white matter.

Thorax and abdomen.—A continuous incision is carried from the larynx to the pubes, and the abdomen first opened. The subcutaneous fat is 1 cm. thick over the sternum and 2 cm. just below the navel. A slight puff of gas escapes when the peritoneum is nicked. Abdominal organs in their normal position. The omentum is very long, extending into the pelvis, and its meshes well filled with fat. The intestines lie quite flat; they are pale in color. There is no fluid in the abdomen. The diaphragm rises to the lower border of the fifth rib. Thorax: The sternum is removed from above downward, no vessels of any size being cut. The anterior border of the right lung extends nearly to the middle line; that of the left lung has receded to the outer border of the pericardium. No fluid in the right pleural cavity; 150 c. c. in left. No adhesions in either cavity. The thymus gland was not observed. The pericardium is smooth, both on its outer and inner surfaces; 150 c. c. of a straw-colored fluid taken from its cavity. The heart is of the size of the closed fist. The coronary veins are tortuous and distended; the coronary arteries empty and collapsed. The right auricle contains a small amount of fluid blood of a black color; the right ventricle also contains a little very dark (black) fluid blood and no clots. The auriculo-ventricular orifice admits two fingers. The left auricle contains a little very dark fluid blood, and a large "chicken-fat" clot. This is indeed so large as to at least half fill the cavity of the auricle. The left ventricle is full to distension of the same dark, almost black, fluid blood. (Its quantity can not be measured because of the lack of a sufficiently powerful syringe with which to withdraw it.) On removing the heart the aortic and pulmonary valves are found competent by the water test. On dissection the endocardium, both that of the walls of the heart and that of the valves, is found smooth, soft, and glistening. The auriculo-ventricular valves are competent. The coronary arteries present nothing noticeable. The heart's weight is 200 grams. The lining membrane of the aorta is smooth. There is nothing abnormal to be recorded of the other blood vessels or of the nerves in the thoracic cavity. Numerous caseous bronchial glands observed about the roots of both lungs. Both lungs removed. The right feels like a piece of liver. It crepitates only slightly; is nodular to the feel—lumpy; its surface is of a dark, mottled purple; numerous puckered cicatrices observed scattered over the surfaces of the three lobes, but are especially numerous about the apex. The lung has shrunk in volume very little since the thorax was opened. It floats. On cutting into it one has the same sensation of gritty toughness as when he cuts a coarse sponge (though of course the tissue can not be compressed like sponge). The cut surface presents numberless grayish-white spots, standing out clearly in the midst of the otherwise almost uniform purple of the surrounding tissues, the spots varying in size from a pin head to the end of a lead pencil, the latter being, apparently, aggregations of the former, and are mostly circular in shape, having dark centers. In places these large spots have fused. No cavities can be found. Considerable

dark, frothy blood can be pressed from the cut surface, and here and there on pressure a little thin, yellow fluid wells up.

The left lung presents precisely similar appearances and conditions, except that it has shrunk more than the right since removal, and therefore has more air space, and it crepitates much more. The whole surface of the diaphragmatic pleura is studded with minute, hard, whitish elevations, here and there aggregated into spots a centimeter or two in diameter. In passing the tips of the fingers over these spots one has much the same sensation as when feeling shark skin.

Abdomen: The spleen is removed. Its surface is wrinkled and the gland is very flabby. Its color is a dark grayish purple. On section, considerable dark, grumous blood follows the knife. The cut surface is of a black purple. The organ is 10 cm. long, 7.5 cm. wide, and weighs 80 grams. Left kidney, 11 cm. long, 5 cm. wide, and weighs 120 grams. Its color is of a dark bluish red. The capsule strips off easily. On splitting it in the usual way, the color of the cut surface is a moderately dark purple, the cortical portion lighter than the rest. A very little dark red, thin fluid can be scraped from the cut surface with the back of the knife. The Malpighian corpuscles stand out clearly. The supra-renal capsule is 3.5 cm. long, 2 cm. wide, and of a grayish color. It is connected to the kidney by a considerable amount of loose connective tissue. The right kidney is of the same size and weight as the left and presents precisely the same appearances. The same can be said of the right supra-renal capsule in comparing it with the left capsule. Bladder is contracted and contains only about 5 c. c. of urine. Its mucus membrane is pale. The vaginal orifice is potent and presents several cicatrices. There is about a teaspoonful of a thin, foul-smelling, whitish fluid in the canal. A few transverse rugæ observed. The color of the lining membrane is gray. The uterus is 6 cm. long, 4 cm. wide, and 2.5 cm. thick. The cervix shows no scar, but is extremely hard, as is also the body of the womb, the tissues being compressed only with difficulty, and cutting like hard leather. A small quantity of turbid, thin, mucoid fluid is found in the cavity of the organ. Its round ligaments are large and strong. The broad ligament is soft and elastic and not thickened in any part, and the internal generative organs lay in it in their normal positions and relations when the abdomen was first opened.

The right ovary is 4 cm. long and 2 cm. wide. It presents numerous small cysts with two or three relatively large ones and very little of the original tissue of the organ remains. The cysts are tense with a clear fluid which spurts out when the wall of the cyst is punctured with a needle. The color of the ovary, as a whole, is a dark bluish purple, due to numerous small blood vessels, full of dark blood, which ramify on and through the organ. The left ovary is of exactly the same size and appearance as the right. The distal end of each Fallopian tube is fused with the respective ovary, the fimbriæ being lost on the surface of the latter. Both tubes are patent from the wound to a point 2 cm. from the ovarian attachment of the tube. The duodenum being slit up, a teaspoonful of greenish-yellow, mucoid, fluid bile can be expressed from its duct into the gut. The mucous membrane is pale. The stomach contains 250 c. c. of a thick, yellow-white fluid. Numerous vessels distended with dark blood ramify through the mucous membrane. The edge of the liver extends to the costal margin. The gall bladder contains 25 c. c. of yellow-green bile. The ducts are patent. On being removed, the surface of the liver is found to be smooth and of a uniform dark purple color. The organ has an elastic feel and cuts easily, considerable dark, almost black, fluid following the knife. The organ weighs 1,000 grams. The jejunum contains a small quantity of bile-stained fluid. Its mucous membrane is slightly reddened in places, otherwise of a light slate color. The ileum has no ulcers in its walls and contains a small amount of fecal matter of the same character as that in the small intestine higher up, except that it is thicker in consistence. The appendix is 4 cm. long and the size of a large "angle worm." A small quantity of lumpy feces in the large intestine, which presents nothing worth noting.

Remarks.—The autopsy confirms the antemortem diagnosis. Death ensued because of the lungs being so consolidated that sufficient oxygen for the needs of the body could not enter the blood. The stupor present during the last few hours was that of asphyxiation—carbonic-acid poisoning. The uniformly almost black color of the blood testified to the small amount of oxygen that could be furnished the vital fluid. The lungs themselves presented a greater extent of consolidation than is usually present without cavity formation having begun.

C. E. D.

CASE 3.

G. C.; age, 29; nativity, Finland; entered United States Marine Hospital at San Francisco, Cal., January 29, 1897, and died March 15, 1897, at 7.45 p. m.

History.—Patient entered the hospital complaining of pain in right side, with cough, expectoration, night sweats, and emaciation. Physical examination revealed dullness in both apices, with bronchial breathing and coarse râles scattered over both lungs. Tubercle bacilli were found in the sputum. Treatment, expectant. Patient grew steadily worse, and died from exhaustion.

Necropsy (fifteen hours after death).—The body is much emaciated. Rigor mortis is well marked. The brain was not examined. The anterior mediastinum and thymus gland are normal. The pericardium is normal. The heart is pale, the cardiac muscle being thin and anæmic. The valves are normal. The right pleural cavity contains 1,600 c. c. of thick, creamy pus. The parietal pleura presents the changes of a severe grade of tubercular pleurisy; it is thickened, measuring from one-half to 1 cm. in thickness. The visceral pleura is thickened, being 2 mm. in thickness. The right lung is firmly contracted about its root; it measures 16 cm. in length, 9 cm. in width, and 7.5 cm. in thickness. It is everywhere invaded by the tubercular processes, and presents in its apex an abscess cavity 2 cm. in diameter. The left lung is normal in size, and is adherent everywhere to the parietes. It is tubercular throughout, and presents in its apex an abscess cavity 5 cm. in diameter. Scattered throughout the entire lung are numerous abscesses 1 cm. in diameter. The abdominal viscera are normal. The genito-urinary tract is normal. The spinal cord was not examined.

H. S. M.
J. G.

CASE 4.

Syphilis.

H. G.; age 31; a native of New York; was admitted to the United States Marine Hospital, San Francisco, Cal., January 16, 1896, and died January 10, 1897, at 10.45 p. m.

History.—On entrance patient gave a distinct syphilitic history and had mucous patches in his throat. Disease advanced rapidly, and soon he was unable to breathe. Laryngotomy was then successfully performed. This greatly improved his condition for a time. He was, however, unable to swallow any solid food, owing to involvement and loss of the epiglottis. Later tuberculosis of lungs developed and death resulted.

Necropsy (twelve hours after death).—Brain and meninges normal. Larynx: epiglottis entirely gone; œsophagus normal. Heart pale, and slightly enlarged. Coagulated serum in both pleuræ. Lower two-thirds of right lung studded with tubercles; cavity, also, in lower part of middle lobe; extensive tubercular involvement of left lung; small cavities in apex. Liver congested. Spleen slightly enlarged. Kidneys: small rough stone about 0.5 cm. in diameter in pelvis of right kidney; both otherwise normal. Genito-urinary apparatus normal

J. H. O.
J. G.

CASE 5.

Softening of brain.

W. H., negro; age, 19 years; height, 5 feet 7 inches; was admitted to United States Marine Hospital at Wilmington, N. C., March 2, 1897, and died May 7, 1897.

History.—This patient was transferred from hospital at Charleston, S. C., with a history of tuberculosis of lungs of about one year's duration. He was greatly debilitated on arrival. He improved somewhat for the first month, then slowly failed. For four days, just before his death, he was comatose, which condition had supervened rather suddenly, without previous confinement to bed. There was no general paralysis, though he had involuntary evacuations of urine and fæces at this time during his stupor.

Necropsy (twelve hours after death).—The pleuræ were found adherent in places, and both lungs filled with tuberculous masses where not broken down into large cavities, the left lung being a mere shell. The pericardial sac was normal. The heart weighed 270 grams, was pale in color, and all the cavities rather small and thin, walls thin, the aortic and mitral valves were good, the pulmonary and tricuspid valves were obstructed from action by a thrombus, well organized antemortem, that nearly filled the right ventricle, extending thence into and partly closing the pulmonary artery and the auriculo-ventricular opening. The membranes of the brain were somewhat thickened and congested, the veins prominent. The cerebro-spinal fluid was abundant. The brain weighed 1,260 grams, and was affected by general softening, especially about the corpus callosum, the posterior lobes, and the crura cerebri, where the white matter was in some spots nearly the consistency of cream. Other organs not particularly examined, though apparently fairly normal. The immediate cause of the coma and brain softening was, probably, the impeded cerebral circulation due to the cardiac ventricular thrombus and the tuberculous lungs; and death followed rapidly from want of proper innervation and general circulation of the blood.

R. D. J.
J. V.

CASE 6.

A. S.; age, 30; nativity, Kentucky; was admitted to the United States Marine Hospital, Cincinnati, Ohio, August 11, 1896; died September 14, 1896.

History.—Patient had been in this hospital several times before for lung trouble and once for secondary syphilis. Patient very much emaciated; left lung showed marked signs of tubercular infection, there being dullness over upper lobe and tubular breathing being present; had a slight hacking cough, night sweats, and an intractable diarrhea. There was lymphadenitis of both groins and axillary of left side. Patient's mental condition was not good. He gradually grew weaker and died suddenly.

Necropsy (seven hours after death).—Body very much emaciated; post-mortem rigidity marked. Brain: dura thickened and adherent to skull; marked congestion of the pia present; brain substance somewhat softened; arachnoid spaces filled with fluid; weight, 1,519 grams. Lungs: pleura of left adherent to chest wall and the lung substance was congested and contracted throughout small cavity in upper lobe of left lung; weight, 248 grams; right in same condition excepting the cavity; weight, 341 grams. Heart was small, but otherwise normal. Abdomen: peritoneum thickened, inflamed, and adherent to intestine with tubercles scattered over it. The mesenteric glands were enlarged, hard, and some of them caseous. Spleen: enlarged, hard, and granular; weight, 310 grams. Stomach normal. Liver: signs of perihepatitis present; weight, 1,581 grams. Kidneys normal, except hilum, which was inflamed in each; weight of right, 279 grams; left, 186 grams. Intestines: small were congested throughout, and several small tubercular ulcers were found; the colon was congested throughout, but no ulcers were found.

J. W. S.
J. O. C.

CASE 7.

J. B.; age, 49; a native of Sweden; was admitted to the United States Marine Hospital, San Francisco, Cal., November 7, 1896, and died January 10, 1897, at 8 p. m.

History.—On entrance he complained of cough and profuse expectoration, night sweats, and a feeling of weight in the chest. Physical examination revealed a marked dullness of both lungs, and bacilli of tuberculosis were found in the sputum. Toward the end he had very severe pains in the abdomen and an obstinate diarrhea.

Necropsy (fifteen hours after death).—Brain and meninges normal. Heart pale and flabby. Firm adhesions of both pleuræ, and bronchial glands enlarged. Lungs: right, several cavities in apex; lobes studded with tubercles; left lung in same condition. Liver pale. Spleen very soft. Kidneys normal. Mesenteric glands enlarged. Numerous ulcerations in small intestines. Genito-urinary apparatus normal.

J. H. O.
J. G.

CASE 8.

L. P. (colored); age, 47; nativity, Virginia; admitted to United States Marine Hospital, Baltimore, Md., May 25, 1897; died June 3, 1897.

History.—Patient was transferred to this hospital from Norfolk, Va., with recorded diagnosis of tubercle of lungs. Family history negative. Had gonorrhœa and sore on penis which was not followed by secondary manifestations. He said he had been quite healthy until seven months ago, when he was attacked with a cough, which was worse in the morning. He soon began to have night sweats, pain in chest, and he has lost about thirty-five pounds since the onset of his trouble. Gives history of having had a pulmonary hemorrhage three months ago. On admission he was emaciated, complained of dyspnœa, cough, free expectoration, and pleuritic pains confined mostly to the right side. Night sweats were at times troublesome and he had but little appetite. Physical examination revealed a small vomica at right apex and considerable involvement of the right lung. Left apex was also involved. For two days after admission the morning temperature record was subnormal. On the third day and after, however, the temperature was normal in the forenoon, with slight exacerbations in the afternoon. Pulse range was between 90 and 120. Patient was put on tonics and the usual remedies in such cases, and for a few days he felt fairly well until June 1, when he was attacked with a diarrhea, which was only partially controlled by astringents.

June 2.—Patient was very weak and the pulse scarcely perceptible at the wrist. Stimulants were freely administered and kept up, but patient gradually grew weaker and died June 3, 1897.

Necropsy (eight hours after death).—Rigor mortis not specially marked; body emaciated. Male, colored; height, 5 feet 5 inches; weight, about 95 pounds. On removing the calvarium the skull was thin and the membranes normal; brain weighed 1,050 grams and was normal. Bronchial glands enlarged. Pericardium was apparently normal and contained about 30 c. c. of clear serum. Heart weighed 280 grams. Numerous post-mortem clots were found among the musculi papulares and calumnæ cornæ. The valves were apparently normal and competent. The aorta contained a blood clot several inches in length. Openings of coronary arteries were patent. Pleuræ: the right pleura showed evidences of chronic inflammation, the pulmonary and costal layers being adherent throughout their entire extent; the left pleura showed some adhesions, though to a less extent.

Right lung weighed 1,060 grams, nodular to the touch, and on section a vomica was found extending from the apex through the two upper lobes and contained considerable quantity of a light-colored and offensive pus. The walls of the cavity were smooth, fibrous, and traversed by connective tissue bands. The lower lobe contained numerous tubercular nodules. Left lung weighed 1,130 grams. The upper lobe, on section, showed numerous tubercular nodules, most marked at apex, and small cavities. The lower lobe contained but few of the caseous masses. Liver

weighed 1,450 grams, somewhat congested, but otherwise normal. Gall bladder distended with bile and its ducts pervious. Spleen, weight 355 grams; surface smooth. On section it was of soft consistence, congested, and of a dark color. Kidneys, combined weight 285 grains; capsules easily separable, and on section were normal in appearance. Abdominal glands considerably enlarged, stomach empty. Intestines apparently normal. Vermiform appendix about 3 inches in length and normal. Urinary bladder contained about 200 c. c. of urine. Organs of generation apparently normal.

G. P.
J. McM.

CASE 9.

Abscess of brain—mitral disease.

P. S.; aged 49 years; nativity, Ireland; admitted to United States Marine Hospital, New York, N. Y., April 12; died May 28, 1897.

History.—Patient a white man, 1.74 meters high, weight 63.6 kilograms, black hair, reddish mustache, blue eyes, ruddy complexion, hollow cheeks, and deep set eyes; was never in a hospital before; has a bad cold now, is short winded and coughing almost constantly; tongue coated, and has severe diarrhea; has troublesome headache.

On physical examination both the lungs were found to be badly infected. There were no cavities. There was extensive pleuritic adhesions on both sides. Tubercle bacillus found; urinary analysis negative; heart's action strong and bounding; mitral insufficiency; has œdema of legs; has to urinate frequently. The patient did well till May 21, when just before morning rounds and while walking in the hallway he fell to the floor in a helpless condition. He was not unconscious. He was picked up and put to bed. It was found that his left side was paralyzed; sensation was not affected; motion began to return to the hand and arm in about an hour; speech center slightly affected. Says he has had similar attacks before, the last one being about five years ago; never had fits; does not know what caused previous attacks. The day following had involuntary passage of urine and feces; bronchi filling up with mucus; almost impossible for him to swallow. Died of exhaustion.

Necropsy (eighteen hours after death).—Calvarium removed. Dura very adherent to skull, and had to be torn off with considerable force. Considerable fluid in arachnoid. The membranes were firmly adherent to brain over the paracentral lobule and marginal convolutions. The external blood vessels were very much engorged. An abscess about the size of a walnut was found in the motor area on the right side. About 2.54 cm. in front of the abscess there was a spot about the size of the abscess which was undergoing softening. The right optic thalamus was quite soft and pulpy. The ventricles were filled with fluid. The sinuses and blood vessels were normal. The left ventricle of the heart was thickened and enlarged. The mitral valve did not close properly because of vegetation on the valve. Other valves normal. The aorta was enlarged. The pericardium was normal. The pleuræ were firmly adherent to lungs and chest walls. Lung studded throughout with tubercles. There were no abscesses and only a few broken-down foci. The diaphragm was normal. The omentum was normal. The spleen was pulpy. The right kidney was normal. The left kidney contained a small tuberculous abscess in the central portion. Suprarenal capsule adherent. Urinary bladder, organs of generation, rectum, duodenum, and stomach were normal. The gall bladder was distended and had a few bands of adhesions to omentum. Gall ducts, liver, pancreas, mesentery, great vessels, and small intestines normal. The descending colon had undergone atrophic changes. The lumen was much diminished for several inches, the gut not being as large in circumference as the small intestine. There were no ulcers, scar tissue, or change in the mesentery to account for the condition.

J. O. C.
G. W. S.

CASE 10.

W. P.; aged 23 years; nativity, Massachusetts; admitted to United States Marine Hospital, New York, N. Y., October 16, 1896; died May 5, 1897.

History.—Patient caught cold two weeks before admission. He is coughing a great deal, and expectorates a yellowish, tenacious mucus. Has pain in left side. There has been no hemorrhage. Is short of breath. Appetite poor, and vomits often. Has lost weight and is quite thin. Family history, negative. Heart normal. Urinary analysis, negative. Has night sweats. The patient improved for a short time. From January on he began to lose ground rapidly. He lost weight very fast, though the lesions in the lungs did not seem to be much worse. During the month of March the feet and legs up to the knees became œdematous. The urine was loaded with albumen. The right lung found to be badly infected. Died from exhaustion.

Necropsy (seven hours after death).—Calvarium removed. The skull, sinuses, membranes, and brain normal. There were no pathological conditions found in the anterior mediastinum. The heart and pericardium were normal. In the left lung at the apex there was a large abscess cavity which contained about 400 c. c. of pus. The entire lung tissue which had not been destroyed by the abscess was consolidated with tuberculous material. The right lung was also badly infected, and there were several small foci breaking down. The pleuræ were adherent. The bronchial glands were indurated and much enlarged. The great blood vessels were normal. The omentum was as thin as tissue paper, containing here and there small deposits of fat. The spleen was normal. Both kidneys were large, very red, and congested. The capsules were not adherent. The suprarenal capsules were apparently normal. The bladder was empty. The organs of generation, rectum, duodenum, stomach, gall ducts, liver, and pancreas were normal. The mesenteric glands were badly infected. The appendix was larger than normal, was bound down with adhesions at the apex by means of a badly infected mesenteric gland. The caliber of the small intestines for several inches in different portions of its course was lessened. The wall of the small intestine was thicker than normal, feeling like stomach on section. It was noticed that the glands of the mesentery of these sections were very much inflamed and indurated. There were no ulcers in the intestines, nor had there been any. The large intestines and great blood vessels were normal.

J. O. C.
G. W. S.

CASE 11.

H. M.; aged 52 years; nativity, Sweden; admitted to United States Marine Hospital, New York, N. Y., June 10, 1896; died April 10, 1897.

History.—A white man 1.7 meters high, weighing 57.3 kilograms, normal weight being 72.3 kilograms. He has brown hair and blue eyes. Has been ill for six months with bad cough and dyspnœa. He can lie only on left side. Has dizziness when looking upward, and is very weak. He has pain in mediastinum which is constant but not severe. Has night sweats. Expectoration is thick, yellow, lumpy, and purulent. Expectorating some blood. Has no appetite. Is troubled with headache and nausea at times. Has constipation and rheumatic pains in shoulders. Throat has been sore at times during his illness. Subcrepitant rales and prolonged inspiration of right lung. Respiratory murmur good everywhere. Tubercle bacilli were found in sputum. No albumen or sugar was found in his urine. In November, 1896, he had a few intestinal hemorrhages and diarrhea. This stopped after a few days, and he was not troubled again. In March he began to fail, and he grew weak rapidly. He could not retain anything on stomach or digest enough food to sustain him, and he rapidly grew worse. His pulse grew weaker and more rapid and thready. He died April 10, 1897, of exhaustion.

Necropsy (fifty-two hours after death).—The body was that of a white man, 1.7 meters high; weight 56.9 kilograms; apparent age 50 years; had brown hair and blue eyes; the pupils were slightly dilated; emaciation was considerable; lividity,

none; there was a bluish-gray discoloration of abdomen, the surface of which was depressed slightly below the level of the thorax. The thorax was of normal size and formation. Rigor mortis well marked. The calvarium was removed and the following conditions were noted: The skull cap, the brain cap, sinuses, and all the vessels were normal; the cerebrum, cerebellum, ganglia, and membranes were normal. Thorax: Nothing abnormal in anterior mediastinum. The pericardium was normal, the sac containing 10 c. c. of yellowish fluid. One leaflet of the mitral valve was destroyed. The pleuræ were adherent generally to the chest walls. The lungs were adherent to pleuræ and were solidified and softened. Three small abscess cavities in both lungs. The arteries, veins, and nerves and diaphragm were normal. Abdomen: Stomach distended; intestines normal; in the end of vermiform appendix was discovered a calcareous mass 22 mm. in diameter, the organ being 7.5 cm. long. The mesenteric glands had undergone calcareous degeneration, consisting of masses 10-26 diameter. The liver was enlarged and friable. The gall bladder was normal. The bladder was empty, but normal. The kidneys, pancreas, spleen, and genital organs were normal.

J. O. C.
G. W. S.

CASE 12.

F. S.; aged 37 years; admitted to United States Marine Hospital, New York, March 31, 1897; died April 17, 1897.

History.—Was in Savannah hospital, November, 1895, to February, 1896; transferred to Wilmington until March 23, 1896; no other hospital since. Appetite poor. Sour taste in mouth. Bowels alternately irregular. Patient has light complexion, blue eyes, brown hair and mustache, 1.74 meters high, and weighing 61.3 kilograms. He dates his present trouble from an attack of la grippe about three years ago; was sick three weeks in this hospital at that time and has been ailing nearly all the time since, although able to work at times; he has been working for nine months now. He has been coughing night and day. Expectoration has been varying from grayish-white to greenish. He has lost 18 kilograms in three years. Sometimes he gets sore in back after coughing; always feels sleepy and tired and weak; he can lie only on right side, as when he lies on left side or his back he hears a sound like music, as the creaking of a door, which keeps him awake. He has very great dyspnœa on exertion. Had profuse night sweats a year ago, but not so bad now, but has fever at night.

Physical examination: Apices and upper lobes of both lungs affected. Heart normal; is very pale. Face shows effort to breathe. Chest lifted upward on inspiration. Lower intercostal spaces drawn inward. Vocal resonance increased on left side. Pulmonary resonance diminished and lost in left upper lobe; is diminished over right apex. Amphoric and bronchial breathing in left lung. Mucous and subcrepitant rales in right apex. No œdema of feet. Sputum loaded with tubercle bacilli. Cough and dyspnœa remained about the same. Nausea checked by drugs. Pain on right side when coughing. Expectoration tenacious. Pain in chest continued in left side. On the 15th of April left side of chest was strapped, but this increased his dyspnœa too much, so it was discontinued next day, April 16. April 17 was very weak. Breathing very rapid and shallow. He became weaker rapidly. Pain severe in left side. Morphia and stimulants ordered. At evening rounds, 5.30, pulse was very weak and dyspnœa considerable. Stimulants were ordered. He rapidly failed, and died about 6.40 p. m. of exhaustion.

Necropsy (sixteen hours after death).—White man, 1.74 meters high. Light hair and moustache; blue eyes, pupils slightly dilated; weight 59.1 kilograms; emaciation slight; rigor mortis marked; lividity, none anterior but considerable posterior and most dependent parts of body. Pus poured from mouth as body was moved about. Calvarium removed and found normal. The sinuses, membranes, and vessels were normal. The cerebrum and cerrebellum were normal. The lateral ventricles con-

tained 5 c. c. of serous fluid. Thorax well developed. Glands in anterior mediastinum were tuberculous. In inferior portion near sternum there was a small abscess. Pericardium contained 50 c. c. of fluid. Tricuspid valve was incompetent, otherwise heart was normal. Pleura on right side normal, on left side was adherent anteriorly to left lung and chest wall. At base was a sero-purulent exudate, slight in amount. Left lung contained numerous abscess cavities and the base was consolidated. The right lung was consolidated and softened slightly. The vessels and nerves were normal. Diaphragm normal. The abdomen was full and on level with chest. Organs occupied normal positions. A few mesenteric glands were enlarged. Kidneys were both congested and enlarged. Suprarenal capsules adherent. Pancreas was normal. Spleen was normal. Gall bladder was distended. The bladder was normal, as were the genital organs.

J. O. C.
G. W. S.

CASE 13.

R. S.; aged 24 years; colored male; was treated in United States Marine Hospital, Louisville, Ky., February, 1896, for fistula in ano, which was opened and scraped. At this time there were signs of consolidation of apex of left lung. Fistula healed and patient discharged April 26, 1896, to be readmitted November 24, 1896, suffering from tubercle of lung. From this time case ran usual course, patient dying February 3, 1897.

Necropsy (six hours after death).—Body much emaciated; rigor mortis well marked; abdomen slightly green; scrotum and glands contracted and bluish; hands large; nails long. Eyelids partially closed; pupils dilated and equal. Cornea firm. No cicatrix observed. Lips closed. No foreign body about nostrils. No perceptible marks of external injury.

Thorax and abdomen: An incision is carried from chin to symphisis pubis, dividing the integument of neck and thorax and opening abdomen. Arch of diaphragm between fourth and fifth ribs on both sides. Intestines not distended. Chronic pleurisy on left side. Pleura very thick and covered with pyogenic membrane. Cavity contained about 300 c. c. of pus. Heart small and contracted; its valves pale and flabby, but competent. Weight, 240 grams.

Lungs: Right lung weighed 550 grams and contained several large cavities; in fact, owing to pleural attachments and necrotic condition of lung substance, the organ could only be removed piece at a time. Left lung weighed 600 grams and contained numerous small cavities. Lung infiltrated with tubercle. Peritonæum covered with gelatinous substance. Coagulated lymph and lymph tubercle. Mesenteric glands greatly enlarged and contained tubercular nodules with foci of broken down tissue and pus. Spleen weighed 110 grams; small; bluish in color. Organ closely adherent to diaphragm and omentum. On section dark red; pulp contained dark red spots. Liver weighed 1,750 grams; pale color; does not bleed on section; the tissue hard. Left kidney weighed 170 grams. Capsule peeled readily. Line of demarcation between cortical and medullary substance not well marked. Right kidney weighed 195 grams; capsule could not be removed except by tearing off piecemeal. Brain weighed 1,450 grams and was very anæmic; otherwise normal, with an unusual large quantity of gray matter (apparently).

W. P. M.

CASE 14.

R. McL.; age, 52; a native of Scotland; was admitted to the United States Marine Hospital, San Francisco, Cal., October 20, 1896, and died October 21, 1896, at 5.40 p. m.

History.—On entrance he complained of frequent and painful urination. He also coughed considerable and expectorated a yellowish white material.

Physical examination.—Urine was found dribbling from the penis and from two small fistulæ in the perineum. On percussion some dullness of the lungs was found.

The patient was greatly emaciated and very weak. He rapidly passed into a semi-comatose state from which it was difficult to rouse him.

Necropsy (sixteen hours after death).—Brain and meninges normal. Heart slightly enlarged. Calcareous deposits found on the aortic and mitral valves. Other valves normal. Lungs, some adhesions of the right lung. Upper lobes studded with tubercles; base in a state of hypostatic congestion. Left lung, adhesions more extensive; contained masses of tubercles, and one large cavity in the lower lobe. Liver pale, otherwise normal. Gall bladder greatly distended. Spleen normal. Kidneys both slightly enlarged. Right kidney, pelvis and ureter distended about three times its normal caliber with a purulent fluid and lined with a pyogenic membrane. Kidney itself congested, and most of the medullary substance absent. Left kidney pale, pelvis and ureter engorged with urine. Bladder, walls enormously thickened; cavity very small and contained a gravel deposit and some foul-smelling pus; numerous ulcerations present in the walls. There were two large fistulæ in the perineum, at the base of the scrotum, which communicated with the bladder.

J. H. O.
J. G.

CASE 15.

A. D.; age, 20; a native of California; was admitted to the United States Marine Hospital, San Francisco, Cal., November 20, 1896, and died November 27, 1896, at 4.30 a. m.

History.—On entrance he complained of pain in the chest and abdomen, cough with profuse expectoration, night sweats, and loss of appetite.

Physical examination: Greatly emaciated; supra and infra clavicular fossæ sunken; marked dullness of both lungs, with bronchial breathing; pulse, 160; respiration, 38 per minute. Symptoms became greatly aggravated and patient died.

Necropsy (nine hours after death).—Brain and meninges normal. Heart normal. Extensive adhesions of both lungs. Right lung one mass of tubercles. Tubercular pleuritis at left apex. Left lung studded with tubercles, and several small cavities found. Liver small and congested; weight 1,150 grams. Kidneys, right pelvis dilated and filled with urine; otherwise normal. Spleen small, weight 82 grams. Mesenteric glands enlarged, and peritonæum studded with tubercles. Dense adhesions of all intestines. Large intestines adherent to bladder and pelvic walls, and in lower part of ileum a large number of ulcers found. Other viscera normal.

J. H. O.
J. G.

CASE 16.

J. E., aged 26; nativity, West Indies; was admitted to the United States Marine Hospital, Boston, Mass., December 16, 1896; died January 25, 1897.

History.—Ten days before entrance he was discharged from the hospital recovered from rheumatism. He went to a boarding house, and there caught a severe cold, for which he came to be treated. He complained of sharp pains in the lower part of left chest, which were much aggravated by coughing and on deep inspiration. Anorexia and constipation. Physical examination showed dullness on percussion over both lungs and friction sounds at all points over both lungs. Bacteriological examination of the patient's sputa revealed the bacilli of tuberculosis in large numbers. His temperature during his illness ranged from a few tenths above normal to 39° C. This was kept in check with antipyretics to some extent. Up to January 24, 1897, there was no apparent change in his condition, but early in the morning of the 25th he was attacked by a very severe coughing fit, which was followed by a most profuse hemorrhage, almost 1,000 c. c. of blood having escaped in the few minutes which elapsed between the commencement of the bleeding and the arrival of the medical officer. Attempts made to rally the patient proved futile, and he died at 2.40 a. m., January 25, 1897.

Necropsy.—Body that of fairly nourished mulatto. Dried blood in nostrils and on lips and chin. Limbs rigid. Calvarium removed, showing the vessels of the dura mater engorged along the longitudinal sinus. The membranes were adherent to the brain along the same line. Interior of brain presented no abnormalities. Abdominal organs in normal position. Intestines not distended. Upper limit of diaphragm corresponds to the lower border of fifth rib, right side. Pericardium normal in appearance; 25 c. c. straw-colored fluid. Valves of heart competent. Right pleural cavity obliterated by adhesions; right lung collapsed on removal; no signs of tuberculosis on section; weight, 415 grams. Upper lobe, left lung solidified. There were several large cavities in this lobe, two of which were very near the surface and about to rupture into the pleural cavity. The hemorrhage evidently occurred from a point in the lower portion of this lobe, although its exact location could not be made out. Lower lobe crepitant. Spleen soft, pale, and flabby; capsule wrinkled; weight, 255 grams. Left kidney 12 cm. in length; 5 cm. in breadth; capsule easily detached, cortico-medullary line well marked. There were several small cysts in the cortical portion; weight, 235 grams. Right kidney differed in no respect from its fellow, except that there were no cysts; weight, 205 grams. Adrenals yellowish-brown in color; weight of each, 9 grams. Blood dripped from cut surface of liver; weight, 1,915 grams. Darkness supervening, no further examinations were made.

E. K. S.
H. W. A.

Case 17.

Larynx.

G. F. L.; a native of Finland; aged 42; was admitted to the United States Marine Hospital, San Francisco, Cal., July 8, 1897, and died July 25, 1897, at 2.15 p. m.

History.—On admission the patient stated that three years ago he was treated at the United States Marine Hospital at Port Townsend for tuberculosis of the lungs. He improved a little under treatment and left the hospital. Since then he has received no treatment. During the last month he has been suffering with his throat, being unable to eat any solid food and to drink liquids only with difficulty. Physical examination showed dullness on percussion in both lungs—on the right, as low as the second rib; on the left, as low as the fourth interspace. On auscultation bronchial breathing was heard over the upper lobes of both lungs. Examination of the throat showed that the epiglottis was swollen and that there were numerous ulcers, having grayish raised edges along its free border. On examination of the sputum bacilli of tuberculosis were found in abundance. He gradually had more difficulty in obtaining nourishment, and slowly became weaker until his death.

Necropsy (twenty-one hours after death).—The body is that of an undersized, poorly developed, very emaciated adult male. Rigor mortis is well marked. The skull cap, brain case, sinuses and vessels, and brain and membranes are normal The heart and pericardium are normal. The upper lobe of the right lung is everywhere tubercular, and there are numerous cavities present, ranging in size from 0.5 to 2 cm. in diameter. The other lobes are normal. The left lung is tubercular throughout. There are numerous cavities in the upper lobe, varying in size from 0.25 cm. to 4 cm. in diameter. At the upper and posterior part of the lower lobe is a cavity 8 cm. in diameter. The parietal and visceral layers of the pleura on the left side of the chest are everywhere strongly adherent. On the right side of the chest the parietal and visceral layers of the pleura are adherent, but not so strongly as on the left. On separating the adhesions miliary tubercles are seen scattered over the pleuræ. The liver and gall bladder are normal. The spleen is normal. The kidneys are normal. The digestive tract is normal. The mesentery is normal. The genito-urinary tract is normal. The spinal cord was not examined.

W. M. J.
J. G.

CASE 18.

D. McL., aged 47 years; a native of Scotland; was admitted to the Marine Hospital, Detroit, Mich., January 20, 1896, and died April 24, 1897. He was transferred from Cleveland, into which hospital he was admitted October 22, 1895.

History.—At the time of his admission the following history was written: "The lungs are badly involved, and upon examination of the sputum an abundance of tubercle bacilli are found. The heart is hypertrophied and its sounds are muffled." There was an evening rise of temperature of 1° from the date of his admission to the 13th day of January, 1897. From this date to March 29, 1897, the temperature was normal. From March 29, 1897, to April 7 the temperature was about 1° subnormal. During this interval he took very little nourishment. He craved sour cider. With the cider he took from one to three eggs daily. From April 7, 1897, to April 24, 1897, the temperature was normal. While the temperature was subnormal, the pulse was weak and irregular. During the first twenty days of April he was too weak to move or think. He was simply alive, nothing more.

Necropsy (four hours after death).—Rigor mortis scarcely perceptible. The body was that of a man 1.7 meters tall and at the time of his death would weigh 41 kilograms. There was extreme emaciation; the subcutaneous fat had all been absorbed. Lungs: The pleural cavities were entirely obliterated by firm adhesions; so strong were they that the lung tissue would yield before the adhesions could be broken. There were large cavities in the upper lobes of both lungs. Around the bronchi, both large and small, there was a large amount of dense fibrous tissue, making it difficult to cut it. The lung creaked like leather when cut. At the apex of each lung there was an air cavity closed from the rest of the lung. Each cavity would hold 75 c. c. of air. The lower lobe of the right lung contained many cavities and tubercular deposits. The left lower lobe was more nearly normal than any other part of the lungs. Heart: The heart was normal in size and the valves were efficient. There was a small clot in each ventricle, formed during the last few hours of his life. There were a few atheromatous patches in the aorta. Weight of the heart, 270 grams. Kidneys: The kidneys were smaller than normal. The diminution in size was at the expense of the cortical portion. The capsule was adherent. The left kidney contained a large cyst, which would hold 25 c. c. of fluid. The ureters were pervious; the bladder empty and normal in appearance. The vesiculæ seminales were normal in appearance, as were the testicles and the urethra. The suprarenal capsules were larger and darker in color than normal. (There were no weights to the post-mortem scales less than 10 grams.) The two suprarenal capsules together weighed 10 grams. The pancreas was normal in size, color, and consistence. The stomach and the intestines were normal. The lymphatic glands in the mesentery were not enlarged nor tubercular. The solar and cardiac plexuses of the sympathetic system were normal. The spleen was firmer than normal and some larger; the increase in size and firmness was due to an increase of interstitial tissue; there were no tubercular deposits evident. The liver was increased in firmness. There was no amyloid reaction with iodine. In the right lobe on the side next to the ribs there was a sulcus 2 cm. deep; it was not broad enough to be an impress of the ribs, nor was there a rib prominent enough to produce it. The waist had not been compressed by a belt. The depression had not been caused by suppuration, for there was not the appearance of a cicatrix. The weight of the liver was 1,470 grams. Brain: The calvarium was abnormally thick in the squamous portion of the temporal bone. There was an increase of fluid in the ventricles and beneath the pia mater. The dura mater was adherent to the pia mater along both sides of the longitudinal sinus. Between the arachnoid and the pia mater there were many psammoma. The brain weighed 1,290 grams. The convolutions were narrow and the sulci shallow. The dura mater was thicker than normal. No tubercular deposits were found in the brain or its membranes.

C. T. P.

CASE 19.

W. S.; aged 27 years; a native of Canada; was admitted to the Marine Hospital, Detroit, Mich., October 14, 1896, and died April 28, 1897.

History.—He states that he took cold on May 10, 1896, which constantly grew worse. His appetite failed. Crepitant râles over the right lung. He presents the appearance of tuberculosis.

November 12, 1896.—The patient is much emaciated. He has a bad cough, night sweats, poor appetite, pain in his chest, marked dyspnœa. Percussion shows dullness over lower lobe of the right and whole left lung. There was tympanitic resonance over the upper right lobe. By auscultation coarse râles were heard over the lower right lobe of lung and whole left lung. Over the upper lobe of the right lung cavernous respiration was heard. Over the dull area there is heard a bronchial respiratory murmur.

On February 1, 1897, I first noticed that his feet and ankles were swollen. At this time a coarse bubbling râle, as of air passing through fluid, was heard. The patient expectorated much, and the sputum contained myriads of tubercle bacilli. Dyspnœa had become more urgent. Slept fairly well. Appetite very poor, difficult to find anything he would eat. He loaths milk and eggs in any form, as well as beef tea. He has night sweats, which are controlled by atropia. On March 10 his face became œdematous and his respirations more labored. April 20 he was no longer able to expectorate. He could think of nothing that he wished to eat. He was afraid to go to sleep lest he should not wake up. He complained of pain in his abdomen. It was not tender to pressure, nor was it distended. For this he was given morphia and a turpentine stupe applied to the abdomen. During the months of October and November there was an evening rise of temperature of from 1° to 2°. During December, January, and March there was a rise of 1°, except once a week, when there was a rise of 2°.

Necropsy (fourteen hours after death).—Body that of a man 1.92 meters tall; much emaciated, with œdema of feet and legs. He would weigh about 60 kilograms. Circumference of body at the shoulders 0.92 meters. Post-mortem lividity marked on the back. Rigor mortis well marked. Pupils normal. General nourishment bad. There was no subcutaneous fat nor cicatrices. Heart: The right ventricle was dilated; its walls were thin, 0.3 cm.; it contained an antemortem clot intimately interwoven with the cordæ tendinæ. Left ventricle normal in thickness and its cavity empty; the valves are efficient. The weight of the heart is 470 grams. Lungs: The apices of both lungs were adherent to the chest wall; the lower lobes of each lung were free; the upper lobes of both lungs contained many cavities, some of which would hold 10 and some 50 c. c. of fluid; the right lower lobe contained myriads of small cavities which would hold 5 c. c. of fluid. There were many tubercular deposits in both lungs. The left lung weighed 920 grams, the right 900 grams. Abdomen: The abdominal cavity contained 800 c. c. of straw-colored fluid, which coagulated when cool. In the fluid were a few flocculi of lymph. The peritoneum presented a smooth glistening appearance. Stomach: The stomach presented an hour-glass contraction. The contraction was 10 cm. from the pylorus. There was no cicatrix, as there would have been if the contraction had been due to an ulcer. There was no apparent cause for the contraction except an increase of connective tissue beneath the mucous surface of the stomach. The diameter of the pylorus was 4.5 cm.; of cardiac orifice, 9 cm. The small intestine was 6.21 meters long; the colon, 1.5 meters. Two meters from the ileo-cœcal valve there was a portion of the small intestine, 2 centimeters long, which was intensely congested, and looked as if an ulcer was about to be formed on the mucous surface. The ulcer forming was due to tubercular deposit undergoing necrotic degeneration. There were tubercular deposits in the mesenteric glands. The liver was large, of a dark mahogany color, and friable. No amyloid reaction. It weighed 1,920 grams. The pancreas weighed 135 grams. The kidneys were congested, otherwise normal. The right weighed

175 grams; the left 170 grams. Pelves of the kidneys were normal; the ureters were also normal. The bladder was normal; it contained 50 c. c. of normal urine. The suprarenal capsules together weighed 5 grams. The spleen is large and friable; there were no tubercular deposits in it. It weighed 260 grams. The calvarium was normal in thickness; pia mater was adherent to the dura mater along the edges of the longitudinal sinus; the ventricles contained 25 c. c. of serous fluid. The weight of the brain was 1,330 grams. Convolutions and sulci were normal; no tubercular deposits in the meninges.

C. T. P.

CASE 20.

T. R.; aged 33; a native of New York; was admitted to the Marine Hospital, Detroit, Mich., May 14, 1896, and died April 9, 1897.

History.—The family history has never been taken. The history of the patient is very briefly written. When I first saw the patient, in November, 1896, there was dullness over apex of right lung and over the whole upper lobe of left lung. There was bronchial respiratory sound on left side and coarse râles over the whole left lung.

Necropsy (ten hours after death).—Body that of a short man, 1.6 meters tall, and would weigh 50 kilograms. There were no cicatrices on the body. Head: The calvarium was thinner than normal and the diploe not well marked. The sinuses were empty. The dura and pia mater were normal in appearance and presented no evidence of tubercular deposits. The arteries and veins at the base of the brain were normal. The convolutions were well marked and the sulci of normal depth. Brain weighed 1,380 grams. Thorax: The apex of the right lung was adherent to the costal pleura. The adhesions were fibrous. The whole upper lobe of left lung was adherent to the costal pleura. The right upper lobe contained a firm, old cicatrix, evidently an old closed cavity of considerable size, as the radiating bands of connective tissue extended 3 cm. into the lung substance. The two lower lobes were in fair condition. There were numerous tubercular deposits in both lobes, in which suppuration had not begun. In the upper lobe of the left lung there was a large cavity, containing a small amount of muco-pus. The remainder of the upper lobe and whole of the lower contained numerous tubercular deposits. The right lung weighed 570, the left 560 grams. The heart was small, valves efficient. The right side contained quite a large antemortem clot, closely interwoven with the chordæ tendinæ. There were a few small atheromatous patches in the aorta about 2 cm. from its origin. Otherwise the aorta was normal. Abdomen: Omentum normal. The spleen was small, soft, and contained a few tubercular deposits. It weighed only 85 grams. Kidneys: The right kidney was small. It contained a few tubercular deposits and an increase of connective tissue. It weighed 90 grams. The left was normal in size and appearance. It weighed 130 grams. Suprarenal capsules normal. Bladder was small and contained 15 c. c. of urine. The walls were thicker than normal. The mucous membrane was rough. The intestines were normal. There were a few tubercular glands in the mesentery. The liver was normal in size but very friable. The gall ducts were pervious and the gall bladder normal, containing about 25 c. c. of dark-green bile. The pancreas was normal in size and consistency. It weighed 65 grams. The liver weighed 1,480 grams. The phrenic, vagus, and cardiac plexuses in the thorax were normal, as were the solar and splanchnic plexuses in the abdomen. The spinal cord not examined.

C. T. P.

CASE 21.

W. B.; aged 20 years; nativity, Missouri; admitted to the United States Marine Hospital, St. Louis, Mo., March 9, 1897; died May 11, 1897.

Clinical history.—The patient was admitted to this hospital March 9, 1897, complaining of pain in his chest and of a "bad cold," which he had had all winter, together with a hard cough, which was worse at night and in the morning on first

waking. This cough was accompanied by a profuse expectoration of a yellowish sputum. He also gave a history of hemorrhages, of night sweats, and of considerable recent loss of weight. On admission his temperature was 37.4° C. Physical examination disclosed the signs of advanced tubercle of lung, namely, anæmia, clubbed fingers, and almost total lack of respiratory movement, in front, of the left side of the chest. The percussion note on the right side below the clavicle had a higher pitch than normal, while that on the left was markedly tympanitic in character and still higher in pitch than that on the right side. Auscultation revealed marked bronchial breathing in the upper part of the right lung, while the breath sounds on the left were amphoric in the upper lobe and typically bronchial in the lower lobes. Râles were numerous over the left, scarce over the right lung. Finally, the tubercle bacillus was easily demonstrated in the sputum. On more particular examination of the area of amphoric resonance in the upper part of the left side of the chest in front, a considerable cavity was delineated, from which, on March 11, 1897, a small quantity of pus was aspirated which closely resembled the patient's sputum. While in the hospital the patient had five hemorrhages—on March 27, at noon; April 7, at 5 in the morning; April 10, at 6 in the evening; April 16, at 8 in the morning, and May 11, at a quarter after 4 o'clock in the morning, the last mentioned proving fatal. The blood lost at each hemorrhage was about 250 c. c. in amount, except on the last occasion, when it was 740 c. c. The treatment of these hemorrhages was as follows: The patient was put to bed, strictly at rest, and was given an injection of Magendie's solution, 1 c. c., at once, the injection being repeated in half an hour if quiet of mind and body had not been obtained. One repetition was usually sufficient. Veratrum viride, two-thirds of a cubic centimeter, was also given, and the dose repeated in a half an hour, and again later if the heart's action had not been quieted. The treatment of the case in general was supporting, its object being to keep the patient in the best possible condition till the end, not only in order to postpone the inevitable fatal issue and give the patient as long a lease on life as possible, but also to prevent, as far as might be, the feeble latter days so common in these cases, with the accompanying drooling of sputum and consequent infection of the ward. Sedatives were given, as necessary, to quiet excessive cough so as to secure sleep. Creosote was administered in glycerin, the initial dose being five minims three times a day, the number of drops thereafter in each individual dose of a given daily group of three doses being by one drop increased over the number of drops in each of the three doses of the day previous. That is, on the second day 6 drops were given three times a day; on the third, 7 drops three times a day, and so on until a dose of 50 drops three times a day was reached. The patient had been taking this dose of creosote for seventeen days before his death, with the exception of the last three days, the remedy having been then abandoned entirely because of the exhaustion of the station's supply. At no time did the urine present signs of kidney trouble. The last two weeks the patient had been feeling better than at any other period of his stay in the hospital. He was up and out in the sun a great part of almost every day, following the directions given to all the cases of lung tuberculosis at this hospital. On May 11, at a quarter after 4 o'clock in the morning, he had the hemorrhage before referred to, which resulted fatally five minutes later. His death was very sudden, the nurse not having the time to give him the veratrum viride ordered on such an occurrence, though he had administered 15 minims of Magendie's solution.

Necropsy—External appearances.—Body is that of a man apparently 20 years of age, small in stature, and poor in muscular development. Abdomen is distended and is as tense as a drum. On separating the thighs, a fistula is seen on the right buttock, 3 cm. from the anus. Upon passing a probe, it is seen to run at first toward the rectum, and then to turn out from it, not entering the gut. It is 7 cm. deep. A considerable amount of blood is seen exuding from the mouth and nostrils. No foreign body is seen in any of the orifices. Rigor mortis is present in all of the limbs. There is no perceptible mark of external injury.

Internal examination.—Cranial cavities: The cause of death being so apparently

located in the lungs, and the patient having exhibited no symtoms of brain trouble antemortem, it was not deemed necessary to enter the cranial cavities. Thorax and abdomen: A long incision is made from the chin to the symphysis pubis, the integuments divided, and the cavity of the abdomen laid open. Adipose tissue is slightly developed, the muscles being somewhat pale. When the abdomen is entered, a considerable amount of a clear, straw-colored fluid flows out. The distended intestines and the stomach present and bulge in the first small opening. The intestines are of a light, pinkish-gray color, a few fine vessels being seen in their walls. No foreign body is found in the abdominal cavity. The arch of the diaphragm comes down to the fifth rib on each side. Thorax: After the removal of the sternum, the lungs came into view, somewhat distended, particularly the left one. On the left side there are numerous firm adhesions between the surface of the lung and the wall of the thorax. On the anterior surface of the pericardium there is a depression which is filled with a mucoid fluid. On opening the pericardium it is found to contain 75 c. c. of a straw-colored fluid. The heart, about the size of a man's fist, is seen pale and firmly contracted. The right auricle and right ventricle together contain 20 c. c. of particularly fluid blood, no clots being seen. The right auriculo-ventricular orifice admits two fingers. The left auricle is quite empty, containing no clots. On section, the wall of the left ventricle is found to be 2½ c. c. thick. The left auriculo-ventricular orifice admits two fingers. The aortic, pulmonary, tricuspid, and mitral valves are without alteration, and therefore functional. The heart weighs 245 grams. The left lung is strongly adherent to the chest walls, and is very difficult to remove. It is of a mottled-gray color and is voluminous. The fissure between the upper and lower lobes is completely closed by inflammatory adhesions. Posteriorly, and down to its base, the lower lobe is intensely red. Numerous large cheesy glands are seen at the root of the lung. On section, a cavity at the left apex is found filled with blood and broken-down tissue. On cleaning it out, several eroded vessels are found in its walls. The shape of the cavity is very irregular and ragged, the remains of large vessels appearing as whitish projections. The rest of the upper lobe is liver-like, and contains a number of small cavities. The cut surface of this lobe is of a dirty gray color, a brownish frothy fluid following the knife. The cut surface of the lower lobe is of a dark red, mottled color, the knife being followed by a bloody, frothy fluid. Several cavities are seen filled with a thick, blood-stained fluid. The left lung weighs 950 grams. The right lung is also adherent to the chest wall. Its outer surface is of a dirty gray color, its base having a great amount of purplish mottling. It is softer in consistence and more crepitant than is the left. In all the lobes, especially the upper, small nodules can be felt. On section, numerous grayish-white minute bodies are seen, the size of a millet seed (miliary tubercles). Similar masses, of a black color, are also seen. On section, the apex of the upper lobe is of a dirty gray color, with here and there reddened areas. The middle lobe presents the same conditions, except that the tubercles are less numerous. No cavities are found in this lobe, its color also being more uniform. On the lower lobe a cyst-like projection present. On cutting into it, a small cavity is seen. The right lung weighs 550 grams. Abdomen: The spleen is flabby, its surface being wrinkled. On section, the tissue is of a purplish color and is soft, being easily scraped off the cut surface with the knife. The organ is 14 c. c. long by 9 c. c. wide, and weighs 152 grams. The left kidney is divided into three nearly equal lobes by two very plain surface fissures, the lower being most marked. On section, the knife is followed by considerable blood, the tissue being much reddened. The capsule easily strips off. The left suprarenal capsule is removed in pieces and is of a yellowish color, though at one end considerably reddened. The kidney is 11 c. c. long by 6 broad by 4 thick, and weighs 160 grams. The right kidney is not lobulated as is the left; otherwise it presents the same characteristics. It is 11 c. c. long by 10 broad by 4 thick, and weighs 165 grams. The bladder contains 250 c. c. of clear urine. The posterior wall to the base is considerably roughened. Numerous fine vessels are seen on its surface, but nothing like

tubercular infiltration. The stomach and duodenum present nothing worthy of note, being empty. The opening of the pancreatic and common bile ducts in the duodenum is patent. The liver is of a brownish color. It is 30 cm. long by 24 antero-posteriorly by 4 thick. On section, serum exudes. The lobules are large and their color more uniform. The gall bladder contains 25 c. c. of bile. The upper part of the small intestine (the jejunum) contains a large amount of fluid. In the ileum the fluid is more clotted, while the large intestine from the ileo-cæcal valve is filled with yellow, pulpy feces, 400 c. c. in amount. The mucous membrane is pale throughout, a few pink vessels being seen on its walls. There is no ulceration.

Remarks: This case was simply one of ordinary ulcerative phthisis. The first of the only two post-mortem findings at all notable was the fistula in ano. It was not present on the patient's admission; but later he made no complaint of any trouble in the region of the anus or perineum, and the condition was absolutely unsuspected. Either this abscess was exceedingly slow in developing and practically painless, or the patient exercised a much greater degree of fortitude than is usually to be observed in his race (colored), unless, indeed, he feared that an operation would have to be done if he disclosed his condition, and therefore chose what, to him, seemed the less evil. At no time did the nurse observe pus on his bed clothes, nor did he ever discover any dressings that the patient must have used to collect the discharge—circumstances that show great cunning on the patient's part. The other interesting condition found was the fluid in the abdominal cavity. This had collected after death. There were absolutely no indications of inflammation in the abdominal cavity, nor were there any conditions of the abdominal organs, either before or after death, that would explain this effusion.

C. E. D.
A. H. G.

CASE 22.

Wm. W., negro; age, 22; nativity, Virginia; admitted to United States Marine Hospital at Baltimore, Md., March 28, 1896; died September 15, 1896.

History.—Patient was transferred to this hospital from Norfolk, Va., with recorded diagnosis of tubercle of lung, the diagnosis being based on physical examination and verified by finding the tubercle bacilli in sputum. His stomach was very easily deranged, so much so that the usual remedies (creosote, guiacol carb., etc.) could not be borne, and his progress had not been satisfactory. On admission to this hospital patient was somewhat emaciated; 132½ pounds. Had a troublesome cough, but a fairly good appetite. Bowels open. Temperature 38° C. Pulse 120. Fremitus was increased on left side. Dullness and cracked-pot sound on percussion at the third left intercostal space. Tubal breathing and pectoriloquy over the same area. A few râles were heard at right apex. Heart very active, otherwise apparently normal. During the progress of the disease night sweats, dyspnœa, and localized pleuritic pains were at times troublesome, for which the usual remedies were administered, and toward the last diarrhea was a prominent subjective symptom, but was kept under control by opium and astringents. Patient's temperature continued to be very irregular, at times normal or subnormal in the morning and ranging from 38° to 40.6° C. in the afternoon. Pulse 100 to 140. Although the temperature rose so high, patient stated that he felt very well, and showed but little of its deleterious effects until about five weeks before death, when he took to his bed.

May 24.—Swelling of feet and ankles noticeable for the first time; night sweats prominent.

June 12.—Urine acid; color normal; traces of albumen.

August 22.—Patient kept his bed from this date and continued to grow worse. Pleuritic pains were so severe at times that morphia had to be given hypodermically. The disease progressed rapidly and patient died at 12.15 a. m. September 15, 1896.

Necropsy (sixteen hours after death).—Male; about 5 feet 6 inches high; negro. Body much emaciated and a beginning bedsore over sacrum; rigor mortis not well

marked; considerable œdema of feet and ankles. Pericardium contained 50 c. c. of clear straw-colored serum; bronchial glands much enlarged. Heart weighed 480 grams and was in distole; rather pale and easily torn; numerous post-mortem clots were found among the musculi papulares and columnæ carneæ. Left pleura: The pulmonary and costal layers were adherent throughout their entire extent. Right pleura showed but little if any change. Left lung had undergone necrosis to such an extent that the lower lobe was almost entirely absent, being replaced by a large cavity which was filled with pus. Necrosis had also taken place to a large extent in the upper lobe. Right lung weighed 960 grams, nodular to the feel, and on section presented tubercular nodules and points of suppuration throughout the three lobes, being more marked in two upper lobes. Small cavity about the middle of the upper lobe. Peritoneal cavity contained a moderate quantity of clear straw-colored serum. Liver weighed 1,680 grams; dark in color, congested, and on section presented a typical nutmeg appearance. Gall bladder somewhat distended with bile and ducts pervious. Spleen weighed 210 grams. Left kidney: Weight, 195 grams; capsule easily separable; on section very pale in color and the lines between the cortical and medullary substances not very distinct. Right kidney: Weight, 195 grams; same condition as left. Bladder apparently normal. Brain: Weight, 1,080 grams; apparently normal.

J. McM.
G. W. S.

CASE 23.

G. H.; aged 27 years; a native of Newfoundland; was admitted to the United States Marine Hospital, Detroit, Mich., April 24, 1896, and died November 21, 1896.

History.—The patient was transferred from the hospital in Cleveland, Ohio. When admitted he said that on September 12, 1894, he fell into the Chicago Creek; he took cold and since then his health has been gradually growing worse. Family history good. Physical examination showed subcrepitant râles over both lungs; cavernous breathing in right lung. His failure was constant.

Necropsy (nineteen hours after death). Post-mortem lividity present in dependent parts; rigor mortis well marked; body that of a man about 5 feet 10 inches tall, of slender frame. The subcutaneous fat had been absorbed and emaciation was extreme. The body would weigh about 52 kilograms. In the left chest there was no pleural cavity; it had become obliterated by the adhesion of the visceral and parietal layers of the pleura. A thin layer of pulmonary vesicles were still visible in the left chest, the left lung was wholly broken down and was represented by a small amount, 250 c. c., of pus. The right upper lobe was in parts full of tubercular deposits, and in other parts studded with cavities. The only lung tissue which could possibly offer any physiological exchange of gases was a portion of the right lower lobe; the left lung could not be weighed; the right weighed 400 grams. There were tubercular deposits in the spleen and liver. The liver weighed 1,250 grams and the spleen 225; the kidneys were normal except for slight congestion due to weakness of heart's action during the last day of his life. The kidneys were normal; the right weighed 220; left, 230 grams. The suprarenal capsules were small and weighed only 5 grams each.

C. T. P.

CASE 24.

P. W.; aged 51; was admitted to the United States Marine Hospital, Chelsea, Mass., October 17, 1896, and died May 30, 1897.

History.—On admission, he said he had had a cough for about eight months, with some expectoration, dyspnœa, and more or less diarrhea. His cough became worse, with abundant muco-purulent sputum, which contained many tubercle bacilli. Examination later showed the apices of both lungs dull, and abundant mucous râles all over both lungs. His diarrhea was troublesome at times. His radial arteries were very atheromatous.

Necropsy (twenty hours after death).—The body was emaciated, with little post-mortem rigidity. The right pleural cavity was completely obliterated by adhesions; the right lung weighed 700 grams. The upper lobe contained several small cavities, and the lower lobe was studded with tubercles. The left pleural cavity had many adhesions above, and was empty below. The left lung weighed 970 grams. The upper lobe contained one small cavity filled with yellow pus, and was full of small tubercles. The lower lobe appeared normal. The pericardium contained about 30 c. c. of a clear serous fluid. The heart weighed 270 grams, and was firmly contracted. The aortic valves had calcareous plates on their upper surfaces, and there was some calcareous deposit at the base of the mitral valves. The pulmonary and tricuspids were negative. The aorta contained a calcareous plate about 1 cm. wide and 2 cm. long, about opposite the opening of the innominate artery. There were many atheromatous areas throughout the aorta. The gastro-intestinal tract was not examined. The liver weighed 1,310 grams and gave a nutmeg appearance, both externally and internally on section. The lobules showed very prominently, giving the surface of the section a granular appearance. The gall bladder was negative. The pancreas was also negative. The spleen weighed 150 grams and the capsule was much thickened. The section was normal. There was a small accessory spleen the size of a hazelnut near the hilum of the left kidney. The left kidney weighed 135 grams. The capsule peeled readily, leaving the surface smooth. On section, the markings were indistinct, even the boundary of the medullary and corticle portions being indistinct in places. The right kidney weighed 130 grams, and was similar in appearance to the left. The suprarenal capsules together weighed 30 grams, and were negative. The urinary bladder was normal. The prostate was large and nodular, the third lobe being especially prominent. The urethra seemed normal. The brain weighed 1,300 grams, and both it and its membranes were negative.

A. R. T.
H. M. A.

CASE 25.

H. H.; was admitted to the United States Marine Hospital, Chelsea, Mass., May 11, 1897, and died May 25, 1897.

History.—This patient was originally admitted February 20, 1897, with the history of having been sick four months with cough and expectoration, dyspnœa, anorexia, loss of weight, and night sweats. The voice was somewhat hoarse. He was discharged at his own request April 30 and was readmitted May 11. He was much emaciated and very weak. There were a series of small punched-out ulcers along the dorsum of the tongue, which were very painful. The voice was very faint and hoarse. The right lung gave dullness throughout, except at the extreme base and the subclavicular region anteriorly, where it was almost tympanitic; and in this same region was heard amphoric breathing. There were mucous râles throughout the lung. The left lung was dull throughout, with mucous râles above and bronchial breathing posteriorly below. The heart and other organs were negative.

Necropsy (five and one-half hours after death).—The body was emaciated; rigor mortis slight; no lividity. The tongue showed a series of ulceration extending along the dorsum, with clear-cut edges and a grayish base. The larynx was somewhat œdematous, and there were numerous small ulcers, particularly about the posterior extremity of the vocal cords. The left pleural cavity was completely obliterated by old adhesions. The left lung weighed 1,060 grams. The upper lobe was riddled with cavities and the lower lobe was studded with tubercular nodules. The right pleural cavity was obliterated by adhesions. The right lung weighed 1,005 grams and the upper lobe contained many cavities, while the lower lobe was studded with tubercles and cheesy nodules and some small cavities filled with a thick yellow pus. The pericardium was empty and negative. The heart was contracted firmly, and weighed 285 grams. All valves were competent to the water test and normal on

section. There was a small amount of serous fluid in the peritoneal cavity. The gastro-intestinal canal was negative. The liver weighed 1,994 grams and was firm and gritty to the knife on section. The surface on section looked pale, and the lobules had a dark center and light periphery. The gall bladder was normal. The pancreas weighed 85 grams and was negative on section. The spleen weighed 270 grams and was soft and flabby and rather light colored on section. The suprarenal capsules weighed 25 grams together, and seemed normal. The left kidney weighed 180 grams. The capsule peeled with difficulty, leaving the surface rough. The section was very tough, and the surface appeared pale and the markings indistinct. The right kidney weighed 150 grams and was similar in appearance to the left. The urinary bladder and urethra were negative. There seemed to be an unusually large amount of fluid beneath the membranes of the brain. The membranes were negative. The brain weighed 1,320 grams and was negative on section.

A. R. T.
H. W. A.

CASE 26.

L. R.; aged 36 years; nativity, Maine; was admitted to the United States Marine Hospital, Chelsea, Mass., September 10, 1896, and died May 20, 1897.

Clinical history.—The patient had been poorly for about four months before admission, with cough and expectoration, loss of weight, anorexia and constipation. On admission the left knee was somewhat swollen and painful. A few tubercle bacilli were found in his sputum. Examination showed dullness of the upper lobes of both lungs, with bronchial breathing and mucous râles. Aspiration failed to obtain fluid from the knee.

Necropsy (twenty hours after death).—The body was extremely emaciated, with marked post-mortem rigidity. The right pleural cavity contained a few old adhesions. The right lung weighed 836 grams, and was solid in upper lobes, with crepitation in the lower lobe. Section showed the upper lobe to be quite solid, and crossed by numerous tough, fibrous bands, the lower lobe containing many cheesy nodules, particularly in the upper portion. The left pleural cavity was completely obliterated by adhesions. The left lung weighed 720 grams, and was solid throughout, except in extremely lower portion. Section showed the upper lobe much contracted from the same fibrous bands as in right lung, with no cheesy deposits. The lower lobe was filled with cheesy nodules and miliary tubercle, except in the lower border. The heart weighed 270 grams, and was firmly contracted. All the valves were competent to the water test. The muscles seemed normal. The mitral valves contained few yellowish atheromatous areas, as did also the beginning of the aorta. The other valves seemed normal. The peritoneal cavity was empty, and the peritoneum was normal. The gastro-intestinal canal was negative throughout, the colon being greatly contracted. The liver weighed 1,310 grams, and was normal in appearance, both externally and on section. The gall bladder was normal. The pancreas weighed 65 grams, and was negative on section. The spleen weighed 140 grams, and was soft and friable. The left kidney weighed 150 grams, the right kidney 135 grams. Both capsules pealed readily, leaving the surface of kidney smooth. The section was somewhat congested, markings distinct. The suprarenal capsules weighed 10 grams each, and were negative. The urinary bladder contained a small amount of urine. The mucous membrane appeared normal. The brain weighed 1,365 grams, and was negative on section. The left knee was swollen to double its normal size, the swelling being doughy and semifluctuating. Section showed the outer wall of synovial cavity at least 2 cm. thick, and the cavity contained a quantity of thick, purulent material. The end of the fibia and tibia were soft, and the outer layer of cartilage was soft, and peeled from the bone easily, leaving a soft reddish area beneath.

A. R. T.
H. W. A.

CASE 27.

Carcinoma of stomach.

J. M. P.; aged 32; nativity, Maine; was admitted to the United States Marine Hospital, Chelsea, Mass., December 14, 1896; died April 29, 1897.

Clinical history.—He had suffered from cough for some time before admission, with emaciation and night sweats. Examination showed usual signs of tubercle of lung, and the diagnosis was confirmed by finding tubercle bacilli in sputum. Had pains in left side on admission. Later pain was present in left hypochondriac region, and two months after admission a tumor developed in left epigastrium, which was excessively tender and painful and had marked pulsation and a loud systolic murmur on auscultation. There was never any vomiting. He became gradually weaker and cachectic, and died from asthenia.

Necropsy (six hours after death).—Body of a medium-sized male, very much emaciated, with very little rigor mortis. The pleural cavities were both obliterated by old adhesions. Right lung weighed 560 grams, and the upper lobe was quite solid and nodular; middle and lower lobes crepitated. Section showed the upper lobe and apex of lower lobe to be studded with cheesy nodules, a few having broken down in center. The remainder of lung was negative. The left lung weighed 375 grams, and its appearance was similar to the right. The pericardium contained about 30 c. c. of pale straw-colored fluid; otherwise negative. The heart weighed 250 grams, and was firmly contracted. The valves were competent; section showed nothing abnormal. The peritoneal cavity contained no fluid. The omentum was adherent to the intestines and abdominal walls in many places. The peritoneum of liver was adherent to adjacent peritoneum; the liver weighed 1,700 grams, was firm, and rather pale on section. Gall bladder normal. The spleen weighed 270 grams, and was very soft and friable. The kidneys were negative, except rather pale on section. Suprarenals negative. The bladder contained about 50 c. c. of urine; otherwise normal. The stomach and adjacent small and large intestines were firmly matted together. The stomach was dilated, and contained about 890 c. c. of fluid, consisting mostly of clotted blood and debris. Near the pyloric end, extending almost completely around the orifice, was an indurated, ulcerated area, about 10 cm. in diameter, with an extremely ragged base, extending through to adherent liver and intestines. The large and small intestines were negative. The brain weighed 1,300 grams. The membranes were negative. The brain was firm and negative on section.

A. R. T.
H. W. A.

CASE 28.

J. P., a native of Portugal, aged 32, was admitted to the United States Marine Hospital, San Francisco, Cal., March 26, 1897, and died April 19, 1897, at 7.45 p. m.

History.—On admission the patient complained of cough with expectoration of yellow purulent matter, night sweats, and pain in the chest aggravated by deep inspiration. Physical examination showed dullness on percussion of the apex of the left lung as low as the fourth rib, and of the apex of the right lung as low as the third rib. On auscultation numerous râles were heard. There was a regurgitant murmur of the mitral valve, otherwise the heart was normal. He gradually grew weaker, his cough more troublesome, and his night sweats more aggravated until his death.

Necropsy (fifteen hours after death).—Body poorly developed and poorly nourished. Rigor mortis not well marked. Skull cap, vessels and sinuses, brain and membranes normal. Bronchial glands enlarged, being from 1 to 1½ cm. in diameter. Pericardial sac contains 40 c. c. of clear fluid. Pericardium slightly thickened. Heart normal. Parietal and visceral pleuræ of the right chest everywhere adherent,

and at the base firmly attached to the diaphragm. Right lung tubercular throughout, and at the apex numerous small cavities full of pus. In the lower lobe, at the base, there is a cavity 10 cm. in diameter resting on the diaphragm, which has set up an inflammation extending through the diaphragm to the capsule of the liver, causing a perihepatitis, with the formation of adhesions uniting the upper surface of the liver and the diaphragm. Parietal and visceral pleuræ of the left chest everywhere adherent and thickened. Apex of the left lung tubercular, and contains numerous small cavities; lower lobe normal. Omentum thickened and everywhere tubercular. Capsule of the liver strongly adherent to the diaphragm, otherwise normal. Spleen enlarged, weighing 265 grams. Kidneys normal. Digestive tract normal. Mesentery thickened and tubercular, and mesenteric glands enlarged. Peritoneal cavity contains 400 c. c. of clear fluid, full of flakes of fibrin. A mild grade of tubercular peritonitis everywhere present. Genito-urinary tract, normal. Spinal cord was not examined.

H. S. M.
J. G.

CASE 29.

P. N.; age, 39; nativity, Denmark; admitted to Marine Hospital at Baltimore, Md., December 7, 1894; died July 18, 1896.

History.—Patient was treated at St. Vincent's Hospital at Norfolk for about three and one-half months before being transferred to Baltimore. Family history negative. Patient dates his illness to "catching cold" three years ago. On admission patient is very much emaciated. Suffers from dyspnœa, and a cough, which is worse in the evening. Physical examination shows slight dullness and increased vocal fremitus at the apex of the right lung. Respiratory sounds diminished over the same area. Subcrepitant râles heard in the region of the right apex. Patient coughed a great deal during his illness. It resisted the usual treatment for such a condition. He was given cod-liver oil and creosote, which for awhile seemed to increase flesh and strength. Later on he began to lose ground, and nothing seemed to do him any good. Six weeks before death patient was seized with a severe diarrhea, which could be checked only temporarily. Later he could not take nourishment. Death came finally at 1.30 p. m., July 18, 1896.

Necropsy (five hours after death).—Rigor mortis not marked. Emaciation very great, patient weighing about 75 pounds. On removing the sternum a large caseous gland was found in the anterior mediastinum. Heart: Weight, 240 grams; mitral valves slightly thickened. The cut surface of heart showed a dark-red color. Right lung: Weight 360 grams, firmly bound down by adhesions; a cavity of considerable size was found in the apex, which burst into the pleural cavity on being removed. In this cavity was a considerable quantity of purulent material. The wall of the cavity was smooth and thickened from the formation of fibrous tissue. Tubercular nodules were found scattered throughout entire lung. Left lung: Weight, 360 grams; apex and anterior border emphysematous. Bronchial glands were enlarged and tubercular. The base of left lung was congested. A few tubercular nodules were found scattered throughout left lung. Liver: Weight, 1,440 grams; gall bladder distended; cut surface revealed pale-yellow areas scattered throughout liver. Spleen: Weight, 235 grams; very irregular in shape; dark-brown in color. Left kidney: Weight, 120 grams; cortex shows a pale, waxy appearance (amyloid kidney); pyramids dark and very conspicuous; capsule not adherent. Right kidney same as left. Bladder contained no urine and was normal in appearance. Intestines were somewhat inflated with gas. Large gut contained numerous ulcers the size of a split pea and larger, with raised edges and depressed bases. Brain was normal in appearance.

J. B. G.
G. W. S.

CASE 30.

C. A. L.; age, 24 years; nativity, West Indies; was admitted to the Marine Hospital at Chelsea, Mass., September 16, 1896.

History.—Family history good; personal history up to his present attack had been good. Some eight or nine months ago he contracted a very bad cold, which, although making him at times very weak, did not prevent his continuing service on his vessel till May. At this time he felt himself getting gradually weaker, he came ashore to get a rest, but still did not improve and now presents himself at the hospital. He complains of coughing quite a little ever since last winter, and of spitting up lumps of greenish-yellow phlegm. He complained of no pain in the chest, but said that he was accustomed to have chills at times, lost flesh, had fever in the night, and would wake up at times and find himself in a profuse sweat.

The following day a physical examination was made and there was found to be a slight emaciation of the chest; heart apex beat slight, tumultuous. Palpation gave marked vocal fremitus on the right side of the chest, both anteriorly and posteriorly. Percussion: Dullness in upper and middle lobes on the right side anteriorly and posteriorly. Auscultation revealed râles on the right side upper and middle lobes, crackling above, mucous and large below, heard anteriorly and posteriorly; bronchial breathing very marked in the upper right lobe. The heart sounds were apparently normal. The same day a microscopical examination of his sputum was made and the bacilli of tuberculosis were found to be present in large numbers. The patient was immediately placed in the consumptive ward and put on a stimulating treatment, combined with out-of-door exercise. He was kept as much as possible in the hospital grounds during the pleasant weather of early fall, and an attempt was made to keep up his strength with nourishing foods and the administration of malt and whisky. Notwithstanding, he gradually became weaker, until about the middle of October his outdoor exercise had to be abandoned, because of his inability to get up and down stairs. During the latter part of his sickness he complained a great deal of severe headaches, which were with difficulty controlled with compound acetanilid and ammonical powders. As he gradually failed in strength so did he in weight. Every week he was weighed, and almost invariably each Saturday would find him two and a half or three pounds lighter than at the close of the preceding week.

Although gradually failing, his death on December 1 was rather sudden. When the evening visit was made at 6 o'clock the patient was apparently feeling quite bright; an hour later he was seized with a severe coughing spell and became immediately very weak. Strychnia was given hypodermically, but he gradually sank, and died at 10.15 p. m.

Necropsy (*thirty-six hours after death*).—Body that of a mulatto of large frame, but poorly nourished. Abdomen distended with fluid. Slight œdema of feet and legs. Bloody froth escapes from the mouth and nose. Post-mortem rigidity apparently beginning to disappear. The skull cap is small and thick. The dura mater was incised and the brain removed by severing the basal attachments. There were a few adhesions along the superior longitudinal fissure between the brain and dura. In the same region were a few calcareous plaques. The central sinuses were filled with dark fluid blood. The brain tissue was soft and pale. Small quantity of clear fluid in the fourth ventricle. Choroid plexes pale. Basal ganglia apparently not diseased; weight, 1,390 grams. Opening the abdomen the viscera are seen to be in normal position. There is about 4,000 c. c. of yellowish serous fluid in the cavity. Intestines moderately distended with gas. Arch of diaphragm is on a level with lower border of fourth rib on both sides. When the sternum was removed the lungs were seen to be of a bluish-gray color; they did not collapse. The pericardium contained 50 c. c. of clear serous fluid, but the membrane did not appear to be inflamed. Heart wall soft and flabby. The valves were competent; weight, 335 grams. Left

lung was removed, and on section the interior of upper lobe was seen to be in a condition of purulent infiltration, with numerous small cavities. Lower lobe red, congested, dripping blood on section; weight, 860 grams. Right lung had suffered rather more than its fellow; contained larger cavities, and the lower lobe was gray and studded with tubercles; weight, 910 grams. Spleen of steel-gray color externally. The pulp was dark red; weight, 350 grams. Capsule left kidney pale and thin. Cortico-medullary line distinct; weight, 165 grams. Left suprarenal capsule much the color of liver. Right kidney and its suprarenal capsule much same as left; weight, 150 grams. Bladder contained about 200 c. c. of urine. Prostate gland not enlarged. Prostatic urethra dark red, almost black. Testicles large and soft. Stomach contained 400 c. c. of milky fluid. Wall coated with mucus. No cicatrices. Small intestine contained a small quantity of yellow material mixed with mucus. Mesenteric glands enlarged, probably tuberculous. Small amount of fat in mesentery. Large intestine contained hard lumps of fecal matter. Liver of a dark-brown mottled color; consistency firm. On section the interior presented the same mottled appearance, but the color was lighter. Gall bladder contained 20 c. c. greenish-yellow bile. Common gall duct patulous.

E. K. S.
H. W. A.

CASE 31.

T. O.; age, 36; born in Norway; admitted to United States Marine Hospital, San Francisco, Cal., November 6, 1896; died March 11, 1897, at 5.30 a. m.

History.—Patient entered the hospital complaining of a daily chill followed by a rise of temperature and of cough and copious expectoration. Physical examination revealed dullness at the apices of both lungs, and bronchial breathing. After repeated examinations tubercle bacilli were found in the sputum. Treatment was expectant and symptomatic. Patient grew gradually worse, and died March 11, 1897.

Necropsy (six hours after death).—The calvarium, membranes, and brain are normal. There is 100 c. c. of straw-colored serum in the pericardial sac. The heart is slightly enlarged, but otherwise normal. The anterior mediastinum and thymus gland are normal. The parietal and visceral pleuræ are everywhere adherent. The upper and middle lobes of the right lung are one dense mass of tubercle tissue. The lower lobe is normal. The whole of the left lung is tubercular. The apex presents a cavity 7 cm. in diameter, with necrotic walls. The great vessels, nerve trunks, and diaphragm are normal. The abdominal contents are normal with the exception of the mesenteric glands, which are enlarged. The genito-urinary tract is normal; the cord was not examined.

H. S. M.
J. G.

CASE 32.

C. D.; age, 35; nativity, Pennsylvania; admitted to United States Marine Hospital, Chicago, Ill., August 26, 1896; died September 1, 1896.

Family history.—One sister died of tubercle of lung. Patient's previous health had been good until a month ago, when his present sickness began with a deep-seated cold. In spite of treatment, this cold grew steadily and rapidly worse, and when admitted to the hospital he was much emaciated and in an exhausted condition. He did not cough often, but the expectoration was profuse, and the effort at coughing often made him vomit. The sputum contained much thick mucus, but had never been tinged with blood. He has never had a hemorrhage. His breathing is rapid and noisy. He sleeps badly, having light delirium and coma vigil. He has heavy night sweats. His appetite is poor, and he suffers from constipation. His temperature when admitted was 38.5 C., pulse 130, and very weak. Physical examination shows deficient expansion on left side, and both supraclavicular spaces sunken in.

Cavernous breathing is heard over left supra and infraclavicular regions, and tubular breathing over whole left lung. On the right side the percussion note is high-pitched, the breathing is tubular, and subcrepitant râles heard over the whole right lung. Microscopic examination: Tubercle bacilli found in large numbers in sputum. The man was evidently in a dying condition when admitted, so treatment was purely symptomatic with a view to euthanasia.

Necropsy.—Body emaciated, still warm over the abdomen; rigor mortis had occurred to a slight extent; anterior surface pale, except over lower part of abdomen, where the skin was greenish yellow; posterior surface shows cadaveric lividity. Apertures of head contain no foreign body. Penis and scrotum are normal in appearance; anus is closed. Skullcap exposed and sawn through. Bone and dura normal in appearance. Sinuses of dura contain 30 c. c. of dark fluid blood. Vessels of pia mater show bright red injection. Large vessels at base of brain are empty. Lateral ventricles contain a few drops of serous fluid. Choroid plexus slightly injected with dark blood. On section, the white matter shows fine red points; gray matter not as much injected. Cerebellum, medulla, pons, and nuclei of cerebrum look normal. Cavity of abdomen opened. No foreign body present. Intestines pale red, except caput coli, which is dull gray and much distended. The omentum covers the intestines well. The arch of diaphragm is about fifth rib. Thorax opened. Left innominate vein torn, and remains of thymus gland can not be distinguished. Anterior mediastinum contained loose areolar tissue and several slightly enlarged glands. Pericardium contained about 30 c. c. of straw-colored fluid. Heart normal in size and position. Both sides of the heart contained a moderate amount of dark fluid blood, the right heart having also a white clot about the size of my finger. The aorta and pulmonary artery were empty, while the veins al. were about one-third full of fluid dark blood. Aortic and pulmonary valves are competent. Right lung mottled-gray color. Ten to twenty tubercular masses the size of a pea felt on surface of upper lobe. The apex is adherent slightly and is much consolidated. On section, about 7 cm. from apex, is a cavity containing about 2 c. c. of white fluid. Right pleural cavity contains no fluid. Left lung contracted to one-half size. Pleural cavity contains posteriorly about 1,000 c. c. of pus, which is walled off by dense adhesions. The visceral and parietal layers of the pleura are densely adherent wherever they are not separated by this pus. In the apex of this lung is a cavity about the size of a goose egg, containing white fluid and thick mucus. On section, the whole lung is full of small cavities from size of a pea to that of a dime, most of them containing a little white fluid. Bronchial glands are much enlarged. Abdomen: Stomach contains food taken a few hours before death. Mucous surface is dark red in color, veins being outlined in dark pigment. Organ is normal in size and position. Duodenum normal; bile and prancreatic duct pervious. Small intestine normal. Cœcum is much distended and dirty gray in color. No abnormal appearance internally. Appendix size of a crow's quill and 2 cm. in length. Hepatic flexure of colon is constricted to the size of my finger, but there is no band of adhesions, no hardness of the wall, nor scar from an ulcer. Rest of large intestine is normal. Mesenteric glands much enlarged. Pacreas feels very hard, but is normal in color, size, and position, and appears normal on section. Spleen is normal in size and structure. Both suprarenal capsules and ureters are normal. Left kidney has in upper end a pus cavity the size of a pea; the rest of the organ is normal, as is the right kidney. Urinary bladder contains 200 c. c. of clear urine and presents no unusual appearance. Prostate gland normal. Liver weighs 1,980 grams; is normal on section. Gall bladder half-full of brownish-yellow bile; structure is normal. Aorta and vena cava were normal in size, position, and branches. Testicles, urethra and penis, seminal vesicles, and solar plexus not examined.

S. R. T.
P. M. C.

CASE 33.

C. L.; age, 24; nativity, Germany; color, white; transferred from Philadelphia to the United States Marine Hospital, Baltimore, Md., March 1, 1895; died December 29, 1896.

History.—Parents living and healthy. No history of tuberculosis in family. Patient was in the marine hospital at New Orleans eighteen months previous to his admittance here, where he was treated for cough and hemorrhage from the lungs; was in the hospital at Philadelphia three months prior to his coming to the hospital at Baltimore. On his arrival patient was found considerably emaciated, having lost about 20 pounds in weight. Complained a great deal of cough, but no night sweats. Patient was given cod-liver oil and creosote, with appropriate cough medicine.

August 17, 1895.—Patient had a chill at 12 m., followed by a temperature of 39° C. Coughed up some blood at the same time.

November 9, 1895.—Patient had a severe hemorrhage.

May 15, 1896.—Patient looks anæmic and his cheeks have the characteristic hectic flush. Has night sweats.

September 9, 1896.—Patient has gained 5 pounds during the last two months, in spite of some unfavorable symptons.

December 8, 1896.—Patient began to complain of pain in his left testicle. An examination revealed that it was principally the epididymis that was involved. Hot applications were applied, with relief. Later on the patient complained of pain principally in the region of, and above, Poupart's ligament of the left side. A suspensory bandage was applied, but not with complete relief.

December 27, 1896.—A distinct fluctuation was noted in the left side of the scrotum, which was incised. A quantity of pus was evacuated, and the wound dressed. Patient continued weak, and at 8 p. m. on December 29 was in a state of collapse. The usual stimulants failed to give relief. Death followed two hours later.

Necropsy (twenty-two hours after death).—Emaciation not great. Rigor mortis not specially marked. Heart: Weight 284 grams. Pericardial sac contained 60 c. c. straw-colored serum. Valves of heart were normal. The openings of the coronary arteries were patent. Left lung: Weight 1,565 grams. Pleural surfaces slightly adherent, especially at apex. Bronchial glands enlarged. The anterior border was markedly emphysematous. The posterior part was congested. The surface of the lung, especially in the region of the apex, was very irregular, giving evidence of old scars. The lung tissue in its upper part contained a cavity the size of an almond filled with pus. The remainder of this lung gave very little evidence of a tubercular process. Right lung: Weight 1,500 grams. Firmly bound down by adhesions very difficult to remove. The pleura was in places 1.3 cm. in thickness. On section, lung tissue was very hard, showing evidence of great increase in fibrous tissue. Considerable pigment deposited throughout lung. Bronchial glands enlarged. A cavity the size of a walnut was found in the base of the lung. Pneumonic areas observed here and there throughout the lung. The omentum was normal in appearance. Stomach was filled with liquid and gas. The sigmoid flexure of the colon was adherent to the vas deferens of the left side where it crosses the external iliac vessels, showing evidence of a fresh localized peritonitis. Separating the two surfaces of peritoneum and examining farther, a small quantity of caseous material was found to exude. At this point the vas deferens was found to be red and thickened. Spleen: Weight 145 grams. Surface smooth. Section showed it to be of soft consistence and very red color. Kidneys: Combined weight 275 grams. Very similar in appearance. Capsule not adherent. Section showed the cortex paler in color than normal. Liver: Weight 1,600 grams. Surface rather mottled. Section showed liver of softer consistence than normal and of a grayish-yellow color. Scrotum very much thickened. An incision 3 cm. in length was observed extending to the tunica vaginalis of the left testicle. Several cubic centimeters of gray pus was seen to exude from this region, and was found to invade particularly the epididymis. The

testicle itself showed evidence of an acute inflammation. The right testicle was apparently normal. The meninges of the brain were normal in appearance and not adherent. The vessels were somewhat congested.

J. B. G.
G. W. S.

CASE 34.

S. E. O.; age, 42; a native of Sweden; was admitted to the United States Marine Hospital, San Francisco, Cal., June 13, 1896, and died August 22, 1896, at 8.45 p. m.

History.—On entrance he complained of cough, loss of appetite and weight, and profuse night sweats. He was unable to speak above a whisper. Examination revealed a tubercular involvement of both lungs, more marked on the right. The sputum was examined under the microscope, and the bacilli of tuberculosis were found in large numbers. The symptoms increased in intensity and the patient became greatly emaciated and finally died.

Necropsy (eleven hours after death).—The brain and meninges were normal. The bronchial glands were enlarged. The interior of the larynx was full of a yellowish-white material, and the mucous membrane was the seat of tubercular deposits. About two-thirds of the epiglottis had disappeared, and the part remaining was greatly thickened. The heart was pale, flabby, and slightly enlarged; valves normal. The right lung was firmly adherent to the chest wall. The entire lung contained cheesy masses and had five or six large cavities in it. The left lung was studded with tubercles, but no cavities were found. The liver was enlarged and congested. The spleen was normal, with the exception of having a small supernumerary spleen, about 2 cm. in diameter, attached to it. The kidneys were slightly enlarged and congested. The mucous membrane lining the bladder was inflamed. Other viscera normal.

J. H. O.
J. G.

CASE 35.

P. F.; white; age, 48; nativity, Ireland; admitted to United States Marine Hospital, Baltimore, Md., June 20, 1896; died October 2, 1896, at 6.15 a. m.

Clinical history.—Patient was transferred to this hospital from Norfolk, Va., with recorded diagnosis of "pneumonia, lobar and incipient phthisis." He said he had been quite healthy until seven weeks ago, when he was attacked with the pneumonia. Family history obscure. On admission he complained of distressing dyspnœa, cough, free expectoration, and pleuritic pains on left side. Night sweats were troublesome, and patient had lost considerable flesh since the commencement of his trouble. Bowels constipated. Appetite poor. No history of hemorrhages. Physical examination revealed a small vomica at left apex, and considerable involvement of the left lung; right apex was also involved; vicarious respiration over right lung. Patient was put on the usual remedies in such cases and for a while did fairly well until July 26, when he had a severe pulmonary hemorrhage; from this time he grew worse, cough, night sweats, and pleuritic pains being prominent. The temperature range was low, seldom rising above 38° C., with morning remissions and evening exacerbations. Only a few times did it reach two degrees above the normal. Pulse quick and feeble. September 22 patient had a profuse pulmonary hemorrhage, about 2,000 c. c. Patient rapidly grew weaker and died October 2, 1896, at 6.15 a. m.

Necropsy (nine hours after death).—Rigor mortis not marked. Livores only slightly marked on posterior aspect of body. Body emaciated. Male, white. Height, 5 feet 10 inches. Weight, about 130 pounds. India-ink marks on dorsum of right hand and wrist of shamrock and heart, and similarly placed on left, stars and shamrock. Pericardium apparently normal and contained about 50 c. c. of clear serum. Heart: Weight, 390 grams; in diastole and contained a quantity of fluid blood; the intima of the aorta for an inch above the aortic valves was considerably thickened, and

edges of the valves themselves showed some thickening; other valves apparently normal. Both pleuræ showed extensive adhesions. Left lung weighed 840 grams, nodular to the touch and on section a cavity was found in apex about the size of a hen's egg and filled with pus. Tubercular nodules found throughout the lung. Right lung weighed 1,440 grams. Tubercular nodules, on section, were seen distributed through the two upper lobes. Apparently the lower lobe contained no tubercular masses, but on section it was dark in color and congested. Liver: Weight, 1,440 grams; pale in color and, on section, nutmeg appearance. Gall bladder distended with bile and its ducts pervious. Spleen weighed 240 grams. Right kidney weighed 240 grams, capsule easily separable. On section pale and the line between the corticle and medullary substances not well marked. Corticle substance narrow. Left kidney about the same as the right. Bladder apparently normal. Brain was normal in appearance.

J. McM.
G. W. S.

CASE 36.

E. E.; age, 25; a native of Norway; was admitted to the United States Marine Hospital, San Francisco, Cal., July 6, 1896, and died September 14, 1896, at 11.30 a. m.

History.—Patient complained of a cough, night sweats, and inability to talk above a whisper. There was dullness of both apices. These symptoms gradually became more marked, the patient became weaker and weaker, and died at 11.30, September 14, 1896.

Necropsy (twenty-two and one-half hours after death).—Body was very much emaciated. The brain and membranes were normal. The thymus gland was very much enlarged and parts of it had undergone tubercular degeneration. Heart small and flabby, otherwise normal. There was about 50 c. c. of pericardial fluid. The right lung was somewhat adherent, studded with tubercles, and the apex contained several cavities. The weight was 1,250 grams. The left lung was a little heavier than the right, but otherwise the same. The liver was slightly congested. The gall bladder was normal. The spleen was slightly enlarged and congested. The kidneys were normal. The mucous membrane of the entire intestines was thickened and presented numerous ulcerations. The mesenteric glands were all enlarged and filled with tubercular matter.

J. H. O.
J. G.

CASE 37.

T. T.; aged 24 years; a native of Mississippi; was admitted to United States Marine Hospital, New Orleans, La., February 22, 1897; readmitted March 21, 1897; died June 16, 1897.

Clinical history.—When patient entered hospital he presented the general phenomena of pneumonic consolidation of the lower lobe of the right lung. The crisis occurred on the evening of March 1, 1897. Tuberculosis had probably already invaded the upper lobe of the same lung, as indicated by previous cough, percussion dullness, bronchial breathing and bronchophony. The sputum was not examined for tubercle bacilli. From March 6 to the time of death the pyrexia may be considered typical, the thermometer registering 37° C. in the morning and as high as 40° C. in the evening. The cough was at no time annoying, and the sputa not abundant. Emaciation was not progressive, and the general condition of patient was rather favorable until the afternoon of June 10, 1897, when a severe hemoptysis occurred, the hemorrhage amounting to 700 c. c. Sodium chlorid and hypodermatic injections of fluid extract of ergot were administered, morphine being given hypodermatically to allay cough. The sputa were for several days sanguined purulent, gradually becoming much purulent. On June 16 patient vomited at 8.15 a. m.; severe hemoptysis immediately followed, the expectorated blood amounting to 1,000 c. c. From the effects of this hemorrhage he did not rally, death supervening at 9.05 a. m.

Necropsy (*five hours after death*).—Body well nourished; rigor mortis not marked. The calvarium was much thinner than normal. The brain weighed 1,310 grams; cerebellum, 170 grams. The meninges and venous sinuses presented no abnormality. The blood was very dark in color. The lungs were adherent to pleuræ and to pericardium, the right lung exhibiting the more extensive adhesions. The right lung weighed 1,050 grams; crepitated, and floated in water. Two small cavities were noted in the upper lobe; tubercular nodules were generally disseminated, and bands of fibrous tissue were prominent. The hemorrhage had evidently proceeded from this locality. The middle and lower lobes showed numerous tubercular deposits, the lower lobe being very dark red in color. The left lung weighed 390 grams and was tubercular in its upper lobe; section of its lower lobe revealed a few scattered tubercular foci. The bronchial glands were enlarged. The heart weighed 310 grams. The parenchyma and valves normal. Stomach was distended. The liver weighed 1,600 grams; was dark red externally and on section. The gall bladder contained a small quantity of normal bile. The spleen weighed 290 grams; was dark red in color, of firm consistence, with adherent capsule. Both kidneys were small; capsule easily detached, and perinephritic adipose tissue abundant. The weight of left kidney was 130 grams; right, 100 grams. The bladder contained a small amount of turbid urine. Prostate gland and urethra normal. Other viscera normal.

S. N.
H. W. S.

CASE 38.

(*Intestines.*)

H. McD.; age, 40; a native of Scotland; was admitted to the United States Marine Hospital, San Francisco, Cal., March 29, 1897, and died May 11, 1897, at 1.15 p. m.

History.—On admission patient complained of pain in chest and abdomen, had a severe cough, and became very dyspnœic on the slightest exertion; he also complained of severe diarrhea. Physical examination revealed dullness of both apices, bronchial breathing over upper lobes of both lungs. The entire abdomen was tympanitic and tender on palpation. The heart sounds were normal. His condition gradually became worse, abdomen became more and more tender, pain more constant, until he died.

Necropsy (*twenty-two and three-fourths hours after death*).—The body is emaciated; rigor mortis is not well marked. Skull cap, brain case, sinuses and vessels, brain, and membranes are normal. Heart and pericardium are normal. Right lung presents slight adhesions at apex. There is a tubercular involvement of the entire lung with the exception of the lower part of the middle and lower lobes; there are no cavities present. Left lung presents adhesions at apex and posteriorly; there is a cavity 3 cm. in diameter in the apex, and several smaller cavities in the upper lobe. The entire lung is studded with tubercular nodules. There is 1,600 c. c. of clear fluid in the abdominal cavity. The peritoneum is normal with the exception of that portion covering the center of the ilium for a distance of 30 cm., where there is a well-marked tubercular peritonitis. At this point there are numerous adhesions between the folds of the gut. Liver, gall bladder, and ducts are normal. Spleen is enlarged, weighing 320 grams. Pancreas is normal. The kidneys on section present the condition of waxy degeneration; the left is normal in size; the right is enlarged, weighing 200 grams. The stomach is normal. The small intestines are normal with the exception of some peritoneal adhesions about the middle of the ilium. The mucous membrane of the cæcum and ascending colon presents everywhere tubercular ulcerations. The mucous membrane of transverse colon presents two large ulcers about 7 cm. in width and involving entire circumference of the gut. Genito-urinary tract is normal. Spinal cord was not examined.

H. S. M.
J. G.

CASE 39.

Ankle and knee joint.

L. T. L.; aged 48 years; nativity, Massachusetts; admitted to United States Marine Hospital, New York, N. Y., October 18, 1896; died March 30, 1897.

History.—Patient first entered hospital in July for rheumatic fever and was discharged, improved, August 10, 1896. At that time he complained of pain in back and right ankle. The ankle was red and swollen and was so painful that he had been unable to sleep for several nights. Has been sweating considerably at times. The swelling soon subsided and he went out much improved. September 19 he returned with the right ankle very much enlarged, red, tender, and extremely painful. The outer part of ankle is very red and the skin is thinned with an abscess. Evening temperature, loss of appetite and strength. Heart and lungs normal. The abscess was opened and pus evacuated. There were several small cheesy masses discharged. Diagnosis of tubercular ankle joint made, and the patient prepared for operation. His condition was poor at this time and the operation was delayed. Shortly after this time he complained of cough and pain in right knee joint. October 27 leg was amputated about 6 inches above the ankle, and the adhesions in the knee joint broken up by forcible manipulation. The amputation did well, healing in six days. The diseased ankle joint was dissected and the bones found badly damaged. The end of the fibula and the tibia were necrosed, and the astragalus was almost entirely destroyed. There was considerable trouble with the knee joint, being more or less pain all the time. Was out of bed, sitting up in twenty days, and walking around ward on crutches in a month. December 16 abscess of ischiorectal fossa began to develop and opened six days later. December 29 operation for ischiorectal abscess and fistula in ano. At this time the lungs began to show consolidation at the base of each. Put on creosote. A slight cough but no expectoration. The evening temperature began to creep up. Loss of appetite; also losing weight and strength. The fistula did not do well and gave him a great deal of annoyance, and the knee joint was painful most of the time. He ran a temperature of about 38° C. for months. His lungs gradually filled with tubercular consolidation. He failed gradually and died of exhaustion.

Necropsy (thirty-six hours after death).—Body very much emaciated. The right knee joint contained tubercular pus. The condyle of femur was undergoing necrosis. Ligaments thickened. Left ankle opened and ligaments found to be thickened. The brain was not examined. The omentum and spleen normal. Kidneys were small; capsules adherent; suprarenal capsules, urinary bladder, the organs of generation, rectum, and stomach were normal. The ischiorectal abscess had not healed. The gall bladder was very much distended with a straw-colored fluid. The liver was slightly enlarged, but otherwise normal. The pancreas, great blood vessels, and arteries were normal. The pleural cavities were entirely obliterated with adhesions. The lung tissue was almost a solid mass of tuberculous tissue, undergoing softening and breaking down in places. There was very little breathing space left. The heart was very small, but otherwise normal. There was no fat all around the pericardium. The pericardium was normal. The great blood vessels were normal.

J. O. C.
G. W. S.

CASE 40.

F. J.; aged 30 years; nativity, Norway; admitted to United States Marine Hospital, New York, N. Y., September 28, 1895; died May 12, 1897.

History.—He had pain in upper portion of left lung for a week. Had pneumonia in left lung last winter. Has been coughing since the attack of pneumonia. Spits blood occasionally. Appetite poor; diarrhea, nausea, and vomiting. Has been growing weaker. Family history negative. Examination of heart showed it to be

normal. The apex of left lung badly infected. He continued in about this condition for nearly two years. For the last three months he has been confined to bed. He is too weak to sit up. Coughing a great deal all the time. Tubercle bacilli found in great numbers at various times. Died of exhaustion.

Necropsy (four hours after death).—Body very much emaciated. Rigor mortis well marked. No marks on body. The calvarium removed. Membranes normal. Considerable fluid in arachnoid. Sinuses normal. The pineal gland was enlarged and undergoing softening. Brain otherwise normal. The pleuræ and pericardium were adherent to chest wall. Heart normal. The left lung had small cavity in apex. The lower lobe of left lung and the lobes of right lung badly infected with many small foci, breaking down. The pleuræ firmly adherent. The omentum, spleen, kidneys, and suprarenal capsules, urinary bladder, organs of generation, rectum, duodenum, stomach, gall ducts, and pancreas were normal. Liver much enlarged and very friable. The mesenteric glands were indurated and enlarged. There were extensive adhesions of the coecum. The appendix was bound down and the end was red and congested.

J. O. C.
G. W. S.

CASE 41.

E. G.; aged 37 years; nativity, Finland; admitted to United States Marine Hospital, New York, N. Y., October 30, 1896; died May 14, 1897.

History.—Has had a cough for eight months. Had chills at beginning of trouble and a cough since that time. Was in Boston hospital last summer for same trouble. Got better and went to sea again. Has expectorated blood at times. Had several hemorrhages last week. Has night sweats. Losing weight all the time. Family history negative. Present physical condition: Has poor appetite and pain in left side of chest. Body fairly well nourished. Chest of medium development, but with poor expansion. Vocal fremitus increased at right apex and in right infra-clavicular region. Marked dullness on percussion in same region. Mucous râles and bronchial breathing on right side. Tubercle bacilli not found. Continued about the same until November 19 when there was some hemorrhage. Had several hemorrhages at times up to March 15, when the tubercle bacilli was found in great numbers. Expectorating a great deal of mucus. Continued to lose flesh and strength and was confined to bed two weeks before death. Died of exhaustion.

Necropsy (seventeen hours after death).—Calvarium removed. The skull cap, the brain case, the sinuses, and blood vessels normal. The membranes were adherent to brain over the motor area. The brain was normal. The pericardium contained about 200 c. c. of fluid. Both lungs badly infected. There were several small cavities in both lungs. Pleuræ firmly adherent to lungs and chest wall. The great vessels, nerve trunks, and diaphragm were normal. The omentum was very thick. Spleen normal. Small supernumerary spleen about the size of a walnut was found near the spleen. It was situated in the folds of the mesentery. The kidneys were large and congested. Suprarenal capsules were enlarged and adherent to kidneys. Urinary bladder, organs of generation, rectum, duodenum, stomach, gall ducts, and pancreas were normal. Liver enlarged and friable. Mesenteric glands indurated and enlarged. Both the large and small intestines were contracted at places. The lumen of the gut was diminished to half the size. These contracted portions were not thin. The walls of the intestine at those points were at least three times the normal thickness. In this case there seemed to be no special reason for the change, as there was no greater number of glands in the mesentery opposite these points than elsewhere. The blood vessels supplying these parts seemed normal. A band of omentum had been carried by the descent of the testicle through the inguinal canal into the scrotum. The band was dissected out and the end was found attached to the tunica vaginalis.

J. O. C.
G. W. S.

CASE 42.

Bright's disease—epilepsy.

R. O.; age, 35; a native of Sweden; was admitted to the United States Marine Hospital, San Francisco, Cal., December 3, 1894, and died March 26, 1897, at 4.30 p. m.

History.—On admission to the hospital patient complained of nocturnal epilepsy. The attacks recurred every two or three weeks during patient's stay in the hospital. In January, 1897, albumen appeared in the urine, and marked œdema of the lower extremities developed. The patient never at any time had any symptoms of tuberculosis of the lungs. The nephritis became gradually worse, and patient died March 26, 1897.

Necropsy (thirty hours after death).—The body is anemic, but well nourished. Rigor mortis not well marked. There is marked œdema of lower extremities and external genitals. The calvarium, meninges, brain, and blood vessels are normal. The anterior and posterior mediastinal glands are enlarged. The thymus gland is normal. The heart is normal. Both parietal and visceral pleuræ of the left side are extremely adherent. The pleura is about twice its normal thickness. The left lung is everywhere tuberculous and contains a cavity in its apex 5 cm. in diameter. The right pleura is also adherent and of the same thickness as the left. The lower lobe of the right lung is full of tubercles. The rest of the lung is normal. The diaphragm is normal in position. The spleen is enlarged and weighs 305 grams. The liver is normal. The capsule of the left kidney is nonadherent. The cortex is normal in thickness and the pyramids are well marked. The kidney substance presents a lardaceous appearance. The right kidney is in a similar condition, but not so well marked. The remaining organs are normal. The spinal cord was not examined.

H. S. M.
J. G.

NOTE.—At no period of stay in hospital did the patient cough or expectorate.

J. G.

CASE 43.

C. J.; age, 47; a native of Sweden; was admitted to the United States Marine Hospital, San Francisco, Cal., December 7, 1896, and died March 27, 1897, at 10.45 a. m.

History.—On entrance to the hospital patient complained of cough and expectoration, which began about two years previously. He also had severe pains in the right side. His appetite was impaired, and he had lost considerable weight. Physical examination revealed a marked dullness of both lungs, more pronounced at the apices. Bronchial breathing also present. Tubercle bacilli were found in the sputum on making a microscopical examination. The patient grew steadily worse, all symptoms being greatly exaggerated at the time of death.

Necropsy (twenty-three hours after death).—The body is greatly emaciated. Rigor mortis is well marked. The subcutaneous fat is reduced to a minimum. The calvarium, meninges, brain, and vessels are normal. The anterior and posterior mediastinal glands are not enlarged; the thymus gland is normal. There is 100 c. c. of amber-colored fluid in the pericardium. The heart is enlarged and weighs 525 grams. On the anterior aspect of the left ventricle is an area of fatty infiltration, 3 cm. in diameter, occupying nearly the entire thickness of the cardiac wall. The cardiac muscle is pale and flabby and presents evidence of fatty degeneration. The mitral valve is thickened along its free border, but is apparently competent; the other valves are normal. Both parietal and visceral pleuræ on the left side are strongly adherent. There is a cavity in the apex of the left lung 5 cm. in diameter. The upper and middle lobes contain masses of tubercle; the lower lobe is normal. The pleuræ on the right side are more strongly adherent than those of the left. The apex of the right lung contains a cavity 4 cm. in diameter. There is tubercular involvement of the upper and middle lobes; the lower lobe is normal; the diaphragm

is normal in position; the spleen is normal; the liver is normal in size, but its tissue is soft and friable; the kidneys and remaining viscera are normal; the spinal cord was not examined.

H. S. M.
J. G.

CASE 44.

(*Aneurism of arch of aorta.*)

R. T.; age, 41; native of New York; was admitted to United States Marine Hospital, Evansville, Ind., May 13, 1896; died October 12, 1896.

History.—Patient admitted to hospital with following history: Had been healthy up to last winter, when he had an attack of la grippe, and has not been well since, although at work. Three weeks ago was taken with a profuse diarrhea while at work during very warm weather, working extra hours with improper food and water. Has had a slight cough since the attack of la grippe; lately this symptom became more marked, without much expectoration. Has lost more than 30 pounds weight lately. Bowels move with great frequency, stools liquid and malodorous; no blood; without pain. Has night sweats. Complains of pain on inspiration, also of dyspnœa. Physical examination: Percussion, left lung, dullness at apex and upper lobe; right lung, resonance normal. Auscultation: Left lung, bronchial breathing upper part, sibilant, mucus, crepitant râles scattered; right lung, breathing harsh, mucus and subcrepitant râles also scattered. Voice somewhat husky. Pulse feeble, but full, about 80 to 100 most of time. Abdominal wall relaxed, soft and quite tender along transverse colon. Patient was given creosote, stimulants, peptonized cow's milk, and with intestinal astringents and opiates improved very perceptibly; was able to get up. Stomach and bowels became somewhat stronger, and appetite returned. Patient improved until June, when he had an attack of nausea and vomiting; bowels moved five to seven times daily. Temperature always was within 1° C. of normal, and rise was irregular, sometimes in forenoon and then an occasional evening rise; toward termination of disease evening rise was regular. Intestinal symptoms improved and condition of lungs grew worse; cough, expectoration, and the accompanying dyspnœa were the distressing symptoms. Expectoration became more profuse, malodorous, and tubercular in character. Patient never had hemorrhage from bowels or lungs. Voice became more husky, and a few days before death almost to complete aphonia. Patient's condition gradually grew worse, and he died very much emaciated. Examination from time to time, following progress of disease, was made, and physical signs changed, but upon post-mortem examination the aneurism found gave no perceptible physical signs, only dyspnœa and partial aphonia toward termination of tubercular process.

Necropsy.—Body much emaciated. Rigor mortis marked. General nourishment poor. Abdominal wall very thin, no adipose tissue remaining. Organs in proper relation and position. Height, 167 cm.; circumference at shoulders, 78 cm. Heart weight, 245 grams, rather small, not dilated or hypertrophied; thickness of left ventricle, 1 cm.; right ventricle, 0.4 cm.; diameter of aortic orifice, 2.25 cm.; capacity of left ventricle, 50 c. c. fluid. All valves competent. Pericardium contained 20 c. c. fluid, structure normal. Aneurism of whole arch of aorta, 7 cm. in width; walls hypertrophied and contained a small organized clot 1.5 cm. in diameter, pressed somewhat on trachea and especially on left bronchus. Larynx and trachea contained considerable pus. Left lung: Weight, 550 grams, scattered throughout with tubercular nodules, also some broken down, resulting in cavities which were small, none larger than 2 cm. in diameter. Most healthy part somewhat in a collapsed state. Pleura somewhat adherent, quite firm in some parts. Right lung: One large cavity, was impossible to remove en masse; remains were just a shell, with one large cavity containing some pus. Structure soft, gangrenous, and very malodorous. Pleural cavity obliterated on right side. Stomach empty. Diameter of pylorus, 3 cm.; structure normal. Small intestines: Average diameter, 3 cm. Large intestine was found to have its walls much thickened;

nowhere along course was it more than 3 cm. in diameter, and some places only 2 cm. Mucous membrane in small intestines in a hyperplastic and anæmic appearance, and along colon principally, which was one mass of cicatricial tissue; also found a few ulcerations, but not extensive; mesenteric glands enlarged. Liver: Weigl t, 1,750 grams; dark red-brown; tubercle nodules of various sizes scattered throughout substance; cicatrices on surface of organ, which left some depressions. Gall bladder full of biliary fluid; ducts normal. Kidneys: Left, weight, 165 grams; right, 170 grams; structure normal. Bladder empty. Spleen: Weight, 565 grams; enlarged, soft, and pulpy. At junction of lower with middle one-third of anterior border was a notch or depression 2.5 cm. deep. Brain, including membranes: Weight, 1,360 grams. All organs not otherwise mentioned, normal.

H. S. C.
P. M. C.

CASE 45.

Seaman J. W.; age, 37; nativity, Sweden; admitted to marine ward, German Hospital, Philadelphia, Pa., December 30, 1896; died March 13, 1897.

Clinical history.—On entering hospital he gave history of having been deaf for last twelve years. For past three weeks had had severe cough and a soreness in chest. Night sweats were frequent. Losing in weight. Examination showed consolidation of right apex and lower lobes of right lung. He improved slightly and lung appeared to be undergoing resolution. Sputum was examined four times, but no bacilli were found. From March 3 he failed rapidly. Was delirious several times. Death from exhaustion March 13, 1897.

Necropsy.—External appearances: Height, 5 feet 8¼ inches; circumference shoulders, 37½ inches. Post-mortem lividity marked posteriorly. Rigor mortis marked. General nourishment very poor. Pupils uneven, left contracted. Circulatory organs: Heart, weight 290 grams; pericardial sac contained 4 c. c. fluid, clear; all valves competent, some nodules on aortic valve; left ventricle had some recent clots; wall, 2 cm. thick; right ventricle, chicken-fat clot, and wall 8 mm. in thickness. Thoracic and abdominal aorta normal; other arteries and veins normal. Respiratory organs: Nares normal; larynx and trachea normal; left lung, weight 390 grams; recent adhesions throughout pleural cavity; nodular deposits in lower part upper lobe and throughout lower lobe section showed these to be little yellow cheesy masses 1 mm. to 1 cm. in diameter; lung floats in water. Right lung, weight, 1,005 grams; numerous old adhesions, especially firm posteriorly, the parietal pleura here stripping off with lung on removal of latter; lung dense, but friable; cuts like liver on section; numerous cheesy deposits; small cavity containing purulent matter, about 2½ cm. in diameter, located in lower central part of upper lobe. Abdomen: Peritoneum, normal; great omentum was adherent to margin of left internal abdominal ring; transverse colon contracted throughout, measuring 2.5 cm. in diameter; descending colon contracted throughout, measuring from 1.5 to 2 cm. in diameter. Tongue, pharynx, œsophagus, and stomach normal. Small intestine empty, contracted somewhat, and ileum slightly congested. Mass of hardened feces size of hen's egg in rectum. Liver slightly congested (dark and red in color); weight 1,290 grams. Gall bladder with 75 c. c. dark-brown (almost black), somewhat thickened bile. Common duct patulous. Pancreas, weight 45 grams, slightly congested. Genito-urinary organs: Left kidney, weight 125 grams, somewhat congested; right kidney, weight 125 grams, somewhat congested; pelvis and ureters normal; bladder normal; urethra and prostate normal; left suprarenal body, weight 9 grams, dark color; right suprarenal body, weight 10 grams, dark color; spleen, weight 115 grams, normal. Nervous system: Head and scalp normal; hair thin; skull rather thin; membranes of brain normal; surface of brain congested, weight 1,490 grams; medulla and pons varolii very pale in color. Microscopic examination: Spreads from nodulus in right and left lungs showed numerous tubercle bacilli; spreads from cavity in right upper lobe showed numerous tubercle bacilli.

F. I.

CASE 46.

E. C., aged 65 years; nativity, Sweden; was admitted to the United States Marine Hospital, Chelsea, Mass., April 15, 1895; died February 23, 1897.

History.—Patient complained of severe cramps in the muscles all over his body and of slight pains in almost all his joints. He was unable to retain his urine for more than three hours at a time. No excessive thirst. No cough. Physical examination showed patient's health to be generally good. He had a double oblique inguinal hernia, the right side of ten and the left of three years standing. Appetite fair; bowels normal. An examination of urine made the following morning showed a slight amount of albumen. His urine was examined frequently, but never showed the presence of albumen again. He was given a tonic of iron, quinine, and strychnine, and his bowels, which showed a decided tendency toward constipation, were kept regular by means of cascara. A physical examination made May 30, 1895, proved the presence of a slight bronchial irritation, from which the patient apparently soon recovered. Several times, however, during the summer and autumn months of the year he contracted slight bronchitis, and later his cough became more constant, so that by the first of January, 1896, he was coughing a great deal and had been considerably reduced in weight. In April, 1896, a physical examination showed dullness in the right apex, with mucus râles over the whole chest. An examination of his sputum about this time revealed the presence in small numbers of the tubercle bacilli. About the middle of June he had an attack of herpes zoster. Much neuralgic pain in the affected nerves. Lungs dull at all points, but particularly so in the right upper and left lower lobes. The patient was now discharged as not improved of the "chorea" for which he was admitted, and readmitted for tubercle of lung. From this time to the date of his death he gradually grew weaker. At first, during the summer months he was able to get out in the grounds, but later he was unable to get up and down stairs. Shortly after this he was confined to his bed.

Necropsy (thirty hours after death).—Body extremely emaciated. Small bedsore over right trochanter. Abscess at lower end of sternum containing 25 c. c. cheesy purulent matter. The skull cap being removed the dura mater on either side of the longitudinal sinus was injected. There were no adhesions. The ventricles were nearly filled with fluid and the foramen of Munro was about 1.5 cm. in diameter. Brain and basal ganglia presented no abnormalities. Peritoneum dry and sticky. Abdominal organs in normal position. Upper limit of diaphragm right side, fifth intercostal space; left side, sixth rib. Right pleural cavity obliterated by adhesions. Left pleura normal save for a few adhesions over upper lobe of lung laterally. Pericardium contained 15 c. c. straw-colored fluid. Heart small; left side firmly contracted; right, flabby. External surface of aorta injected. Right ventricle contained very little blood; the cordæ tendineæ of tricuspid valve bound up in a firm antemortem clot. Cusps of aortic valve contain several calcareous placques. There are patches of atheroma on the cusp of mitral valve. Weight, 295 grams. Right lung tuberculous throughout; contains numerous small cavities. Left congested at base, but otherwise normal. Spleen, small; capsule wrinkled; weight, 90 grams. There was a small nodule of splenic tissue 1.5 c. m. in diameter lying in the gastro-splenic omentum. Left kidney has several small cysts on the surface; weight, 135 grams. Right kidney same as its fellow; weight, 105 grams. Suprarenal capsules granular both to sight and touch. Bladder contained 200 c. c. urine; irregular in outline, and at the base there were numerous connective tissue bands interlacing in every direction. Prostate gland greatly enlarged as to all its lobes; very firm and hard. Liver presents a finely mottled appearance externally and on cut section; weight, 1,255 grams. Gall bladder normal; ducts patulous. Intestines contained yellowish fluid fæcal matter. No ulcerations were noticed.

E. K. S.
H. W. A.

TUBERCLE OF RECTUM.

C. K.; aged 27 years; nativity, Nova Scotia; admitted to United States Marine Hospital, Chelsea, Mass., September 18, 1893; died January 20, 1897.

History.—Patient was admitted under diagnosis of external piles, and later he was operated on for hemorrhoids. The resulting wound never healed, and May 16, 1894, he was readmitted for ulceration of rectum. The ulcerative process within the rectum produced a stricture. Topical and internal applications were used to no effect. Dilatation of the stricture with rectal bougies, although tried several times, seemed to aggravate rather than relieve the trouble. For about one year preceding death morphia was demanded for relief of pain. Constipation was at times present, but the bowels generally were relaxed. There was, as a rule, very severe pain following a stool. Patient became cachetic and very much emaciated. He failed very slowly and death seemed imminent for several days before it finally came to his relief.

Necropsy (twenty-one hours after death).—Body greatly emaciated. Rigor mortis leaving arms and neck, but still present in legs. Both pupils dilated, right more than left. Calvarium removed. Dural sinuses filled with fluid blood. Surface of brain on either side of longitudinal sinus congested. In the choroid plexus, right side, was a small bleb or cyst 1 cm. in diameter, distended with gas. Brain weighed 1,355 grams. The abdominal cavity was opened and the viscera were found to be in normal position. No gaseous distension. Mesenteric glands enlarged. Omentum contains a little fat. Peritoneum gray and glistening. Upper limit of diaphragm lower border of fifth rib, right side. Sternum removed. Right pleural membrane thickened and fibrinous. Anterior surface lower lobe right lung coated with fibrin. Adhesions bind the lung on this side laterally and posteriorly from base to apex. Left pleura smooth and glistening; a few slight adhesions at posterior surface of upper left lobe. Pericardial fluid clear; in amount 15 c. c. Heart small, firm, and comparatively empty; only 20 c. c. of fluid was obtained from the four cavities. There were post-mortem clots in both auricles which nearly filled those cavities. Valves competent. Small patches of atheroma in aorta. Heart weighed 120 grams. Right lung studded with tubercles; it also contained many small cavities filled with pus; weight, 1,280 grams. Left lung crepitant throughout, although there were beginning tuberculous processes in the upper lobe; weight, 620 grams. Spleen bluish gray in color; transverse measurement, 8 cm.; longitudinal measurement, 5 cm.; weight, 180 grams. Right kidney pale; capsule slightly adherent; internal outlines well marked; weight, 105 grams. Left kidney same as right; weight, 130 grams. Suprarenal capsules weighed 10 grams each; color, pale brown. Slight varicocele of left pampiniform plexus. Both testicles small, 2.5 by 2 cm. Prostate firm to touch; 3 cm. in length, 2 cm. from above downward; prostatic portion of urethra congested. Bladder contained 300 c. c. urine; mucous membrane at neck congested, otherwise normal. Liver bluish gray in color; mottled yellowish red appearance on section; weight, 1,490 grams. Gall bladder moderately distended; common bile duct patulous. Stomach and intestines apparently normal till transverse colon was reached, the caliber of which was reduced to 2 cm. The upper half of the descending colon was about the same size; at about its middle the descending colon regained its normal size, which was maintained to the sigmoid flexure, where the gut again became constricted to 2 cm. in diameter. The rectum was an oblong mass, the walls of which were 2 cm. in thickness; the caliber was not very much contracted. The mucous membrane was destroyed and the internal surface was covered with small nodular masses.

E. K. S.

H. W. A.

ALCOHOLISM (DELIRIUM TREMENS.)

Case 1.

W. E.; aged 57; born in Norway; entered United States Marine Hospital, San Francisco, Cal., February 19, 1897; died February 19, 1897, at 11.30 a. m.

History.—Patient entered hospital with a history of having fallen six days before a distance of 8 feet, striking on his back. Two days later he became delirious, with hallucinations and delusions, especially well marked at night. Two days before death he became comatose, in which condition he remained until death. Upon physical examination at the time of admission the head was slightly retracted, the pupils equally contracted and not reacting to light. There was athetosis, and the forearms were flexed at the elbows and resisted extension. There was no paralysis and no anæsthesia. Respiration was forced and increased in frequency. Percussion of the thorax was normal. Auscultation revealed coarse bubbling râles over every portion of both lungs. It was impossible to auscultate the heart sounds. The pulse was slow, small, and weak. The extremities were cold. The temperature was 36.4. There was incontinence of urine and fæces. Patient sank steadily, and died at 11.30 a. m., February 19, 1897.

Necropsy (two hours after death).—The body is well nourished. Rigor mortis is absent. The calvarium and membranes are normal. The sinuses of the dura mater and the superficial vessels of the brain are widely distended with blood. The fluid in the ventricles, the sub arachnoid space and at the base of the brain is considerably increased in amount. The brain tissue is normal. The thoracic contents are normal with the exception of the apex of the right lung, which is adherent to the parietal pleura and presents the evidences of a healed tubercular process, there being two encapsulated caseum nodules ½ cm. in diameter. There is also a moderate amount of œdema of the posterior portions of both lungs, with large amounts of mucus in the bronchii. The stomach is intensly inflamed, its entire mucous membrane being red and injected, with many areas of superficial erosion. The other abdominal contents are normal. The spinal cord was not examined.

M. S. M.
J. G.

Case 2.

Meningo-cerebritis.

J. J.; age, 25; a native of Finland; was admitted to the United States Marine Hospital, San Francisco, Cal., November 1, and died November 3, 1896, at 5 p. m.

History.—On entrance he was in a state of acute delirium due to alcohol. He raved continually, and it was almost impossible to make him take either food or medicine. He became very weak, and was rational for a short while before death.

Necropsy (sixteen hours after death).—Brain and meninges: Large amount of cerebro-spinal fluid; dura adherent to the arachnoid; pia thickened, opaque, and congested. Brain itself greatly congested. Right spheno-temporal lobe yellowish in color, softened in some places; small, hard nodules in others. Occipital lobe softened. Upper part of right ascending frontal convolution softened and disintegrated. Heart slightly enlarged, otherwise normal. Lungs normal. Liver normal. Spleen normal. Kidneys normal. Stomach: Mucous membrane greatly thickened and inflamed in places. Remaining viscera normal.

J. H. O.
J. G.

CARCINOMA OF LIVER AND SPLEEN—SECONDARILY INFECTED MESENTERY.

Case 1.

J. H. A.; age, 43; nativity, Florida; admitted to the United States Marine Hospital, Stapleton, Staten Island, New York, August 8, 1896; died September 1, 1896.

History.—Complains of pain in left side and back, sometimes shifting to left chest; has had pains about six months; feels very weak, but has a very good appetite; no cough or expectoration; bowels constipated. Physical examination shows patient is not well nourished; very little flesh on chest and arms; lungs and heart apparently normal, though the latter is slightly displaced upward. The abdomen is very much distended and a large tumor is made out in the lower part, extending from right iliac region across the median line and about 5 cm. above the level of the umbilicus. Right testicle undescended. States that the growth began twenty-six months ago as a small lump apparently in the abdominal wall. For two years it grew slowly, causing little, if any, annoyance. During the last two months the growth has been rapid and his strength has failed proportionately. From the size of the tumor, its evident malignancy, and the patient's enfeebled condition, an operation was deemed unjustifiable.

August 17.—Growth increasing in size. Beginning œdema of right leg from pressure upon iliac veins. Patient is failing.

August 21.—Difficulty in voiding urine; considerable straining required to empty bladder.

August 27.—Œdema in left leg. Urine now voided freely.

From the above date till his death, patient was restless and mildly delirious when not in a semicomatose state, and died at 8.30 p. m., having been unconscious all day.

Necropsy (thirteen and a half hours after death).—Cadaveric rigidity present; slight post-mortem lividity. Body emaciated. Abdomen distended by a firm mass lying in median line and extending halfway from umbilicus to xiphoid cartilage. Both lower limbs œdematous, right more than left. On inner surface of skull, on left side of median line, are 3 depressions, 1 cm. in diameter and 0.5 cm. in depth, caused by pressure of Pacchionian bodies. Dura reddened along the median line. Dual sinuses normal; frontal sinuses normal. Excess of serous fluid in subarachnoid space. The upper surface of brain covered with fibrinous exudate. Brain weighed 1,674 grams. On opening the lateral ventricles they were found to contain enough fluid to fill the middle cornua. Various basal ganglia normal. Abdomen contained a large reddish-white lobulated tumor, pushing the intestines to other side and forcing the diaphragm upward till the arch was on a level with the lower border of the fourth rib. Two enlarged lymphatic nodes, 5 cm. in diameter, in region of ensiform cartilage. The under surface of the diaphragm and the walls of the abdomen were thickly set with enlarged lymphatic nodes. Pluræ normal. Apex of heart on a level with lower border of fourth rib; base at level with lower border of first rib. Pericardium normal, contained 25 c. c. fluid. Coronary veins distended; arteries empty. Right ventricle contained small quantity of fluid blood; right auricle distended with post-mortem clot; left side of heart comparatively empty; walls of left ventricle four times the thickness of right; ante-mortem clot in aorta; valves normal. Omentum contained a small amount of fat, pushed to left side by tumor. Spleen 5 cm. in breadth and 13 cm. in length, wedge-shaped from external surface to hilum; very tough on section; both kidneys and their capsules apparently normal. At this point it was necessary to dissect out the tumor, which was adherent to the mesentery and the parietal layer of the peritoneum. It apparently originated between the bladder and the rectum on the right side, and by its growth it surrounded, but did not occlude, the rectum. The bladder lay over the anterior surface of the tumor, firmly adherent by its posterior wall. In the removal it was necessary to sever the rectum. The mass was then turned out and the urethra cut just in front

of the prostate gland. The growth weighed 3,968 grams, and a mass of enlarged retroperitoneal glands 992 grams. On section the tumor was firm on the surface, while the center was beginning to soften. Urethra normal. Small varicocele on left side. Left testicle normal; right testicle not found. Left lobe of liver covered with depressions caused by pressure of enlarged lymph nodes; right lobe 15 cm.; 2 cm. in thickness, 20 cm. in length, and 8 cm. in width. Stomach normal. Duodenum bound to liver. Lumen of small intestines diminished. In many places the gut is adherent to tumor mass. Cæcum and vermiform appendix adherent. Large intestine otherwise normal save the rectum, the lumen of which was diminished by the new growth. Liver: A general infiltration of small cylindrical cells, which crowd out and flatten the normal liver cells here and there. The small cylindrical cells have apparently undergone degeneration in places. Connective tissue of trabeculæ increased in amount. Lumen of smaller vessels appreciably decreased in size. Spleen: Walls of smaller arteries and capillaries thickened. Lumen lessened in size. Waxy degeneration of reticulum of glomeruli with lymphoid cells atrophied. Reticulum of pulp extensively degenerated. Tumor: Cells closely resembling epithelial in a connective tissue stroma, which here and there forms alveoli. The cells lining alveoli and a large majority of those scattered throughout the stroma are cylindrical in shape, though in places spindle and polyhedral shaped ones are seen. The cellular elements largely predominate.

E. K. S.
P. H. B.

CASE 2.

Liver, spleen, and lungs.

E. W.; age, 47; a native of Alaska; was admitted to the United States Marine Hospital, San Francisco, Cal., March 16, and died September 27, 1896, at 12 m.

History.—On entrance, he complained of dyspnœa, pain in the region of the liver, and enlargement of the abdomen. A syphilitic history was given. Physical examination revealed a distended abdomen and an enormous enlargement of the liver. On palpation it was found to be very hard, and was nodulated in some places. Icterus pronounced. Measurement of liver: Right mammary line, 25 cm.; left, 22 cm.; transversely across the abdomen, about 50 cm. Acites present, but not marked. No relief followed after treatment. Patient became greatly emaciated, and the fluid rapidly increased in quantity. Had severe pains, which were alleviated by the use of morphine. Patient had to be tapped several times, and in all about 90 liters of fluid were withdrawn. Toward the end there was a partial loss of sight, and for twenty-four hours before death he remained in a comatose condition.

Necropsy (*four hours after death*).—Great emaciation present. On removing the skull cap considerable cerebro-spinal fluid escaped. The brain and meninges were normal. Heart, small and flabby, valves in good condition. Both lungs were smaller than normal. Left was adherent over its entire surface. The right lung was slightly adherent, and at its base was found a yellowish mass about 4 cm. in diameter, involving the lung tissue. Lungs otherwise normal. The greater part of the splenic tissue was replaced by a mass similar to that found in the lung. Liver: Weight, 7,850 grams. The greater part of the right lobe was made up of one huge mass of yellowish colored tissue. On section it was found to be of a leathery consistence; the center was somewhat softer and a watery fluid oozed out. Along its anterior border there was a strip of liver tissue about 4 cm. in width; this was in a state of hypertrophic cirrhosis. The entire left lobe was made up of one large yellowish mass. The lobus spigelii was composed of normal liver tissue and was enormously hypertrophied. The gall bladder was contracted and adherent to the liver tissue. The kidneys were contracted, otherwise normal. The intestines were studded with small nodules. The visceral layer of peritoneum was similarly covered. The nodules were composed of the same yellowish tissue as found in the other organs. Remaining viscera normal.

Later report after microscopical examination.

At the autopsy specimens from the various diseased organs were saved and treated by Professor Freund as directed. Sections (just completed and herewith forwarded) were made and stained and submitted to microscopic examination, from which an amended diagnosis of fibrinous carcinoma or scirrhus cancer is made. As may be seen from the sections, there is a preponderance of fibrous stroma, some parts of which are infiltrated with cancerous cells, and between the fibrinous bundles a close packing of other cells.

J. H. O.
J. G.

CASE 3.

O. F.; age, 68; a native of Ireland, was admitted to the United States Marine Hospital, San Francisco, Cal., April 21, 1896, and died July 30, 1896, at 10 a. m.

History.—On entrance, a tumor was found involving the tongue and partly filling up the oral cavity. The swelling was greatest on the right side beneath the inferior maxilla. The glands of the neck were not enlarged. The tumor was hard and indurated, and malignant in character. The patient had great difficulty in swallowing and could not articulate plainly. The tumor rapidly increased in size, the man became very weak and finally died.

Necropsy (twenty-four hours after death).—The subject was greatly emaciated. The brain weighed 1,610 grams and was slightly congested; the meninges were normal. The tongue was one mass of cancerous tissue, no muscular fibers being found. The apex and right side were ulcerated. The larynx presented cancerous nodules throughout and the tracheal glands were infiltrated. The entire surface of the right lung was adherent. Both lungs were in a state of hypostatic congestion, and were studded with cancerous nodules. The heart weighed 235 grams. Vegetations were found on one of the aortic semilunar valves. Other valves normal. The liver was congested and the portal ducts filled with bile. The kidneys and supra-renal capsules were normal. The spleen was soft and mushy. Other viscera and genito-urinary apparatus normal.

J. H. O.
J. G.

TUMOR OF BRAIN.

N. A. J.; white; male; age 55; nativity, Delaware; admitted to United States Marine Hospital, Baltimore, Md., May 12, 1896; died November 8, 1896.

History.—Patient was transferred from Philadelphia with a recorded diagnosis of "mitral stenosis and insufficiency, cerebral embolism-aphasia." When admitted to hospital in Philadelphia, April 12, 1896, patient was in a semiconscious and apathetic condition. Pupils equal. Tongue normal. Patello tendon reflux on right side increased; normal on left. Breathing slow; pulse 70. Paresis and some loss of sensation in right face, arm, and leg; heart had a double murmur, mitral direct and regurgitant, was irregular, and patient had amnesic aphasia. He was given potassium iodide, and continued to improve up to May 12, when he was transferred to Baltimore. On admission to this hospital patient's general health was in fairly good condition; weight 150 pounds; somewhat anæmic. His mental condition, however, was abnormal, and his speech defective; loss of memory, mental failure, and depression were the psychical symptoms, and there was marked amnesic aphasia. When asked a question he would try to answer, but could not give the correct word. When the correct answer was suggested, however, he would at once recognize it as such. Partial paralysis, motor and sensory, existed on right side, and the tongue was slightly deviated; pupils dilated; knee jerk exaggerated; no ankle clonus; temperature and pulse normal; no atheroma; no lymphatic glandular enlargement. Urine pale, alkaline, and free from sugar and albumen.

May 26.—Afternoon temperature record shows a rise of about one degree, centigrade, and the daily rise and fall occurred during the period of one week. Patient kept his bed from this time on. Had frequent spells of Cheyn-Stokes breathing, and his mental condition did not improve.

June 17.—Traces of albumen found in urine. Appetite continued fairly good until about the middle of October, when patient began to lose ground. Bed sores began to develop, and emaciation became quite marked. Several weeks before death the motor paralysis of right arm and leg was greatly increased, the limbs were stiff in extreme flexion, and urine and fæces were passed involuntarily in bed. Patient took considerable quantity of food, especially milk, etc., but continued to grow weaker and more emaciated until death relieved him at 8.45 a. m., November 8, 1896.

Necropsy (six and one-half hours after death).—Rigor mortis not well marked. Emaciation extreme. Several bed sores on dorsal surface of body and a large gangrenous sore over the right trocanter. Muscles very red and tissues almost devoid of fat. Brain: A macroscopical examination of the membranes revealed nothing abnormal. Horizontal sections were made and a tumor about the size of a hen's egg was discovered in the left hemisphere beneath the cortex in the temporo-sphenoidal lobe about midway of, and posterior to, the horizontal limb of the fissure of sylvius encroaching upon the island of Reil. Some softening of the brain tissue had taken place around the tumor most marked in a circumscribed area above the tumor, due possibly to primary embolic obstruction. ("We can not always find an obstructed artery, even when extensive softening has occurred."—Gowers.) A microscopical examination of the tumor which was made by Dr. Miller, pathologist to the University of Maryland, showed it to be a glio-sarcoma with considerable degeneration and softening of the center, and some calcareous deposit in the wall of tumor. Heart weighed 480 grams. There was some thickening of the walls of the left auricle and dilitation of its cavity. Numerous post-mortem clots were found among the musculi papulaves and calumnæ cornæ. The mitral valve showed some thickening and contraction of its segments and of the chordæ tendinæ, indicating a stenosis of this valve. The aortic valves were apparently normal and competent. Right lung weighed 480 grams; pale in appearance but apparently normal. Left lung weighed 420 grams and apparently normal. Liver weighed 1,500 grams; hard and resistant to the knife and presented the macroscopical appearances of a nutmeg liver. Gall bladder distended with a dark-colored fluid. Ducts pervious. Spleen weighed 210 grams and apparently normal. Left kidney weighed 210 grams. Capsule easily separable. Cortical substance narrow, indicating some cirrhosis, and the line between the cortical and medullary substances not well marked. Right kidney weighed 240 grams and practically same as left. Omentum contained but little adipose tissue. Urinary bladder contained about 150 c. c. urine; the mucus coat was much thickened and showed the pathological changes of a chronic cystitis.

J. McM.
G. W. S.

DEGENERATION OF POSTERIOR COLUMNS OF SPINAL CORD.

E. G.; aged 32 years; a native of Germany; was admitted to the Marine Hospital, Detroit, Mich., January 20, 1896, and died February 8, 1897.

History.—This patient was transferred from Cleveland to this station with a diagnosis of locomotor ataxia. When admitted he complained of pains, sharp and severe, shooting down the sciatic nerves. His feet in walking had the sensation of walking upon some soft material even when walking upon the floor. He was unable to stand with his heels and toes together; when he attempted it there was a vibratory motion of the body at once and a liability to fall. The patellar reflex, cremasteric, ankle, wrist, and bicipital reflexes were absent. There was occasionally diarrhœa and inability to control the act of defecation.

January 20, 1897.—This patient had a convulsion and lost consciousness. These convulsions he had almost every day till he died. There was neither albumen nor sugar in his urine.

January 27, 1897.—He gives a good family history. He has notched teeth, but denies having had syphilis. He is very much emaciated, pupils dilated, eyelids normal, and their reflex normal. Respiratory sounds normal, except at apices of the lungs, where there was a coarse, clicking râle. There was dullness over apices of both lungs. Respiration 18 per minute, and abdominal. Heart sounds were normal; heart pulsations 112 per minute; heart sounds were rhythmical, clear, and strong. Sensation of skin of legs to pain, heat, and cold was much diminished. He has no control over bladder or bowels. Sensation of hearing is diminished. Patient complains of a dull pain in his head and occasionally vertigo.

January 28, 1897.—Urine before filtration is pink and turbid. It has an ammoniacal odor. Specific gravity of the urine is 1.026 before and 1.019 after filtration. The precipitate is of a pink color. After filtration the urine is yellow. There is neither sugar nor albumen in the urine. There is 0.2 grams of urea in 30 c. c. of urine.

February 4, 1897.—Yesterday he had several convulsions. To-day his pulse is very weak.

February 6, 1897.—Patient unable to speak. Eyelids close spasmodically.

February 8, 1897.—Patient has been unconscious for two days. He died at twenty minutes past three in the afternoon.

Necropsy (sixteen hours after death.)—The body was that of a man 1.7 meters tall, and would weigh 68 kilograms. The body was much emaciated. There was a bedsore over the sacrum. Brain and cord: The brain and spinal cord were removed together. The calvarium was thicker than normal. This was especially true of the frontal and occipital portion. The veins of the pia mater were much distended with blood. The longitudinal and straight sinuses near the torcular herophili contained partially decolorized blood clots. The dura mater was firmly adherent to the pia mater and the brain on each side of the longitudinal sinus where the ascending frontal and parietal convolutions unite. At these points of adhesion there were calcified deposits over the left cerebrum the size of a silver quarter of a dollar; over the right cerebrum, in a similar location to that of the calcified deposit on the left side, there was a bony spiculum 2 cm. long projecting downward into the brain. In the spinal cord the columns of Goll and Burdach were much hardened. This was markedly noticeable below the cervical enlargement. Microscopically the sclerosed condition of the cord was confirmed and the posterior root zones were involved. There were tubercular deposits at the apices of both lungs. The apices of both lungs were adherent to the costal pleuræ. In the right upper lobe there was a small cavity, and the lobe was extensively solidified. The right lung weighed 970 grams; the left 670. The kidneys were normal in size and weight. The ureters normal; bladder empty, its mucous membrane normal in appearance and touch. Penis normal, and without a sign of a stricture. Stomach and intestines normal, as were the mesenteric glands. Liver and spleen normal; former weighed 1,230, the latter 320 grams. Heart was normal and its valves efficient. The heart weighed 330 grams. Pancreas was normal.

C. T. P.

INFLAMMATION MEMBRANES BRAIN (DIFFUSE).

T. B.; aged 22 years; nativity, Newfoundland; admitted to United States Marine Hospital, Boston, Mass., March 21, 1897; died March 28, 1897.

History.—Patient said that he had been sick for two weeks; more than that, little could be learned from him. He would start to answer a question, and after saying a few words he would stop, having apparently forgotten about what he was talking. Suffers from headache, anorexia, vomiting, and constipation. Vomited frequently previous to admission, but later this symptom was noticed only once. No urinary

symptoms. Physical examination: Eyes sunken; dark rings underneath; pupils equally responsive to light. Sordes on teeth. Tongue gray, but moist. Chest negative. No abdominal tenderness. No rose spots or eruption of any kind. There is a peculiar wild, staring expression, and questions must be asked sharply to elicit an answer. Temperature, 38.7° C., and during remainder of illness there were only trifling variations from that point.

24th instant.—Bowels well opened after the administration of calomel and soda powder, followed by magnesia sulphate. No apparent improvement. Passes urine and feces in bed. Takes liquid nourishment freely.

28th instant.—Œdema of both lungs has existed for past 48 hours. Respiration rapid and each act is accompanied by a moan. Pulse feeble. Food has been administered by means of a tube passed into the œsophagus through the nose. Died at 11.20 a. m.

Necropsy (twenty-four hours after death).—Body that of a well-developed young man. Marked congestions in the dependent portions of body. Bloody, frothy mucus issuing from mouth. Calvarium removed. Vessels of the dura mater engorged. The vessels of the pia mater were injected and the membrane was reddened, especially at the base. On section blood issued freely from the puncta vasculosa of the centrum ovale minus and majus. The ventricles were filled with bloody serous fluid, and the basal ganglia were much softened on their exposed surfaces. On opening the abdomen the viscera were seen to be in normal position. The upper limit of the diaphragm was the fifth rib on right side and the sixth rib on the left side. The spleen was of normal size and appearance. Cut surface was dark brownish-red, and the Malpighian bodies were prominent. Left kidney was large and pale. The capsule stripped readily. On section blood dripped from the cut surface and the outlines were indistinct. Weight, 180 grams. Bladder contained about 200 c. c. urine. Seminal vesicles normal. Right kidney did not differ materially from its fellow. Supra renal capsules normal. Gall bladder filled with dark green bile. Ducts patulous. Liver dark brownish red in color. Weight, 1,450 grams. Stomach contained 150 c. c. of milky fluid. Intestines contained only a small amount of fecal matter.

E. K. S.
H. W. A.

INFLAMMATION OF BRAIN.

Case 1.

Intercerebral hemorrhage.

W. R. D.; age, 26; a native of England; was admitted to the United States Marine Hospital, San Francisco, Cal., October 22, and died October 26, 1896, at 7 a. m.

History.—On entrance he complained of slight pain in the head and abdomen and constipation. The muscles of the neck were rigid. There was a slight elevation of temperature. No other symptoms could be elicited, as the patient was delirious and continued so until his death.

Necropsy (three hours after death).—Brain and meninges: Immense amount of cerebro-spinal fluid and profuse hemorrhage between the hemispheres of the cerebrum; entire brain greatly congested and puncta vasculosa very prominent; anterior part of left spheno-temporal lobe and Isle of Reil completely destroyed by softening. Heart normal. Lungs: Extensive adhesions of right lung to chest walls, also between lobes themselves; large cavity found in the lobe, and the entire lung greatly congested; left lung congested. Liver enormously congested, otherwise normal. Spleen congested. Kidneys congested. Intestines and genito-urinary apparatus normal.

J. H. O.
J. G.

CASE 2.

C. G. H.; age, 46; a native of the West Indies, was admitted to the United States Marine Hospital, San Francisco, Cal., September 4, 1896, and died September 17, 1896, at 8 p. m.

History.—On entrance he complained of dizziness, severe shooting pains in the head, and general weakness. Physical examination revealed nothing abnormal. Patient grew rapidly weaker and facial paralysis on the right side set in. Extremities became cold, and he sank into a comatose state from which it was difficult to rouse him. This condition continued until he died..

Necropsy (performed fifteen hours after death).—The skull cap was abnormally thick and measured 2 cm. at the external occipital protuberance. The sinuses and vessels were filled with blood. The brain weighed 1,550 grams and was greatly congested. The ventricles were engorged with cerebro-spinal fluid. The puncta vasculosa showed enormous arterial congestion. The membranes of the brain were in a similar condition. The heart and pericardium normal. Both lungs and pluræ were in a state of hypostatic congestion. The liver weighed 1,800 grams and was congested. The spleen and kidneys were normal with the exception of the hypostatic congestion as found in the other organs. The remaining viscera and urinary apparatus were normal.

J. H. O.
J. G.

HEMORRHAGE OF THE BRAIN—PONS VAROLII.

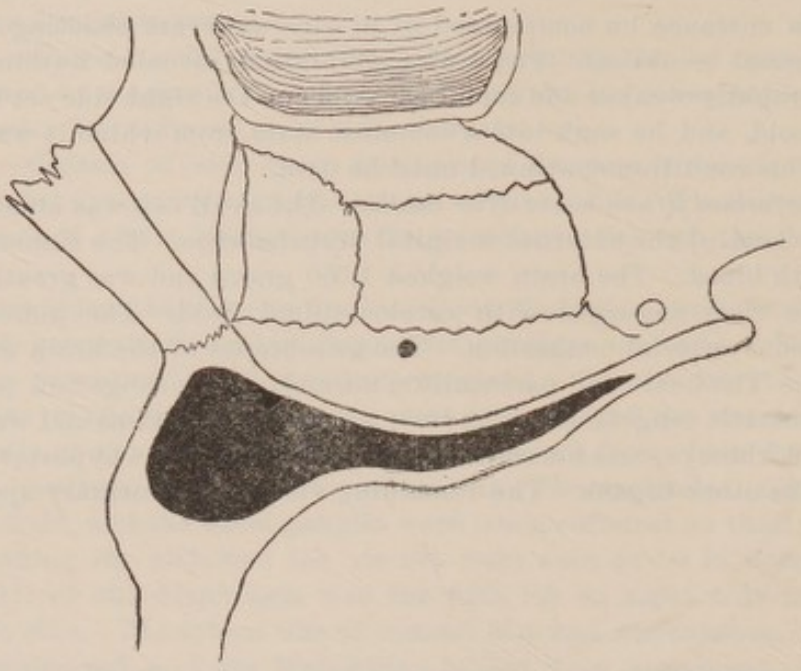
J. B.; aged 35; a native of Norway; was admitted to the United States Marine Hospital, port of San Francisco, February 24, 1897, and died July 8, 1897, at 5 a. m.

History.—On entering the hospital the patient complained of pain, referred to various parts of his body, and of great muscular weakness. His intellect was far below par, and all attempts to obtain definite information from him in regard to his symptoms were unsuccessful. Physical examination: There was a slight dulness on percussion over the apex of the right lung, otherwise the lungs were normal. The heart sounds were normal, and the area of cardiac dulness was not enlarged. The liver and spleen were normal. His condition remained unchanged until March 21, 1897, at 11.30 p. m., when he fell out of bed, striking his head. When placed in bed again it was noticed that his mind wandered, and that there was a hemorrhage from his nose and mouth. One-half hour later he again fell out of bed, after which he became very violent, and remained so for some hours. He then became comatose and his entire left side became paralyzed. His pulse was slow and regular, and his respirations were full and deep. He remained in about the same condition for ten days, after which he slowly regained consciousness and the paralysis disappeared. He remained in a fair condition until the morning of the 8th of July, at 9 a. m., when he suddenly became unconscious. This was followed later by a condition of maniacal excitement, requiring several men to restrain him. This lasted for two hours, when he lapsed into a comatose state. There was paralysis of the right side of the face and of the left arm. The pupils were equal and reacted sluggishly to light. His pulse was full, soft and compressible, and rapid (150 per minute). His respirations were irregular, shallow, and jerky.

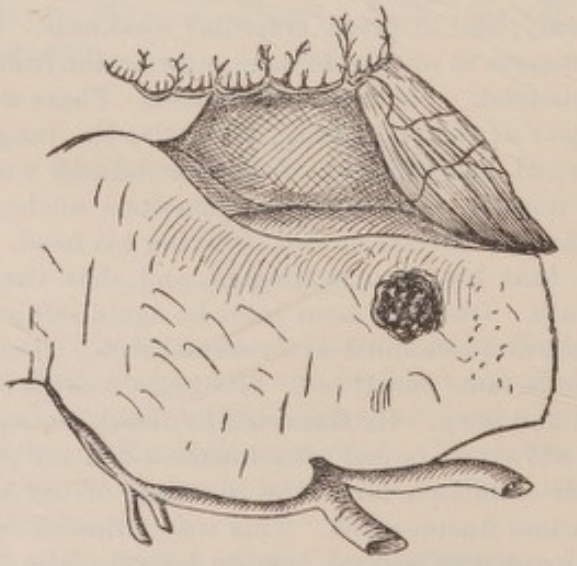
Necropsy (five and a half hours after death).—The body is that of a well developed, well nourished, somewhat anæmic adult male. Rigor mortis is not well marked. The skullcap is normal. The brain case is normal, except for an abnormal development of the frontal sinuses, which are situated between the two tables of the supraorbital plates of the frontal bone, over their entire extent. They are

lined with mucous membrane and connect directly with the nasal cavity. (See drawing No. 1 of sinus.)

There are numerous punctate hemorrhages in the dura mater on each side of the longitudinal sinus at the vertex of the skull. Otherwise the membranes are normal.



The cerebrum, cerebellum, and medulla are normal. There is a hemorrhage the size of a pea situated at the junction of the lower and middle thirds of the right side of the pons, 1.5 cm. from the median raphe. (See drawing No. 2; cf. Gowers, p. 784, edition 1888.)



The heart and pericardium are normal. The lungs are normal. There are extensive adhesions between the parietal and visceral pleural membranes on the right side. Otherwise the pleuræ are normal. The liver, gall bladder, and ducts are normal. The spleen is normal. The digestive tract is normal. The genito-urinary tract is normal. The spinal cord was not examined.

H. S. M.
J. G.

SOFTENING OF BRAIN.

CASE 1.

H. M.; aged 35 years; nativity, Nova Scotia; was admitted to the United States Marine Hospital, Chelsea, Mass., November 9, 1896; died January 23, 1897.

History.—He was unable to speak and he seemed to have but little intelligence. When brought here he was attended by a man who got away before any questions could be asked concerning the patient's ailment. Physical examination: Respiratory and circulatory systems apparently normal. Nervous system: Patient unable to speak, and when spoken to does not appear to understand what is said. Sensation in face and neck impaired; in the limbs apparently normal. No motor paralysis of the limbs, but the patient is unable to open his mouth. Both tendon reflexes appear exaggerated. No clonus. Incontinence of urine. The patient was placed on saturated solution of potassium iodide, 10 drops three times a day; this was gradually increased until on December 4 he was taking 50 drops three times daily. The following day this medicine was stopped. On December 9 he was attacked with a rather severe bronchitis; slight dullness and sonorous râles found in both lungs. He recovered, however, from this in a few days. On December 22 the iodide was renewed in small doses, it seeming to have had a beneficial action, the man appearing bright and more intelligent, yet still unable to speak.

January 21.—Although apparently in good condition when seen at 6 o'clock the evening before, he was suddenly attacked with dyspnœa early in the morning. On the morning visit both lungs were found full of moist râles and there was some cyanosis. Strychnia was given him hypodermically and he appeared to improve, until on the 23d he grew very rapidly worse and died at 10 o'clock p. m.

Necropsy (sixty hours after death).—Body that of a fairly nourished man. Post-mortem lividity slight. Hypostatic congestion marked. Small bedsore 2 cm. in diameter over center of sacrum. Skullcap removed. Dura mater adherent over longitudinal sinus. Vessels of dura congested and the sinuses were moderately distended with fluid blood. There were also adhesions to the pia mater in same situation, which were quite firm. Vessels of pia congested, so that the terminals were very distinct. There was an area of softening in the white substance about the roof of the lateral ventricle, left side. No other pathological change was found. Cord removed and, so far as could be judged from external appearances, presented no signs of disease. Incision from manubrium sterni to symphisis pubis. Abdominal viscera in normal position. The upper limit of diphragm was at the upper border of sixth rib. Sternum removed. Heart small and firm; the right side contained 40 c. c. of blood, the left 30 c. c. No lesion of the valves; weight of organ, 255 grams. Lungs of a light-pink color. There were a few adhesions at lower border of right upper lobe posteriorly. Congestion at base slight. The bronchi were pale and contained a small quantity of frothy mucus. Spleen steel-gray externally; pulp dark, almost black; weight, 160 grams. Left kidney easily removed from its bed; pale red; pyramids and cortico-medullary line distinct; weight, 160 grams. Left adrenal about the color of liver tissue; weight, 10 grams. Urinary organs presented no changes worthy of note. Right kidney and adrenal did not differ from left. Liver mottled with small, yellow dots externally and internally. Parenchyma soft and easily lacerated; weight, 1,365 grams. Gall bladder filled with dark-green bile; common duct very small, and its lumen was narrowed, but a very little bile was forced through. Stomach small and contained a small quantity of milky fluid. Intestines contained a small quantity of fluid, yellowish, fecal matter. The mucous membrane of the gastro-intestinal tract was pale throughout.

E. K. S.
H. W. A.

CASE 2.

J. R.; age, 39 years; nativity, England; admitted to United States Marine Hospital, Detroit, Mich., September 8, 1896; died September 27, 1896.

History.—Patient was well until eight days before admission, when he was suddenly taken with loss of power in left leg, which gradually became worse and involved the left arm within twenty-four hours. Has since had complete hemiplegia of left side. Sensation normal. While in hospital patient was very restless, unruly, and noisy, except while under the influence of hypnotics. Speech thick and hesitating and memory impaired. Difficulty in swallowing appeared thirty-six hours before death. Patient was also suffering with chronic cystitis and had had syphilis twelve years ago.

Necropsy (eighteen hours after death).—Post-mortem lividity marked on dependent parts. Rigor mortis very marked. Right pupil larger than left. Heart: Weight, 280 grams; pericardium and valves normal. Lungs: Left, weight, 630 grams; very much congested except a small portion of upper lobe; some muco-purulent secretion in smaller bronchi. Right lung: Weight, 460 grams; also much congestion involving lower lobe principally. Stomach: Normal, but of small size; capacity about 1,560 c. c. Liver: Weight, 1,750 grams; normal Kidneys: Left, weight, 185 grams and somewhat congested, the blood vessels of cortex appearing very marked. Right kidney: Weight, 155 grams; condition same as left kidney; the pelves of both kidneys and the ureters were much inflamed. Bladder: Somewhat contracted, chronic inflammation of its mucous membrane very apparent and contained a considerable quantity of muco-pus. Spleen: Weight, 200 grams; normal. Nervous system: Scalp, skull, and membranes of brain were normal. Brain: Weight, 1,420 grams; examination shows two patches of softening, one, which was small, situated in cortex of cerebrum in right occipito parietal region, the other involving the interior of the right corpus striatum.

E. P.

PARALYSIS.

CASE 1.

Meningitis, acute.

E. B., age 68, a native of Maine, was admitted to the United States Marine Hospital, San Francisco, Cal., September 11, 1893, and died January 9, 1897, at 4.15 p. m.

History.—On admission to the hospital he complained of paralysis of the left side of body and face. This came on suddenly while at work a few days before. Received an injury to the skull some years previous, the marks of which still remain. Condition improved under treatment for a while, but later he steadily grew worse. Intellection became greatly impaired, and most of the time he was unaccountable for his actions. He laughed without reason, and a few words would cause him to cry. He lost control of the sphincters, and had involuntary passages of both urine and feces. Paralysis of the leg improved, but the arm, at the time of death, had reached the stage of permanent contracture. Bed sores developed. He began to talk incessantly, indicating an acute cerebral state. After a few days this subsided to a condition that was half conscious, and finally to death by gradual loss of vitality.

Necropsy (nineteen hours after death).—There was an opening 3 by 3.5 cm. in the vertex of the calvarium, in the median line, just anterior to the coronal suture, the result of an old trephine. There was a partial necrosis of the bone surrounding the opening on the inner surface of the skull cap. A cup-shaped process of dura was beneath and surrounding this opening, thereby shutting off communication with the brain. Dura, in immediate neighborhood, greatly thickened. Cerebro-spinal fluid increased. Cloudy swelling of the pia from recent inflammation. All vessels

of the brain, as well as vessels of the entire body, atheromatous. Brain substance congested. Superior extremities of right ascending frontal and parietal convolutions softened. The area of softening was just beneath the opening in the skull. Marked loss of brain substance in the lower two-thirds of ascending frontal and parietal convolutions on right side. Some softening (3 cm. in diameter) in vertex of left parietal convolution, posterior extremity. Cyst, 1.5 cm. in diameter, full of serous fluid, occupying site of external capsule, encroaching on corpus striatum and extending upward to the convolution of the Isle of Riel on right side. Circumscribed area of corresponding parts on left side harder than normal. All the ventricles contained fluid. Some softening in posterior part of left lobe of the cerebellum. Heart: Hypertrophy of left ventricle; arch of aorta enormously dilated and ascending portion covered with plates of calcareous matter; these could be easily picked off; calcareous deposits on aortic semilunar valves; other valves normal. Lungs: Right normal; hypostatic congestion of left. Liver and spleen normal. Kidneys: Both pelves dilated and filled with urine; small cyst in medullary substance of left kidney. Intestines: The descending colon passed downward in its normal position till it reached the pelvis, then arched over to the right side. The sigmoid descended to the right of the promontory of the sacrum. The bladder occupied the entire true pelvis, and its walls were very thin.

J. H. O.
J. G.

CASE 2.

Hemorrhage, corpus striatum, intercurrent meningitis, and Bright's disease.

J. M., age 45 years, a native of Norway, was admitted to the United States Marine Hospital, San Francisco, February 26, 1892, and died December 2, 1896.

History.—Two days before admission to the hospital he became paralyzed on right side, losing all power of motion in right leg and arm, and was unable to speak. He continued in this condition, with alternate periods of improvement and relapse, until he died, December 2, 1896, at 5.30 p. m. He was in a comatose condition for forty-eight hours previous to death.

Necropsy (sixteen and one-half hours after death).—Brain and meninges in a condition indicating recent congestion and inflammation, with a distinct cloudy swelling of the arachnoid. There were calcareous deposits in the arteries at the base of the brain. The dura was adherent at the top of the cerebellum. A portion of the tempero-sphenoidal lobe just over the posterior horn of the left lateral ventricle showed a small area of yellow softening, seemingly of long standing. The middle part of the left corpus striatum was yellowish in color and gritty to the touch. Heart was normal. Lungs were both congested; the right was slightly adherent. Kidneys were both granular, the capsules nonadherent. In the upper part of the right one was a multilocular abscess cavity and two or three small cysts. Liver and spleen were normal. Genito-urinary organs, excepting kidneys, were also normal.

J. H. O.
J. G.

CASE 3.

Acute mania (valvular disease of heart, mitral).

T. M.; aged 49; nativity, England; admitted to United States Marine Hospital, New York, N. Y., March 11, 1897; died April 4, 1897.

History.—Native of England; white; married; 49 years old; below medium height and build. Employed on S. S. *Allianca* as steward. Above the average capabilities mentally for a man of his station. Accompanied by son, who knew little of his condition save what his father himself had told. Had not been advanced in position on the ship when he considered he should have been. Had had some recent financial

reverses. Claimed to have been in good condition physically, and, his son says, mentally, before this occasion. Talked intelligently, and seemingly gave a good account of his trouble. His son said that it was only at times that he gave evidence of derangement, which, however, was gradually becoming worse. About March 1, 1897, while in Aspinwall, commenced to be dizzy and have fever. Dizziness continued after he got on board, when he sent for the surgeon. Had headache and pain in a rupture (inguinal hernia) of twenty-seven years' standing. Could not hold his urine for a while, but gradually obtained better control. Had no chill at this time, though some fever. Was constipated. Since then he claimed his memory has been failing him. Had two large bunions on the inner side of the metatarso-phalangeal articulation, one on the left and the other on the right. The one on the right, he said, he had struck accidentally, and quite a raw surface covered with a thin purulent matter was found. He denied excesses of all kinds, also venereal troubles. Knee reflex on both sides absent; ankle clonus not present. Pupils did not respond to light promptly. Claimed to be troubled with his larynx and chest. Nothing could be made out of the examination of chest, owing to his restlessness and incessant talking. On the 12th he was found in different parts of the hospital at various times, having eluded the vigilance of the nurse of the ward. The idea of immense wealth seemed to occupy the greater portion of his talk. On the evening of the 12th, fearing that he might escape, or from his threats might injure himself or others, his clothes were searched and he was strapped in bed. He gradually got wilder and more intractable, talking incessantly. Bromide was used freely at night and patient kept on nourishing diet. Straps kept on at intervals until the 24th, when all restraint was removed. Patient gradually grew weaker. On April 1 right foot and ankle became œdematous and very much swollen. The foot was dressed frequently, but it was found impossible to make him leave the dressing in place any length of time. Kept on the most strengthening and nutritious diet, but gradually grew weaker until the morning of the 4th, when he died rather suddenly. His temperature ran normal throughout his sickness. His pulse was uniformly fast through the whole course and especially near the end, when it kept above 100 all the time. His respiration ran from 22 to 30, with an average of about 24. Morphine was tried to quiet him in his wildest moments, but found useless, the bromidia acting better.

Necropsy (twelve hours after death).—Body emaciated. Eyes and abdomen sunken. One foot and leg œdematous. No other marks on body. Skull opened and brain and membranes examined. The scalp was very thin, the knife apparently only cutting through skin. The bones of the skull were very thin and soft. The sawing had to be carefully done to prevent it going through into the brain tissue. The dura was thin and adherent to brain in motor area. The blood vessels of the pia were injected and larger than normal. The arachnoid was thickened and gelatinous. There was no fluid in the spaces. Cord severed and brain removed. Some fluid in spaces around medulla. Brain substance seemed softer than normal, otherwise no change was found. The pericardium contained 50 c. c. of fluid. The mitral valve was partly destroyed. Heart otherwise normal. Lungs normal. No pathological condition in anterior mediastinum. The blood vessels were normal. The omentum and the spleen were normal. Both kidneys were enlarged and congested. The suprarenal capsules, bladder, and organs of generation were normal. The rectum, duodenum, and stomach were normal. The gall bladder was distended, but the gall ducts were patent. The liver was enlarged and friable, but not congested. The pancreas, mesentery, small intestines, large intestines, and the great vessels of the abdomen were normal.

J. O. C.
G. W. S.

VALVULAR DISEASE OF HEART.

Case 1.

R. F.; aged 25 years; nativity, Germany; was admitted to United States Marine Hospital, New York, August 21, 1896; died October 10, 1896.

History.—When admitted was suffering with cough and shortness of breath, which had bothered him for over a month. Has fever, constipation, and pain in chest. Can not sleep because of cough and shortness of breath. A distinct murmur could be heard, accentuated on diastole. Some swelling of ankles. Urine normal. The dyspnœa grew worse, and he became dropsical. The lungs were normal when first admitted, but very soon became congested. Died suddenly.

Necropsy (forty hours after death).—General œdema. Brain normal. Abdominal cavity contained 1,000 c. c. ascitic fluid. Kidneys large and congested. Liver normal. Spleen enlarged and congested. Both lungs very much congested. Pleura adherent at apex of right lung; about 200 c. c. fluid in each of the pleural cavities. Pericardium contained 150 c. c. fluid. There were a few adhesive bands. Heart hypertrophied; right ventricle dilated; left ventricle thickened; mitral valve normal; tricuspid insufficient; aortic valve obstructed with a new growth, which prevented the complete closure of the valve leaflets and also obstructed the outflow of the blood. All other organs normal.

J. O. C.

Case 2.

F. G.; aged 34 years; nativity, Prince Edward Island; was admitted to the United States Marine Hospital, Boston, Mass., August 10, 1896.

History.—Patient said that years ago he drank a great deal. Said he had been troubled with shortness of breath on exertion for three weeks previously to entering hospital. When he would lie down at night he had a sense of suffocation, so that he had to sit up in bed to sleep. Had a slight cough, and would spit up a little blood, but no other material. Physical examination: Body well nourished; legs and ankles œdematous. Lungs: Lower right lobe gave slight dullness on percussion, and a few râles were heard on inspiration; was slight bronchial breathing over upper part of left lung. Heart: Dullness began at second interspace; apex beat heard best 2 inches below nipple and one-half inch to left of mammillary line; a loud blowing systolic murmur was heard at the apex; murmurs less distinct were heard over all the other valves. The urine contained one-eighth per cent of albumen. The patient was treated with the usual heart tonics, and for a few days he improved slightly. Then he began to decline gradually. Dyspnœa became more marked from day to day, he slept very little, and the lungs became more and more congested until he died, September 13, 1896.

Necropsy (twelve hours after death).—It was the body of a white male, about 5 feet 7 inches in height, well nourished, but with considerable œdema of the feet, ankles, legs, scrotum, and penis. A mark to attract attention on the body was a cicatrix from a burn on the lower part of the left chest, about one decimeter square. The pupils of the eyes were unequally dilated, the left one being the larger. On making an incision, the tissues were found to be slightly œdematous. The pericardium was distended, and when opened about 50 c. c. of clear fluid, serous in character, escaped. The heart was much enlarged, the muscle itself being very pale and flabby. All the valves were incompetent, due to the immensely dilated condition of the organ. The aortic semilunar valves, besides being incompetent, showed signs of atheromatous degeneration; this was also true of the endothelial lining of the aorta just above the valve. Post-mortem clots were found in both ventricles and in the right auricle. The weight of the organ was 670 grams. No adhesions were found, but both lungs were very much congested, the right lung being more so than the left, the apex of either lung being the only portion that would float. The lower and

middle lobes of the right and the lower lobe of the left lung were in a state of red hepitization. The right lung weighed 1,159 grams and the left 680 grams. The abdominal cavity, when opened, showed the presence of about 1,000 c. c. of clear serous fluid. The liver was congested and showed signs of sclerosis along the lower border of the right lobe and the whole of the left. It was gritty and dark on section. The liver weighed 1,700 grams. The pancreas weighed 95 grams and appeared normal. The capsules of both kidneys stripped easily; both were much congested and the markings very indistinct. The right was more congested than its fellow, and the cortical substance was rather friable and rough on section. The medullary substance and pelvis of the organ were occluded by a considerable quantity of very viscid yellowish fluid. The left kidney weighed 220 grams while the right was 15 grams lighter. The stomach, intestines, and bladder were normal; the latter organ contained about 100 c. c. of highly colored urine. The brain and membranes appeared normal, except just in front of the fissure of Rolando, and on either side of the longitudinal fissure was an area of inflammatory adhesion, one-half inch by 1 inch, between the surface of the cerebrum and the dura mater. The inflammation extended in upon the falx cerebri for half an inch, the falx at that spot being firmly adherent to the cerebrum on either side. Further examination of the brain was negative. It weighed 1,360 grams.

H. M. A.

CASE 3.

H. A. K.; aged 50 years; admitted to the United States Marine Hospital, St. Louis, Mo., May 16, 1897; died May 20, 1897.

History.—On admission, at 10 o'clock in the evening, the patient was in a comatose condition. The captain of the boat on which the patient had been employed, who accompanied the man, said the patient had been recently treated for rheumatism, his shoulders having been blistered and large doses of morphine given. On examination, the man's pupils were observed to be very small and his body covered with sweat. His shoulders and elbows were swollen, red, and ecchymosed, looking as if the joints had been severely contused. There was severe pain on attempts at movements of the arms, whether active or passive. The heart's action was very quick and irregular, the rate being 80 per minute. The pulmonary second sound was much accentuated, being much louder than was the aortic. There appeared also to be a mitral murmur, but the cardiac action was so weak and irregular and the heart sounds at the apex so faint that the opinion a mitral lesion existed rested rather on the symptoms present and on the signs other than those observed about the cardiac region. The only sign of disease observed on the part of the lungs was a harsh, prolonged, expiratory murmur below the left clavicle. The rate of respiration was 22. The urine gave no evidence of kidney lesion. It was examined several times. During the second day the patient's stupor continued. He was very hard to rouse when it was necessary to give him food. On the third day his mind was clearer and he could understand questions. He then substantiated the captain's story of his (the patient's) condition and treatment before entering this hospital, and said he had been troubled with rheumatism for fifteen years and with "heart disease" for ten years. His mother and brother had died of "heart disease," he said. The patient had practically no fever until 10 o'clock on the night of his death, when his temperature suddenly rose to 39.6° C., his respiration then being 39 and his pulse 104; coma was present also. There being signs, though obscure, of effusion into the right side of the chest, exploratory aspiration was done without result. Notwithstanding energetic stimulation, the patient's condition did not improve, and at a quarter of 1 o'clock he suddenly died. The treatment of the case was chiefly directed to improving the heart's condition. To this end strychnine, digitalis, and whisky were given in large doses. Sodium salicylate was also given on account of the joint pains, and a few doses of phenacetine and sulphonal were administered to relieve pain and

secure sleep. The patient's chief food was milk, administered regularly in amounts of 250 c. c., diluted with lime water (one fourth).

Necropsy (thirteen hours after death).—The body is that of a man of apparently 50 years of age; height, 2 meters; of fine physique, his muscular system being fairly well developed. There is a general purple staining of the back. The forehead, notwithstanding the supine position of the body, is also purple. Post mortem rigidity still remains to a considerable extent. The eyes are only partly open. No foreign material is found in any of the orifices of the body. The abdomen is distended, being as tense as a drum. There is considerable tumefaction about the elbow and shoulder, extending from the joints in both directions. The swellings pit on pressure. No perceptible mark of external injury is to be seen. Cranial cavities: The skull cap is sawed through with little difficulty and is easily separated from the dura mater, which is of a pale color. The longitudinal sinus is large and filled with fluid blood. The brain being removed, there is no appearance of serum nor of any other effusion on the basis cranii. The large sinuses contain only a moderate amount of fluid blood. The surface of the brain in well formed; the pia mater delicate throughout, the veins being filled with blood. On cutting into the lateral ventricles they are found to contain a slight quantity of clear fluid. The choroid plexus is distended and of a dark red color. On making consecutive sections the hemispheres of the brain are found to be moist and glistening, being white internally, the cortex being gray, as was also the corpora striata and optic thalami. The consistency is good. The fourth ventricle is empty, the choroid plexus being distended. The cerebellum, pons varolii, and medulla oblongata present nothing worthy of note. An incision is made from the larynx to the symphysis pubis, a moderate amount of fat being seen. There is no foreign body in the abdominal cavity. The intestines, distended to tenseness with gas, are of a slate-gray color, with a few fine red vessels in their walls. The arch of the diaphragm comes down to the level of the sixth rib. On removal of the sternum several small vessels are cut. The lungs do not recede upon opening the thorax. The pericardium is red because of the presence of fine vessels in the substance of its fatty covering. The amount of fluid in the pericardium is only 10 c. c. While the inner surface of the membrane is smooth, it is markedly dry and thicker than usual; it has a mottled appearance, yellow spots alternating with purple. Fine vessels are seen here and there. On the left side, near the bottom of the pericardial cavity, is an area of a yellowish color, 5 cm. in the longest diameter, which extends from above downward as the body lies (from before backward anatomically); in breadth, 1.5 cm. This area presents several spots, varying in size from half of a centimeter to a centimeter in the longest dimension, their shape being irregular and their thickness that of the membrane in which they lie. The inner surface of these plaques (for such they may be termed) is rough, like fine emery paper. When the finger is placed behind the plaques to test their flexibility they retain their shape, not bending even when considerable strain is placed on them, and it is impossible to cut them with a scalpel because of their hardness, which is that of ivory. As it lies in situ the heart appears of a deep purple color and is of immense size, measuring 15 cm. from the base to the apex and 15 cm. across the base. On the antero-external surface of the left ventricle, and opposite the formerly described hard areas in the wall of the pericardium, there is a shaggy spot, 2 cm. in diameter, which appears to have been recently adherent to one of the plaques. An incision is now made into the right auricle, which is found to be very large and roomy, its appendix being also enlarged and containing three large masses resembling chicken fat. The wall of the right auricle is 1.25 cm., that of the left being 1.75. Their substance is of a red color and tough in consistence. Though the tricuspid valve is not normal, changes have not taken place in it as in the mitral valve. The right ventricle is not especially enlarged or its papillary muscles hypertrophied. There is no blood in the right side of the heart. On cutting open the left auricle a large lump like chicken fat is obtained. Upon

introducing the finger, thickened, hardened, masses are encountered around the auriculo-ventricular orifice, forming a hard-walled, tunnel-like passage. Both leaflets of the mitral valve are very thick. On the auricular face of the anterior leaflet, at its base, are several rough, yellowish areas, and on the ventricular numerous nodules, the edge of the valve itself being occupied by nodular masses the size of a millet seed. The posterior leaflet presents the same appearances as the anterior. The papillary muscles in the left ventricle are very thick, measuring 2.5 cm. in diameter. The chordæ tendineæ are considerably larger than usual, being the size of a No. 8 linen thread. The aortic leaflets are the seat of irregularly situated plaques or thickenings, and on them the corpora arantii are larger than usual. The leaflets do not coapt perfectly; therefore the valve leaks slightly. On feeling the aortic leaflets a sandy sensation is experienced. They are shrunken and thickened, the spots of thickening being of a yellowish color, slightly raised from the surface, discreet, and of millet-seed size. The heart weighs 480 grams. The lungs are adherent to the chest wall, and their removal is an especially bloody operation. Right lung: The color of the anterior surface of the upper lobe of the right lung is a mottled gray, considerably reddened here and there. The upper lobes are adherent to each other, and their separated surfaces bleed when parted. The upper lobe has shrunk since the chest is opened, and crepitates. On section the upper lobe is of a more reddened color, and numerous spots are found, from which a very dark fluid exudes. Similar fluid can be scraped from the cut surfaces generally. On the lower surface of the middle lobe numerous nodules, from the size of a pin head to a buckshot, are seen. They are hard to cut—are like pieces of chalk. A cavity occupies the interior of each nodule. Section of the middle lobe has a grayish color and is merely moist. The lowest lobe is of a deep-black liver color. The color of the cut section is an intense garnet red. A frothy, dark-red fluid follows the knife and can be scraped from the surface. This lobe does not crepitate. The lung, as a whole, floats. On separating the lowest from the upper lobes, it floats, notwithstanding its solid, noncrepitant condition. The right lung weighs 740 grams. Left lung: The lobes of the left lung are also adherent, their separated surfaces bleeding. The color of the outer surface is a mottled gray, mixed with red, with here and there black spots, sharply delineated and having depressed surfaces. The cut surface of the upper lobe presents an intense, garnet-red color, in all respects like the lowest lobe of the opposite side. A deep-red fluid follows the knife. The outer surface of the lower lobe is gray in color, its cut surface being grayish red. The lung, as a whole, floats. It weighs 490 grams. The postero-external surface of the spleen is covered with numerous yellow bodies the size of a small pin head. The cut surface is purple in color. The spleen is 16.5 cm. long, 10 wide, and 4 thick, and weighs 360 grams. The capsule of the left kidney strips readily, the color of the kidney being a dark red. A fissure on the anterior surface 0.5 cm. deep cuts off the lower one-fourth of the kidney as a separate lobe. The anterior surface of the lower lobe is black in color. On section the knife is followed by considerable dark-red fluid. It is 12 cm. long, 9 wide, and 4 thick, and weighs 200 grams. The posterior surface of the right kidney is a deep slate color, the capsule stripping easily. On the external surface of the organ there are three spots of irregular shape, the largest being 1 cm. in the longest diameter. The right kidney is 12 cm. long, 9.5 broad, and 3 thick, and weighs 230 grams. The bladder contains 25 c. c. of urine. The omentum is short and is found packed in between the lower surface of the stomach and the small intestines. The stomach is found distended with gas, as are also the intestines. Fine vessels are seen in the walls of both the stomach and intestines, giving a pinkish tint to the otherwise gray color. About 200 c. c. of semisolid feces are removed from the large intestines. The liver is voluminous, weighing 2,100 grams, and measuring 21.5 cm. from the outer edge of the right lobe across to the outer edge of the left lobe, its greatest antero-posterior dimensions being 20.5 cm. and its greatest thickness 8 cm. The surface of the organ everywhere is very rough, because of the projection of innumerable

granular bodies about the size of half a wheat grain. The outside of the liver is of a brownish color, except for the anterior half of the inferior surface, which is of a deep olive green. This green color, however, does not extend into the liver substance, staining only the capsule. The organ is very firm to the touch, and on cutting into it the knife gives the sensation one feels when cutting through a turnip. This hardness is uniform. The lobules are large and uniformly red. The gall bladder is filled with gall, 30 c. c. in amount. The right shoulder being so enlarged, the joint is opened, but only a small amount of a yellowish viscid fluid is obtained. No injection of the joint structures can be detected; in fact, nothing abnormal is observed. On account of the ante-mortem pain and swelling, the right elbow is also examined, with a like result.

This case is chiefly interesting because of the severe grade of chronic rheumatism associated with the serious heart lesions, these latter having been in all probability caused by the rheumatism poison, whatever that is. A curious appearance was the hardened area in the pericardium, a part of which had evidently been slightly adherent to the heart wall opposite it. Death ensued because of the acute exacerbation of the chronic endocarditis. The heart could not withstand the final assault, its strength and vitality being already almost fatally undermined.

C. E. D.

CASE 4.

Mitral.

J. L.; aged 64 years; nativity, Massachusetts; was admitted to the Marine Hospital, Boston, Mass., December 24, 1895; died December 5, 1897.

History.—He gave a history of having been a very hard drinker and of going on periodical sprees. He had been subject to attacks of rheumatism in various joints off and on for more than thirty years. It was for this complaint that he was admitted; this time it was his hands and wrists that were affected. He complained also of shortness of breath and palpitation on the slightest exertion; this he had noticed for the past two years. His urine was examined and found to be normal, but a physical examination determined a mitral lesion of the heart. He remained in hospital, gradually improving, until April 27, 1896, when he was discharged, improved. During his stay in hospital he was kept continuously on heart tonics and antirheumatic treatment; digitalis, strophanthus, and convallaria being chiefly used for the heart, and salicylic acid and bicarbonate of soda for the joints. After shipping during the summer, the patient, on the 5th of November, returned to the hospital with the same trouble—extreme shortness of breath, palpitation, and dry, hacking cough; this time there was also considerable œdema of the legs. He was given digitalis, as before, together with pills of mercury, to keep his bowel well open. An examination of his urine now showed the presence of considerable albumen and fatty, granular, and hyaline casts. He experienced during his last two weeks a great deal of discomfort from external piles. He gradually sank and died December 5, 1896, after being in hospital just one month.

Necropsy (forty hours after death).—Body very large and fat. Abdominal wall 4 cm. in thickness. Hypostatic congestion and post-mortem lividity marked. The dura mater was adherent to the greater portion of the skull cap, necessitating an incision through that membrane along the line of the cut through the bone. The sinuses were filled with dark fluid blood, and the veins beneath the pia were very distinctly distended. The cerebral fluid was not increased. The structures were very soft and a satisfactory dissection was impossible. The intestines, distended with gas, bulge into the abdominal incision. Cavity filled with serous fluid. No abnormality of position. Omentum very fat. Surface of ileum dull red; intestines otherwise pale. The diaphragm reaches to the lower border of fifth rib at the costosternal junction. Removal of the sternum shows the right pleural cavity to be filled with serous fluid and the lung compressed at the posterior surface. Left lung crepitant. Heart in normal position, but very large. Opening the pericardium it is found to be adherent to the heart at nearly all points, so that the heart muscle is

lacerated slightly in removal. Both ventricles filled with dark fluid blood; the auricles contained antemortem clots. The organ weighed 810 grams. The pulmonary artery was 2.5 cm. in diameter; there were a few plaques of atheroma on the internal surface. The musculature of the right auricle was increased. Pulmonary semilunar valves insufficient. The tricuspid valve was apparently normal. The aorta was 2 cm. in diameter, and there were numerous atheromatous patches on the internal surface. Some of them had become calcified at the base, but their free border was thin and looked normal. The mitral valve was also calcified, and the segments were adherent to the walls of the ventricle. All the cavities of the heart were enlarged and their walls thickened. Right lung bound by adhesions at apex and posteriorly; except where there were adhesions the pleura was glistening. Lung compressed and blood flowed freely from the cut surface. Weight, 600 grams. Left lung completely filled the left side of thorax and did not collapse when the pleura was opened. Compensatory emphysema. Bronchi contained a grayish fluid. Weight, 685 grams. Spleen, 10 cm. long and 6 cm. broad; externally bluish gray and very firm to touch; on section it was tough; pulp dark red, almost black; weight, 160 grams. Left kidney embedded in a mass of fat. In removing the organ its capsule came off entire, leaving a dark red nodular mass. On section the outline of malpighian pyramids was distinct and somewhat darker than the cortex. There were numerous white striæ in the pyramids. The cut surface dripped blood. Weight 255 grams. Suprarenal capsule, 2.5 cm. by 1.5 cm., of a grayish yellow color. Right kidney in same condition as left; weight, 235 grams. Capsule same. Bladder contracted. Only a few drops of urine were present, a catheter having been passed just previous to his death. Stomach empty; walls coated with mucus. Liver dark brown in color; the surface is finely mottled; on section the color is light brown, but mottled, as on the surface.

E. K. S.
H. W. A.

CASE 5.

Mitral.

F. J. B.; aged 26 years; nativity, Michigan; admitted to the United States Marine Hospital, Cleveland, Ohio, February 9, 1897; died March 2, 1897.

History.—Patient's illness probably dates back ten years, he having complained of shortness of breath during that period. Was treated in hospital here in October and November, 1896, and later on at Pittsburg, from which place he was transferred to this port. Tumultuous and irregular heart action, with local distress and difficulty in breathing, were the prominent symptoms.

Necropsy (twenty-four hours after death).—Rigor mortis marked. The pericardial sac contained 95 c. c. of turbid, straw-colored serum. The heart was enormously hypertrophied and dilated and weighed, after opening, 751 grams. The mitral orifice was stiff and deformed from atheroma, and had numerous projections of atheromatous material upon its margins. The valves were so bound down and disfigured as to be indistinguishable. The other valves were fairly normal. The aorta contained a pure antemortum clot, filling its entire caliber and weighing 120 grams. The aorta, beyond the left common carotid and left subclavian, was very much contracted and thin. The left pleural cavity contained 200 c. c. of turbid, straw-colored serum; a few recent adhesions were found on the posterior surface. The right cavity was partly obliterated by recent adhesions and contained no fluid. The left lung weighed 1,100 grams, the right 1,225 grams, both showing extreme œdema. The peritoneal cavity contained 50 c. c. of turbid, straw-colored serum. The liver weighed 2,120 grams, and was a fine example of the "nutmeg type." The spleen weighed 270 grams and was in the same condition. The left kidney weighed 195 grams; the right 240 grams. Both showed passive venous congestion, and the left was badly disfigured by scars, one at upper and anterior portion being an inch and a half in diameter. The stomach and intestines were normal.

H. L. G.

CASE 6.

Pericarditis and pleurisy; mitral and tricuspid.

A. S.; aged 30 years; nativity, Sweden; admitted to United States Marine Hospital, New York, June 2; died June 13, 1897.

History.—Is a white man 1.77 meters high, weighs 63.6 kilograms, brown hair and mustache and blue eyes. Family history negative. Denies having had anything, previous to this, more serious than a cold; also denies venereal trouble of any kind. Gets out of breath easily, especially in climbing. Feet and legs are swollen, and have been so for about three weeks; has been this weak for quite a while, but has not had the swelling until recently. Heart roughened at apex and sound transmitted over into the axilla. Sent to ward for further examination. Physical examination: Chest dimensions fair. Emaciation is marked. Reflexes good. Expansion slightly more on right. Heart impulse at second interspace much marked, also at one-half inch below and to left of nipple, apex beat being displaced somewhat and very forcible. Vocal fremitus exaggerated over left upper lobe. Resonance is very much diminished over left upper lobe, extending down and through the increased cardiac area of dullness. There is diminished resonance posterior to left lung. The gastric tympanitic area is normal. Spleen about normal size (slightly increased). Right lung has diminished resonance of much lesser degree than left lung over upper lobe anteriorly; this extends to middle lobe. There is a marked tympanitic area, 60 mm. diameter, at right nipple, which is a little to the left of the center of the area. Resonance slightly diminished posteriorly. Bronchial breathing. Apices both lungs, especially the left and left upper lobe. There are subcrepitant and crepitant râles scattered through base and lower lobe of left lung, anterior and posterior. There are mucous and subcrepitant râles about and within the tympanitic area near right nipple. Râles, crepitant and subcrepitant, scattered through the middle lobe. In scapular line and axillary lines are heard pleuritic friction sounds, besides the subcrepitant râles. There is quite a compact area in region of acromion process and spine of right scapula posterior, where the râles are loud and circumscribed. The pleuritic sound extends to vertebral column, about level of seventh or eighth ribs. The mitral sounds are abnormally loud, and adventitious murmurs are distinct. Mitral stenosis and regurgitation; loudest below and to left of left nipple and is heard at angle of scapula. Liver is enlarged considerably, abdomen being soft and full and some œdema of legs. 4th. Both legs are œdematous. 5th. Continue treatment. 6th. Continue. 7th. Legs still swollen. 8th. Urine pale, cloudy, straw-colored, faintly alkaline; albumen present, sugar absent. He now feels fairly well. 9th. He has some headache and can not sleep well at night. 10th. Fairly well. 11th. Some sore throat. He has appeared delirious at times and out of his head, according to nurse who was observing him. 12th. He has much dyspnœa when lying down; is much weaker. Pulse very weak and yielding in right wrist. Same, but thready in left. Evidences of pericarditis, with effusion into sac; also a pleuritis of left pleura. The skin over thorax is also œdematous. The valvular sounds (double mitral) are present, but rather faintly heard. Respirations are rapid and shallow. Bronchial breathing over upper lobe of right and also over left lung anteriorly. Both legs below knees are œdematous. He does not cough much, if any; no expectoration. The area over right nipple, noted several days ago, seems like a cavity healed up. There are now some pleuritic sounds, as of adhesions and pleuritis. 13th. Had a bad time last night. 9 a. m. Is in considerable distress to-day; later, very weak. Called at 12.45 p. m. Pulse very weak and quite rapid; breathing very labored; is evidently failing rapidly. Strychnine, $\frac{1}{30}$ ordered hypodermically every twenty minutes. Five doses given. 1.20 p. m. Patient again seen, and at about 2.15 p. m. still weak, but the mouth had been filling up with mucus, etc. 3.20 p. m. Called and found patient dead; pupils slightly dilated. He had been kept nourished with milk. Died 3.17 p. m.

Necropsy (twenty-fivehours after death).—Body well nourished. Marked general œdema. The superficial veins were very full and stood out prominently over the entire body. Wherever the skin was cut clear serum flowed freely. The brain, the sinuses, and blood vessels were normal. The pericardium was full of fluid, estimated at 250 c. c. The heart and pericardium were covered with layers of lymph showing recent pericarditis. The heart markedly enlarged. The walls of the left ventricle were about 2.54 cm. thick One leaflet of the mitral valve was almost entirely destroyed. There was a vegetation on the other. One leaflet of the tricuspid was destroyed and the others were firmly bound down. The other valves were normal. The right lung had three calcareous deposits, showing healed tuberculosis. Otherwise the lung tissue was normal. The pleural cavity of the right side contained about 70 c. c. of fluid. The left lung was collapsed, and firmly bound down by pleuritic adhesions. There was no breathing space in the lung at all. The bronchial glands had undergone calcification. The omentum, urinary bladder, organs of generation, rectum, duodenum, stomach, pancreas, small intestines, liver, and great blood vessels were normal. The spleen was enlarged and so soft that it was removed with difficulty. Both kidneys enlarged and congested. The adrenals were indurated and enlarged. The gall bladder was inflamed and thickened. The gall ducts were thickened. There were some enlarged glands in the mesentery. The descending colon was atrophied and much contracted for about 15.24 centimeters of its course.

J. O. C.

CASE 7.

Aortic and mitral.

J. S.; aged 45; nativity, Scotland; admitted to the United States Marine Hospital, Cleveland, Ohio, November 14, 1896; died January 13, 1897.

History.—Patient entered hospital complaining of shortness of breath and was also very anæmic. On examination the heart was found to be in very bad condition; the mitral and aortic valves were found to be incompetent. The urine was examined and found negative.

Necropsy (fifteen hours after death).—Rigor mortis well developed. Post-mortem lividity moderate. Pupils normal size. Upon removing the calvarium about 1,000 c. c. of dark fluid blood poured out of the sinuses and other vessels. The membranes of the brain were intensely congested, but there was no sign of inflammatory action. The ventricles were filled with clear serum. The pericardium contained 100 c. c. of clear serum. The heart showed hypertrophy and dilatation of both auricles and ventricles. The mitral and aortic orifices were evidently too large to be closed by the valves, which were themselves somewhat stiffened by atheroma. The aorta was enormously dilated, especially just at its beginning, where it was at least 2½ inches in diameter, and contained many atheromatous patches. The heart weighed 550 grams; the left lung, 700 grams; right lung, 1,000 grams. Both were deeply pigmented and were œdematous. Each contained at the apex small scattered spots of caseous material, showing a former tubercular process. The left pleural cavity contained 75 c. c. of clear fluid, and the right pleural cavity 100 c. c. of the same. The liver weighed 1,500 grams, and was a beautiful example of "nutmeg" liver. The spleen weighed 190 grams and showed beginning passive cirrhosis. The right kidney weighed 150 grams and the left kidney 170 grams, both showing cirrhosis and chronic passive congestion. The stomach and intestines were normal.

H. L. G.

CASE 8.

Mitral and aortic.

J. I.; aged 29; nativity, Japan; admitted to United States Marine Hospital, New York, N. Y., January 22, 1895; died February 16, 1897.

A clear history could not be obtained, as the patient could not speak English.

When admitted had a severe bronchitis and a heart complication, which was diagnosticated mitral and aortic regurgitation, with pericardiac effusion. The patient was kept in bed and given heart sedatives, as the pulsations were running above 100. One peculiarity of the systemic circulation was the fact that the heart murmur could be distinctly heard over any artery in the body. The patient continued in about this condition for five months, with no apparent change, except disappearance of cough. At short intervals he had severe pain over region of heart, passing up along the course of the aorta to the left shoulder. Patient continued about the same up to April 29, 1896, when he had a severe attack of bronchitis and dyspnœa. He was quite sick for ten days. August 4, 1896, it was observed that the heart had enlarged considerably, the apex impulse being an inch beyond the left mamillary line. September 8, 1896, had another severe attack of bronchitis and dyspnœa. Patient continued in about the same condition until the afternoon of February 16, 1897, when he suddenly expired in the wash room.

Necropsy (forty-six hours after death).—The organs of the abdominal cavity were all normal except congestion of both kidneys. The lungs and pleura were normal. The heart was hypertrophied, weighing 520 grams. One leaflet of the semilunar valves was entirely destroyed, allowing regurgitation. One of the leaflets of the mitral was bound down, and the other had a vegetation growing from the edge. Brain normal. All other organs normal.

J. O. C.
P. H. B.

CASE 9.

Mitral pneumonia, lobar; malarial fever.

E. N.; aged 23 years; native of Missouri; was admitted to the United States Marine Hospital, Cairo, Ill., May 14, 1897, and died May 18, 1897, at 5.10 a. m.

History.—The patient was left on the "wharf boat" by a passing steamboat, and the ambulance summoned for his removal. On admission to the hospital, within twenty minutes thereafter, he was in collapse. He stated that he had been quite well up to the morning of the previous day, and had been seized suddenly with a chill and great pain in left side. Pain had subsided within twenty-four hours and left him too weak to sit up. Pulse very rapid, feeble, and at times indistinguishable. Respiration irregular, shallow, and at times lost. Temperature, axillary, 40.3° C. He was placed in a rolling chair, conveyed to the ward, placed in bed, and carefully sponged with hot water and alcohol; a "cotton jacket" put on, covering the entire chest, and small doses of digitalis tincture with aromatic spirit of ammonia given every two hours and freely stimulated with whisky. The temperature fell gradually to 37.2° C. by next morning with improvement of respiration and pulse. Quinine sulphate in 0.13-gram doses was given every two hours, substituting the digitalis and ammonia, and as he said he could not drink milk, beef juice was given freely at regular intervals. On the evening of the second day the temperature was found 37.1° C. A severe chill occurred at 11.15 p. m., the temperature rising to 39.2° C., and thence to 41 C. by 8 a. m., May 16. A cough mixture was added to quiet the cough, which had then appeared, though without indicative sputa, and a full dose of quinine sulphate given on the mornings of the 16th and 17th to forestall chill, lowering the temperature on the latter date in the morning to 37.5° C., from which it rose by evening to 40.8° C., and remained until death next morning at 5.10.

Necropsy (ten hours after death).—Body was that of a young, muscular, dark-brown negro man; height, 171 cm.; circumference of shoulders, 107 cm. Pupils moderately dilated. Rigor mortis extremely well marked. On removing scalp, four small perforations, averaging 1 mm. in diameter, through which dark blood oozed, apparently due to arrested development, were found in the skull, irregularly placed and having no apparent corresponding points in the scalp or duramater. The sinuses, vessels, and brain were intensely congested, the membranes being of a dull chalky-white

color. On the right side of the great longitudinal fissure and immediately adjoining same, near the vertex, was a patch of granulations to which the membranes were not adherent. The anterior mediastinum, the greater vessels, the diaphragm, and the left pleural sac presented no feature of note. The pericardium contained a small quantity of serum and was normal. The heart was enlarged, fatty; weight, empty, 200 grams. Left ventricle filled with firm ante-mortem clots. Right ventricle greatly hypertrophied, empty. Mitral valve incompetent. Right pleural cavity at apex coated with freshly organized deposit. Lungs intensely congested throughout and exuding frothy serum on section, otherwise normal, except the entire right superior lobe, which was completely and recently hepatized. Weight: right, 610 grams; left, 450 grams. The peritoneum, small and large intestines were markedly free from fat. The stomach was empty, and strongly adherent near its pyloric extremity to the underside of the liver, and on section showing frequent points of post-mortem erosion. Liver somewhat congested, weight, 2,620 grams. Gall bladder contained 3 c. c. of viscid, clear bile. Spleen, medium size, currant-jelly like, very friable; weight, 150 grams. Capsule cleaving readily. Kidneys: Right, on section giving a strong faecal odor; weight, 110 grams; both congested, the left not so fully as its fellow, yet weighing the same; capsules of both adherent. The bladder wall was slightly thickened, the viscus containing 150 c. c. of dark straw-colored urine. The urethra, penis, testicles, prostate gland, and seminal vesicles apparently normal. The inguinal glands were but slightly enlarged, and careful observation failed to detect mark of syphilitic invasion.

J. M. G.

CASE 10.

Malarial fever remittent.

T. P.; negro; aged 22 years; nativity, Mississippi; admitted to the United States Marine Hospital, New Orleans, La., January 2, 1897; died January 11, 1897.

History.—Patient stated that he had been ill for three weeks with malarial fever, having intermittent fever of the tertian type until ten days before admission to the hospital, when the fever assumed the remittent form. At the time of admission patient had high fever, rapid pulse, tongue heavily coated, constipation, and anorexia. Also complained of nocturnal bone pains in legs. Gave a history of syphilis contracted one year ago. Physical examination revealed a marked hypertrophy of heart; also mitral and aortic murmurs; the mitral murmur occurring with the systole; the aortic with the diastole, the heart quite tumultuous. Lungs normal; area of liver dullness increased. Patient was also suffering from ptyalism, produced by taking large doses of calomel before entering the hospital. Several days after admission vomited frequently. Also had a hemorrhage from the lungs several hours before death, which continued up to the end.

Necropsy (seventeen hours after death).—Rigor mortis very marked; general nourishment good; pericardial sac contained about 75 c. c. of fluid. Heart weighed 524 grams; poorly nourished; substance greatly softened; wall of left ventricle thickened; aortic valves incompetent; vegetations at aortic orifice; mitral valves incompetent; edges somewhat calcareous; pulmonary and tricuspid valves competent. Aorta and other vessels normal. Both pleural sacs contained fluid; left 175 c. c. and right 300 c. c.; no adhesions in either sac. Both lungs contained a quantity of frothy blood; left weighed 875 grams, right 720 grams. Peritoneum normal. Stomach contained some partially digested milk, and mucous membrane was covered with a thick, tenacious mucus. Intestinal tract normal. Liver weighed 2,245 grams; greatly increased in size, pigmented (a typical bronzed liver). Gall bladder distended; ducts normal. Kidneys slightly congested; left weighed 182 grams, right 154 grams. Spleen weighed 657 grams; substance greatly softened and deeply pigmented; capsule readily detached. Bladder, prostate; urethra and ureters normal. Membranes of brain normal. Brain weighed 1,299 grams, apparently normal.

H. W. W.
H. W. S.

CASE 11.

Aneurism of aortic arch.

F. F.; nativity, Denmark; 61 years of age; admitted to United States Marine Hospital, San Francisco, Cal., January 12, 1897; died February 13, 1897.

History.—Patient entered hospital complaining of a dry, hacking cough, and of pain referred to poststernal region, and beneath upper border of ribs on left side. Physical examination revealed numerous crepitant and subcrepitant râles scattered through both lungs. There was dullness at both apices. The heart was enlarged, and there was a well-marked aortic regurgitant murmur. There was a well-marked pulsating tumor beneath left clavicle and an aneurism of the ascending and transverse portion of the arch of the aorta diagnosed. Treatment mainly expectant. On the 23d of January œdema of the extremities developed, and 10 per cent of albumen by volume appeared in the urine. During the first twelve days of February the œdema increased, fluid being present in the abdominal and pleural cavities, and the patient had several attacks of cardiac dyspnœa. Pulmonary œdema developed, and the patient died February 13, 1897, at 12.30 p. m.

Necropsy (twenty-four hours after death).—The body is well nourished. Rigor mortis is well marked. There is well-marked œdema of the lower extremities and of the scrotum. The calvarium, membranes, and brain are normal. The thymus gland is normal. The anterior mediastinum is normal. The pericardium contains 400 c. c. of straw-colored fluid. The heart presents a well-marked left-sided hypertrophy, and weighs 750 grams. There is roughening and thickening of the aortic valves; the rest of the heart is normal. The arch of the aorta is dilated uniformly, measuring 5 cm. in diameter; its walls are atheromatous. The right lung is nonadherent, normal in size and weight, and is œdematous. The left lung is bound down to the diaphragmatic and parietal pleuræ by strong adhesions. It is marked by œdema, otherwise normal. The right pleural cavity contains 300 c. c. of straw-colored fluid; the left pleural cavity contains no fluid. The right side of the diaphragm is normal; the left side is covered with old adhesions, and presents at the center close to the central tendon a dense plate of calcareous material 4 cm. in diameter. The right kidney presents in its upper end a cyst 3 cm. in diameter filled with a clear serous fluid. Otherwise the kidneys are normal. The other abdominal contents, including the organs of generation, are normal. The spinal cord was not examined.

H. S. M.
J. G.

CASE 12.

Mitral regurgitation.

A. R.; aged 39; nativity, Portugal; admitted to United States Marine Hospital, Boston, Mass., May 22, 1896.

History.—Patient stated that he had had gonorrhea and rheumatism several times, and that he was treated at this hospital last winter. He complained of pain and swelling of feet; had no rise of temperature and there was no albumen in urine. A physical examination revealed a slight precordial bulging; increased vocal fremitus over lungs; dullness over lower portion of left lung; moist râles over lower lobe of each lung. The area of cardiac dullness was enlarged; a marked systolic murmur was heard over the apex; aortic sound obscured by rough breathing; pulse weak and irregular; abdomen distended, hard, and tense; liver dullness increased; splenic dullness normal. Toward the end dyspepsia was a distressing symptom, and his lips were very dusky from venous congestion. He died July 24, 1896, at 11.30 a. m.

Necropsy (two and a half hours after death).—The body was that of a man about 39 years of age; height, 5 feet 9 inches; well built, muscles well developed, without

an excess of adipose tissue. The features were slightly drawn, the pupils much dilated. Tongue coated and teeth decayed. There was a discolored, purplish spot over each ear extending down the neck for a distance of 2 cm. There was a slight precordial bulging and a slight depression of the second and third intercostal spaces laterally on the left side of the chest. The abdomen was much protruded, appearing almost globular. There was slight œdema of both legs and feet and also of the scrotum. Rigor mortis had hardly set in when the examination began, but was quite noticeable when it was completed. On making an incision from the chin to the pubes, the superficial structures were found to be œdematous and the superficial veins much congested. On removal of the sternum the pericardium bulged and was found to contain about 90 c. c. of serous fluid. The heart was enormously enlarged and dilated, measuring across the base 1.6 decimeters, and from apex to base 1.5 decimeters; it weighed 535 grams. It was slightly covered with fat and was of an exceedingly pale color. All the chambers were filled with fluid blood-dark in color, and in both ventricles dark, post-mortem clots were found. Of the valves the aortic semilunar seemed to be the only one that was normal, the others being insufficient. The left lung was contracted and bound down by old adhesions to the pleura in its upper part. It was mottled in appearance, crepitated when cut except at the lower part of the lower lobe, where red hepatization had taken place. The right was also small, but appeared to be quite normal except at the lower part of the middle lobe, which was quite congested, and which at one point adhered to the pericardium. The left lung weighed 415 and the right one 560 grams. The abdominal cavity was greatly distended with about 1,000 c. c. of clear, reddish fluid. The mesentery was greatly engorged and covered with a very large amount of fat. The spleen was contracted, and on section appeared dark brown, quite congested; it weighed 165 grams. The left kidney weighed 235 grams; was slate colored in appearance, and very much misshapen from pressure from above; the upper anterior portion was so flattened as to make it appear wedge shaped, with its upper and posterior border as the base of the wedge and its inferior border, the apex; the capsule peeled easily, and it was slightly congested on section, the markings being a little indistinct. The right kidney was congested, the cortical substance being very indistinctly marked. The capsule was readily stripped from it; its weight was 265 grams. The bladder was contracted, holding about 30 c. c. of dark-colored urine. The stomach was very much distended, and contained about 500 c. c. of yellowish fluid in which was much mucus. The small intestines were distended with gas, as were also the ascending and transverse colon; the descending colon was, however, smaller than normal, and contained some small amount of fecal matter. The vessels of the intestines throughout were very much injected. The liver was firm to the touch, enlarged, and mottled in appearance; on section it showed streaks of yellow. The lobules were quite large and far from uniform in color. The liver weighed 2,065 grams. Pancreas was normal, weighing 65 grams. The skull cap was removed and the vessels of the dura mater were much injected. The brain was removed, and with the exception of being slightly engorged, was normal. Its weight was 1,460 grams. The large sinuses were filled with fluid blood, and there was some slight effusion of serum found in the fourth ventricle.

H. W. A.

CASE 13.

Mitral stenosis.

J. B. S.; age, 67; native of United States; was admitted to the United States Marine Hospital, San Francisco, June 14, 1897, and died July 6, 1897, at 11 p. m.

History.—On admission patient complained of a feeling of great weakness, inability to perform any work, shortness of breath, and swelling of the legs and scrotum. Physical examination showed that the lungs were normal. Heart area was enlarged downward and to the left. A loud systolic murmur was heard over the mitral valve. The other heart sounds were normal. Examination of the urine revealed large quan-

tities of albumen. The patient grew rapidly weaker; the heart beats became more rapid and feeble until his death.

Necropsy (twelve hours after death).—The body is that of a well-developed, well-nourished adult male. Rigor mortis is well marked. The skullcap, brain case, sinuses, and vessels are normal. There are a few adhesions between the dura and pia mater on each side of the falx cerebri, at the vertex. The brain is normal. The anterior mediastinum and thymus gland are normal. There is 100 c. c. of straw-colored fluid in the pericardal sac. The pericardial membranes are normal. The heart is concentrically hypertrophied and weighs 580 grams. The free edges of the leaflets of the mitral valve are thickened and present atheromatous deposits. There is stenosis of the orifice. The other valves are normal. Both lungs present a well-marked condition of anthracosis, but are otherwise normal. The visceral and parietal pluræ of both sides are adherent. The liver and gall bladder are normal. The spleen is normal. The digestive tract is normal. The left kidney is small and weighs 90 grams. The capsule is not adherent; on section it presents a well-marked atrophic cirrhosis. The right kidney is small and weighs 100 grams; capsule is not adherent. On section the cortical area is seen to be completely atrophied, and in the substance of the pyramids are seven cysts filled with clear fluid, ranging in size from 1 cm. to 2.5 cm. in diameter. The bladder is contracted and the walls greatly hypertrophied, being 3 cm. in thickness. The prostate gland is hypertrophied. There are numerous strictures in the urethra. The spinal cord was not examined.

H. S. M.
J. G.

CASE 14.

Cerebral hemorrhage (old)—posterior horn of left internal capsule.

N. W.; age, 45; a native of Greece; admitted to the United States Marine Hospital, San Francisco, Cal., March 9, 1895, and died December 14, 1896, at 5 p. m.

History.—On entrance patient complained of pains and tingling coming on suddenly, and referred to the left side of the head. Subsequently there was paralysis of the right arm and leg. Intellect and speech were at no time affected. Some dyspnœa present, and a well-marked valvular murmur was heard at the apex of the heart and at the second right intercostal space, close to the sternum. Patient continued without any marked improvement. Above symptoms gradually became more severe, and for the last few days he was confined to bed.

Necropsy (twenty hours after death).—Brain and meninges: Cloudy swelling of the pia. Small cavity, 1 by 1.5 cm., found in the second division of the posterior horn (where fibers for arm center pass) of left internal capsule. The walls of the cavity and part of the surrounding structure were of a yellowish-brown color. Heart: Enlarged; calcareous deposits all over mitral and aortic semilunar valves; small vegetation on pulmonary valve. Lungs: Hypostatic congestion. Liver congested. Kidneys, spleen, and intestines normal.

J. H. O.
J. G.

CASE 15.

Aortic and mitral.

M. B.; age, 28; native of Tennessee; was admitted to United States Marine Hospital, Evansville, Ind., July 24, 1896, and died October 22, 1896.

History.—Patient was admitted to hospital July 24, 1896, suffering with severe pain in chest. Previous history of health has been good, never having been ill, with the exception of chills and fever some years ago and some slight cough for last five or six weeks. Personal history: Single; habits good. Venereal history: Denies ever having had any venereal disease. Family history: Father died suddenly; not informed regarding death of other members of family and near relatives.

Present illness came upon patient suddenly; while lifting a heavy weight yesterday, something felt as though it gave away in his chest in region of heart, shortly followed by dyspnœa, pain, cramps in arms, hands, and legs; patient also began to swell all over, as he said; the swelling partially disappeared, but some slight œdema of feet and legs still present. Upon examination in sitting posture apex beat as in normal position; in recumbent posture it is indistinct. Area of dullness slightly increased. Action tumultuous and impulse against chest wall imparts a decided thrill to hand. Auscultation reveals a loud rasping murmur all over precordium, also posteriorly, but less distinct. With stethoscope, reveals a soft blowing sound or murmur at apex, heard after the first sound, quite distinct from the rasping murmur heard all over chest. Both murmurs intermingle at base and heard most distinctly to right of second costal cartilage on right side. Area of dullness of base increased. Also a "to-and-fro" friction sound heard over precordium. The murmer heard at base was systolic. Patient had attacks of dyspnœa accompanied by severe pain; these were irregular in occurrence and would last some hours if not relieved by a narcotic. When patient had these attacks he sighed and groaned with every expiration, which he said he could not prevent or control. Œdema disappeared somewhat under administration of cardiac stimulants, as digitalis, but never entirely disappeared. A few weeks before death œdema became very marked and was quite extensive at death.

Necropsy.—General œdema; body well nourished, quite muscular, but flabby from œdema. Rigor mortis very slight. Subcutaneous fat and sclerotic, bile stained. Thorax and abdomen full of watery fluid, but pleural cavity was not. Some slight adhesion of visceral to costal pleura. Pericardial sac normal; no adhesions and contained no fluid. Heart markedly enlarged and hypertrophied; thickness of left ventricle, 2.25 cm. Right auricle dilated; capacity 150 c. c. fluid. Aortic valve incompetent; cone diameter, 1.75 cm. Mitral also incompetent and posterier flap shortened by contraction of its cordæ tendonæ; both of above valves studded with ulcerations and vegetations. Walls of arch and thoracic aorta hypertrophied. Weight of heart, 750 grams. Larynx and trachea streaked with blood. Lungs dark red, congested; left, weight, 650 grams; right, weight, 783 grams. Omentum somewhat gangrenous. Tongue streaked with blood. Stomach contained 30 c. c. fluid, dilated from fermentation, possibly after death. Diameter of pylorus, 3.5 cm. Liver: Color, dark-brownish red, congested; weight, 1,750 grams. Gall bladder contained 15 c. c. biliary fluid; ducts normal. Left kidney, weight, 255 grams; right, 260 grams; structure normal. Bladder contained 200 c. c. urine. Spleen, weight, 205 grams; small, hard, concavity marked; edges, when cut, presented a dense, firm, gray-colored fibrous tissue. Brain weight, including membranes, 1,380 grams. Organs otherwise not mentioned normal.

H. S. C.
P. M. C.

Case 16.

Aortic, mitral, and tricuspid regurgitation.

R. J. (colored); age 40; admitted to the marine hospital, New Orleans, La., March 30, 1897.

History.—Patient had been suffering for two months with troublesome cough, copious expectoration, shortness of breath, which was first noticed two or three years ago, and now severe; sputum of late has been blood tinged. Appetite fair, no nausea or vomiting, bowels regular; some œdema of both legs; urinary symptoms negative. Examination of chest showed lungs filled with mucous râles, large and small. The congestion of lungs was so great that the heart sounds could not be well heard. Examination of urine was negative. History of syphilis, primary lesion, fifteen years ago. No history of rheumatism. Under the treatment of ammonium carbonate cough mixture and tincture digitalis every three hours, with

strychnine sulphate every three hours, the lungs cleared up sufficiently to make a thorough examination of heart, which was found to be considerably enlarged. At apex of heart a soft murmur, systolic in time, was heard. The murmur was transmitted upward and to the left along the course of the ribs into the axilla, and also heard behind at lower angle of scapula. At aortic interspace another soft systolic murmur was heard. Under the above treatment the heart grew gradually stronger and the congestion of the lungs gradually less; the pulse became slower, regular, and stronger. The tincture digitalis was administered in 10-drop doses three times a day along with strychnine sulphate, 0.001 gram, three times a day for the next six weeks, with marked improvement. On April 5 the lungs again became considerably congested, and hot turpentine stupes were applied for several days with good result. At the end of six weeks all congestion of the lungs had disappeared, the heart was strong and regular in its action, the œdema of the legs had disappeared, and the patient was sleeping well of nights without any great dyspnœa. Examination at this time showed the apex beat to be 2 inches below and two-thirds of an inch without the nipple, and rather heaving, and the aortic and mitral murmurs as heard at the time of admission. The digitalis was then omitted from the treatment. After a week there was some increased dyspnœa and congestion of lungs during the night, and 10 drops of tincture digitalis were ordered at 10 p. m. and 2 a. m. Patient rested very well for a few days, when it became evident that compensation was failing again by the increased congestion of lungs and œdema of legs and dyspnœa, so the digitalis, with strychnine, was continued during the day in the same doses as heretofore. After three days tinct. strophanthus in 0.3 c. c. doses three times a day was substituted for the digitalis, as the latter failed to act well. This gave some temporary improvement only, and digitalis treatment was again begun. On the 9th of June patient had frequent hæmoptysis, slight in amount, and these slight hemorrhages occurred off and on until his death five weeks later. Brandy was administered daily, beginning on 30 c. c. three times a day, and later using 150 c. c. during the day and night. On June 11 potassium iodide was given, 1.3 grams, three times a day, and this was continued for ten days without any material improvement in patient's condition. On July 4, for the first time there was heard a soft systolic murmur at ensiform cartilage in addition to the two murmurs at the aortic interspace, one systolic in time, one diastolic, and the murmur heard at the apex and transmitted into axilla, as previously noted. The heart was beating more rapidly and less strong; the apex was three-fourths to 1 inch outside of nipple line. Tincture strophanthus in 7-drop doses three times a day was again substituted for the digitalis for several days without any signs of improvement. Patient's stomach became very irritable, and during the last two weeks preceding his death strychnine and digitalis were given hypodermatically. Patient was nourished with eggnogs. Morphine sulphate, 0.01 gram, was given off and on during the night when dyspnœa became severe and uncontrollable. Patient became gradually weaker until in the afternoon of July 17, while attempting to get out of bed to a commode, he fell to the floor unconscious, and died within two or three minutes.

Necropsy (thirteen hours after death).—Body fairly well nourished. Rigor mortis present; some cadaveric lividity; pupils normal; some serous effusion into the conjunctivæ. Face and legs œdematous; right inguinal hernia. Superficial view of abdomen is normal except for congestion of stomach and intestines. Heart occupied unusually large part of left chest, having pressed the left lung to the left and behind. The apex of heart is on a level with seventh rib and 1 inch without the nipple line. The right border extends one-half inch to the right of sternum. The pericardium is firmly attached to the pleura covering the lungs and diaphragm, and the heart is attached by thin adhesions to the pericardial sac. No pericardial effusion. Weight, 790 grams. Large post-mortem clot in aorta. Aorta thick and harder than normal; lining membrane of aorta sclerotic. The aortic valve is insufficient, and the leaflets are thick and leathery. The orifices of the coronary

arteries are constricted from the sclerotic changes in the aorta, the orifice of the left coronary artery being less than one-half the size of the right one. The lining membrane of the coronary arteries is normal, and it is evident that the sclerosis did not proceed farther than their orifices. The mitral valve is insufficient. Both leaflets appear to have been worn away; one, more worn than the other, is bound down against the wall of the ventricle. Each segment is sclerotic. No vegetations or ulcers are seen on either valve. Pulmonary valve is normal. Tricuspid valve is insufficient; no evidence of vegetations on its segments. Both ventricles contained large post-mortem clots. The walls of all the cavities of the heart were much thicker than normal, that of the left ventricle measuring about three-fourths of an inch. All the cavities were dilated. Right lung weighs 835 grams; base adherent to diaphragm by old adhesions; lower lobe congested, otherwise normal. Left lung weighs 615 grams. No serous effusion into either pleural cavity. Sections of each lung show healthy tissue, except for the congestion. Liver weighs 1,787 grams. Surface smooth; sections show normal tissue. Gall bladder full of bile; gall duct normal. Stomach dilated and congested; no ulceration; intestines show the same congestion; appendix vermiformis adherent to mesocolon, not inflamed. Spleen weighs 92 grams; sections normal. Left kidney weighs 205 grams; section shows cortical and medullary congestion, but no degeneration; adrenal normal. Right kidney weighs 180 grams; section shows the same congestion, but no degeneration; adrenal normal. Ureter normal. Bladder moderately distended with urine; normal. Hernia of small intestines through inguinal canal; easily reduced. Prostate and seminal vesicles apparently normal. Diaphragm normal. Brain: Dura mater normal; pia mater shows some venous congestion, otherwise normal. Sinuses of brain normal. Cerebrum weighs 1,290 grams; cerebellum weighs 142 grams; apparently normal. The ventricles of the brain are normal. Sections of cerebrum and cerebellum show the brain tissue to be normal, without any softening or evidence of acute or chronic inflammatory products. Medulla normal, apparently. From macroscopic examination of the viscera there was no apparent degeneration or inflammation, and sections for microscopic examination were therefore not prepared.

H. H.
H. W. S.

CASE 17.

Mitral.

D. S. E.; aged 55 years; nativity, United States; admitted to marine ward, St. Mary's Infirmary, Galveston, Tex., April 30, 1897; died June 20, 1897.

History.—About three weeks prior to admission to hospital the patient began to be troubled with shortness of breath. A few days later he noticed some swelling of feet and ankles before going to bed. He was next troubled with headache and indigestion, and found it necessary to get up two or three times at night to urinate. The dyspnœa shortly after admission became extreme, requiring patient to sit up at all times. Œdema of lower extremities and scrotum marked. He expectorates a thin watery mucus, sometimes tinged with blood; cough has never been severe. Urine highly albuminous, contains no casts, and is scalding to urethra. Physical examination showed mitral systolic murmur.

Necropsy (fourteen hours after death).—Body fairly well nourished; anasarca general and marked; scrotum very œdematous. Heart greatly hypertrophied and dilated; weight, 1,800 grams. Mitral valves atheromatous and insufficient; pericardium contained about 50 c. c. of serum. Lungs congested and small amount of fluid in each pleural cavity. Liver engorged and enlarged; weight, 2,100 grams. Kidneys normal, but engorged; right weighed 250 grams; left, 240 grams. Other organs normal.

G. M. M.

CASE 18.

Bright's disease.

J. R.; age, 76; nativity, Massachusetts; was admitted to United States Marine Hospital, port of San Francisco, January 25, 1894, and died February 1, 1897, at 3.45 a. m.

History.—Patient was admitted to the hospital complaining of vertigo so severe that he frequently fell down, of vomiting not associated with nausea, and of precordial pain and oppression. Examination revealed valvular disease of the heart, aortic, with left-sided hypertrophy. The urine showed evidence of a chronic diffuse nephritis without exudation. During the patient's first six months in hospital the cerebral symptoms entirely disappeared, and the cardiac disease became the feature of the case, together with several exacerbations of the chronic nephritis. During his entire stay in the hospital patient complained of pain referred to the region of the diaphragm, and of the irritation caused by distichiasis, and marginal conjunctivitis affecting both upper eyelids. For the last six months of patient's life he was confined to bed, gradually becoming weaker, and dying at 3.45 a. m., February 1, 1897.

Necropsy (twelve hours after death).—Body well nourished. Over right trochanter is a superficial ulceration 10 cm. by 5 cm. in size. The right side of the scrotum presents a similar condition of the epidermis 5 cm. in diameter. Rigor mortis is well marked. Head: Calvarium and membranes, normal; cerebrum, normal. Cerebellum: The right inferior surface of the cerebellum presents a thin-walled cyst containing 10 c. c. of viscid fluid and occupying all that portion of the cerebellum lying below the great horizontal fissure. The rest of the cerebellum is normal. All of the arteries of the brain are markedly atheromatous. The sinuses contain the usual amount of coagulated blood. Thorax: The anterior mediastinum, thymus gland, and pericardium are normal. The heart is hypertrophied, the hypertrophy being confined entirely to the left side, and weighs 320 grams. The interior of the heart and the valves are normal, with the exception of the aortic valve, the segments of which are thickened and calcareous and incompetent to close the orifice. There is no atheroma of the aorta. The diaphragm is normal in position. The bases of both lungs are firmly adherent to the diaphragmatic pleura. There are no other adhesions, and no fluid in either pleural cavity. The lungs present the changes of a chronic diffuse bronchitis, with dilitation of the bronchi. The great vessels and nerve trunks of the thorax are normal. Abdomen: The omentum is normal. The spleen is normal in size and weight, but the splenic tissue is hard and friable. The kidneys are slightly smaller than normal, and present the changes of a chronic diffuse nephritis. The suprarenal capsules are normal. The bladder is contracted and its walls are thickened. The prostate is enlarged. The other organs of generation are normal. The stomach presents the typical changes of a chronic gastritis. The rest of the intestinal tract is normal. The gall bladder and ducts are normal. The liver is smaller than normal, weighing 1,190 grams. Its tissue is extremely friable and deeply stained with bile. The pancreas, solar plexus, and mesentery are normal. The spinal cord was not examined.

H. S. M.
J. G.

CASE 19.

Pericarditis.

J. W. D.; a native of the United States; aged 71; was admitted to the United States Marine Hospital, San Francisco, September 18, 1896, and died April 17, 1897, at 4.30 p. m.

History.—On admission patient complained of cough and dyspnœa, aggravated by lying down. Physical examination: Numerous râles were heard over the entire

surface of both lungs, but otherwise they were normal. The heart was normal. His condition improved slightly under treatment. On January 8, 1897, an aortic insufficiency was found. He gradually grew worse, his dyspnœa becoming more aggravated, his cough worse, and his heart weaker until his death.

Necropsy (*seventeen hours after death*).—The body is well developed and well nourished. Rigor mortis is not well marked. The skullcap, sinuses, and vessels, brain, and membranes are normal. The anterior mediastinum and thymus gland are normal. The pericardial sac contains 75 c. c. of purulent fluid. Both parietal and visceral pericardial membranes are thickened and covered with flakes of fibrin. The heart is enlarged and weighs 430 grams. The aortic valve is insufficient, and on all three leaflets calcareous deposits are found, also a few vegetations. The other valves are normal. The parietal and visceral pleuræ of the left chest are not adherent, but there is a cheesy deposit from 0.5 to 1 cm. in thickness situated at the fissure between the lobes. The left lung is normal. The parietal and visceral pleuræ of the right chest are not adherent. There is a cheesy deposit on the visceral pleuræ situated on the anterior portion of the surface of the base. The right lung is slightly congested, but is otherwise normal. There is a slight deposit of fat in the omentum. The liver is slightly congested, but is otherwise normal. The gall bladder contains five small stones, but is otherwise normal. The rest of the digestive tract is normal. The kidneys are slightly congested, but are otherwise normal. The bladder is greatly distended with urine, but is normal in structure. The spinal cord was not examined.

H. S. M.
J. G.

CASE 20.

(*Aortic and mitral.*)

S. A.; age, 60; a native of Sweden; was admitted to the United States Marine Hospital, San Francisco, September 1, 1896, and died September 20, 1896, at 9.50 p. m.

History.—On entrance the patient complained of weakness and shortness of breath. Physical examination showed a very much dilated heart, a mitral and an aortic insufficiency, and a very atheromatous condition of the arteries. On September 19 the patient suddenly lost all power of motion, was unable to speak, and did not understand anything that was said to him. Pulse dropped to forty per minute. The patient continued this way for about twenty hours, when he died.

Necropsy (*twelve hours after death*).—The blood vessels of the brain and meningies were atheromatous and engorged. The entire left lobe of the brain was softened and presented numerous small hemorrhages. The island of Reil and the upper part of the left ascending parietal and frontal convolutions were especially soft. An abscess cavity of about 10 c. c. capacity was found in the posterior part of the base of the left cerebellar lobe. There were pericardial adhesions. The heart was very much enlarged, and there was an hypertrophy and dilatation of the left ventricle. There were calcareous deposits on all of the valves. The lungs were slightly adherent, but otherwise normal. There was an aneurismal dilatation of the arch of the aorta, and also of the thoracic aorta. The innominate was twice its normal diameter. All of the arteries were very atheromatous. The liver was congested. The spleen was very soft. The digestive organs were normal. The genito-urinary organs were normal.

J. H. O.
J. G.

ANEURISM OF AORTA (DESCENDING PART OF ARCH), RUPTURE.

C. E.; age, 41; native of Norway; was admitted to the United States Marine Hospital, San Francisco, Cal., January 12, 1897, and died January 13, 1897, at 10 a. m.

History.—He complained of pain in the chest, more severe on right side, sore

throat, and very difficult respiration. Could not breathe unless lying on right side. Pulse, 120; respiration, 46; temperature, normal. No other symptoms could be elicited, as patient was very weak. He sank rapidly, and died sixteen hours after admission.

Necropsy (three hours after death).—Meninges normal; brain pale. Right anterior cerebral artery three times size of left. Large aneurism, 9 cm. by 7 cm., at the beginning of the descending part of arch of aorta. Rupture had taken place, and the blood had descended between the longitudinal and circular muscular coats of the œsophagus, through the œsophageal opening in the diaphragm, and lodged between the external and middle coats of the stomach, forming quite a large tumor at that point. The external coat of the stomach became greatly distended and finally ruptured, thereby filling the abdominal cavity with blood. The latter pressed up against the diaphragm and caused the lungs to collapse. Heart: Dilatation of the aorta and calcareous deposits in its walls. Valves competent. Extensive adhesions of both pleuræ. Left lung in a state of collapse; right in nearly same state. Some œdema and hyperæmia were present. Liver, spleen, kidneys, and other viscera normal.

J. H. O.
J. G.

LOBAR PNEUMONIA.

Case 1.

M. R.; native of Sweden; age, 49; was admitted to the United States Marine Hospital, San Francisco, April 3, 1897, and died April 7, 1899, at 11.45 p. m.

History.—On admission patient, who had been drinking heavily for some time, complained of severe cough and pain in the right side of his chest, which was aggravated by deep inspiration. Physical examination showed decreased movement of the right side of the chest, dullness over the entire right lung, and moist râles heard on both inspiration and expiration. The left lung and the heart were normal. His condition grew rapidly worse, his pulse becoming weaker and more rapid, and his respirations more shallow until death.

Necropsy (performed twelve hours after death).—The body is well developed and well nourished. Rigor mortis is well marked. The calvarium, skull cap, sinuses and vessels, brain, and membranes are normal. The heart and pericardium are normal. The parietal and visceral pleuræ of the right chest are everywhere adherent. The right lung is completely solidified, and weighs 2,670 grams; on section it shows a condition of gray hepatization. The parietal and visceral pleuræ of the left chest are adherent posteriorly. The left lung is slightly congested, but is otherwise normal and weighs 1,050 grams. The digestive tract is normal. The genito-urinary tract is normal. The spinal cord was not examined.

H. S. M.
J. G.

Case 2.

Double.

S. W.; aged 21 years; native of Virginia; admitted to marine ward, Providence Hospital, Washington, D. C., April 7, 1897; died April 11.

History.—Patient gave a history of previous good health. Four or five days before admission says he "took cold," had sore throat, cough, and on the 6th, the day before admission, chilly sensations, which continued through the day and night, with pain just below the right nipple, which has gradually increased in severity, especially marked on coughing. Examination on the day of admission: Face flushed, dusky red spot on each cheek; tongue coated in middle, red at edges, but moist; alæ nasi active in respiration; skin bathed in perspiration; patient complains of headache and pain in right side at each inspiration and cough; cough

short, hacking, and dry; mind, clear; pulse, 120; respiration, 40; temperature, 39° C. On auscultation, respiration is somewhat suppressed on right side and exaggerated on the left. No râles perceptible. Magnesium sulphate was ordered, 15 grams, to move the bowels. Next day (8th) crepitant râles were distinctly heard about the right nipple, and there was considerable expectoration of rusty sputum. Five p. m. 15 c. c. of antipneumonic serum were injected under the skin of the abdomen; temperature, 38.9° C. At 6 p. m. temperature was 40°.

April 9.—Temperature, a. m., was 38.3°; respiration, 38.3°; pulse, 120. General condition not improved. Twenty cubic centimeters of antipneumonic serum were injected in right side of abdomen beneath skin at 10.30 a. m. At 4.30 p. m. temperature was 39.3°; pulse, 120; no improvement apparent. Copious expectoration of rusty sputum and considerable pain in right side.

April 10.—An eruption of irregular maculæ very similar in appearance to measles is discovered covering both forearms, but does not itch or cause inconvenience. Crepitant râles heard at base of left lung.

April 11.—Condition worse—dyspnœa extreme, face and extremities livid, occasional delirium, tongue dry, with sordes, sweats freely, and expectorates copiously a prune-juice-looking material. Carbonate of ammonium and whisky had been freely used, but in view of the evident want of oxygen in the blood, due to filling of the lungs, it was decided after consultation to bleed the patient. About 120 c. c. of blood were removed through the left median basilic vein, but the relief was slight and only temporary, the patient expiring about eight hours later.

Necropsy (*twenty-eight hours after death*).—Body of a young man apparently 21 years of age. Post-mortem rigidity marked; lividity of dependent portions; livid spots on front of shoulders and chest. Muscular development good. Hair brown, forehead broad, eyebrows brown, eyelashes brown, eyes brown, pupils dilated, nose straight, cheek bones high and prominent, mouth medium, teeth good, jaws tightly clinched, beard brown and of about one week's growth, ears of moderate size and close to head. Brownish mucus exudes from mouth upon application of pressure to chest. Orthocephalic skull; skullcap fairly thick, symmetrical; dura mater congested; vessels of pia mater distended with blood; cord, as far as could be seen, congested; puncta vasculosa prominent in centrum ovale minus; same in centrum ovale majus; brain congested throughout. Incision from upper border manubrium sterni to symphysis pubis in median line. Sternum removed. Right pleural cavity obliterated by recent adhesions; thick fibrinous exudate of acid reaction covers surface of lung; red hepatization from base to apex, with the exception of a narrow strip along the anterior margin, which is crepitant. Left pleural cavity obliterated by recent adhesions; left lung differed from its fellow in no respect except that there was less fibrin on the surface. Heart slightly larger than patient's closed fist; reaction of pericardial fluid, acid; no signs of inflammation. Ante and post mortem clots in both ventricles; clot in left ventricle extends well up into aorta; heart is diastole, right side dilated; valves competent and normal. Small and large intestines distended with gas; no fecal matter present except in the ascending and descending colon; vermiform appendix 12 cm. in length, projected downward and inward, resting upon the bladder. Liver slightly enlarged and congested; spots of fatty infiltration on upper surface of right lobe. Gall bladder and ducts normal. Left kidney enlarged, capsule strips easily, cut surface bleeds freely, outlines indistinct; appearances of cloudy swelling; ureter normal. Rectum normal and empty. Right kidney and ureter do not differ materially from their fellows of opposite side. Bladder contains 400 c. c. of urine free from albumen; spleen slightly enlarged and congested; malpighian bodies prominent; vesiculæ seminales normal; rectum and prostate normal; pancreas normal; adrenals normal; bronchial glands normal; penis and testicles normal.

G. T. V.

CASE 3.

F. L.; white; aged 57 years; a native of Michigan; was admitted to the marine hospital, Detroit, Mich., December 1, 1896.

History.—This patient has been a hard drinker of poor whisky. He was taken sick November 29, 1896, with what he calls a cold in his head. "The next day it seemed to be on his lungs." Complained when admitted of pain over right lower lobe and left lower lobe of lungs. Pain in his bones. He complained of having a chill on the 30th of November. Has a headache, dry tongue, bowels constipated, slight cough, and frequent urination. Physical examination shows marked absence of respiratory murmur over lower lobe of right lung. There was marked dullness over left lower lobe and right upper lobe.

December 1.—Appearance of prune-juice sputum. Respiratory movements easier, rested easily, and coughed four or five times. Temperature, 40.5° C. Pulse, 112.

December 4.—Pulse, 108; temperature, 39.4° C.; respiration, 18. Little pain.

December 5.—Rested till after midnight, when respiration began to be more rapid, and at 2 a. m. reached 44. Nine a. m—pulse, 144; temperature, 39.1° C.; respiration, 34. ℞ ammon. carb., tr. digitalis. Above mixture every two hours. Continue poultices.

December 6.—Pulse, 116; temperature, 40° C.; respiration, 34. Digitalis mixture every three hours, and continue poultices.

December 7, 5 a. m.—Respiration lowered, stertorous, and pulse weak. Strych. nitrate given hypodermically. Death at 8 a. m.

Necropsy (six hours after death).—Body that of a man 1.8 meters tall; slender, and would weigh 70 kilograms. There was no post-mortem lividity. Rigor mortis well marked. Head partially bald. Epidermis over right lung had disappeared over an area of 10 cm. square. There was no subcutaneous fat. The costal cartilages were ossified so that they had to be cut with a saw. The pleura covering of the left lower lobe was firmly adherent to the chest wall. It looked as if the adhesions were old. The lung looked like a piece of muscle, and pieces of it sank in water. The upper lobe of the right lung was solidified and in the stage of gray hepatization. Over the right lower lobe there were recent deposits of fibrin. There was about 150 c. c. of serous fluid in the right pleural cavity. Sections of right upper lobe sank in water, of the right lower lobe floated. Weight of right lung, 1,300 grams; of left, 550 grams. Liver extends across the abdomen. The right lobe seemed to be of normal size. The left lobe extended farther to the left than normal. There was no reaction to the iodine-and-acid test for starch. The organ weighed 2,310 grams. Left kidney normal in appearance and weighed 180 grams; right kidney weighs 175. In it there were several cysts containing urine. The largest contained 5 c. c. of fluid and was as large as a hickory nut. Spleen weighs 175 grams, is thin, and over its outer surface beneath the capsule are a number of bodies which looked like rice, but upon examination proved to be fat. Heart weighs 230 grams. Valves efficient. Heart stopped in systole. Aorta shows numerous patches of atheromatous degeneration. In many places the atheromatous patches had become calcified. In one place in the aorta, about 3 cm. from the origin of the innominate artery, there was a cicatrix in the intima, around the edge of which was a calcified deposit.

C. T. P.

CASE 4.

S. M.; age, 35; nativity, New York; color, white; admitted to United States Marine Hospital, Baltimore, 4.30 p. m., January 23, 1897; died 10 p. m. same day.

Family history.—Mother died of tuberculosis; father living and healthy; patient had enteric fever six years ago. No other serious illness. Present illness began two weeks ago with chilly sensations, followed by fever and headaches. Since that time patient has been aboard his boat. During the first four or five days patient was constipated, later on suffered from diarrhea. When admitted to hospital he was

weak and exhausted, but complained of no pain nor dyspnœa. Two hours later (6.30 p. m.) his condition was very much changed. He now had the appearance of a very sick man. Complained of cough and pain in left chest. Pulse, 144. Respiration, 55 per minute. Sputum dark and viscid. Perspiration was noticed on forehead. Examination of urine revealed a considerable quantity (5 per cent) of albumen. Physical examination: Inspection, respiration very hurried. Movement of chest very limited on left side. No special fullness noticed on either side. Apex beat of heart not visible. Palpation, vacue fremitus, almost entirely absent on left chest; present on right. Percussion, resonance over left lung very defective, almost amounting to flatness. Right lung resonant. Auscultation, sounds very much masked by the loud "rattle" in throat. In the upper lobe of left lung neither bronchial breathing nor râles were heard. Here and there an occasional friction rub could be made out. Low down, just in front of the midaxillary line, tubular breathing was heard. Breath sounds were exaggerated over right lung. Râles were numerous. Strychnia and ammonium carbonate were administered without relief. Three hours after noting the above condition patient was in a dying condition. Stimulation hypodermically was resorted to, but with no benefit. Patient died at 10.05 p. m.

Necropsy (twelve hours after death).—Rigor mortis marked. Emaciation not great. Considerable fat in the subcutaneous tissues. Thorax: On the left lung was seen quite an extensive deposit of fibrin, which was more noticeable in the upper region. A few fresh pleural adhesions were noticed. There was no effusion. Left lung: Weight, 1,900 grams. Upper lobe firm in consistence; no crepitation. On section the tissue was of a grayish yellow color, from which exuded a quantity of purulent material. The lower lobe of the left lung was red, but crepitant. On section a number of red clots were seen to exude from the vessels. The bronchi were found to contain a quantity of frothy mucus. Right lung: Weight, 975 grams. Red in color; very much congested and œdematous; the anterior border slightly emphysematous. Heart: Weight, 420 grams. Pericardial sac contained 75 c. c. straw-colored fluid. The ventricles contained red and white clots; valves were normal. No endocarditis could be made out. The openings of the coronary arteries were patent. Abdomen: Intestines were slightly congested. There was observed a slight invagination of the upper part of the small intestine. There were no adhesions nor evidence of severe obstruction. Liver: Weight, 2,550 grams; surface smooth. On section rather softer and paler than normal. Gall bladder distended. Spleen: Weight, 250 grams; soft and friable. Kidneys: Right, weight, 230 grams; left, 260 grams. The capsules were not adherent. The cortical portions were clearly distinguished from the medullary portions. The cortex was rather pale in appearance. The pyramids were red and prominent.

J. B. G.
G. W. S.

CASE 5.

R. C.; age, 67; nativity, West Indies; admitted to marine ward, German Hospital, Philadelphia, Pa., March 1, 1897; died March 11, 1897.

History.—Was first taken sick about two weeks ago with cold, cough, and pain in middle of right side. Pain sharp and stabbing in character. Consolidation of lower lobe of right lung was detected. Rusty sputum and crepitant râles.

Necropsy (eleven hours after death).—External appearances: Height, 5 feet 6 inches; circumference of shoulders, 40 inches; no post-mortem lividity; rigor mortis marked; general nourishment good; pupils dilated. Circulatory organs: Heart, weight 290 grams; pericardial sac contained 50 c. c. clear serum; all the valves normal; walls of the left ventricle thickened; chicken-fat clot in right auricle, extending through to valve. Arteries: Calcareous patches palpable in radial arteries. Respiratory organs: Left lung, weight, 850 grams; hypostatic congestion; floats in water; no adhesions in pleural cavity. Right lung, weight, 980 grams; sinks in water; solid throughout; pleural cavity obliterated; adhesions from apex to base; lobes adherent

to each other and to diaphragm; all adhesions recent. Peritoneum normal. Tongue brown in color. Œsophagus normal, patent. Stomach pale. Pylorus not strictured. Cardiac orifice patent. Small intestine normal. Large intestine distended with gas. Appendix normal and pointing to right. Liver mottled; weight, 2,016 grams. Gall bladder and ducts empty. Pancreas, weight 125 grams; normal. Left kidney, weight 190 grams; capsule easily detached. Right kidney, same. Moderate amount of perirenal fat. Pelvis and ureters normal. Bladder small and contracted. Urethra and prostate normal. Suprarenal bodies: Left, weight 12 grams; right, weight 12 grams. Spleen soft; weight, 120 grams. Head: Scalp, normal, pale, and dry; skull not as thick as usual in negroes. Membranes of brain normal. Brain, weight 1,350 grams; contained large quantity of serum.

F. I.

PNEUMONIA, LOBULAR—(ABSCESS OF LUNG).

Adynamic intestinal obstruction—caused by arrest of peristalsis.

G. P.; aged 25 years; nativity, Norway; admitted to the United States Marine Hospital, New Orleans, La., November 26, 1896; died January 17, 1897.

History.—Patient had been under treatment for lobular pneumonia and was readmitted January 6, 1897, with the symptoms of intestinal obstruction. Several days before readmission was seized with a severe pain in the abdomen and a sudden rise of temperature, from normal to 40.4° C. The temperature continued high for about twenty-four hours and then dropped to normal. This was followed by seven greenish watery evacuations in the next twenty-four hours, and one of the stools contained several prune stones. He complained of severe pain in his abdomen at intervals; the pain was not localized, but seemed to vary greatly from time to time. Later his bowels were regular for several days, but he started to vomit, at first only once in the twenty hours, subsequently becoming much more frequent. The vomited matter at first consisted of the contents of the stomach; later it assumed a green and watery character, and finally became stercoraceous. As these symptons progressed his pulse became very thready and at times could not be detected. The patient was in a profound state of collapse; his features had a pinched expression and his skin was covered with a cold sweat. He was unable to retain any nourishment by the stomach, so it became necessary to resort to rectal alimentation. The large intestine was thoroughly distended by inserting a rectal tube and allowing warm water to flow through it from a height. The outline of the distended colon could readily be made out, as the abdomen was very flat. The irrigation brought away a considerable quantity of fæcal matter and the nourishment was well retained. In addition to this the patient was well stimulated and apparently improved; the pulse became stronger; the vomiting less frequent and lost its stercoraceous character. The apparent improvement only lasted a few days, when the rectum became irritable and would not retain any nourishment at all. Patient also developed an ulceration of the cornea and an otitis media several days before death.

Necropsy.—Body poorly nourished; rigor mortis not marked; pupils dilated. Pericardial sac did not contain any fluid. Heart: Weight, 222 grams; poorly nourished; valves competent. Left lung weighed 395 grams; contained a small abscess in lower lobe; there were also several small tubercular deposits. Left pleural cavity contained a great many adhesions. Right lung weighed 468 grams; lower lobe congested and contained several small tubercular deposits. Pleural cavity of right side contained adhesions. Both lungs were retracted, tough, and firm; section revealed an overgrowth of fibrous tissue and some dilatation of the bronchi. Peritoneum was greatly congested. The stomach was bile-stained and contained 300 c. c. of a dark-green acid fluid. The small intestine was dark brown in color; collapsed; contained a small amount of lumpy fæcal matter irregularly scattered throughout and presented numerous areas of congestion. Large intestine congested and contained a moderate amount of fæcal matter. Rectum congested. Liver

weighed 1,360 grams; slightly pigmented. Gall bladdder contained 65 c. c. of bile; ducts normal. Kidneys normal; left weighed 165 grams and right 170 grams. Bladder, urethra, and prostate normal. Spleen weighed 130 grams; softened and deeply pigmented. Membranes of brain normal. Weight of brain 1,460 grams.

H. W. W.
H. S.

CASE 6.

L. S.; aged 45 years; nativity, Denmark; admitted to marine ward, St. Mary's Infirmary, Galveston, Tex., May 29, 1897; died June 4, 1897.

History.—Has not felt well for past ten days; headache and general malaise with occasional nausea and vomiting; three days ago, while on his ship, was taken with a severe chill. On admission complained of pain over right side, dyspnœa, cough with nasty expectoration. Respiration, 50 per minute; pulse, 102; and temperature, 39.2 C. Physical examination showed complete consolidation over entire right lung, and on June 2 the lower lobe of left lung became involved.

Necropsy (fourteen hours after death).—Marked post-mortem lividity and rigidity. Lungs and pleuræ: No adhesions of left pleura. Right pleura firmly adherent to chest wall, adhesions both old and recent. Left lung: Red hepatization of lower lobe; upper lobe normal. Right lung: All lobes solidified, resolution commencing in lower lobe; small tubercular deposit in lower lobe of right lung. Heart: Pericardium contained about 30 c. c. of serum; heart normal in size; both ventricles filled with dark blood; ante-mortem clot was found filling right auricle and making a complete cast of it; also large ante-mortem clot found in right ventricle and extending into pulmonary artery; all valves normal. Liver slightly enlarged and congested; extensive adhesions of liver to diaphragm, showing perihepatitis; adhesions well organized. Kidneys: Right kidney slightly enlarged, capsule adherent. Left kidney congested, capsule much thickened and congested. Remaining organs normal.

G. M. M.

CASE 7.

J. P.; colored; permit No. 92; age, 23; native of Arkansas; admitted to United States Marine Hospital, Memphis, Tenn., November 23, 1896.

History.—Patient gave a somewhat obscure history of being taken sick five days previously with severe rigor, followed by pain in abdomen and region of liver. Has been hiccoughing incessantly for twenty-four hours. Temperature, 40.2° C.; pulse, 120; respiration, 30. Physical examination showed a double pneumonia of lower lobes and commencing third stage. He failed steadily, and died at 6.30 p. m. on the 26th.

Necropsy (twenty hours after death).—A well-nourished negro; bloody discharge from nose and mouth. Abdomen very much distended. Thorax: Left lung had three lobes; the accessory lobe was almost detached from rest of lung, merely connected by a sort of pedicle of lung tissue. This lobe was in a state of red hepatization throughout. Right lung somewhat adherent. A little pus in pleural cavity. The upper lobe was in a condition of red hepatization; the lower lobe in a state of gray hepatization. The upper lobe floated in water, but the lower one sank. No effusion in pericardium. No pericarditis. Fibrinous clot in right auricle. Aortic and pulmonary valves competent; endocarditis on both sides. One leaflet of pulmonary valve very badly inflamed. Abdomen: Surface of liver (peritoneal) acutely inflamed. Chronic interstitial hepatitis. Spleen enlarged. Left kidney large, pale, and cortex softened; capsule nonadherent. Right kidney large, pale, and flabby; capsule nonadherent. The cortex of both kidneys was of normal appearance. Stomach and œsophagus contain a little blood; no ulceration. Trachea acutely inflamed.

G. B. Y.

CASE 8.

G. G.; age 41; a native of Cape Verde Islands; was admitted to the United States Marine Hospital, San Francisco, Cal., January 8, 1897, and died January 10, 1897, at 6.40 p. m.

History.—Sickness began with a chill, followed by fever. Complained of severe pain on right side just below free margin of ribs. Coughed some, expectoration slight. Respiration 40, pulse 120, temperature 40.2° C. The latter soon fell to 38° C. Pain in side continued unabated until death took place.

Necropsy (nineteen hours after death).—Brain and meninges normal. Heart: Enlarged, weight, 420 grams; calcareous deposits in arch of aorta, and small calcareous deposits on aortic semilunar valves. Lungs: Hypostatic congestion of left; right in stage of gray hepatization. Liver normal, but stained with bile. Gall bladder inflamed and walls thickened. Complete occlusion of duct at junction of hepatic and cystic ducts. Spleen, kidneys, and genito-urinary apparatus normal.

J. H. O.
J. G.

CASE 9.

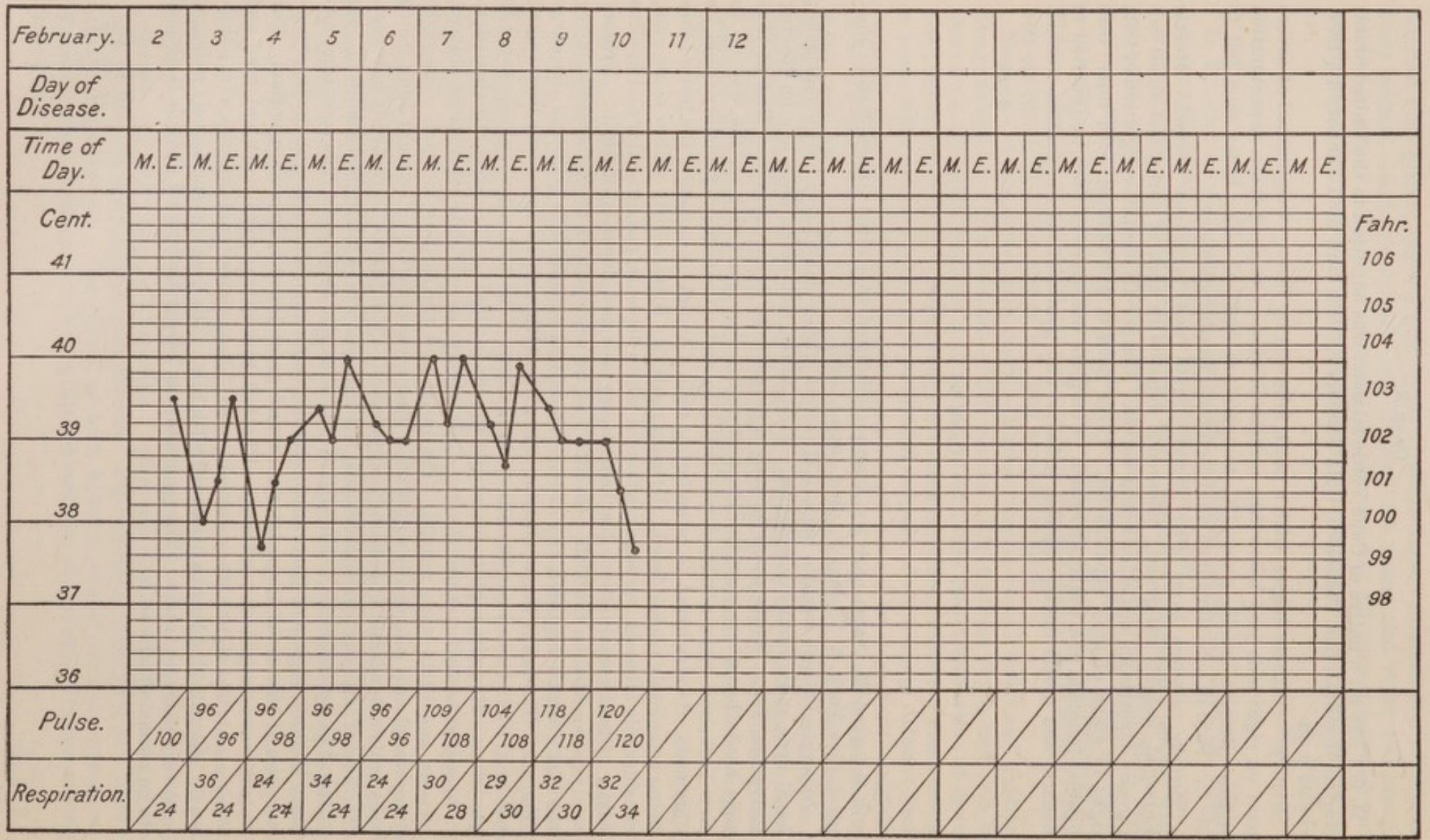
Nephritis.

J. S.; aged 35 years; nativity, Ireland; admitted to United States Marine Hospital, New York, N. Y., May 5; died June 1, 1897.

History.—Patient a white man, 1.72 meters high; black hair; brown mustache; hazel eyes, and swarthy complexion. First taken sick seven days ago on leaving Galveston, Tex. While there he took a severe cold from exposure. Had at that time headache, severe pain in side, and chill. Was quite sick on the way up to New York, and when admitted was delirious and no satisfactory history could be obtained. He was found to be suffering from a double pneumonia, the lower lobes being completely consolidated. Urinary analysis: Urine a dirty yellow color, acid, considerable albumen, no sugar, adherent white deposits, pus, granular and hyoline casts. Blood examination: Marked leucocytosis and deposits of fibrin. Urinary analysis repeated on the 13th. On 17th had an acute attack of otitis media during the night, which ruptured the drum. There was considerable pain and discharge from ear. The lungs began clearing up on the 14th, and he was much better until the 20th, when he had considerable pain in chest. The 21st, albumen reappeared in the urine. He grew rapidly worse and the lungs filled up. He died of exhaustion.

Necropsy (twenty hours after death).—Calvarium removed. The membranes, sinuses, vessels, and brain were normal. The heart and pericardium normal. The right lung was almost completely solidified. There was a focus in the right lung which was broken down and undergoing suppuration. The pleuræ were firmly adherent. The base of left lung was consolidated, but the apex was in fairly good condition, only being slightly congested. The pleura was adherent in places. The omentum, urinary bladder, organs of generation, rectum, duodenum, stomach, gall ducts, mesentery, small intestines, large intestines, and great blood vessels were normal. The spleen was enlarged and softened. The left kidney was very much enlarged and congested. The right kidney was congested. Both supra-renal capsules were adherent. The gall bladder was distended with bile. The liver was enormously enlarged and very pale and friable. The pancreas was harder than usual, though it seemed to be normal otherwise.

J. O. C.
G. W. T.


February. 2 3 4 5 6 7 8 9 10 11 12
Day of Disease.
Time of Day. M. E. M. E. M. E. M. E. M. E. M. E. M. E. M. E. M. E. M. E. M. E.
Cent. 41 40 39 38 37 36
Fahr. 106 105 104 103 102 101 100 99 98
Pulse. /100 96/96 96/98 96/98 96/96 109/108 104/108 118/118 120/120
Respiration. /24 36/24 24/24 34/24 24/24 30/28 29/30 32/30 32/34

CASE 10.

Phthisis.

J. S.; male; aged 38; single; nativity, New York; occupation, night watchman on a river tug; admitted to the United States Marine Hospital, St. Louis, Mo., February 2, 1897; died February 10, 1897.

History.—When admitted late in the afternoon the patient complained of a sharp pain, referred to a spot just over the right nipple, and also of shortness of breath. He stated his illness began four days preceding, two or three hours after a fall into the river, the first symptoms being pain in the right side of chest (as on admission), together with dyspnœa, cough, and fever. After his wetting he could neither change his clothes nor dry them, his only place of shelter from the cold wind being the hold of the boat into which he descended to let his clothes dry on him as they could. During the day or two before admission he said he had had, besides the symptoms noted above, diarrhea and loss of appetite. Questioned as to his past history, the patient said he had measles when four years old, smallpox at five, malarial fever a number of times. Several years ago he was confined to his bed for a year by an ulcer caused by a dog's bite. Two years ago he had an "enlarged gland" removed from the right axilla. The patient denied having been addicted to liquor or having had any venereal disease, and stated he had never had a cough. The history of the patient's family was good. His father died in 1895 of the "grip." His mother and all the children of the family—three brothers and a sister—he said were living here in St. Louis, and in good health. Physical examination: Patient is a man of good physique, about 1.75 meters tall, and weighs now about 75 kilograms, though his usual weight is probably more. He gives the impression of being a strong, robust man. The color of his face and lips is good, as is that of the body generally. The genitals are well developed. A large scar is observed in the right axilla. Chest: No tenderness of skin in region to which pain in right side of chest is referred. Tactile fremitus is increased over lower part of right side, both in front and behind; it is about normal on left side of chest. There is a pronounced relative dullness of the percussion note in this same region of the right side of the chest, extending to a little above the nipple in front and to the angle of the scapule behind. Auscultation shows exaggerated breathing in upper part of right lung and in whole of left, the sound almost amounting to "bronchial breathing." Over the whole of the dull area of the right side there is pronounced bronchial breathing, though no râles can be heard except a few fine crackling ones in the axilla (right). The heart's action appears to be normal—the apex is in the normal position. The pulse is of fair quality and regular and not faster than might be expected with the degree of temperature present. (See chart.) The patient coughs with moderate frequency; the expectoration is scanty, thick, and of a light-yellow color. From a consideration of the history of the case and the signs and symptoms presented, a diagnosis of lobar pneumonia was thought to be the correct one, notwithstanding the absence of the "prune-juice" sputum, which it was thought might appear later. Treatment appropriate to the case was instituted: Strychnine nitrate, in doses of 0.004, was given hypodermically, as seemed indicated by the heart's action throughout the patient's illness. Easily assimilated food—milk, malted milk, broths, soups, etc.—was given regularly, day and night, every two hours. On February 4 cold compresses were ordered applied to the chest and renewed every half hour. These were continued until the real nature of the disease and the hopelessness of all efforts to save the life of the patient appeared. The case gave the medical officer in charge some anxiety from the first. The patient did not react to the remedial measures employed as young, robust persons having lobar pneumonia usually do. The strength of the heart failed progressively, notwithstanding the frequency and size of the doses of strychnine. The dyspnœa also steadily increased in a way not to be accounted for by the state of the lungs as shown by the daily examinations (that is,

until February 4—see below). To relieve the heart, if only for a short time, 250 c. c. of blood was taken from the arm on the afternoon of the 6th. Until the 7th there had been great restlessness and inability to sleep, this latter condition having required sulphonal, and finally morphia, when pain was present. On the morning of the 7th, however, a tendency to stupor was remarked. There was also a little muttering delirium. The patient could be easily aroused, however, and was then wholly rational. The pulse was very weak, yet the heart sounds were of good quality and the lips and nails were pink. Yet, at the base of the left lung a few fine râles were heard. The sputum, too, what there was of it, was still yellow. Suspicion now became strong that here was a case, not of lobar pneumonia, but of acute tuberculosis of the lungs. By evening the patient was much weaker.

The next morning, the 8th, the patient was reported to have slept well. At the regular ward visit he was found asleep on the left side. Examination showed the left lung slightly dull all over, but especially behind, and bronchial breathing was present over the whole of the lower part of the lung, while numerous fine râles were also to be heard in the same region. At the apex there were large bubbling râles present. Tactile fremitus was, as formerly, over the left side of chest. Emaciation had progressed to an astonishing degree during the night—the flesh seemed to have fairly melted away. Close questioning of him now brought out the fact that the patient had been untruthful when first examined as to his past mode of life, he now admitting excessive addiction to alcohol, even acknowledging being intoxicated when he fell into the river. He also now admitted having coughed for several months and having lost flesh to some extent, this being exactly the opposite to the statement he made to the same questions on admission. This history removed all doubts, and a positive diagnosis of acute tuberculosis of the lungs was made, even in the absence of the evidence, that finding the tubercle bacillus would have furnished. Elastic tissue was looked for in the sputum but not found.

The subsequent history of the case is one of gradually, quickly proceeding dissolution. The patient's lungs became more and more infiltrated, the heart weaker and weaker, stupor more and more marked. A sharp diarrhea occurred on the 9th, which was quickly checked with lead-and-opium pills. On this day, too, the sputum became very profuse and blood-tinged also, though it never approached in color the "prune-juice" hue of the sputum of lobar pneumonia. By the morning of the 10th the quantity of expectorated material was again small, and it gradually lessened, until by afternoon the patient raised nothing—indeed, did not then cough. Death occurred at 8 p. m. of the 10th.

The body was immediately claimed by the patient's relatives, who at first positively refused to allow an autopsy to be made. Next morning, however, permission was obtained from the brother, who came with an undertaker for the body, to examine the chest only, but limiting the time to be taken in the examination to one hour.

Necropsy.—The body is that of a young man, apparently about 35, considerably emaciated, the ribs standing out plainly. The eyes are open; no foreign matters in any of the apertures of the body. A purple stain covers the whole back and the buttocks. A long scar in right axilla. Incision is made from top of sternum to pubes. Considerable fat (1 cm. thick) underlies the skin of abdomen. Omentum found to be quite fatty and to extend down into pelvis. Intestines of a pinkish-gray color and contain little gas, since they make no attempt to escape from incision. Diaphragm comes down to sixth rib. Chest opened. As sternum is raised, the surface of the right lung at the inner edge and opposite the middle of sternum presents three cyst-like bodies, each the size of a hazel-nut, and grouped so that they are more or less coalesced. Their outer wall is the visceral pleura, their inner, the lung. When punctured, they collapse and no fluid escapes. No fluid in pleural cavities. In fact, the outer surfaces of the lungs are closely and generally adherent to the chest walls. The left lung, where it overlaps the heart, is closely adherent to the pericardium. On opening the latter, 25 c. c. of clear, straw-colored fluid is

found. The heart is the size of a man's fist. The right side is flabby, the left hard. Right auricle contains a few black clots and about 15 c. c. of dark fluid blood. The right ventricle contains a few black clots and about 40 c. c. of very dark fluid blood. The right auriculo-ventricular orifice easily admits two fingers. The left auricle contains about 10 c. c. of dark fluid blood, and a few very dark clots with one small "chicken-fat" clot. The left ventricle holds almost no fluid blood and only a little clotted blood. The orifice between the two left chambers admits two fingers, but with some difficulty. On removing the heart and examining its valves in detail, they are all found apparently normal.

The endocardium is everywhere smooth and shining. The heart's weight is 310 grams. The left lung is so closely adherent to the chest wall that in removing it it is necessary to cut away the parietal pleura. The operation is an exceedingly bloody one, the tissues concerned being engorged with blood. The organ is found to dip far down into the abdomen. In the hurry, a considerable chunk of the lung's base is accidentally torn off, when finally the lung is thought to be freed. This piece is left in situ, there being no time to extract it. The main part of the organ is an immense piece of liver-like flesh, its surface being very rough and bloody. Its weight is 1,335 grams. The piece left in the chest would have considerably increased the total weight—in all probability to at least 1,500 grams. On cutting into the lung, the knife meets with considerable resistance, though perhaps not more than when incising normal lung. The cut surface is of a drab color, from the great number of more or less coalesced, gray, circular spots, varying in size from a pinhead (or smaller) to a bean. This appearance is found everywhere in the lung. Almost no fluid follows the knife, but on squeezing the cut surfaces a small quantity of non-frothy pus-like fluid exudes, apparently coming from the bronchials. No cavities are found and no cheesy nodules. At the root of the lung are found a number of large, in some cases cheesy, glands. The right lung is much more easily removed than the left, and does not dip down into the abdomen as did the left. It presents exactly the same appearance as does the left, except that at the apex there are areas where the disease-process seems much older than at the base, though no really cheesy spots or cavities were observed. In the hurry, the organ was not weighed, but in all likelihood it would have weighed about what that part of the left lung which was removed weighed. So far as could be determined by the hurried inspection and palpation there were no ulcers in the intestine. The vermiform appendix was the largest I have ever met with, 15 cm.; its color was a deep purple; it was flaccid, and the size of a lead pencil. The liver was seen to be of very large size, but it could not be removed for close examination. A few incisions disclosed nothing notable, except that the blood flowed freely.

Remarks.—This was certainly a most interesting case of "acute pneumonic phthisis" (Osler). At first there was not the slightest idea that the disease was anything but lobar pneumonia. No dullness at the apex of the right lung—undoubtedly the seat of the primary trouble—was found at first, and the involvement of the two lower lobes of the right lung with the other features of the case, with one exception, made, it seemed, a plain picture of pneumonia. The exception, however, was an important one—the absence of blood-tinged or "prune-juice" sputum. It was this and the asthenia that first aroused my suspicions, and the extension of the disease confirmed them. I saw a case in California quite like this, clinically. The diagnosis was lobar pneumonia, and the patient, a particularly robust, strong young Scandinavian, died in something like ten days after his entrance to hospital. Autopsy, however, showed the lungs infiltrated, much as those in this case, with tubercles. The sputum in that case was yellow, also. I have always had the California case in mind and the remembrance served me well in this case.

C. E. D.

ABSCESS OF LUNG.

Case 1.

J. W.; colored; aged 35 years; nativity, South Carolina; admitted to United States Marine Hospital, New York, N. Y., March 25, 1897; died April 5, 1897.

History.—Is a colored man, 1.74 meters high; weight about 59.1 kilograms. Sick about two weeks; caught cold on board ship from Martinique; arrived at Philadelphia and was sent to New York by friends. While at Philadelphia had cold and fever, but no sweating. Has had frequent chills up to last night; has had cough, expectoration, and vomiting; expectoration and vomitus were both greenish yellow, and bitter. Had pain in chest; none elsewhere. Bowels quite regular. Passes urine freely, but it is dark red. Has appearace of a very sick man. Temperature was 39.6, pulse 106, respiration about 22 per minute. In profuse sweat. Pulse full, regular, quick, elastic, and yielding. Physical examination: Rapid, labored breathing, intercostal, sternothyroid, and sternohyoid muscles aiding; lower intercostal spaces drawn inward on inspiration; left lung expands more than right, and intercostal spaces more drawn inward on right; emaciation in supra and infra clavicular spaces on both sides; chest dimensions good; skin hot and dry at times, at other times moist with perspiration; vibrations of breathing transmitted through chest walls; vocal fremetus about normal over left and slightly increased in same area over right lung anteriorly; breathing very quick and shallow; dullness over left lung anterior and diminished resonance over right lung. Auscultation of right lung: Anterior to middle lobe and base subcrepitant and crepitant râles; posteriorly crepitant râles at base and middle lobe; tracheal and bronchial breathing marked over infraclavicular region and apex; lower down diminished breath sounds and subcrepitant râles, crepitant at lower lobes. Left lung: Exaggerated and bronchovesicular breathing; crepitant râles at base anteriorly; roughened breathing in apex; subcrepitant râles in posterior portion of lower lobe of left lung; same condition in apex; twenty days after admission the râles were generally distributed over both lungs. Heart: Harsh and quick sound, no murmurs; patient's condition changed very little from day to day. Patient had prolapsus of rectum and large external hemorrhoids. Sputum: Fluid, purulent, and greenish; microscopical examinations failed to reveal tubercle bacilli; had no odor and contained pus; it was scanty at first and more abundant after a few days; not rusty at all. Urine: Specific gravity 1,020; acid, heavily loaded with albumen; sugar none; color very dark; sediment small. Bowels free; some diarrhea; stools yellow and very offensive. Tongue had brownish-gray coat. Was rational at first and complained of pain in chest when he coughed; became delirious four days after admission, and afterwards seemed unable to talk or express himself, although rational at times; perspiration very profuse nearly all the time. His bowels began to move involuntarily and the fæces were very offensive; complained of pain in right side. He was given cough mixtures and stimulants. His temperature on admission, March 23, at 7 p. m. was 39.6° C.; at midnight March 24 temperature was 39.2° C.; March 31, evening, 39.6° C.; April 2, evening, 40.6° C., these being the highest recorded temperatures. The temperature ranged between 37° C. and 39° C., evening rise and morning remission. Pulse 124 to 150, higher as temperature rose; respiration 24 to 48. April 5 patient was weak and at times would arise out of bed and start across the ward. He was delirious and would be found lying prone upon the floor and replaced in bed. His pulse was very weak and he seemed to be failing rapidly. At 8.40 p. m. he was found lying prone upon the bed, as though after making some exertion. Life was extinct and extremities were cold, body being warm. Bed was saturated with urine.

Necropsy (fifteen hours after death).—Body was that of a negro, 1.7 meters high, weighing 56.8 kilograms. Emaciation and rigor mortis marked. The abdomen was sunken. The chest was filled out and well formed. The intercostal spaces bulged

slightly. The muscles were well developed. The calvarium was removed, the membranes, cerebrum, cerebellum, basal ganglia, ventricles, sinuses and vessels, and other organs found normal. The thorax was opened and mediastina were found normal. The pleuræ were adherent to lungs and thorax. Both lungs were congested. The left lung has extensive softening, and an abscess cavity occupying the anterior portion of middle and lower lobes contained 200 c. c. pus. Microscopical examination of this pus failed to reveal tubercle bacilli, but showed pus cells and leucocytes and necrosed tissue. The pericardium was normal. the heart, normal in size and weight, contained clots. The ventricles contained large white thrombi which completely filled the cavities in which they lay. The valves were normal. In the abdomen the mesentery glands were indurated and enlarged. There were slight adhesions between the omentum and the head of the colon. The appendix was also bound down. The appendix was abnormally long. Spleen enlarged. Kidneys congested. Suprarenal capsules, urinary bladder, organs of generation, rectum, duodenum, and stomach were normal. The gall bladder was distended with bile. The ducts were patent. Liver very much enlarged and congested. Pancreas, small intestines, large intestines, and the great blood vessels were normal.

J. O. C.
G. W. S.

CASE 2.

Fatty degeneration of heart and kidneys.

R. B.; aged 34 years; a native of Nova Scotia; was admitted to the United States Marine Hospital, Boston, Mass., March 26, 1897.

History.—Family and personal history, good. Present illness began about two weeks ago with severe cough, pain in small of the back, and diarrhea. His cough moderately loose. Dyspnœa on exertion. Urgent demand to pass water, sometimes as often as once an hour. No ardor urinæ. A physical examination showed the patient to be jaundiced. Right hip dislocated—this injury was of long standing. Patient slightly constipated.

March 27.—Was given calomel and soda which failed to produce any effect.

March 29.—Was given Epsom salts. This was repeated at night and his bowels moved freely the following day.

March 30.—During the three days he was in hospital his urine dribbled away and it stopped for the first time to-day about 8 o'clock a. m. About 1 p. m. patient complained of great pain over his bladder with a desire to pass his water but an inability to do so. Patient was removed to the operation room and with a little difficulty a small sound and afterwards a catheter was introduced. About 400 c. c. of very foul smelling light colored water was drawn. Patient was then put to bed. In about an hour the patient very suddenly sank, respiration slow and weak and radial pulse could not be felt. Strychnia was administered hypodermically but patient continued to rapidly fail. He died at 3 o'clock p. m.

Necropsy (twenty hours after death).—General appearance: Body fairly well nourished. Rigor mortis, marked. Thoracic cavity: The left lung contained several small nodules in its apex; cheesy on section. The right lung contained a number of nodular masses, one particularly prominent. On section this revealed an abscess cavity in size capable of containing a large walnut. The two lower lobes were normal. The pericardium quite free from fluid. The heart rather small in size; the right side particularly showing evidences of fatty degeneration. The right side contained a large ante and post mortem clot extending from the ventricle to the auricle. The tricuspid valves contained some vegetations. The left side of the heart appeared less fatty and its valves as well as those of the aorta were apparently healthy. Liver: This organ was about normal in size and weight; the right lobe being slightly congested. Weight, 1,160 grams. Kidneys: The right kidney was large, white, and flabby, with an adherent capsule. On section it presented a number of abscesses; the cortical substance was partially obliterated and the cavity filled with a mixture

of pus, cheesy in character, and urine. The ureter was so dilated as to admit an ordinary sized lead pencil to enter. The left kidney was much larger than its fellow and presented a pale irregularly nodular or saccular appearance, with an extremely adherent capsule. On section the organ was found to contain no kidney tissue whatever, but was composed of several large compartments, each containing a quantity, about 50 or 60 c. c., of pus and urine. The ureter was greatly dilated, being one-half an inch in diameter and filled with pus. The weight of the right kidney was 210 grams, that of the left kidney, 405 grams. The bladder was quite red and inflamed and contained about an ounce of urine. The other organs were apparently normal.

H. W. A.

GASTRIC AND INTESTINAL DYSPEPSIA.

P. M.; age, 36; nativity, England; was admitted to the United States Marine Hospital at New Orleans May 10, 1897.

History.—Present sickness began five years ago, with nausea and vomiting and diarrhea. At that time, as at present, the stools were watery, devoid of blood or "slime." This first attack of diarrhea lasted four or five months before it was checked. Since then it has recurred from time to time, beginning usually with nausea and vomiting. Never has had bloody stools; little or no pain. Has been an imprudent eater and moderate drinker. Denies syphilis; no evidence of that disease. Had Chagres fever five years ago. Present condition: Body very much emaciated; skin dry; sallow, muddy complexion; no jaundice; no œdema anywhere. Tongue red and rather beefy; bad taste in mouth; no appetite; at present no nausea or vomiting; a feeling of discomfort and heaviness after eating is felt in epigastrium; bowels act five or six times in the twenty-four hours, more frequently when imprudent in eating or drinking; stools consist of undigested food; no blood; not much mucus; no pus; no pain or straining attends the evacuation; no respiratory or urinary symptoms. Examination of chest shows lungs and heart to be normal except for weakness of the heart. Area of liver dullness decreased; stomach dilated, reaching a little below umbilicus. No tenderness at any point of the abdomen, but a general feeling of discomfort upon pressing over abdomen. Diet of boiled milk, soft-boiled eggs, and beef tea was enforced. A tonic of tincture nucis vomicæ, 0.5 c. c. in tincture cinchonæ compound .4 c. c., was given before each meal, and dilute hydrochloric acid, 0.6 c. c. in water, after the meal. This was continued for a week or so without any material improvement and then discontinued. Salol, 0.3 gram three times a day, with daily irrigation of the colon with cold water, was given, and at the same time a preparation of maltine was used, given after each meal. The stools did not improve in character, continuing, as above noted, to consist of undigested milk, and even egg, maladorous and accompanied by flatulency. Later pepsin was administered after meals. Diet was changed several times in the endeavor to find something more easily digestible. The whites of eggs with whisky and water, strained chicken broth and milk, one-fifth lime water, seemed to be the most grateful diet, and patient was kept on this for the last four months. There was some temporary improvement at times. As the patient's strength began to fail, strychnine and wine or whisky were given regularly. The temperature remained about normal, sometimes slightly elevated, never above 38° C., and often subnormal. The bowels were frequently cleaned out with castor oil, calomel, or sulphate of magnesium, and toward the end of the illness calomel was given in 0.03-gram doses three times a day, combined with guiacol carbonate, thymol, menthol, and eucalyptol. There seemed to be some improvement in the character of the stools, as a result of this, and much less flatulency; but the strength of the heart gradually failed, œdema of the connective tissue became marked, and the patient died on August 21, 1897. The relatives of the patient consented to an examination, after death, of the stomach and intestines only. This was made twenty-four hours after death. The body was very much emaciated, some œdema of legs, scrotum, and connective tissue of body. The

peritoneal cavity contained 4,000 c. c. of clear, serous fluid. The peritoneum was pale, but otherwise normal—no thickening, no adherent flakes of fibrin, and no tubercles. The coils of intestines presented no adhesion. Liver was a little smaller than normal; otherwise seemed normal, as apparently were also the spleen and kidneys. By request no organs were removed except stomach and intestines. The former was small, of pale external surface; no congestion. The walls were unusually thick. The lining membrane was pale red and presented no ulceration or congestion, but was tough, permanently ridged, and rough to the touch. The ridges seemed to be composed of hypertrophied muscularis mucosæ and connective tissue. There was some adherent mucus; no cysts. The gall bladder was filled with bile; the bile duct was open. The small and large intestines showed the same changes as were seen in the stomach—of small volume, pale, thick walls, roughened lining membrane, bearing very little resemblance to a mucous surface; some adherent mucus and undigested egg and milk. The increased development of the muscular tissue of the wall and atrophy of the mucous membrane were likewise apparent. There were no ulcers or tubercles on or in either small or large intestines. The Peyer's patches of the small intestines were not seen, although the mesenteric glands throughout were enlarged, varying in size from a pin's head to a lima bean (4 cm. long). Many of these glands were incised, but were not found to contain any abnormal growths—no tubercles, caseous, or purulent material.

H. H.
H. W. S.

GASTRO-INTESTINAL INFLAMMATION.

W. M.; aged 19 years; nativity, Kansas; admitted to the United States Marine Hospital, St. Louis, Mo., August 25, 1896; died August 29, 1896.

Clinical history.—He arrived, accompanied by a friend, at the city office of the service at 2 p. m. on August 25, in a convulsive state. Opisthotonos occurred during the wait for the ambulance, which had been sent for. He was also slightly delirious and could give no history of his case. The friend who accompanied him said, however, that he (the patient) attributed his sickness to poisoning with bad food and to drinking too much ice water. On the arrival of the patient at the hospital at 3.30 p. m., he was much better, being able to walk into the office and into the ward without support. He had had no treatment at the city office. He was also able to give information for the register, though his mental faculties were dull. His temperature, at 4 p. m., was 39.4° C.; the pulse, 108. He was given a bath and put to bed. At the evening visit he was quiet and apparently asleep. Physical examination disclosed no evidences of organic disease. He said he had no pain. The belly was somewhat tympanitic. He was given the following at 8 p. m.: ℞—Hydrarg. chlorid. mitis, sodii bicarb., āā 0.30. M. Sig.: Give the whole at one dose. The next morning it was reported that during the night he had had several foul stools, and that he had vomited two or three times, but that, on the whole, he had rested well. At the regular morning ward visit he complained of considerable pain in the abdomen, and there was a generalized tenderness on palpation; considerable tympanitis was also present. A provisional diagnosis of gastrointestinal inflammation was made, since on careful examination no signs of other trouble could be found. During the day (August 26), he vomited several times a greenish, foul-smelling fluid, and was able to retain nothing, excepting warm water, in his stomach. He lay all day in a half-asleep state, from which he could be easily aroused by speaking his name; he was somewhat restless and groaned a good deal; yet there was no facial expression of pain, and, when questioned, he said he had no distress beyond a little pain in the bowels, not well localized. His morning temperature, August 26, was 37° C.; the evening temperature, 37.5° C.; the pulse rate varied between 80 and 86, the strength of the pulse being good.

During August 27 he was much the same, though he retained some milk with lime water, which was given him regularly, though in small amounts because of the

stomach's irritability. During the afternoon of August 27 his temperature rapidly rose, reaching 40° C. by 4 p. m. In the early evening he became more restless and vomiting became worse. Calomel and sodium bicarbonate, each 0.30, were again given in the evening, producing several very foul stools during the night. His temperature on the morning of August 28 was 38.5° C. He had not slept well during the night and could retain no food. His mental faculties were brighter. His sclerotics were observed to be slightly yellow, and the diagnosis of gastrointestinal inflammation of a severe grade was considered established. Later, however, an examination of the urine was made, but no bile found in it. This failure to find bile in the urine must, however, have been due to defective methods in testing, since the patient's sclerotics had certainly become yellow during the afternoon of August 27 and the night of August 27–28. During the afternoon of August 28, retention of urine was observed and relieved by the catheter after the other ordinary measures (hot bath, stupes, etc.) had been found ineffective. There was in this, as was also the case with the other specimens of urine examined in this case, no albumen, sugar, or other abnormal constituent. His evening temperature August 28 was 36.8° C. At 1 a. m. August 29 he was again catheterized and again 500 c. c. of urine withdrawn from the bladder. The patient slept little that night, though complaining of no pain, and the next morning was found cold and almost collapsed, his respirations being weak and rapid (32 to the minute) and the pulse very frequent and thready. Active stimulation was ordered to be at once begun, but it appeared later the order was not clearly understood and a delay occurred. At 10 a. m. he was reported to be dying. All efforts to resuscitate him were futile, and he died at 10.30 a. m. (August 29, 1896).

Necropsy (twenty-four hours after death).—The body is that of a young, adult, male negro (color very dark), muscular, and well developed, about 1.60 meters tall. Rigor mortis is still present, and is especially marked in the limbs, it being impossible to flex the joints to any degree. The right hand is tightly closed, the finger nails being pressed into the skin of the palm; the left hand is only partly closed. A slight cadaverous odor is noticeable. The eyes are partly open. The sclerotics are yellow; the cornea cloudy. A light yellow, frothy fluid has escaped from the nostrils and mouth and has run down over lips, chin, and neck, having dried, in the last situation, to a glistening, scaly streak. None of this fluid is on the table. Yellow froth fills both nostrils. The mouth is half open, the space between the lips being filled with yellow froth like that filling the nostrils. The teeth are irregular, the right upper middle incisor being broken half off. Eight brownish, depressed spots, irregularly circular in shape and about a centimeter in diameter, are scattered over the anterior surface of the chest. On section, the skin is found to be atrophied and pigmented. No fluid follows the section. Two very noticeable scars are observed, one at the middle of the anterior surface of the right arm, the other occupying a similar position on the right forearm; each extends transversely and is 3 cm. wide and 8 cm. long. There are numerous spots of a generally circular shape on the anterior surface of each leg, varying in diameter from 3 to 5 cm., having light, almost white, horny centers, which are surrounded by dark rings. Section of one of these spots shows the skin in the center to be atrophied, with deposits of pigment in the periphery of the spot. No fluid follows the knife. On turning the body on its face, large, very dark, irregular spots are seen, especially on the shoulders and buttocks. On incising them, thin, reddish fluid follows the knife. The anus and the skin of the buttocks adjacent is soiled with dried feces, which have a dark green color. Internal examination: The scalp is divided by an incision from ear to ear across the top of the head and reflected forward and backward. Scalp is thick. Some thin, dark red fluid exudes from the cut edges of the scalp. Skull cap removed by sawing around the cranium in the usual way. Dura tightly adherent and only with great difficulty separated from the bone. Internal surface of skull cap smooth. Surface of dura also smooth and glistening. Superior longitudinal sinus is empty. Pia mater transparent and nowhere adherent. It is traversed by numerous small veins

containing blood, which can be pressed about in them. Brain removed in the usual way. Condition of membranes at the base the same as on the cortex. The lobes of the brain are now carefully incised from cortex to base, longitudinally, the incisions being parallel and as close together as possible, the slices thus made being left in place and so resembling the leaves of a book. Numerous dark red points appear in the white matter. A little thin, dark red fluid follows the knife. The lateral ventricles are patent and contain a small amount of a clear, straw-colored fluid. Vessels of the choroid plexus and of the velum interpositum full of red blood. On section, the basal ganglia show numerous minute red points on the surfaces of the sections. Nothing notable is seen on examining the cerebellum, pons varolii, or medulla, or other nerve structures in the cranium. Total weight of the brain is 1,140 grams. Abdomen and thorax: On incising the peritoneum a slight puff of gas escapes. Contents of abdomen in normal position. Intestines are of a slate-gray color, glistening, distended. Omentum is short. Diaphragm extends to lower border of fifth rib. On opening chest both lungs are found to be very voluminous, and completely fill the pleural cavities. The external surface of pericardium is rough. Twenty c. c. of a clear, straw-colored fluid found in pericardium. Internal surface of pericardium smooth and shining. The heart is the size of a man's fist, and is flaccid. Right ventricle full of dark blood but contains no clots. Right auricle also contains fluid blood, and also a soft, yellow (chicken fat) mass, as large as the thumb, attached to a dark, almost black, blood clot, and really continuous with it, the yellow gradually shading into the dark color at the other end of the clot. The auriculo-ventricular orifice (right) admits two fingers. Left ventricle contains a small quantity of fluid blood, but no clots. Its wall is 2 cm. thick. Left auricle is full of fluid blood. Auriculo-ventricular orifice admits two fingers. The heart is now removed from the thorax by severing the great vessels. Water poured into the aorta very slowly sinks out of sight. The same result follows the pouring of water into the pulmonary artery. The coronary arteries are soft and easily compressed. On now cutting the heart open, so as to examine its cavities more fully, the endocardium is found to be, in all parts, smooth and glistening. The heart valves are soft, and appear to close the several openings to which they are attached in a complete manner. The heart's weight is 260 grams. The left lung is tightly adherent to the costal pleura, and is only with great difficulty removed. It shrinks to half the size it presented before removal on being freed from its adhesions. It crepitates and floats. Posteriorly its surface is of a dark slate color, gradually shading into the lighter color of its anterior portion. Numerous air bubbles are seen distributed quite generally directly under the visceral pleura. They can be pushed about by the finger. On section (left lung) the cut surface is of a very dark, almost liver color. Considerable dark, frothy fluid follows the knife, and can be pressed out of the incised surfaces. The lung (left) weighs 480 grams. The right lung is more easily removed than the left, though it, too, is bound down by numerous adhesions. It is also larger than the left, but otherwise presents precisely similar appearances. Its weight is 540 grams. No fluid, except a very little blood from the great vessels, is in the pleural cavities. The tunica intima of the aorta is smooth and shining. Nothing notable is seen in connection with any of the structures in the mediastina. The spleen is 12 cm. long and 9 cm. wide. The color of its cut surface is a dark, almost black, green. Blood freely follows the knife. The weight of the organ is 390 grams. The left kidney presents, in the middle of its external border, a sulcus 1 cm. deep, extending transversely for 2 cm. onto each side of the organ. The capsule easily strips off. The cut surface presents a mottled, speckled appearance, and is of a light, brownish-red color. Little blood can be expressed from its cut surface. The pelvis and ureter show nothing notable. The kidney (left) is 11 cm. long and 8 cm. wide. It weighs 170 grams. The right kidney presents the same appearance as does the left, except that it has no sulcus. It is 11 cm. long, 7.50 cm. wide, and weighs 160 grams. The bladder contains 250 c. c. of clear urine. Its mucous membrane is pale and smooth. The

duodenum is found to contain a quantity of a slimy, greenish, thick fluid, which adheres closely to the mucous membrane, and only with considerable difficulty can be washed away. The mucous membrane is injected. (At this point in the examination, by an unfortunate accident, the common bile duct, with the accompanying vessels, was cut across before it was ascertained whether or not there existed an obstruction to the outflow of bile into the intestine.) The stomach contains a quantity of fluid like that in the duodenum. Numerous full vessels are seen in the mucous membrane, but the latter is not reddened. No undigested food is found. The liver, being now removed, is incised. It cuts easily, the cut surface being very dark. A small amount of bloody fluid follows the knife. On following up the vessels into the interior of the organ nothing abnormal is found. The gall bladder contains 30 c. c. of dark-green fluid bile, which, when gentle pressure is made on the gall bladder, readily flows out of the common duct. (As the color of the fluid in the duodenum and stomach closely resembles that in the gall bladder, it may, I think, be safely assumed that the duodenal fluid was, in part at least, bile, and that, therefore, there was no hindrance to the outflow of bile from its bladder to the intestine, at least at the time of death.) The longest dimension of the liver is 26.5 cm.; the width of the right lobe is 20 cm.; the total weight of the organ is 1,560 grams. The mesentery of the small intestine contains numerous large vessels distended with blood. The small intestines contain fluid exactly like that in the stomach and duodenum. The mucous membrane of the small intestine becomes gradually paler than that of the duodenum as the examination progressively proceeds toward the large intestine until, at the ileo-cecal valve, it is not at all injected. The colon and sigmoid flexure contain the same green fluid that is found in the small intestine excepting that it is considerably thicker. There are, however, no formed feces in the large intestine. The testicles, palpated in situ, are apparently normal.

Remarks: When the patient was first seen at the hospital it was considered that the diagnosis lay between sunstroke ((*a*) thermic fever, (*b*) heat exhaustion), typhoid fever, and inflammation of the stomach and small intestines. Thermic fever was excluded because of the low degree of the fever present; heat exhaustion certainly was not present. Typhoid fever was excluded when, on the morning of the second day, the patient's temperature fell to normal. Therefore, by exclusion, the diagnosis of inflammation of the upper digestive tract was made, it also being supported by the symptoms present and by the statements of the patient's friend. Convulsions are not uncommon in cases of bad-food poisoning; constipation is also frequently present, though it is not the rule. The post-mortem findings seem to support the ante-mortem diagnosis, though the conditions found in the stomach and intestines hardly indicate an inflammation of these organs of a severe enough grade to destroy life. The appearances found in the brain certainly exclude insolation, the brain being absolutely normal, so far as the examiner is competent to judge. In the congestion and œdema of the lungs is found, probably, the immediate cause of the death of the patient. In the opinion of the examiner the patient was poisoned with the products of decomposition of food he had eaten (this decomposition having taken place before ingestion or after it, or partly before and partly after), the poisons elaborated being sufficiently powerful to greatly depress—having at first greatly irritated—the vital centers, pulmonary congestion and œdema then ensuing and causing death. At any rate, this would seem to be the most plausible explanation of the case, the one best supported by the ante-mortem course and the post-mortem findings.

C. E. D.

INFLAMMATION OF LIVER.

C. S.; aged 26; nativity, Germany; was admitted to the United States Marine Hospital at Portland, Me., September 7, 1896; died September 13, 1896.

History.—The patient had a suppurating gland of the groin previously, followed by an erruption of the skin. About a week before admission had a chill and fever;

complained of pain in right shoulder and side, and a sensation of weight in right hypochondrium increased by pressure, with nausea and vomiting; bowels deranged with frequent evacuations on some days, with loss of appetite and strength. There was dullness over the hepatic region. The skin and conjunctivi slightly icteric. Stated that his habits were intemperate.

Necropsy (twenty hours after death).—Body fairly well nourished; cadaveric rigidity slight. Skin jaundiced, and that over the abdomen of somewhat greenish color. Scar in right groin. On removing the calvarium the veins of the dura mater were found to be greatly congested. The dura mater was attached to the calvarium along the line of the sinuses; the subarachnoid space filled with serum. The brain appeared normal upon making sections. Weight of brain, 1,384 grams. The right lung was normal; the left small and attached by pleuritic adhesions, showing effect of former inflammation. Pericardium filled with yellow serum; heart somewhat flabby; valves apparently normal. Weight, 377 grams. Both lobes of the liver were enlarged; the surface was smooth, and presented on section a deep greenish yellow color. The structure had a coarse appearance; upon tearing it the lobules seemed to separate themselves from the connective tissue. The portal vein contained blood nearly black in color. Weight of liver, 2,510 grams. The gall bladder contained about 30 c. c. of dark ropy bile. The small intestines were filled with yellow fluid. The right kidney showed interstitial inflammation, and weighed 180 grams. The left kidney seemed normal, and weighed 166 grams. The spleen was very dark in color, and somewhat soft and flabby, and apart from its weight, which was 910 grams, seemed normal. The bladder contained a small quantity of dark urine.

F. W. M.

ABSCESS LIVER (BRAIN).

M. A.; aged 33 years; nativity, Sweden; admitted to the United States Marine Hospital, New York, September 24, 1896; died November 2, 1896.

History.—When admitted he stated that he had been sick eight days with chills and fever. The attack came on after exposure to cold and dampness. Bowels were constipated; nausea and vomiting. On day of admission had considerable pain in right side, fever, and parched, dry tongue. Examination in bed revealed painful swelling in the median line about 3 inches below the ensiform cartilage. There was considerable pain over liver. Lungs and heart normal. No jaundice. Three days after coming into hospital began to cough, and expectorated sputum tinged with blood. At this time there was a distinct oval-shaped swelling below and a little to the left of ensiform cartilage, which was dull on percussion and very tender. At base of right lung the breathing is a little rougher than natural. Some roughening of the pleura.

September 29.—Diagnosis of abscess of liver confirmed by finding pus with hypodermic needle. Patient operated on at 3 p. m. Abscess wall firmly adherent to abdominal wall. Abscess opened, irrigated, and packed; the liver substance not involved. The abscess was under the liver capsule. The abscess cavity was irrigated daily with sterile water.

September 30.—Had chill and temperature ran up to 39.4, followed by profuse sweating. Put on large doses of quinine. Hardly any discharge from abscess. Patient progressed favorably, appetite improving and general condition being very good. Was up and around ward. He continued this way, except every five or six days the fever would run up and he would have copious sweating.

October 24.—Complained of pain in right ear and side of face. Had sweating during the night, but no fever. The earache was worse next day, and he had vomiting. There was no swelling over mastoid, nor was it painful to touch. Delirious and threatened to commit suicide; would not eat; vomiting at intervals.

October 27.—Patient dull and stupid. Pupils slightly contracted, but respond to light; no unevenness of pupils; no paralysis; no exaggerated reflexes. Urine shows

a trace of albumen; pulse very slow and weak; respiration slow and deep; temperature subnormal—36° C.

October 31.—Incontinence of urine; had to have restraining apparatus; very delirious.

November 2.—Seems somewhat improved this morning. Temperature had run up to 38° C. and the pulse was 80. At 7.30 p. m. the breathing suddenly dropped to 14 and the pulse which had gone down to 60 during the day ran up to 80. In about five minutes the breathing ceased altogether and it was necessary to carry on artificial respiration. During this time the heart's action was good, the beats being accelerated. Artificial respiration was carried on for about twenty minutes, and as long as the heart kept up its action. The heart's action got slower and weaker and gradually ceased, continuing for at least twenty minutes after respiration had stopped.

Necropsy (sixteen hours after death).—The membranes of the brain felt very tense after the calvarium had been removed. The sulci were almost obliterated, the cerebrum being quite smooth. Pus in all the ventricles, its pressure in the fourth ventricle being the immediate cause of death. A large abscess was found in the right tempero-sphenoidal lobe containing dark-green pus. The abscess had pointed and opened into the posterior cornu and into the lateral, third, and fourth ventricles. The distension from the abscess had caused general cerebral compression. The site of the abscess also explains why none of the centers was affected. The gush of pus had filled the fourth ventricle and extended down into the spinal canal. Abdomen opened and the old abscess cavity carefully dissected out. The cavity had almost healed, being only a small opening through the abdominal wall. The wall of the abscess was adherent to the edge of the right lobe of the liver, but was easily torn away. The walls of the abscess had originally been the liver capsule and the body of the liver. In the edge of the right lobe was a small abscess the size of a walnut, containing greenish pus exactly resembling that found in the brain. This pus was extending along the interlobular veins for several inches into the liver. A few pleuritic adhesions right side. Other organs normal.

J. O. C.
P. H. B.

CIRRHOSIS OF LIVER.

Case 1.

J. N.; aged 40 years; nativity, Finland; admitted to United States Marine Hospital, Boston, Mass., August 4, 1896; died, October 1, 1896.

History.—Family history, negative. Previous history: Had scurvy eighteen years ago; had malaria, first seven years ago and attacks annually until last year; had gonorrhœa one year ago; vomited blood eighteen months ago; chews, smokes, and drinks occasionally. Present illness began one week ago with pain and fullness in stomach; has had more or less pain constantly. Does not vomit. Appetite poor. Bowels regular. Physical examination: Eyes clear; beginning pterygium at inner canthus both eyes; tongue red and moist; body fairly nourished; abdomen very prominent; umbilicus protrudes; cicatrices and copper-colored spots on both shins. Respirations accelerated and shallow; broncho-vesicular breathing over both lungs. Apex beat of heart felt and heard in region of left nipple; systolic murmurs at apex. First sound at aortic orifice muffled; second clear. Abdomen evidently distended with fluid. Fluctuation easily obtained. Liver dullness begins just above right nipple; lower border can not be distinctly outlined, owing to presence of fluid. Splenic dullness begins at the fifth intercostal space in axillary line; lower border not located. Feet and legs œdematous. Anterior border of right tibia very uneven; left somewhat so. Penis and scrotum œdematous; latter somewhat excoriated. Patient was put upon a tonic treatment with laxative doses of sodium phosphate.

August 28.—The abdomen being greatly distended with fluid, a trocar and canula

were introduced and 5,000 c. c. of greenish yellow serous fluid withdrawn. Paracentesis was subsequently performed three times and fluid varying in quantity from 5,000 to 8,000 c. c. withdrawn each time.

September 21.—Urine was examined with the following results: Color, reddish; reaction, acid; albumen, none; sediment, small, flocculent; specific gravity, 1.31; sugar, trace.

September 28.—Slight hemorrhage from bowels and nasal mucous membrane.

September 30.—Coma complete. Urinary examination with practically same results as given above.

October 1.—Tracheal râles. Vital forces evidently nearly spent. Death at 12 m.

Necropsy (twenty-six hours after death).—Frothy fluid exudes from mouth. Left side of face, neck, and shoulder blackened. Abdomen greatly distended. Hypostatic congestion of back and sides. Legs œdematous, as is the penis and scrotum. Numerous cicatrices upon both legs, probably syphilitic. Vessels of the dura mater filled with blood, and along the course of the superior longitudinal sinus the membrane is pinkish. Both longitudinal sinuses empty; others filled with blood. The brain tissue was softened to such an extent that the various basal ganglia were with difficulty identified; weight, 1,450 grams. Abdomen filled with serous fluid. The intestines were filled with gas. The diaphragm was pushed upward to lower border of third rib at the sternal end on right side and to the lower border of the fourth rib, left side. The heart and lungs were crowded upward to a corresponding extent. Pleura bright and glistening, save posteriorly on both sides, where there were a few adhesions. Left lung crepitant, bluish gray in color, and congested at the base. Bronchi contained a considerable quantity of white, frothy fluid; weight, 720 grams. Right lung in same condition; weight, 680 grams. Pericardium glistening; pericardial fluid, 25 c. c. Heart flabby; right side empty; 5 c. c. of blood in left side. Valves normal. Small calcareous patches in the aorta around the openings of the coronary arteries; weight, 320 grams. Spleen 18 cm. in length and 10 cm. in breadth. Capsule was gray and tough. The pulp was dark red and soft. Kidneys apparently congested. Outline of pyramids and the cortico-medullary line distinct. Left weighed 165 grams; right, 150 grams. Bladder walls not thickened. It contained 200 c. c. of amber-colored urine and there was a congested area at the base. Prostate gland not enlarged. The urethra was congested throughout its length. There was a hydrocele of the right spermatic cord, containing 25 c. c. of clear fluid. Both testicles small and soft. Anus normal. The liver was greatly atrophied and had apparently undergone fatty degeneration. The surface was gray and covered with small nodules. On section the cut surface was greenish yellow; weight, 980 grams. Stomach contained a small amount of fluid. The intestines were normal.

E. K. S.
H. W. A.

CASE 2.

T. W.; aged 65 years; nativity, Massachusetts; admitted to the United States Marine Hospital, New York, N. Y., January 30, 1896; died September 19, 1896.

History.—Has been sick for several years, but lately has begun to grow worse, the dyspnœa being especially troublesome. He has œdema of both legs and ascites, though the amount of fluid in the abdominal cavity was small. Up to a short time before coming into the hospital the dyspnœa had occurred in paroxysms, lasting only a short time. This condition grew worse, and at time of entry the attacks were more or less frequent and the paroxysms were longer. There was a troublesome cough, with occasional expectoration, which was tinged with blood. The urinary analysis revealed nothing abnormal. After two weeks in hospital the œdema of the legs was so great that the skin was cracked in several places, causing an eczematous inflammation of the skin of both legs. One month after admission a mitral murmur was first heard. The dyspnœa became very much worse. He could not sleep at night, nor could he lie down at any time. Toward the latter part of his illness he was troubled

with nausea and diarrhea. Occasionally the stools contained what resembled partially digested blood. The lungs were also badly congested at this time. The urine was normal until a short time before he died, when it contained a small amount of albumin with hyaline casts. Patient gradually grew worse, and died from exhaustion.

Necropsy (fifty-four hours after death).—Blood vessels of brain congested; some fluid in sub-arachnoid spaces; otherwise brain normal. Kidneys and spleen normal. Atrophic cirrhosis of liver confirmed by microscopical examination; 200 c. c. fluid in abdominal cavity. Pleuritic adhesions over both lungs, but no fluid in either pleural cavity. Lung tissue normal, except congestion at base of both lungs. Heart dilated and the walls thickened. The aorta very much dilated and the internal coat had deposited on it calcareous scales, which were hard and sharp enough to cut one's finger. The aortic valves were normal. The leaflets of the bicuspid had calcareous plates attached on both surfaces. Other valves normal. The coronary arteries were badly damaged by calcareous deposits in the walls of the vessels. The right coronary was destroyed just before its first bifurcation. This condition was the probable cause of the dyspnœa from which patient suffered severely at times. Liver: Connective tissue of trabeculæ markedly increased in size and amount. Lobules cut up everywhere by bands of connective tissue running through them in various directions. Liver cells very much crowded up. Walls of vessels compressed in places from pressure of cells, and of connective tissue itself, upon them. Capsule of liver much thickened, and dips down into substance of liver commencing the formation of "hob-nails."

J. O. C.

CASE 3.

W. D.; age, 51; nativity, Ohio; admitted to the United States Marine Hospital, Cleveland, Ohio, April 27, 1896; died November 15, 1896.

History.—Patient entered hospital with enormous anasarca. The limbs were so distended that the water oozed through the skin, giving forth a very fetid odor. The limbs were wrapped in sheets soaked in glycerine, which extracted the water very readily and removed the odor. Elaterium was given in repeated doses, producing free catharsis. Digitalis and strychnia were then given, followed by tonics. The abdomen was tapped with trocar 15 times at intervals of about ten days, drawing off each time from 9,000 c. c. to 19,500 c. c. of clear or slightly turbid serum. The fluid contained no albumin. Signs of local peritonitis developed within the last fortnight.

Necropsy (twenty-one hours after death).—Rigor mortis very slight. Entire posterior aspect of body and limbs blue from suggillations. Upon making the usual median incision, 10,000 c. c. of turbid serum was removed from the abdominal cavity. This fluid contained flakes of recent lymph. The pericardium contained about 5 c. c. clear serum; the heart weighed 370 grams and was apparently normal. The right pleural cavity was obliterated by recent adhesions; left pleural cavity contained 25 c. c. clear fluid; the right lung was dry and tough; the left lung was markedly œdematous; right lung weighed 850 grams and left lung 780 grams. Liver weighed 1,800 grams; was small, pale, hobnailed, and tough, showing a beautiful example of atrophic cirrhosis. The gall bladder was partially filled with bile. The spleen weighed 530 grams and showed an infarct in its lower half, covering an area upon its outer surface about 2½ inches in diameter and extending almost through the organ; the other portion of the spleen was congested, fibrous, and the capsule much thickened. The left kidney weighed 140 grams, capsule was easily stripped off, and the organ had a normal appearance. The right kidney weighed 190 grams; much congested, especially in the pyramids; capsule easily stripped off; a small infarct about two-thirds inch in diameter was found on the convex surface. The general peritoneum was considerably injected, and the stomach, intestines, and mesentery were more or less matted together by inflammatory adhesions, making it difficult to

separate them. The omentum was obliterated in the general mass; the stomach and intestines were normal aside from œdema of the peritoneal coat; the mesentery was also very œdematous. The bladder was almost empty, and normal.

R. M. W.

CASE 4.

C. K., age, 35; nativity, Norway; admitted to the United States Marine Hospital, Stapleton, Staten Island, N. Y., June 3, 1896; died August 27, 1896.

History.—The following history was taken June 3, on admitting patient to hospital: Says he has been jaundiced two years; was in hospital in St. Johns, N. B., eighteen months ago and got apparently well; he left the hospital and went to work, but had a return of his trouble in a short while. At present he is intensely jaundiced and complains of constant pains across back and shoulders; he also complains of diarrhea; stools clay colored, great weakness and loss of appetite. Physical examination discloses no enlargement of liver and no tenderness; abdomen considerably distended with gas. The following prescription was ordered: R. Sub. mur. hydrarg., .3; rhei. pulv., 1; M. and div. in chart No. V. Sig—One every three hours. Analysis of urine: Color, amber; reaction, acid; specific gravity, 1007; albumen, none; sugar, none; bile pigment present in seemingly considerable quantity. Several days after his admission symptoms of malaria developed, which were relieved with quinine sulphate. The diarrhea was very persistent and was controlled by bismuth, sub. nit., and camph. et opii pills. Turpentine stupes to abdomen and emulsion of turpentine was ordered for tympanites. The patient's condition improved temporarily; his appetite got better; this, however, lasted only a short time; swelling of feet and ankles was noticed later; infusion digitalis was ordered as a diuretic. July 21, patient began to get worse, his desire for food disappeared; vomiting was frequent; all medicine was left off and a bitter tonic substituted with the effect of temporarily aiding his appetite. Milk diet disagreed with patient whenever it was tried. August 23, hemorrhages began from different mucous surfaces, especially mouth and rectum, large quantities of blood being discharged from mouth and anus. A mouth wash of alum and cracked ice was ordered, together with fluid extract of ergot. The hemorrhage, however, continued at intervals until his death. August 27, note on history sheet says: "Found patient in an unconscious state; respiration shallow and labored with suspicious rattle in larynx; no hemorrhage from mouth; considerable and continuous hemorrhage from anus." Patient died quietly at 11.50 a. m., August 27, 1896.

Necropsy (twenty-six and one-half hours after death).—Body fairly nourished; rigor mortis present; skin of a saffron, yellow color; lower limbs œdematous; skull cap very thin; dura mater greenish gray along longitudinal fissure, and on either side of the median line were thickened plaques, the result of inflammation. Other parts of the dura mater were stained yellow. The lining of the frontal sinus was olive green. Dura adherent to brain along longitudinal fissure, and at the same points the pia mater was thickened and covered with fibrinous deposits. Dural sinuses healthy, but only partially filled with blood. The various structures of the brain presented no abnormalities. The abdominal cavity contained 500 c. c. of brown serous fluid; greater omentum contained a little fat; lower border of liver 3 cm. above margin of costal cartilages; intestines distended with gas; diaphragm in normal position; the thymus gland was dark brown, 2 by 1 cm.; surface of right pleura adherent at base and posteriorly; right lung reduced one-third in size; left pleura normal; both lungs were dotted with small black spots—anthracosis; bronchial glands enlarged, indurated, and black; left lung crepitant, base of lower lobe congested; right lung congested throughout; spleen adherent externally and at its lower border; capsule light gray; weight, 930 grams, 20 cm. transversly, 15 cm. longtudinally, and 5 cm. in thickness; held in the hands it trembles like a mass of jelly; on section, the pulp seems gelatinous and blood exudes freely. Kidneys weighed 248 grams each, the malpighian pyramids were very prominent, being bile-

stained; supra renal capsules apparently normal; ureters normal; bladder contained 300 c. c. brown urine; prostate not enlarged; other generative organs normal; stomach not enlarged; mucous lining pale; duodenum normal; common bile duct smaller than the hepatic or cystic duct, but patulous; gall bladder walls white, thickened, contained 5 c. c. brownish-yellow bile. Liver weighed 1,736 grams, surface rough, color bluish gray, firm to the touch and very tough under the knife. The organ was bound by adhesions superiorly, posteriorly, and to the hepatic flexure of colon. Small intestines normal, as was vermiform appendix and large intestines; aorta, portal vein, and thoracic duct normal; semilunar ganglia normal. Pathological examination: A large amount of connective tissue surrounding lobules and scattered generally throughout the section in irregular streaks and bands. Liver cells in places flattened as though by pressure, and nearly all colored with bile pigment, as is also the new formed tissue. This tissue is dense, quite vascular, and contains cylindrical ducts lined with what appears to be cuboidal cells; these are apparently new gall ducts. Blood vessels not noticeably increased in size, but amount of connective tisue around them greater than normal. Capsule thickened in irregular patches. Spleen: Extremely soft and spongy; hardened only with great difficulty; trabeculæ thickened. Cavernous veins mostly dilated and filled with blood, though they are obliterated in a few spots where the pulp tissue is rather dense; malpighian bodies normal; capsule thickened; kidneys normal.

E. K. S.
P. H. B.

Case 5.

Tuberculosis of peritoneum.

J. S.; age, 63; a native of New York; was admitted to the United States Marine Hospital, San Francisco, May 8, 1896, and died August 17, 1896.

History.—On entrance he complained of pain in the abdomen, was constipated, and the entire abdomen was distended. The liver dullness could not be made out on account of the abdomen being swollen. The symptoms gradually became worse, and then subsided, with the exception of the pain in the region of the liver. The patient's feet became swollen and œdematous. He grew weaker and weaker, and died August 17, 1896, at 6 a. m.

Necropsy (five and one-fourth hours after death).—The brain and membranes were normal. The heart was small and fatty; valves normal. The lungs were adherent all over; there was a slight hypostatic congestion, but otherwise they were normal. All the abdominal viscera were agglutinated together with extensive adhesions. There was marked peritoneal tuberculosis, the peritoneum being very much thickened, measuring about 3.20 mm.; there was about a liter of fluid in the peritoneal cavity. The liver was greatly reduced in size and weight; it presented numerous granulations of the surface; the substance was hard and firm and made up partly of the normal liver tissue and partly fibrous connective tissue; weight, 800 grams. The gall bladder was unusually white, slightly distended, and contained three stones, each of which was 2 c. c. in size and weighed 5 grams. Kidneys were both normal. Intestinal tract likewise. Genito-urinary organs normal. Bladder had a tubercle about 0.5 cm. in diameter on the left posterior surface. Spleen was soft and slightly congested.

J. H. O.
J. G.

BRIGHT'S DISEASE.

Case 1.

Cardiac hypertrophy.

C. W.; a native of the United States; was admitted to the United States Marine Hospital, San Francisco, Cal., September 24, 1896, and died April 26, 1897, at 1 a. m.

History.—On admission the patient complained of inability to make the slightest

exertion; dyspnœa, aggravated by lying down, and swelling of the genitals and lower extremities. Physical examination showed that the lungs were normal, the heart was enlarged, and a mitral murmur was present with the first sound of the heart. Examination of the urine showed a considerable amount of albumen and a specific gravity of 1,010. Under treatment his condition improved for a time, but again grew worse, his dyspnœa more marked, and the œdema greater until his death.

Necropsy (ten hours after death).—The body is emaciated, but there is great œdema of the genitals and the lower extremities. The skull cap, vessels and sinuses, brain and membranes are normal. The pericardial sac contains 150 c. c. of fluid. The heart is hypertrophied and weighs 770 grams; otherwise it is normal. The right pleural sac contains 2,500 c. c. of fluid; the right pleural membranes are normal; the right lung is normal. The left pleural sac contains 550 c. c. of fluid; the left pleural membranes are normal; the left lung is normal. The peritoneal cavity contains 2,200 c. c. of a straw-colored fluid. The digestive tract is normal. The spleen is enlarged, weighing 270 grams; otherwise it is normal. The right kidney is small and weighs 80 grams; the capsule is adherent. On section the kidney presents the appearance of cirrhotic kidney, there being a marked decrease in the cortical layer and a hypertrophy of the interstitial connective tissue. The left kidney is small and weighs 90 grams; the capsule is adherent. On section the left kidney presents the same pathological condition as the right. The genito-urinary tract is normal, except for the œdema of the prepuce and scrotum. The spinal cord was not examined.

H. S. M.
J. G.

CASE 2.

L. J.; aged 37 years; nativity, Tennessee; admitted to the United States Marine Hospital, New Orleans, La., October 3; died October 7, 1896.

History.—Patient stated when admitted that he had been ill for the past seven weeks. The first symptoms were headache, vomiting, œdema of lower extremities and lower eyelids. At time of admission patient was suffering from shortness of breath and hemorrhage from the intestines, which was accompanied with a frequent desire to go to stool and marked tenesmus. No appetite, and skin very dry, anæmia marked. Physical examination: Heart showed a marked hypertrophy, but no valvular lesions were found. Lungs showed a condition of engorgement, more marked on right side, also a wheezing condition in bronchial tubes; asthma quite marked. Liver greatly increased in size. The urine almost entirely suppressed, probably the result of the intestinal hemorrhage; quantity could not be measured on account of the number of stools; specific gravity 1,010, acid reaction, contained a large quantity of albumen. Blood vessels not atheromatous. Previous history of syphilis and rheumatism. Denies being addicted to the use of alcohol. Patient was given digitalis, iron, pilocarpine, and sweat baths as symptoms required. Two days after admission was troubled with severe epistaxis, which could not be controlled except by plugging the anterior and posterior nares. Mind remained clear until eight hours before death, when he became delirous and died in a state of coma.

Necropsy (seventeen hours after death).—Body of large size; well-built negro; emaciated; no discoloration; rigor mortis marked. Several cicatrices on leg over tibia. Pupils midway between dilatation and contraction. Abdominal cavity contained no fluid. Great omentum of a light slate color, contained very little fat. The spleen softened; weight, 262 grams. The left kidney weighed 82 grams. Capsule very adherent and thickened; surface granular; on section tissues very tough. Cortical portion a mere shell; pyramids contracted. Line of demarcation between the two portions poorly marked; pelvis somewhat contracted. Right kidney weighed 92 grams and found in the same condition as the left. Both kidneys were of the small red variety, the amount of connective tissue being very excessive. Ureters normal; urinary bladder contained 100 c. c. of urine, congested in region of trigone; otherwise normal. The rectum congested, of a dark slate color, contained

blood and mucus. Large intestine slate-colored, contained fecal matter, blood, and mucus. Small intestine congested, covered with a thick coating of tenacious mucus. Stomach empty, congested, covered by a thick coat of mucus. Liver weighed 2,090 grams, was very large and congested. Gall bladder normal, contained 10 c. c. of fluid. Left lung weighed 710 grams; lower lobe showed a marked hypostatic congestion; pleural cavity no adhesions or fluid. Right lung weighed 836 grams; hypostatic congestion of middle and lower lobes; pleural cavity few adhesions; no fluid. Heart weighed 705 grams after opening. Left ventricle dilated, walls hypertrophied and softened; left auricle dilated and hypertrophied; mitral valve competent but thickened. Aortic valves thickened but competent. Right ventricle dilated, walls hypertrophied. Pulmonary and tricuspid valves competent. Pericardial sac contained 100 c. c. of muddy-looking fluid. The lymph gland in the cervical region, also the mesenteric glands were hypertrophied and indurated. Arteries normal.

H. W. W.
H. W. S.

CASE 3.

Arterio-capillary fibrosis—"Unsymmetrical kidney."

G. H.; aged 42 years; a native of Ohio; was admitted to United States Marine Hospital, New Orleans, La., March 26, 1896; died July 7, 1896.

History.—Fireman and addicted to the free use of alcoholic stimulants. Had had variola and frequent attacks of malarial fever; denied syphilis but admitted gonorrhœa and accasional difficulty of micturition. General appearance indicates a man of 55 years of age. When admitted patient was suffering with dry and distressing cough; dyspnœa was constant, amounting practically to orthopnœa. Tongue was coated, appetite capricious, and gastric digestion impaired. Temperature normal; respiration 25; radial pulse weak, intermittent, and numbering 70 in the sitting posture. Chest: Cardiac impulse was marked and transmitted a wavy motion to hand; area of dullness much increased, mainly to the left; prominent pulsations of both subclavian arteries. Auscultation revealed decided cardiac arrhythmia, neither sound being distinct, the organ presenting a condition of typical delirium cordis; a slight systolic murmur was noted at the aortic orifice. The brachial arteries were hardened, not easily compressed and rolled like cords beneath the fingers; a similar condition existed in the radial arteries. Bronchial breathing was marked, especially on right side; with the exception of sibilant and piping râles, other respiratory phenomena were absent. Urine: Clear, reaction acid, specific gravity 1.020; albumin by heat, HNO_3 and picric acid tests. Patient had been in this hospital with similar symptoms from February 8 to March 11, 1896, when he was discharged improved. Slight benefit accrued from the administration of drugs, which were directed to the control of the heart's action and the reduction of arterial tension, to the increase of the renal secretion and to the alleviation of the harassing cough and dyspnœa. During the latter part of his illness puffiness of the eyelids and œdema of the legs and ankles were observed. For twelve hours before death there were nausea and vomiting, no radial pulse could be detected, the dyspnœa continued to increase, the patient expiring suddenly in the erect posture, after a free and copious emesis.

Necropsy (thirteen hours after death).—Rigor mortis marked; livores on posterior aspect of trunk and extremities; general nutrition good; abdomen slightly distended and œdema of ankles and legs; pupils somewhat dilated. Cranium: Calvarium removed; frontal eminences thick and prominent; frontal sinuses larger than normal. Dura and venous sinuses showed no abnormality. On incision of dura, a considerable quantity of black blood escaped. The vessels of cerebral cortex were congested and dark and their walls slightly thickened. The pericardium presented no adhesions and contained 15 c. c. of clear serum. The heart was enormously hypertrophied, weighing 865 grams, but was not appreciably dilated. The walls of

both left and right ventricles were very thick and firm; valves normal; ante-mortem clots were abundant in left chambers; post-mortem coagula noted in right ventricle. The left lung weighed 718 grams, crepitated, its external surface dark and sections almost black. The right lung weighed 864 grams, dark externally and black in section. There were slight adhesions at apices of both lungs. The right pleural cavity contained 350 c. c. of sero-sanguineous fluid; the left, 85 c. c. The peritoneal cavity was distended and contained 1,000 c. c. of malodorous fluid; the peritoneum was congested and the ileum and colon were darker than normal and distended with gas. The liver weighed 1,560 grams, pale in color, and a few cicatricial bands were observed on the superior surface of the outer extremity of right lobe; its parenchyma was hard and firm to the touch and resistant on section. The gall bladder contained 20 c. c. of greenish-yellow bile. The right kidney weighed 175 grams; its capsule was easily detached; its substance could be easily broken and was dark in color. Suprarenal capsule normal. Although careful search was made, no trace of left kidney could be found. The patient was catheterized just before death, consequently this viscus was empty; its walls were slightly thickened. Two coarctations of small caliber were detected. On account of the marked allorrhythmia of the heart during life, it was supposed that sclerosis of the coronary arteries would be found post-mortem, but these vessels showed no macroscopic abnormality, neither were any nodosities noticed in the aortic arch. Careful examination of the left brachial artery showed diffuse sclerosis of its walls, the lumen of the vessel being almost obliterated.

H. W. S.

CASE 4.

H. D.; aged 21 years; nativity, Dutch Guiana; admitted to the United States Marine Hospital, New Orleans, La., September 20; died November 21, 1896.

History.—Patient denies any history of syphilis, rheumatism, or the use of alcohol to excess. Was treated in Galveston, Tex., for mitral regurgitation for a period of two weeks and transferred to this hospital. The symptoms at date of admission were shortness of breath on the slightest exertion, pains in head of a sharp character, œdema of lower extremities, and dimness of vision. Physical examination revealed a murmur occurring with the first sound of the heart over mitral area, also an accentuation of second sound of the heart over aortic area. Heart at times acting very forcibly; left side hypertrophied. Arteries atheromatous; bowels constipated; appetite good. Specific gravity of urine 1.006 to 1.008; quantity averaged 1,400 to 1,700 c. c. in twenty-four hours; highly albuminous. Convulsions and coma several days before death, followed by delirium, which continued up to the end.

Necropsy (twenty-two hours after death).—Rigor mortis marked, general nourishment fair, pupils contracted. The pericardial sac contained 50 c. c. of fluid, visceral portion somewhat inflamed. Heart weighed 640 grams after opening; anterior flap of mitral valve incompetent, calcarious deposits around free margins of both flaps. Tricuspid valve competent but atheromatous, aortic and pulmonary valves competent. Wall of left ventricle very thick; wall of right ventricle comparatively thin. Arteries atheromatous, especially well defined in the radial and brachial. Left lung weighed 460 grams, slight adhesions in pleural cavity, lung congested and œdematous. Right lung weighed 580 grams, no pleural adhesions, lung congested and œdematous. Gastro-intestinal tract and peritoneum normal. Liver weighed 1,260 grams, congested and darker than normal. Gall bladder and ducts normal, contained about 3 c. c. of bile. Kidneys, left weighed 94 grams, right weighed 92 grams; capsules adherent, cortex thin, great increase of connective tissue. Bladder, urethra, prostate, seminal vesicles, and testicles normal. Spleen weighed 145 grams, tough and elastic, some increase of connective tissue. Membranes of brain slightly congested; brain weighed 1,460 grams.

H. W. W.
H. W. S.

CASE 5.

C. G.; a native of the United States; aged 57; was admitted to the United States Marine Hospital, San Francisco, March 15, 1897, and died May 11, 1897, at 5 a. m.

History.—On admission the patient complained of shortness of breath and œdema of the lower extremities and genitals. Physical examination: The lungs were found to be normal, the heart area enlarged, and on auscultation an aortic regurgitant murmur was heard. Examination of the urine showed that albumen was present in large quantities. He gradually grew worse, the dyspnœa becoming more marked and the œdema more extensive until his death. For the last five days he was delirious, and toward the last was violent.

Necropsy (six hours after death).—The body is that of an adult male; it is well developed and well nourished. Rigor mortis is well marked. There is a slight œdema of the lower extremities and genitals. The skin of both legs from the knees down presents a thickened, dry, and fissured condition, with numerous small ulcers on the inner sides of both legs. The skullcap, brain case, sinuses and vessels, brain, and membranes are normal. The pericardial sac contains 600 c. c. of straw-colored fluid. It is otherwise normal. The heart presents the condition of concentric dilatation and hypertrophy. It weighs 670 grams. The valves are normal. In the arch of the aorta are numerous atheromatous patches. The pleuræ and lungs are normal. The abdominal cavity contains about 300 c. c. of clear fluid. The liver is normal in weight, but on section it shows numerous areas of cirrhosis. The gall bladder is normal. The spleen and pancreas are normal. Both kidneys present the appearance of a chronic diffuse nephritis, the condition being more marked on the right. The left kidney is normal in weight, but the right is enlarged, and weighs 216 grams. The capsules are not adherent. There are strictures in the urethra. Otherwise, the rest of the genito-urinary organs are normal. The spinal cord was not examined.

H. G. M.
J. G.

CASE 6.

M. H.; aged 65 years; a native of Ireland; was admitted to the United States Marine Hospital, San Francisco, April 4, 1897, and died June 14, 1897, at 10 a. m.

History.—On admission the patient complained of swelling of the lower extremities and genitals and shortness of breath. Physical examination showed that his lungs were normal. The area of cardiac dullness was enlarged. Upon auscultation the heart sounds were normal with the exception of a systolic aortic murmur. His urine contained large quantities of albumen. His condition grew gradually worse, his legs and genitals becoming more œdematous. On the 11th of June he had a total suppression of urine for forty-eight hours, followed by a short interval during which he passed small amounts of urine. The suppression again returned and continued until his death.

Necropsy (twenty-four hours after death).—The body is that of a well-developed and well-nourished adult male. Rigor mortis is well marked. The subcutaneous fat is abnormally well developed. There is œdema of the lower extremities and external genitals. The skullcap, brain case, membranes and vessels, and brain are normal. The pericardial membranes are normal. The heart is concentrically hypertrophied and weighs 650 grams. The valves are normal with the exception of the aortic valve, the cups of which are thickened and studded with punctate hemorrhages. The ascending portion of the arch of the aorta presents several atheromatous plates. The pleural membranes are normal with the exception of strong adhesions between the parietal and visceral layers at the base of the right lung. The lungs are both normal with the exception of a well-marked condition of anthracosis. The omental fat is very large in amount. The liver and gall bladder are normal. The spleen is normal. The right kidney is large and weighs 280 grams. It is pale in color and very friable. The capsule is not adherent. On section it shows a diminution of the

cortical area and a complete obliteration of the central malpighian pyramids. The left kidney is enlarged and weighs 320 grams. On section it presents the same appearance as the right. The bladder is contracted and the walls are infiltrated with fat and greatly hypertrophied. The external genitals are œdematous, but are otherwise normal. The spinal cord was not examined.

H. S. M.
J. G.

CASE 7.

H. M.; age 48; nativity, Virginia; white; admitted to United States Marine Hospital, Baltimore, November 27, 1896; died December 24, 1896.

History.—On admission patient complained principally of dyspnœa on exertion and defect of vision. There was considerable œdema of lower extremities and a puffiness around his eyes; some bronchitis. Examination of urine showed a considerable amount of albumen. Soon after admission patient suffered from obstinate constipation, which was relieved by Rochelle salts in appropriate doses. During the latter stages Croton oil was administered in large doses without effect. Enemata were resorted to. The dyspnœa persisted in spite of the use of digitalis, Boshom's mixture, and strychnia at different times. The insomnia could only be relieved by the use of hypodermic injections of morphia. December 21 the patient was seized with a convulsive attack, in which he lost consciousness. It lasted about ten minutes. The pupils were dilated, but equal. At this time patient was passing only about 500 c. c. of urine during the twenty-four hours. On the night of his death patient was very restless and entirely unconscious.

Necropsy (twelve hours after death).—Rigor mortis marked. Some œdema of subcutaneous tissue, especially over abdomen. Right lung: Weight, 510 grams. There were no pleural adhesions present. Three or four hard pigmented areas the size of a shot were noticed on the surface of the lung. There was some emphysema along the anterior border of both lungs. Left lung: Weight, 690 grams. The surface of this lung was normal in appearance, with the exception of the pigmented areas described above. A slight fibrous band was noticed connecting the lobes to each other. There was considerable congestion of the lung, with a corresponding diminution of air in the vesicles. Heart: Weight, 660 grams. Wall of left ventricle very much thickened. Valves were apparently competent. In the left ventricle was a large white thrombus, which was very adherent to the heart wall. Walls of right ventricle were slightly thickened. The openings of the coronary artery were pervious. The coats of the aorta were thickened. The peritoneal cavity contained a red serous fluid. The intestines were dark in color and very much inflated with gas. The odor given off was very offensive. A fresh fibrous band was found connecting the jejunum to the transverse colon. The stomach contained some liquid and gas. Spleen: Weight, 90 grams. Very dark in color and firm in consistence. Liver: Weight, 1,500 grams. Surface was smooth in appearance. Was not very resistant to the cut of the knife. Kidneys: Combined weight, 270 grams. Were about equal in size. Their surface was pale in color and smooth in outline. The capsule was only slightly adherent. The kidney substance, especially the cortical portion, was of a yellowish gray color. The line of demarkation between the cortical and medullary portions was not distinct.

J. B. G.
G. W. S.

CASE 8.

J. A.; age, 38; nativity, Maine; admitted to the United States Marine Hospital, Stapleton, N. Y., May 2, 1896; died August 18, 1896.

History.—Patient was taken sick December 27 last, after catching cold, with pains across back, loss of appetite, scanty, high-colored urine, slight cough with frothy

expectoration and some dyspnœa, and swelling of the ankles and upper eyelids; was under treatment at Norfolk, Va., for thirteen days. Patient says he left the hospital feeling almost entirely well. One month afterwards he caught cold and had a recurrence of same symptoms. After getting better he again went to work, got wet, and had a third attack. He was treated during this recurrence at the Providence Hospital, Washington, D. C., and after seventeen days was discharged much improved. Two weeks ago he was taken again with cough, great shortness of breath, considerable nausea and vomiting, scanty and high-colored urine, dizziness, and swelling of lower limbs. The œdema has gradually extended to the abdomen. Heart rapid and weak; tension lower than normal. The above history was taken May 2, 1896, when the patient was admitted to this hospital. He was put on tincture digitalis, 15 gtts., t. i. d.; sulphate magnesia, 16 grams before breakfast in 100 c. c. of water; diet of milk, 3 pints a day, one-fifth limewater. Examination of urine showed reaction acid, specific gravity 10.14, with slight traces of albumen; subsequently was given Bashams's Mixture, with temporary benefit. Infusion of digitalis was then given later with the effect of increasing output of urine. Acetate of potassium was given in 1.3-gram doses, t. i. d.; this, together with hot vapor baths and hot pack, afforded temporary relief. Stimulants were administered regularly from the first. At no time was the patient's condition improved for any great length of time. His scrotum and penis became very œdematous toward the end; 600 c. c. of straw-colored fluid was withdrawn from scrotum about two weeks before his death, and smaller quantities at intervals later. The action of the heart was kept up by strychnia sulphate and infusion digitalis when examination showed that it was needed. After about the 20th of July patient grew gradually worse and died August 18 at 5.30 a. m.

Necropsy (thirty and one-half hours after death).—Middle-aged stout mulatto. Body and limbs œdematous, scrotum and penis distended with fluid to twice their normal size. Scullcap large, broad and thick; frontal sinus was one large cavity 4 cm. in depth, 5 cm. in width, and 2 cm. antero-posteriorly. Dura mater greenish gray along the longitudinal fissure, and it contained numerous calcareous concretions, one of which was 3.5 cm. long, 1.25 cm. wide, and 0.5 cm. thick. The falx cerebri was in the same condition. The longitudinal sinus was obliterated and its place occupied by calcareous matter. On opening the dura mater a quantity of serous fluid escaped and the surface of the brain was covered with fibrinous coating resembling gelatine. Brain weighed 1,364 grams; all the structures were so softened that a critical examination could hardly be made, but no abnormalities were discovered. The ventricles were filled with sero-sanguinolent fluid. When the abdominal cavity was opened it was found to contain 2,000 c. c. of straw-colored fluid in which were numerous long shreds of fibrin. The liver extended 5 cm. below the right costal margin in the mammary line. The abdominal fluid being removed the diaphragm was seen to be pressed downward and pressure elicited succusion in both pleural cavities. Upon opening the thorax the thymus gland was found atrophied; both pleural cavities were filled with serous fluid; the right lung was collapsed and adherent at the apex and to the mediastinal surface of the pleura; the left pleura was normal and the left lung, although congested, was crepitant. The pericardial fluid was increased to 100 c. c., and the heart was enlarged, weighing 558 grams. Valves apparently normal. The aorta for 1 to 2 cm. beyond the sinus of valsalva was atheromatous, and around the opening of the coronary arteries were calcareous patches. The greater omentum was small, devoid of fat, and in appearance resembled a very large choriord plexus; the smaller omentum was in the same condition. Spleen small, firm, and bluish gray in color, tough under the knife, pulp very dark. Left kidney weighed 248 grams; capsule nonadherent; cortico-medullary line obliterated, as were all the normal lines usually visible. Right kidney evidently in same condition as left, but the degenerative process had not gone so far. Adrenals normal; ureters normal. Bladder contained a small quantity of urine; its walls were apparently

normal. Urethra normal. Testicles small. Rectum showed no signs of disease. Duodenum normal. Stomach normal. Gall bladder full of dark-green bile; the common bile duct was patulous. Liver rough, bluish red in color and tough under the knife; weight, 1,364 grams, same as brain. Pancreas normal. Mesentery normal. Small intestines normal. Cæcum normal. Vermiform appendix 5 cm. in length. Colon throughout contracted to about the size of the small intestine. Abdominal vena cava filled with fluid blood. Aorta normal.

Kidneys: Much new connective tissue in the stroma; stroma irregularly thickened in some places. Tubes atrophied and compressed, slightly dilated in some places. Glomeruli atrophied and their capsules thickened. Spleen: Cavernous veins dilated; trabeculæ of pulp compressed between these enlarged veins. Glomeruli (corpuscles of malpighii) enlarged. Liver normal, except for a slight thickening of the connective tissue in the capsule.

E. K. S.
P. H. B.

CASE 9.

Valvular disease of heart—Aortic and mitral.

D. G.; aged 52 years; a native of Ohio; was admitted to the United States Marine Hospital, New Orleans, La., March 24, 1897; died March 31, 1897.

History.—Contracted syphilis five years ago; addicted to free use of alcohol for past thirty years; denies rheumatism. Complained of shortness of breath; sputa muco-sanguineous; anorexia; bowels were regular; œdema of legs present; murmurs heard on auscultation over mitral and aortic areas; pulse rapid and weak; arteries distinctly atheromatous; lungs showed hypostatic congestion; urine laden with albumen. The infusion of digitalis was ordered.

March 28.—No marked change. Heart very feeble and marked dyspnœa. Hypodermic injections of strychnine sulphate.

March 30.—Dyspnœa somewhat improved; expectorates blood mixed with mucus. Hypodermic injections of strychnine sulphate continued.

March 31.—At the morning visit patient's general condition seemed better; in the afternoon all symptoms became worse, death occurring at 5.50 p. m.

Necropsy (fifteen hours after death).—Rigor mortis marked. The heart was greatly hypertrophied, weighing 580 grams; myocardium softened. The walls of both right and left ventricles were much thicker than normal; coronary arteries atheromatous. Both aortic and mitral valves were incompetent, the former presenting abundant calcareous deposit. Antemortem clots in ventricles. General atheroma was present throughout the arterial system. The pericardial sac contained 100 c. c. of serum, tinged with blood. The left lung weighed 680 grams; its lower lobe was congested and softened. The left pleural cavity contained about 2,000 c. c. of straw-colored fluid. The right lung weighed 660 grams; lower lobe congested (hypostatically); small tubercular deposits at the apex. In the left pleural cavity bloody serum amounting to 500 c. c. was found. The liver was in the condition of hypertrophic cirrhosis; weight, 2,049 grams; interstitial connective tissue much increased. The gall bladder contained 25 c. c. of bile; ducts normal. Left kidney: Weight, 155 grams; capsule adherent; cortex a mere shell. Right kidney: Weight, 175 grams; capsule adherent; cortex, thin. Both kidneys contracted and cirrhotic. Prostate was slightly hypertrophied. The spleen was soft and weighed 520 grams. The meninges and brain were normal, the latter weighing 1,617 grams. The peritoneum and gastro-intestinal tract presented a normal appearance.

H. W. W.
H. W. S.

CASE 10.

Hypertrophy of heart, complicated with a compressed lung, caused by a former pleuritic effusion.

C. B., colored; aged 31 years; a native of Virginia; was admitted to the United States Marine Hospital, Detroit, Mich., September 15, 1896, and died at 9 a. m. January 11, 1897.

History.—Family history not good. Father and mother died of pneumonia. One brother died of pneumonia and one of "heart disease." In 1881 he was sitting one cold day where the wind blew upon his back. At night he had a chill. The following morning he could not use either leg. Sensation in the legs to pain, heat, and cold was good. He was in bed one year and nine months before he regained the use of his legs. Six weeks after he was out of bed he had an attack of acute rheumatism. During the attack of rheumatism, and subsequently, he had to get up three times every night to urinate. One year after the attack of rheumatism he began to suffer from dyspnœa on exertion. Upon admission he complains of dyspnœa on exertion, slight cough, and swelling of feet.

November 15, 1896.—I found by physical examination an increased area of pericardial dullness, and dullness over lower lobe of left lung. The heart sounds are muffled, but no murmur could be detected. There is general anasarca. The urine has a specific gravity of 1,024, and contains a trace of albumen and some hyaline casts.

November 19.—Urine acid; specific gravity, 1.017; urea increased relatively, but really considerably diminished; albumen, three-fourths of 1 per cent; some hyaline and granular casts. He failed continuously. His dyspnœa became extremely urgent, at times amounting to orthopnœa.

January 16, 1897.—At 11 p. m. patient became delirious, imagining himself on board ship.

January 17.—At 2 a. m. patient became unconscious, and died at 9 a. m.

Necropsy (five hours after death).—The body was that of a negro 1.66 meters tall and would weigh 70 kilograms. The body was well nourished and free from cicatrices. There seemed to be a great deal of fluid in the subcutaneous tissue. Rigor mortis absent. On section, about 250 c. c. of fluid was removed from the abdominal cavity. The stomach was normal, as were the intestines. The kidneys were small, dense, with adherent capsules. Blood flowed quite freely upon section. The pyramids were smaller than normal and appeared macroscopically to be degenerated, showing yellowish lines along the straight tubes of Henle. The renal arteries were thicker than normal, standing erect when the kidney was placed on its outer border, though it had been cut close to the aorta. Weight of left kidney, 170 grams; right, 140. Suprarenal capsules small, weighing 2 grams each. Spleen small, of normal appearance, bleeding freely on section; its weight was 90 grams. Liver normal in size, weight, and consistency; it weighed 1,470 grams. Pancreas normal in appearance, but small, weighing 60 grams. Heart was hypertrophied. The cavities were empty, except there was a small fibrinous clot in each ventricle. The cavities were larger than normal, and the ventricular walls were a little thicker than normal. All the valves were efficient. The right pleural cavity and the pericardium contained only a normal amount of fluid. Heart weighed 570 grams. Lungs: The right lung was normal; the left pleural cavity was completely obliterated by firm adhesions, which held the lung in close contact with the chest wall. The left lung appeared as if compressed for a long time. The vessels, bronchi, and air vesicles seemed smaller than normal. The lung occupied only 650 c. c. of space, yet there was not a trace of consolidation. It was everywhere crepitant, and sections of it from different parts floated upon water. The left lung weighed 270 and the right 550 grams. Microscopically there was a large increase of tissue between the renal tubules, the arteries were thickened, and the epithelium of the tubules was undergoing a granular degen-

eration. The capsules of the Malpighian corpuscles were considerably thickened. Brain normal; weighed 1,425 grams. The arteries, like the basilar and cerebral, were thicker than normal.

C. T. P.

CHRONIC INFLAMMATION OF BLADDER.

Case 1.

Interstitial nephritis.

S. B. B.; aged 66 years; nativity, Rhode Island; admitted to United States Marine Hospital, New York, December 22, 1896; died June 30, 1897.

History.—Patient is a white man; gray hair and whiskers; well nourished and well built, 5 feet 8 inches high, and weighing 190 pounds. Has been troubled recently with pains in back and shoulders and calves of legs, and with incontinence of urine. Has deafness in both ears, and the patella reflex is absent in both knees. For eighteen years he has had a slight swelling of right testicle. It is somewhat swollen now. Cutaneous sensibility almost absent. Examination of urine negative. These symptoms continued, with occasional remissions and intermissions.

February 3.—Cutaneous sensibility lost entirely save a small area around webs of fingers and toes and on penis, these parts being dulled in sensibility. Incontinence due to retention, and although relieved by frequent catheterization and irrigation of bladder the trouble increased.

February 13.—He complained of numbness of body and prickly-heat sensation in calves of legs.

March 12.—He had some œdema of feet and ankles; also muco-purulent discharge from urethra, due probably to catheterization.

May 20.—Roughened breathing and adventitious sounds in right upper lobe of lung were noted. Œdema of legs less marked. Patient consumed a large quantity of food, but still complained of loss of appetite.

June 17.—Hydrocele chronic of right side aspirated and 160 c. c. brownish, milky, highly albuminous fluid withdrawn, affording considerable relief.

June 28.—Left testicle became greatly enlarged, swollen, and painful. Hypodermic needle revealed some albuminous fluid, but trocar and canula failed to remove any fluid but blood. He has been very despondent for the past week or two.

June 29.—Resting quietly.

June 30.—Apparently asleep, breathing slightly stertorous. Weak pulse. Stimulants given frequently during the day, also sponge baths, but the body temperature gradually increased until 7 p. m., when it was up to 41 C., dropping slightly until 9.30 p. m., when he died.

Necropsy (eighteen hours after death).—Rigor mortis present. Lividity, none. Pupils dilated. Normally developed body of a white man, 5 feet 8 inches high, weighing about 180 pounds. Thorax opened: Anterior mediastinum normal. Heart and valves normal. Pericardium contained 35 c. c. of fluid. Pleural cavity contained a small quantity of fluid. There were very extensive old adhesions of pleuræ to chest wall, especially the right side. Lungs, large vessels, and diaphragm were normal. Abdomen opened: A thick blanket of fat beneath the skin. Omentum and spleen were normal. The kidneys disclosed a cirrhotic condition, with bluish green discoloration of medullary and a shrinkage of the cortical areas. The right kidney weighed 190 grams, the capsule only slightly adherent. The left kidney weighed 105 grams, and had a cyst at superior extremity. Suprarenal capsules normal. The bladder walls showed a marked hypertrophic condition, and a small polypoid growth was found on the bladder wall near the urethral orifice. The ureters were greatly distended, most marked near the kidneys. The prostate gland was enlarged. Right testicle normal; left, congested, hardened, enlarged, and easily penetrated. Penis and urethra normal. Rectum, duodenum, and stomach normal. Liver weighed 1,792

grams, soft and friable. Gall ducts and gall bladder distended and adherent to liver; no concretions. Intestines, pancreas, mesentery, solar plexus, apparently in normal condition.

G. R. G.
G. W. S.

CASE 2.

Peritonitis.

P. C.; colored male; aged 31 years; nativity, United States; was admitted to wards of United States Marine Hospital, Louisville, Ky., December 16, 1896, suffering from stricture of urethra and complications (cystitis and extravasation of urine); died January 2, 1897, at 4.20 a. m.

History.—Patient gave history of stricture of two years' standing; had also suffered from syphilis. At the time of admission patient had been unable to micturate for four days, except a drop at a time. Complained of great pain in stomach and over bladder. Vomits constantly (a very small sound had been passed on him before he entered). Suffers greatly from vesical tenesmus. Straining all the time, but can only pass a little pus mixed with blood. Shows signs of infiltration of urine. A filiform bougie was passed followed by a Maisonneuve urethrotome under anæsthesia, and stricture cut. A small quantity of urine mixed with pus, etc., was drawn off, and bladder washed out with boric acid solution. Pain continued in region of bladder; belladonna and opium suppositories prescribed. Up to 22d there was little change. Urine voided in small quantities by use of soft catheter, and even this causes great pain. Swelling around perineum and scrotum somewhat distended with fluid. Made incision in scrotum, which was followed by discharge of fetid pus and urine. By passing finger into opening in scrotum a ragged tear or rent can be felt in urethra. Since stricture was cut, a soft catheter has been kept in bladder, and that viscus irrigated twice daily. Infiltration probably took place by urine passing down by side of catheter, as eye of catheter became blocked with pus and blood, although changed every twelve to twenty-four hours. Salol was given internally. Tear in urethra was twice stitched up, but infiltration continued to some extent, caused by bearing down and straining by patient, notwithstanding suppositories of opium and belladonna. The cystitis is extremely severe and of a gangrenous nature. Patient died of acute fulminating (septic) peritonitis on the 2d of January, 1896.

Necropsy (*six hours after death*).—Body of medium-sized colored male. Rigor mortis well marked. No froth on lips or nose. No lividity observable. Scrotum and glans swollen, and in the former an incised wound of about 4 cm. in length. Prepuce unusually long and pendulous. Cicatrix on left thigh near knee. Left foot turned inward and upward, inverted and rotated to some extent, constituting talipes varus. The hands are large; the nails long, the projecting edges filled with dirt. Very slight mobility of large joints. Eyelids only partially closed; the cornea transparent and comparatively tense. Lips and teeth slightly parted. No foreign body about mouth. Auditory meatus empty. Neck not very easily movable; no change observed. Chest full; abdomen slightly distended. Parts about anus somewhat soiled. No evidences of external injury except as noted. The coverings of the skullcap are normal in appearance. The bones of skull are remarkably thin for one of African extraction; the dura mater peels easily from bone; no fissure or injury of any kind is visible in the roof of skull. The bones are about 4 or 5 mm. thick. The brain being removed, there is no indication of effusion at its base. Very little blood in sinuses. Weight of brain, 1,200 grams. No signs of injury to bones of base of skull. There is no change on base of brain itself. The pia mater is very much congested on convexities of brain. The lateral ventricles are normal in size and contain a very small quantity of clear fluid. The tissue of hemispheres of brain is moist and glistening. The puncta vasculosa bleed upon section. Gray sub-

stance of cortex pale reddish. Consistence of brain good. Fourth ventricle empty; its choroid plexuses injected and somewhat turgid. The cerebellum is of good consistence and shows no change from the normal. No alteration of base of brain, pons Varolii, or medulla oblongata. Weight of cerebellum, 200 grams. Incision from chin to pubic symphysis: Adipose tissue slight; muscles pale. No foreign body of mechanical nature in abdominal cavity; but a whitish (sero-pus) yellow fluid escapes on opening cavity. The peritoneum is inflamed in both its visceral and parietal coats, and about 500 c. c. sero-pus contained in cavity. Intestines somewhat distended with gas; omentum of dark color; position of parts normal. Thorax: Slight pleural adhesions on both sides of chest; internally, near pericardium, adhesions are more extensive. Pericardium contains about a tablespoonful of fluid of straw color, but contains no flakes. Heart larger than normal; the right auricle contained antemortem clot, which nearly filled its cavity and extended into ventricle and pulmonary artery. A similar clot, only smaller, was found in left side of heart. The aortic valves somewhat stretched, but otherwise appeared competent. The tissue of heart muscle was pale and flabby. Mitral and tricuspid valves were competent, except for clot which was entangled in meshes of chordæ tendinæ and obstructing valves. Weight of heart, 340 grams. The lungs were both much congested, the posterior portions œdematous. Right lung weighed 500 grams; left, 475. Abdomen: Spleen, on section, dark brown red in color, two supernumerary spleens about size of filbert attached at entrance of splenic artery. Weight of spleen, 195 grams. Both kidneys congested. Right kidney weighed 200 grams. Color, dirty red brown. Capsule peeled easily. Line between cortical and medullary substance fairly well defined. Suprarenal capsule appeared larger than normal. Ureter dilated, as was pelvis of kidney, slightly, and contained about 2 c. c. of pus. Left kidney weighed 190 grams; abnormal in shape; a line drawn from pelvis across kidney would bisect apex of a cone, making organ appear as if pressed at both extremities and bulging in center. Capsule peeled with difficulty, tearing instead of coming off; line of demarcation fairly marked. Bladder strongly contracted and contained only a few drops of pus and blood. Walls greatly thickened. Mucous membrane intensely inflamed, almost gangrenous, black in color and in shreds of necrosed tissue. Testicles appeared much congested. Stomach distended and contained 150 c. c. to 200 c. c. of dark, bloody fluid. Mucous membrane congested and covered with petechiæ. The liver weighed 1,900 grams, of dark-red color, and bleeds freely on section. Inferior vena cava contained fluid blood. Cause of death: Inflammation of bladder, gangrenous with acute fulminating peritonitis. Immediate cause: Heart clot. No direct avenue through which the streptococci reached peritoneal cavity was discovered.

W. P. M.

STRICTURE URETHRA, ORGANIC (PERITONITIS).

J. S.; age, 32; nativity, Massachusetts; admitted to the marine ward, German Hospital, Philadelphia, Pa., January 29, 1897; died March 9, 1897.

History.—Gives history of having had gonorrhœa three times. Complains of strictures for last two years. Stream steadily getting smaller. Has had to arise several times at night to urinate for some time past. On failure to pass filiform bougie the operation of external urethrotomy was performed, and strictures well dilated. Perineal opening closed in, but urine still dribbled from it. On March 2 complained of pain in abdomen. Pain extended. Pus escaped from rectum, but its origin could not be detected. He grew weaker, and died March 9.

Necropsy (two and a half hours after death).—External appearance: Height, 5 feet 5¼ inches; circumference at shoulders, 32 inches. Skin very dark and hairy. Postmortem lividity, moderate. Rigor mortis, slight. General nourishment, fair. Pupils, unequal; right slightly dilated. Abdomen: Omentum inferiorly somewhat congested and adherent to fundus of bladder and anterior abdominal wall. Puriform lymph in masses, size of small coin, attached to small intestines. Sigmoid flexure of colon bound down by adhesions. Pancreas, weight 60 grams; pale on section. Left kidney,

weight 160 grams; small amount of perirenal fat; capsule stripped readily; surface somewhat congested. On section, pyramids slightly congested; cortex normal. Right kidney, weight 165 grams; otherwise same as left. Spleen, 180 grams; slightly congested. A supernumerary spleen the size of a hazel nut. Stomach, capacity 1,400 c. c.; was half filled with ingested fluid. Liver, weight 1,520 grams; light brownish-red in color. Section normal. Gall bladder distended with dark-green bile; common duct patulous. Space of Retzius contained 700 c. c. of greenish-yellow pus. From this cavity no sinus was discovered. Bladder contained 60 c. c. of dark-colored urine. Walls showed fibrous thickening, especially at the base. Mucous surface showed small hemorrhagic flecks. Lungs, no adhesions. Left, weight 450 grams; posteriorly some hypostatic congestion. Section showed nothing unusual. Right, weight 490 grams; otherwise same as left. Heart, weight 310 grams; right auricle completely filled with black clot. Right ventricle partially filled with thick, dark blood. Left auricle showed post-mortem clot. Left ventricle small post-mortem clot. All valves competent. On removal of lower 20 cm. of rectum, a round hole, 1 cm. in diameter, in left wall was found, 16 cm. from anus. No pus in this locality was discovered. The perforation had a smooth edge of mucous membranes. (Patient had passed some pus by rectum for several days prior to death while straining in urinating. Other organs not examined.)

C. P. W.

CHRONIC PERITONITIS.

T. V.; age, 27; nativity, Holland; admitted to the United States Marine Hospital, Stapleton, Staten Island, N. Y., August 26, 1895; died September 14, 1896.

History.—Well until three weeks ago, when he began to have abdominal pain and enlargement of abdomen. Feet and legs are now swollen; no nausea or vomiting; three or four small, dark-colored, bloody, slimy stools daily; no tenesmus; says he has had several attacks of yellow fever (?); withdrew 8,600 c. c. of fluid from abdomen. R. Infusion of digitalis, 10 c. c. t. i. d.

August 30, 1895.—Withdrew 7,200 c. c. of fluid; symptoms about the same as on entrance.

September 1, 1895.—Passed 600 c. c. urine in last twenty-four hours. Analysis: Color, dark yellow; reaction, alkaline; specific gravity, 0.1025; albumen, none; sugar, none; heavy sediment of phosphates.

September 12.—For past ten days patient has been very feeble; urine has increased in quantity to 1,000 c. c. daily; withdrew 7,000 c. c. of fluid from abdominal cavity.

September 21.—Some pain in abdomen, R. Morph. sulph., 0.015; withdrew 6,600 c. c. fluid.

October 1.—No marked change in condition; 7,000 c. c. fluid withdrawn.

October 9.—Passing little urine; frequent copious, watery stools; withdrew 7,200 c. c. fluid.

October 12.—R. Morph. sulph., 0.06; acid salicylic, 0.3; aqua calcis, 20. M. Sig. 30 gtts. hypodermically t. i. d.

The above prescription was continued without interruption until February 1, 1896, with marked improvement in his general condition. He was tapped about once monthly during that time.

December 27, 1895.—A large firm substance palpable in left hypochondriac region 10 to 12 cm. in diameter. Emphysematous condition of belly wall, the water having invaded the cellular tissue and thus gave this sensation to the touch.

September 14, 1896.—Patient has been failing for the last six weeks. Symptoms do not differ materially from those outlined above. He was tapped thirteen times and 84,000 c. c. water was removed. Digestion good; appetite fair. Has been confined to bed for last two weeks. Died at 8.30 p. m.

Necropsy (nineteen hours after death).—Body emaciated; post-mortem lividity slight; abdomen distended with fluid and the lower ribs are greatly expanded by the pressure. Upon removing the skull cap the dura mater presented a normal appearance.

The vessels of the pia mater were injected and the vertex of the brain covered with a fibrinous coat resembling gelatin. The dural sinuses contained fluid blood. The puncta vasculosa exuded a quantity of blood upon section through the brain. The choroid plexus was very pale and the basal ganglia very much softened. The abdomen being opened it was found filled with a fluid resembling thin gruel. The intestines were coated with fibrin and lay in a solid mat in the center of the cavity. When the fluid was removed, the walls of the abdomen did not touch the viscera, leaving a space of about 7 cm. all around, save at the diaphragm. The diaphragm was pushed upward so that the plane of its arch was on a level with the lower border of the fourth rib at the sternum. Right lung coated with fibrin and firmly adherent to mediastinal surface of pleura. Right pleural cavity contained 300 c. c. of grayish purulent fluid. Left lung congested and coated with fibrin but not adherent. Left pleura cavity contained 250 c. c. bloody serous fluid. Pericardium contained 250 c. c. of straw-colored fluid. Right auricle filled by post-mortem clot. Other cavities contained both ante and post mortem clots. Wall of left ventricle four times the thickness of right; weight 260 grams; valves normal; aorta presented no abnormality. Omentum lost in fibrin. Spleen completely enveloped in a fibrinous coat 0.5 in thickness, which thus gave it the appearance of a mass of fat; weight 1,240 grams; tough under the knife. Both kidneys congested. The suprarenal capsules resembled liver tissue in appearance. Mucous surface of bladder was mottled red and black. The prostatic urethra was of a mahogany-brown color; beyond the prostate the urethra was somewhat reddened. The right side of scrotum contained a hernial sac, the walls of which were very much thickened. The intestines had been returned to the abdominal cavity some time previously and adhesions had held it there. The remaining abdominal viscera were firmly matted together and a satisfactory dissection was next to, if not, impossible. The peritoneum was about 0.5 cm. thick and studded with small red elevations, papules, as it were, probably tubercles. Pathological examination: Kidneys normal. Spleen slightly congested, otherwise normal. Liver normal. Prostate gland normal. Peritoneum (omentum) covered by a fibrinous deposit; structure very dense. Connective tissue greatly increased and thickened. A few bundles of yellow elastic tissue seen.

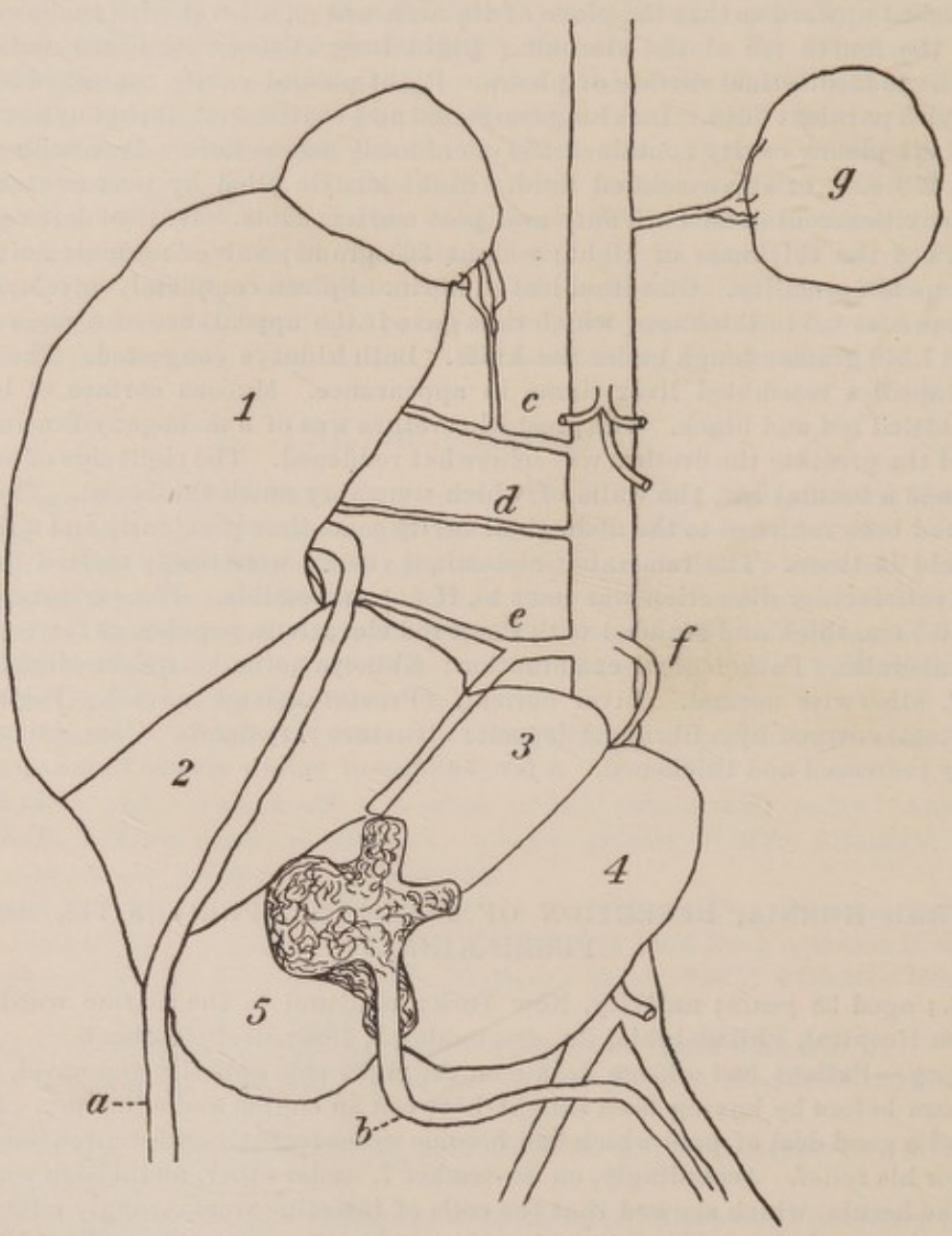
E. K. S.
P. H. B.

VENTRAL HERNIA, RESECTION OF INTESTINE, PERITONITIS, SINGLE-FUSED KIDNEY.

J. C.; aged 38 years; nativity, New York; admitted to the marine ward of the German Hospital, Philadelphia, Pa., September 2, 1896; died October 5.

History.—Patient had a large hernia on the right side opposite the navel, caused ten years before by having been caught between an engine and a bumper. He had suffered a good deal of pain which had become worse recently and wanted something done for his relief. Accordingly, on September 7, under ether, an incision was made over the hernia, which showed that the coils of intestine were strongly adherent to one another, and also to the skin and subjacent tissues over a space about 10 cm. in diameter. In the attempt to separate the adhesions, three small openings were made in the intestine not far from one another. These openings were closed with fine silk, Lembert suture, the operation abandoned on account of the adhesions, and the abdomen closed with interrupted sutures of silkworm gut. There was no trouble until September 15, when, the wound having healed by primary union without pus, the stitches were removed. On the same day, soon after eating dinner, the patient sneezed, causing the abdominal wound to break open over a space of about 2 cm., followed immediately by a discharge from the intestines. Patient was etherized and the opening in the intestine and abdomen closed as before, but seven days later, September 22, the wound again broke open and the discharge continued, checked by compresses till September 28, when it was decided to make a radical operation for

the relief of the patient. Under ether, the wound was reopened, the mass of intestines dissected loose, some being between the peritoneum and abdominal walls (properitoneal), when it was found that the intestines were adherent to one another in such a way as to cause a stricture of the gut, and it was decided best to excise the mass. The mesentery was tied in three sections with catgut and 20 cm. of the jejenum resected, approximating the ends with two rows of sutres, the first including all coats and the second only peritoneum and muscle. With difficulty the abdominal walls were approximated with interrupted sutures of kangaroo tendon and silk,



Front view of forward kidney. Figs. 1, 2, 3, 4, and 5 indicate the lobules with grooves separating them from one another. *a*, right ureter; *b*, left ureter coming from the anterior hilum. *c*, *d*, *e*, and *f* indicate the four renal arteries. *g*, left supra renal capsule and artery.

and the wound closed without drainage. Patient was very weak for twenty-four hours, but rallied and seemed to be doing well on rectal alimentation with peptonized milk and eggs until October 4, when he became restless; pulse and respiration hurried, and death occurred next day from exhaustion. There was no elevation of temperature, the highest being 37.2, the average 36.4.

Necropsy (sixteen hours after death).—The body of a man apparently 38 years old, of medium stature, hair brown, and beard of two or three weeks growth of same color. Features regular, teeth good, eyes gray, pupils dilated. Body pale except

dependent parts, which are livid. A wound is seen on right side of abdomen, opposite the navel, 15 cm. long, partly open, with sloughing edges, over which pus escapes. Only the thorax and abdomen were examined. On removing the sternum the lungs and pericardium appear normal in front. No fluid nor adhesions in either pleural cavity. Pericardium contains about 30 c. c. of slightly turbid fluid. Heart weighs 250 grams, about size of a man's fist. Right ventricle contains white clots adherent to the trabeculæ and projecting into the pulmonary artery. Black clots in right auricle. Left side empty. All the valves seem normal. Diameter of aorta 2.1 cm., of pulmonary artery the same. Large bronchi filled with a slightly reddish, frothy mucus. Left lung pale in color in front, red posteriorly. Right lung dark red posteriorly and almost solid in upper and lower lobes, middle lobe only slightly congested. On section the solidified parts exude bloody, frothy mucus and serum. Weight of left lung, 375 grams; of right lung, 750 grams. Nothing abnormal found in the mediastinum; the remains of the thymus gland were observed and the nerves and vessels appeared normal. Abdomen: The opening in the abdominal wound leads to an abscess cavity in the abdominal wall on the right side of the wound containing about 75 c. c. of thick pus with a disagreeable odor. The abscess also communicates with the peritoneal cavity. The omentum is adherent to the edges of the wound and has gangrenous sloughs on its anterior surface. General fibrinous, suppurative peritonitis, exudate on the parietal and visceral layers of the peritoneum, especially marked beneath the wound and in right iliac fossa, gluing the coils of intestines to one another. No free fluid in the cavity. Spleen was about normal size, but paler in color and tougher on section; no abnormal adhesions. Bladder contracted and contained about 200 c. c. of turbid urine. Stomach distended with gas and contained a little fluid. The pyloric orifice admits two fingers; the cardiac orifice is one-fourth smaller. The small intestine contains a little grayish fluid and is somewhat dilated above the point of resection, which is some 2.1 meters from the pylorus. Union between the two ends was complete and there was no leakage under strong pressure with the water test. There was no obstruction of the intestinal caliber. There was considerable plastic lymph on the cut surface of the mesentery, although at the operation this was covered with peritoneum. Liver appeared normal except a dark stain on right lobe extending inside to a depth of 2.5 cm. Gall bladder and ducts normal. Pancreas normal. Kidneys: There was no kidney on the left side, only a suprarenal capsule, fully developed, 5 by 4 cm., oval in shape, in the normal position and supplied by a small branch from the left side of the aorta. On the right side was a large kidney mass, of L shape, as if the two kidneys had been fused together at right angles, the vertical portion joining the side of the horizontal portion, which apparently lay on its back with the hilum on its anterior surface. The hilum of the vertical portion was on the inner side, as is usual. The vertical portion was in the normal position with a normal suprarenal capsule above, while the horizontal portion extended 2 cm. across the aorta just above its bifurcation into the iliacs on the fourth lumbar vertebra. The posterior surface of the mass was flat and smooth with no indication of division into lobules or of the line of fusion. The anterior surface, more rounded, presented four slight grooves, three horizontal and one vertical, suggesting the division of the mass into five lobules. The lowest transverse groove does not extend completely across the kidney, but from the inner side only as far as the upper end of the vertical groove. From this point extending up to the second groove is the large four-sided hilum. Ureters: The right ureter originates in a large pelvis near the center of the vertical arm opposite and behind the first two renal arteries, but in front of the superior branch of the third artery, and descends across the horizontal portion, thence along the right side to the bladder in the usual way. The left ureter originates from the hilum on the anterior surface as follows: Four infundibula spring from the hilum, one from each of the four lower lobules, the largest coming from the lobule at the angle. These infundibula unite outside and in front of the kidney to form a pelvis from which the ureter arises, descends to a

point just below the lower border of the kidney, crosses the right common iliac artery and vein to the inner side of the left common iliac, along which it descends, lying over the left iliac vein, to the pelvis, and thence normally on the left side to the bladder. Length of right ureter, 32 cm.; of left, 27 cm. There are four renal arteries, three coming from the right side of the aorta and one from the left side of the front of the aorta opposite the lowest branch on the right. The first artery arises just below the superior mesenteric, enters the hilum of the vertical arm 4 cm. from the upper end and divides into three branches, first giving off a small branch from its middle to the right suprarenal capsule. The second, the smallest of the four arteries, arises 2 cm. below the first, enters the hilum 3 cm. below the first and divides into two branches. The third, the largest of the four, arises by a short trunk 3.5 cm. below the second and divides into two branches, the superior entering the hilum of the vertical arm opposite the first transverse groove 2 cm. below the entrance of the second artery and dividing into three branches, while the inferior passes over the front of the kidney, lying in the second transverse groove, to the anterior hilum, where it divides into three branches. The fourth artery, about the size of the first, curves slightly from left to right across the aorta, enters the third transverse groove and divides into two branches. The veins correspond with the arteries. Nerves: There are several small ganglia on the first and third arteries, from which numerous filaments form an intricate plexus. On section the kidney structure appears healthy, save perhaps slight cloudy swelling; from top to bottom the mass measures 18 cm.; length of lower arm, 10.5 cm.; width of vertical arm, greatest, 7 cm.; least, 4.5 cm.; of horizontal arm, greatest 7 cm., least 5 cm.; thickness, uniformly 4 cm.; weight, including suprarenal capsules, ureters, bladder, and the corresponding section of the aorta, 525 grams. (See drawing and photograph.)

NOTE.—It seems that this is the rarest form of anomalous kidney. Woolsey, in Morrow's System of Genito-Urinary Surgery, gives the frequency of horseshoe-shaped kidneys as one in sixteen hundred (1–1600); of entire absence of one kidney, one in four thousand (1–4000); and of single-fused kidney, one in eight thousand 1–8000).

G. T. V.

CHRONIC NEPHRITIS (URÆMIA).

P. A.; aged 40 years; nativity, United States; admitted to St. Francis Xavier Infirmary, Charleston, S. C., July 27, 1896; died July 29, 1896.

History.—The patient gave a history of rheumatism in 1872, affecting several of the larger joints and lasting several weeks. The present illness began July 23, 1896, with headache, vomiting, and numbness of the fingers. Two days before admission the right knee became swollen and very tender to the touch. The skin over the knee was reddened, apparently from the application of liniment. There was an aortic murmur with first sound of heart. On the 29th the redness over the patella had increased and the presence of pus was indicated by fluctuation. Upon incision about 30 c. c. of pus was withdrawn. The temperature, which was nearly 39° C. upon admission, had by this time dropped to 37° C., and there was a mild, restless delirium, with continuous dyspnœa. The urine was found to contain a small quantity of albumen. On the evening of this day the patient became comatose, and died at 11 p. m.

Necropsy (fifteen hours after death).—Rigor mortis well marked; body well nourished; lividity posteriorly. Some redness in front and outside of knee joint; abscess of connective tissue over patella and inside the joint not communicating with joint. On section the abdominal wall contained a thick layer of fat. The omentum also contained considerable fat. Intestines inflated with gas. Anterior mediastinum contained fat. Thymus gland not found. Thoracic contents: The pleura normal, both sides. Lungs showed some hypostatic congestion posteriorly and dark red color throughout. They were everywhere pervious to air and otherwise normal; weight, right lung, 768 grams; weight, left lung, 640 grams. The pericardium presented a



POSTERIOR VIEW OF SINGLE FUSED KIDNEY, SHOWING AORTA, SUPRARENAL CAPSULES, URETERS, AND BLADDER.

few fibrinous patches on both surfaces, not of recent character. There was a deposit of fat along the vessels of the pericardium. Heart enlarged; weight, 282 grams; walls of normal thickness and firm. Aortic valves calcareous and unyielding, causing stenosis, but very little, if any, regurgitation. Cavities of heart slightly enlarged. Walls of aorta thickened and yellowish in color. The large vessels of the thorax and abdomen were normal. Thyroid gland normal. Abdomen: Appendix vermiformis 9 cm. in length, with mesentery throughout. Kidneys surrounded by fat; capsules adherent; color, dark red; surfaces, granular; cortex of both very narrow; weight, 150 grams each. Suprarenal capsules normal. The spleen was extremely soft and friable; weight, 160 grams. The pancreas was normal in appearance; weight, 112 grams. The bladder, organs of generation, intestines, and mesentery were of normal appearance. The brain not examined, as friends desired the remains for burial.

P. C. K.

DISLOCATION OF CERVICAL VERTEBRÆ (FOURTH AND FIFTH) AND MULTIPLE INJURIES.

M. M.; aged 32 years; native of Austria; admitted to marine ward of German Hospital, Philadelphia, Pa., December 27, 1896; died December 28.

History.—On day of admission the patient had been caught in the chain of the hoister on a dredging boat and thrown against the deck. On examination, numerour contusions were seen on patient's body, on each side of the chest, across the back of the neck, in lumbar region, and on both thighs. A depression was detected above the seventh cervical vertebra, and there was complete paralysis of motion and sensation from the neck down, except the muscles of respiration and slight sensation just below the clavicles and shoulder joints. The patient could move the head from side to side and downward, but could not bear for anyone else to move his head. On turning him on his side to examine his spine he vomited and complained of pain in the neck, and could not bear any extension. When lying on his back with his head on a pillow he was perfectly easy. He had been given a hypodermic of morphia on admission, and his urine had been drawn off by catheter. Pulse was 88 and strong, respiration about 20, and temperature 35.4 on admission, but gradually arose to 41.4 at the time of his death. Eyes were bloodshot. Mind was perfectly clear and he spoke as if he thought his injuries slight. Pupils normal. Death occurred at 1.35 a. m. December 28, from failure of respiration.

Necropsy (fourteen hours after death).—External appearance: Body of a man apparently 35 or 40 years of age, well nourished and of excellent muscular development. Rigor mortis well marked. Lividity of dependent parts. On front of body an abrasion is seen extending across right thigh just below the groin. Posteriorly a concentric abrasion extends from top of right shoulder across base of neck. Slight bruise on back of left shoulder, also below left axilla, and another parallel and over the lower ribs. Left buttock covered with contusions extending nearly to the knee. Had well-shaped scalp, covered with dark-brown hair; ears thin, of moderate size; forehead broad; eyebrows heavy and dark brown in color; eyes dark gray, closed, pupils moderately dilated; nose short, but straight; mouth tightly closed, covered with dark-brown mustache; teeth, so far as could be seen, sound and regular. Internal appearance: Incision from neck to pubes. Thoracic organs contained nothing noteworthy, except right pleural cavity contained about 500 c. c. of liquid blood, evidently caused by the wounding of the pleura by the fragments of the right twelfth rib, which showed a comminuted fracture, 5 centimeters from the vertebral column. The eighth and ninth ribs on the same side were fractured about 1 centimeter from the costochondral junction, the eighth rib being also fractured again 3 centimeters behind the first lesion. The heart appeared normal in all respects; was in diastole, and both ventricles contained black clots. On opening the abdomen 250 c. c. of fluid blood were found in the peritoneal cavity, and con-

siderable extravasation of blood was visible through the peritoneum in the retroperitoneal tissues on both sides of the spinal column. A laceration large enough to admit the finger was found in the inferior layer of the duodenal mesentery (the peritoneum just below the duodenum), through which a rough piece of bone could be felt, which further examination proved to be the upper border of the second lumbar vertebra, which had been separated from the intervertebral disk above and dislocated laterally to the right, so that the spinal cord was visible. The spleen was twice the normal size and slightly more friable than usual. The fatty capsules of both kidneys contained considerable hemorrhagic extravasation, but the organic structure and suprarenal capsules and other abdominal and pelvic organs contained nothing noteworthy. The subject was turned on the face and the spine exposed from the atlas to the sacrum. Considerable extravasation of blood was found in the tissues in the midcervical and upper lumbar regions. The fourth cervical vertebra was found dislocated forward so that its inferior articular processes rested in front of the superior articular processes of the fifth vertebra. A small fragment, about 2 mm. square, had been broken from the lower part of the right inferior articular process of the fourth vertebra. The body of the fourth vertebra projected forward about 4 mm. beyond the body of the fifth. With the dislocation there seemed still to be room enough in the canal to avoid compression of the cord, but the membranes were found much congested, and on section of the cord, the same condition was seen in the abnormal number of vascular points presented, as compared with similar sections made at short distances above and below the point of injury. Though there seemed to be no compression, it was clear that the cord had suffered serious compression and internal laceration at the time of the injury. The tip of the spinous process of the first dorsal vertebra was fractured. There was not time to examine other organs.

G. T. V.

GUNSHOT WOUND OF FOREARM, WITH COMPLETE FRACTURE OF RADIUS AND RUPTURE OF RADIAL ARTERY.

Y. J.; a negro; aged 26 years; a native of Mississippi; was admitted to the United States Marine Hospital, New Orleans, La., July 15, 1896; died July 16, 1896.

Previous history.—General health had been good; denied any syphilitic infection; muscular system splendidly developed.

Present history.—During a quarrel, ten days ago, was wounded by a pistol shot; the bullet (38 caliber) penetrated the radial side of forearm on its anterior surface, comminuting and fracturing completely the radius about 10 centimeters from its lower extremity, severing the radial artery and escaping below the ulna on the posterior aspect of forearm. Profuse hemorrhage resulted (the patient stated that he had lost two bucketfuls of blood), which was eventually controlled by bandaging of arm. When admitted to hospital at 3 p. m., forearm was found to be dressed with bandages and posterior splint. On removal of dressing, wound appeared dark and suppurating; to confirm previous diagnosis of fracture, pressure was made on lower end of radius, when hemorrhage immediately commenced. Esmarch's bandage was applied to arm, chloroform administered, and an attempt made to secure bleeding end of artery, but without success. Dressing of iodoform gauze and splint were applied to forearm, Esmarch bandage left in situ, and patient assigned to bed. Examination was made several times during evening and night to ascertain whether tourniquet could be removed with safety, but as soon as rubber band was loosened hemorrhage immediately supervened.

July 16.—Lost some blood during night. Complained of pain in arm, for which hypodermic injection of morphine sulphate was given. Temperature, 37.6° C.; pulse 116, and weak. It was decided to ligate the radial artery in upper third of forearm; should hemorrhage not cease, then the brachial was to be secured. At 9.30 a. m. anæsthesia was induced by chloroform, and on account of the feeble pulse

was continued with ether. On examination of wound tissues were noticed to be gangrenous and malodorous, and amputation was immediately determined. The operation was performed as rapidly as possible by manchette of skin and subsequent circular division of the muscles at the upper third of forearm. Hemorrhage was slight; the radial, ulnar, anterior and posterior interosseous arteries were secured with catgut ligatures, the flaps sutured with aseptic silk, and drainage tube inserted. During operation the head was kept low, and cardiac and respiratory stimulants were freely administered. All precautions were taken to prevent shock. Patient regained consciousness, but remained in a condition of partial collapse. After the operation the radial pulse could scarcely be detected, extremities became cold, death taking place at 3.20 p.m., about five hours subsequently.

Necropsy (seventeen hours after death).—Body of well-developed, muscular negro. Rigor mortis marked; pupils dilated. Lungs normal, but pale. Heart pale in color, valves normal. Ante-mortem coagula found in right and left ventricles and extending into auricles. Spleen normal in size and capsule easily detached; parenchyma paler than normal. Liver weighed 1,100 grams, was pale on external surface and on section; small and devoid of blood; gall bladder contained small amount of bile. Both kidneys pale, but otherwise normal. Stomach distended and filled with liquid ingesta. On severing connections of heart only a small amount of blood escaped. The condition of entire body was profoundly anæmic. Seat of wound: The flexor muscles of lower third of forearm were gangrenous; radial artery was completely severed and necrotic for about 3 cm. at its proximal end. The radius was completely fractured and comminuted, fragments being found some distance from seat of injury. The bullet issued on posterior aspect of forearm, its course and exit being marked by black, necrotic tissues.

NOTE.—The case properly coming under the jurisdiction of the coroner, the necropsy was made under his direction and in his presence.

S. N.

CARIES OF THE DENTAL ALVEOLI—SECONDARY SEPTICÆMIA.

W. C. (colored); age, 51; nativity, South Carolina. Admitted to the United States Marine Hospital, Stapleton, Staten Island, N. Y., September 5, 1896; died September 12, 1896.

History.—Patient had a molar tooth extracted from upper jaw, right side, two weeks ago. The soreness and pain have not diminished, and there is some swelling of the right side of face. The tissues seem hard and indurated. Has applied blister to face, the cicatrix of which remains. Can not open mouth more than 2 cm., face and jaw are so tender. Pain in back of neck and throughout body. Appetite poor. Bowels constipated. Sleeps poorly and sweats some at night. Had a chill one week ago, but none since. Temperature, 37.5 C. That evening temperature had risen to 39.1 C.

9th.—Patient became talkative and mildly delirious; temperature, 39.4 C.; pulse, 106.

10th.—Passed a quiet night under the influence of bromide of potassium, 1 gram; still delirious and growing weaker.

11th.—Carphologia; subsultus tendinum; makes constant attempts to protrude tongue; can not speak.

12th.—Temperature, 41 C.; pulse, 130; respiration, 50; patient gradually failed, and died at 1.50 p. m.

Necropsy (forty-five hours after death).—As the right temporal fascia and muscles were cut across, preparatory for sawing the skull cap, the upper end of a pus cavity was opened. The calvarium was removed. The dura mater was normal. In removing the brain the circular sinuses were opened in freeing the pituitory body, and they were found to be filled with purulent matter. Further examination showed the two cavernous, the right superior and inferior petrosal, the right lateral and

transverse sinuses, to be filled with purulent thrombi. The left inferior petrosal contained a white thrombus 3 cm. long. Other sinuses on left side apparently normal. The vessels of the pia mater were injected, and on the vertex of the brain was a deposit of fibrin. Brain tissues apparently normal. Lateral and middle ventricles dilated to three times their normal capacity and filled with bloody serous fluid. The basal ganglia were softened, apparently the result of post-mortem changes. The pus cavity was now opened, beginning at the anterior border of the temporal muscle, on a level with the upper border of pinna, right side. It was found to extend downward beneath the zygoma, and between mucous membrane and muscles, nearly to the lower border of the inferior maxilla. The cavity was small, but the tissues were infiltrated with pus. On opening the abdominal cavity the intestines and liver were seen to be of a greenish hue. The diaphragm was in normal position. The right lung was collapsed and adherent at base and posteriorly. Left pleural cavity obliterated with adhesions. Pericardial fluid normal. Heart large and flabby. Right auricle distended with post-mortem clot. Other cavities about one-half full of fluid blood. Valves normal. Weight, 434 grams. The serous lining of all the cavities was dark reddish brown in color, probably from post-mortem changes. The aorta and large vessels were also slightly stained on their inner surface. The lungs were bluish gray, and were dotted with dark spots (anthracosis). Both were crepitant. On section the interior was nearly black, and blood exuded freely on pressure. Omentum contained little fat. The spleen was very small, weighing only 186 grams. Kidneys normal in size and weight. On section they were found to be congested, and fat droplets exuded freely from the cut surfaces. Bladder normal, as were the organs of generation. Rectum normal. Stomach partially filled with milky fluid. Duodenum normal. Gall ducts patulous. On upper posterior surface of the right lobe of liver was a depression or fissure 12 cm. in length, 1.5 cm. in depth; otherwise apparently normal. Pancreas normal. Mesentery normal. Small intestines normal. Vermiform appendix held by its fold of peritoneum to inner side of cæcum and extending nearly to the median line; about 2 cm. were free. Large intestines filled with dry feces. Aorta and vena cava presented no abnormalities.

E. K. S.
P. H. B.

ANEURISM OF ARCH OF AORTA.

W. McC.; age, 35; nativity, Nova Scotia; was admitted to United States Marine Hospital, Chelsea, Mass., March 26, 1897, and died May 14, 1897.

History.—Patient had been sick for three months before admission with shortness of breath and palpitation of heart and some pain in chest. There was no history of syphilis, but he had been a heavy drinker in former years. He was treated in this hospital some years ago by Surg. Fairfax Irwin for an aneurism of the popliteal artery, which was cured by compression of the femoral for twelve hours. Examination on admission showed a pulsating tumor in the upper right chest, about half way between the sternum and shoulder, and most prominent at third rib. This tumor gave loud systolic murmur, which was also heard over aortics and at apex. He became more dyspnœic and greatly œdematous, particularly on right side, and died apparently from weakness of the heart.

Necropsy (*six hours after death*).—The body was large, well nourished; great post-mortem rigidity and lividity, and all tissues very œdematous. On opening chest the posterior surface of sternum was found eroded in the upper third and the anterior extremity of second and third ribs of right side. The pericardial sac contained about 500 c. c. of a straw-colored fluid, with flakes of lymph, and the whole surface of pericardium was covered by a soft, ragged, fibrinous deposit. The heart was negative on section, but the muscle was extremely pale and flabby. All valves were normal. The aorta was very atheromatous, and about half way from the valves to

the opening of the innominate artery on the right side was a circular opening about 5 cm. in diameter, which had a very well-defined border and led into an enormous sac about 20 by 10 cm., the walls of which were lined with laminated clot at least 5 cm. thick in places. The tumor occupied nearly the whole of the upper portion of the right pleural cavity, compressing the upper lobe into a small space posteriorly. The tumor had eroded the posterior surface of the manubrium and the second and third ribs, the latter to such an extent as to allow pulsation, and a tumor to be seen on the outside during life. The aorta throughout was very atheromatous. The left pleural cavity contained about 1,000 c. c. of clear serum and there were a few old adhesions posteriorly. The left lung weighed 645 grams and was negative on section. The right pleural cavity was entirely obliterated below, and the lower lobe of the right lung was atelectatic, and the lower portion contained much purulent material. The upper lobe was negative. The liver weighed 2,975 grams, and was negative on section, except for the extreme congestion. Gall bladder negative. The spleen weighed 320 grams and was negative. The right kidney weighed 297 grams, the left kidney 280 grams. Both capsules peeled readily and left smooth surfaces. Section showed great congestion, otherwise negative. The urinary bladder was normal. The stomach and intestinal canal were negative. Pancreas weighed 125 grams and was negative.

A. R. T.
H. W. A.

ANEURISM FEMORAL ARTERY.

P. B.; white male; aged 28 years; nativity, Kentucky; admitted to United States Marine Hospital April 16, 1897, suffering from aneurism of the femoral artery.

History.—Patient states that two months since he first noticed a swelling about the size of a pigeon's egg on the inner anterior part of left thigh. This swelling came suddenly and gradually enlarged until at present it is 7 cm. long and 12 cm. across, beginning 4.50 cm. below pouparts ligament of left thigh. Man says he has not had syphilis to his knowledge; gives no history of direct injury; was accustomed to carrying very heavy loads; said that he could carry as much as five men could lift and put on his shoulders. At time of admission the tumor had reached the dimensions above stated; the pulse at the wrist was 130 per minute and continued at this rate, in spite of arterial sedatives and cardiac depressants, up to time of death. Temperature, 38.5° C. No pulsation of arteries could be felt in foot or leg; very little, if any, œdema of foot; considerable pain in foot and leg; urine loaded with urates and alkaline in reaction. Patient suffered from epistaxis almost daily. The tumor is very tense, the skin thin, bluish or purplish in color, and apparently unable to stand the pressure much longer. April 19, three days after admission, the patient was anæsthetized and a ligature applied above to the common femoral, but as this gave way the external iliac was tied; the femoral was then tied below tumor and the sac dissected out. Patient did well until the 24th, when gangrene of foot and leg set in and spread to thigh. On May 4 the "forlorn hope" of a hip-joint amputation was tried. Patient died eight hours later.

Necropsy (twelve hours after death).—Body of medium size, strongly built, muscular; white male. Left leg and thigh are missing, and a recent wound at left hip joint indicates point at which this member had been amputated; no cicatrices; gangrenous blebs forming on right leg also; rigor mortis; post-mortem lividity of dependent parts; eyelids partially opened, pupils dilated slightly; both nostrils stained with dried blood; the lips and teeth slightly parted, teeth well preserved; neck movable; no change noted about ears or scalp; no mark of injury except as noted. Body opened by a long incision from chin to pubic symphisis; adipose tissue well developed; muscles slightly pale. No foreign body in abdominal cavity; position of parts normal. The arch of diaphragm on each side is between the fifth and sixth ribs. The position of viscera of thorax is normal. There are no adhesions of pluera or pericardium. The pericardium contains about 8 c. c. straw-colored fluid. The

heart is hypertrophied and dilated. There is a considerable amount of fat surrounding heart, and its muscular substance is infiltrated with fat and easily torn. There is a small ante-mortem clot in left ventricle and a large one in the right auricle extending into ventricle. The right auricle is very much dilated. The tricuspid valve shows signs of recent inflammation. The valve cusps are covered with fresh vegetations. Weight of heart, 340 grams. Right lung slightly congested, otherwise normal. Weight, 500 grams. Left lung, hypostatic congestion of posterior part. Weight, 550 grams. Left kidney capsule peeled easily; line of demarkation between cortical and medullary substance well marked; the substance of organ firm and of a red color. Weight, 180 grams. Right kidney about the same as left, except a small hole or excavation in its substance about the size of a BB shot and about 3 mm. deep, situated on posterior surface just underneath capsule. Weight of organ, 165 grams. Spleen hypertrophied, purplish in color, pulp tolerably firm. Weight, 290 grams. Liver pale in color, somewhat coarse in grain or texture; bleeds slightly on section, glistening and fatty on section. Amyloid liver. Weight, 2,500 grams. Gall bladder contained 10 c. c. thick, ropy bile. The external iliac artery and vein were both clear above ligature—that is, no clot had formed—notwithstanding the vessel had been tied fifteen days before. The vermiform appendix found beneath the colon curved upon itself and bound down by adhesions. Brain could not be examined, as parties—friends—desired to bury him.

W. P. M.

CYLINDRICAL EPITHELIOMA OF STOMACH.

F. K.; aged 47 years; nativity, Austria; admitted to the United States Marine Hospital, New Orleans, La., July 6, 1896, and died March 6, 1897.

History.—Patient gave a history of syphilis contracted ten years ago; also of being a hard drinker. For the past two years he has been suffering with pain in epigastric and right hypochondriac regions. In March, 1895, he had an attack of jaundice, from which he apparently recovered. The most marked symptoms while under observation were a heavily coated tongue, anorexia, eructations, vomiting—the vomited matter at times resembled "coffee grounds;" constipation, pain and tenderness in epigastric region, progressive emaciation, and a slight cachexia. No tumor could be detected in the epigastric region. The heart and lungs were normal. The urine contained no albumen.

Necropsy (*seventeen hours after death*).—General nourishment very poor. Heart weighed 290 grams, poorly nourished, tissues softened, valves competent, no fluid in the pericardial sac. Left lung weighed 500 grams, right lung 420 grams; slight hypostatic congestion of both lower lobes. Right pleural cavity contained a few adhesions, left normal. Peritoneum inflamed in the region of stomach and duodenum and marked by numerous firm adhesions. The stomach was collapsed, greatly inflamed throughout; the pylorus presented an ulcerated area 8 cm. in length and 5 cm. in breadth. All the coats of the stomach were destroyed in this area except the peritoneum, and this was ulcerated through in one portion, allowing the contents of the stomach to escape into the peritoneal cavity. The pylorus was bound by adhesions to the head of the pancreas and the under surface of the left lobe of liver. Small intestine congested. Large intestine normal. Liver weighed 1,400 grams; tissues pale. Gall bladder contained 34 c. c. of bile. Kidneys: Left weighed 160 grams, right 170 grams; both normal. Bladder, urethra, and prostate normal. Spleen weighed 290 grams, substance greatly softened. Membranes of brain normal; weight of brain, 1,375 grams.

H. W. W.

NOTE.—Microscopic examination of specimens in this case showed a cylindrical epithelioma of stomach and fatty infiltration of liver. Pancreas normal.

H. W. S.

LOCOMOTOR ATAXIA.

W. B.; aged 64 years; nativity, Maine; admitted to United States Marine Hospital, Boston, Mass., November 15, 1893; died November 27, 1896.

History.—Patient had been ill for six months, but worked up until ten days ago. Unable to flex left leg upon his thigh. Fingers of left hand supplied by ulna nerve are somewhat numb and stiff. Appetite good. Bowels open. Voids urine unconsciously. Eyesight good. Says that he has had rheumatic attacks for years. Pupils react to stimulation of the will for accommodation, but the pupillary reflex is lost. Paralysis of muscles of shoulder and upper arm. Arthritis deformans affects some of the joints. Tendon reflexes lost. Subsequent history of the case includes gastric crises, with progressive loss of use of limbs, till he was confined to bed unable to rise. During the last six months there was a diarrhœa that was very slightly influenced by treatment, although numerous and continued efforts were made to check it. Abdominal pain at times was very severe. Emaciation became extreme, although appetite was very good most of the time. Urine and feces were voided involuntarily, yet no bed sores formed; on the contrary, the buttocks were callous and stained with tar from oakum kept under him to absorb discharges.

Necropsy (twenty-four hours after death).—Body extremely emaciated. Post-mortem rigidity absent. Slight hypostatic congestion. The dura mater of the spinal cord was reddened from the cauda equina up to the fifth dorsal vertebra. There was fluid beneath this membrane which produced some distention. The membranes of the brain were normal and nothing was found in the interior of the organ to indicate disease. Upon opening the abdominal cavity the pelvis was found filled with a thick grayish fluid and the intestines below the umbilicus were covered with a lusterless, gray, fibrinous coat. No abdominal organ displaced. The sternum being removed the lungs were seen to be of a light bluish color and in a state of collapse. The pleuræ were bright and glistening and there were no adhesions. About 5 c. c. of fluid in pericardium. Heart small but firm. Small quantity of dark-colored blood in right side. Firm ante-mortem clot in left ventricle; weight, 200 grams. Spleen bound by adhesions so that its capsule was torn in removal. Pulp dark red and very firm; weight, 45 grams. Left kidney presented no abnormality. The suprarenal capsule dark brown and friable; right kidney and suprarenal capsule in the same condition. Bladder contained a small quantity of milky urine. Walls thickened and firm and the interior is covered with a slimy mucous coating. Stomach contained 150 c. c. of black fluid with a few curds of milk. Mucous membrane soft and glossy. The lower part of small intestine contains a small quantity of fluid, yellowish feces and there are a few scybala in large intestine. No perforation was found through which the peritoneum could have been infected, but there were numerous spots from which the epithelium was desquamated, leaving a dark red base. Liver had a fine, gray, granular appearance on the surface. On the front of right lobe was a stellate cicatrix 2 cm. in diameter. The substance of the organ was very soft; weight, 1,400 grams.

E. K. S.
H. W. A.

MENINGITIS, ACUTE, DIFFUSED.

G. J.; age, 29; a native of Norway; admitted to the United States Marine Hospital, San Francisco, Cal., December 10, 1896, and died December 14, 1896, at 4 p. m.

History.—On entrance he complained of cough, vomiting, nosebleed, constipation, and a general feeling of malaise. Pulse 170. Temperature 39° C. He soon after became delirious and remained so until his death.

Necropsy (nineteen hours after death).—Brain and meninges: Meninges congested; pus under the dura spreading over anterior cortical region. Inflammation of arachnoid extended all over the cortex and down into the anterior fossa on left side. Puncta vasculosa profuse and well marked. Brain otherwise normal. Heart: Cal-

careous deposits around aortic opening and on the aortic valves. Other valves competent. Lungs: Hypostatic congestions. Spleen enlarged. Kidneys, liver, and intestines normal.

J. H. O.
J. G.

NOTE.—The inflammation was probably owing to sepsis, though the source was not ascertained. There were no signs of tubercle nor of syphilis.

J. G.

NEPHRITIS CHRONIC.

V. S.; aged 28 years; nativity, Louisiana: admitted to the United States Marine Hospital at New Orleans, La., November 3; died November 3, 1896.

History.—When admitted was too weak to give any history of himself, and died one-half hour after admission. He vomited almost continuously while in the hospital. An examination revealed œdema of the legs, which pitted very much on pressure. Respiration rapid and shallow, expectoration of frothy serum, râles coarse and fine, diffused over both lungs, which could be heard some distance from the patient. Heart feeble, sounds masked by the noisy respiration; mind remained clear up to time of death.

Necropsy (twenty-two hours after death).—Rigor mortis marked; general nourishment fair. Pericardial sac contained 50 c. c. of clear fluid; no adhesions. Heart weighed 452 grams; large and muscular; wall of left ventricle very thick; valves competent; the margins of the aortic and mitral showed small calcareous deposits. The arteries showed no signs of atheromatous changes. Left pleural cavity contained 150 c. c. of clear fluid; a few adhesions were found. The right pleural cavity contained 100 c. c. of fluid; a great many adhesions were found throughout the cavity. Left lung weighed 820 grams, pitted on pressure, and from the cut surface a large quantity of clear serum flowed freely; the lower lobe showed a slight hypostatic congestion. Right lung weighed 1,090 grams; very œdematous; lower lobe showed a marked hypostatic congestion. Peritoneum slightly congested; gastro-intestinal tract greatly congested. Liver weighed 2,350 grams; very large; showed a marked engorgement; tissue stained with bile. Gall bladder contained 25 c. c. of bile; ducts normal. Left kidney weighed 217 grams; right weighed 200 grams; both kidneys were enlarged; the capsule thin; surface white; on section the cortex was swollen and light in color; the pyramids deeply congested. Bladder and urethra normal. Spleen weighed 190 grams; normal in appearance.

H. W. W.
H. v. S.

FRACTURE OF FEMUR AND SKULL.

J. M.; aged 32; nativity, Canada; admitted to United States Marine Hospital Chicago, Ill., September 4, 1896; died September 10, 1896.

History.—Patient was brought in by ambulance about 11.30 p. m. He was conscious. Said he had fallen through the hatchway of the *Topeka* into the hold. His left thigh was broken about 12 cm. above the knee. A temporary splint had been put on by a doctor, but the foot was everted. There was very little shortening. Both eyes were "blacked," and the skin was broken over the left external angular process of frontal bone. He was not suffering, and there was no evidence of shock. He was put to bed in a comfortable position, and slept well. On September 5 an anæsthetic was given and the limb was set, a long auxiliary splint and Buck's extension being used. There was no overriding of the ends of the bone at the site of fracture, and false motion being free, comminution was suspected, but no manipulation was used for diagnosis of this for fear of wounding the vessels. On recovery from anæsthesia he was conscious, rational, and free from pain. On the evening of September 6, he became very dull, this being succeeded by violent delirium. On September 8 dressing was renewed, the adhesive plaster having stretched. He was

then comatose, and that day his urine became bloody. His temperature, which had ranged from 38° to 38.85°, rose to 39° C. on the 9th, and remained so until death.

Necropsy (six hours after death).—Body well nourished, still warm over abdomen; rigor mortis well marked. Skin generally pale, but slightly blue over upper part of chest and arms in front. Cadaveric lividity well shown posteriorly. Tissues about both eyes dark blue. Skin abraded near left external angular process of frontal bone. A greenish-yellow spot about size of a goose egg over right kidney. On section here blood is effused in skin only. Whole of left thigh is greenish yellow in color. Scalp carefully reflected and bone examined. A spot about the size of a dollar shows deep injection over the inner end of the left superciliary ridge. Periosteum being removed a vertical linear fracture is seen about 4 cm. long. Skull sawn carefully, calvarium removed. In removing brain the dura was so firmly adherent that the sinuses were cut in order to prevent tearing of the brain tissue. An irregular fracture of the horizontal portion of frontal bone on both sides is seen, on the right side a fragment in the center of the orbital plate being freely movable. The fracture observed on outer surface of vertical portion of frontal bone extended entirely through the thickness of the bone. On examination of the brain the vessels of the pia and arachnoid were highly injected. The lateral ventricles contained about 4 c. c. of straw-colored fluid each. The white and gray matter both showed fine red points on section, but no effusion of blood or laceration of brain tissue could be made out. The eyes were not removed, and on examination they appeared normal, pupils being equally dilated. Abdomen opened; omentum not seen; bladder is greatly distended, and of bluish-red color on top. No foreign substance seen. Intestines and viscera are normal in color and appearance. Arch of diaphragm reaches fourth rib. Pleural cavities both normal; lungs are mottled gray and dark red. Pericardium contains about 30 c. c. of straw-colored fluid. Right ventrical, small amount of dark fluid blood; right auricle, full of dark clots; left ventricle, small amount of dark fluid; left auricle, thick dark clots. Pulmonary artery contained a large, light red clot, and in the tricuspid valve was entangled a firm white clot. All valves normal. Right lung, dark fluid blood exudes on section. On the outer surface near the top of middle lobe is a firm patch of organized lymph about size of a quarter. Left lung presents same appearance with exception of the lymph. Aorta and pulmonary vessels normal. Thymus gland not seen. Abdominal viscera: Stomach normal in size and position. Mucous membrane gray, spotted with red, and covered by large blue vessels. Duodenum normal, bile duct open. Pancreas normal. Spleen normal in position and structure; has two notches on anterior border. Large intestine, vessels are half full of dark blood. Vermiform appendix long, very small, lumen open. Liver deep red on section, black blood flowing from cut vessels. Hepatic artery and portal vein are normal. Gall bladder half full of fresh bile. Kidneys and suprarenal capsules show no abnormality. Tissues around the right kidney seem normal. Solar plexus not examined. Bladder adherent to anterior abdominal wall to within 4 cm. of umbilicus, greatly distended, containing 1,000 c. c. of very bloody urine, no clots. Its mucous membrane was dark red in color, except at trigonum, which was light red. No ruptured vessel seen. Urethra normal; testicles and cord normal. Rectum contained semifluid feces. On cutting into thigh over the fracture the tissues were injected dark red, color not washed out; femur was broken only in one place; popliteal vein was opened; contained a large amount of dark fluid blood.

S. R. T.
P. M. C.

CEREBRAL HEMORRHAGE.

D. K.; age, 34; nativity, Germany; admitted to United States Marine Hospital, Baltimore, Md., July 10, 1896; died July 13, 1896.

History.—Family history could not be obtained as patient was unconscious. The following history was obtained from patient's friends who came with him to the

hospital: At 3 o'clock in the afternoon of July 9 it was found impossible to arouse him, after being asleep for several hours. In the morning of the same day patient had been at work on the boat as usual. He would open his eyes when spoken to and attempt to answer questions put to him. On admission to hospital patient had a pinched expression. Eyes were sunken and surrounded by dark circles. A slight ptosis was noticed of right eyelid, with a smoother appearance of the right side of face. Body was bathed in a profuse perspiration. No conjugate deviation observed, nor was there any abnormality of the pupils noticed. Both extremities of right side fell when raised without any resistance. Patella reflex of right side diminished. Ankle clonus slightly present. Sensation entirely absent on right side, though muscles contract by reflex action when pin is introduced. Pulse (70) was full, but regular. Heart sounds were normal. Arteries were "cord-like" under the finger. Lymphatic glands not enlarged, nor was there other evidence of syphilitic infection. Temperature (per rectum) was 37.4° C. Two hundred and fifty c. c. of highly colored and foul smelling urine was withdrawn from bladder; specific gravity, 1,020; acid reaction; a trace of albumen was found, but no sugar. Patient's shoulders and head were elevated, and bowels were moved with an enema. Cold applications were made to head. On the following day (July 11) patient vomited freely and was troubled with hiccoughs. Croton oil was given with no effect. July 12, temperature 38.2° C. Pulse 84. Passed urine involuntarily. Croton oil was again administered without producing a movement of the bowels. In the afternoon patient's temperature had gone up to 39.2° C. Pulse 120. Patient continued to grow worse till his death at 5 a. m., July 13, 1896.

Necropsy (*fourteen hours after death.*)—On removing the skull a large quantity of blood streamed from the nostrils. The dura mater was found filled with blood. Cutting through the dura a large quantity of blood poured out. On the surface of the left side of the brain, in the region of the second parietal lobule, was noticed a soft, pulpy area about 3 cm. in diameter. This necrotic area was colored with blood. It was very extensive and seemed to embrace the entire middle third of the left hemisphere. It extended almost to the pons varolii. An examination of the left middle cerebral artery showed that it had ruptured, though there was no evidence of an aneurism. The internal capsule could not be made out in the necrotic mass.

J. B. G.
G. W. S.

CANCER OF ŒSOPHAGUS AND RECTUM—GASTROSTOMY BY WITZEL'S METHOD.

J. W.; aged 67 years; negro; native of Nova Scotia; admitted to marine ward of the German Hospital, Philadelphia, Pa., September 1, 1896; died October 21.

History.—Had been a sailor thirty-five years, and during that time had had no serious illness, only a little rheumatism. Had drunk no alcoholics for thirty years. Never had any kind of venereal disease. Present trouble began two months ago with difficulty in swallowing and diarrhea. Three weeks ago he vomited about 250 c. c. of blood. On examination a thin, weak old man, with marked sclerosis of the arteries, no pulsation in either radial, though the arteries could be felt nearly throughout their course as unyielding cords. Heart sounds weak and irregular. Complains of constant burning, not lancinating pain, about the cardiac orifice of the stomach. Regurgitates all solid food shortly after apparent swallowing, and most of the liquid food. Says food seems to "hang" in his throat. Œsophageal bougie passed to a point 32 cm. from incisor teeth, beyond which it would not go. Urine normal. As the patient was starving, Witzel's operation for gastrostomy was done September 14, and the patient was fed through the fistula, which was entirely satisfactory, there being no leakage. He seemed to gain strength for a while and sat up a little four weeks after the operation, but October 15 he had bloody discharges from the bowel. The rectum was examined and an ulcerated tumor discovered about 7 cm. above the

anus. The patient grew gradually weaker from these discharges, although he continued to take food through the fistula until death occurred.

Necropsy (*six hours after death*).—General external appearances: Body of an old negro man with dark brown skin; length, 1.66 meters; circumference of shoulders, 0.96 meters; body much emaciated; rigor mortis marked; head covered with short, black, kinky hair, mixed with gray; short beard and mustache same. Forehead high; eyes much sunken; eyebrows and eyelashes scant; eyes open, irides brown; pupils dilated; cheeks hollow and cheek bones high; nose inclined to flatness; mouth large; jaws clinched; teeth visible, good, except right upper first bicuspid broken off close to gum; ears large. Five cm. below the ensiform cartilage and 2 cm. from the median line to the left, is a clear cut, round opening, 1 cm. in diameter, in the abdominal wall, through which a probe passes downward and to the left into the stomach. A faint scar 10 cm. long is seen passing through this opening from the median line to the left, parallel with the border of the left costal cartilages. Penis long, likewise prepuce, which extends considerably beyond the glans; pus and smegma beneath prepuce; two testes in scrotum. Head: Skull opened, skullcap nearly symmetrical, left side slightly larger; antro-posterior diameter, 18.5 cm.; transverse, 13 cm.; decided dolichocephalic with index of 70.2. Skull thick, front and back same, 12 mm.; sides, 5 mm.; three small pacchionian depressions on left side; meninges adherent on both sides of longitudinal sinus for 7.5 cm. from vertex back. Arteries at base of brain dilated and thickened. Sinuses contained little blood; a few black clots in left lateral sinus. Weight of brain 1,030 grams. Nothing else remarkable about brain. Incision from chin to pubes. Very little subcutaneous fat or muscular tissue; muscles red. Sternum removed; internal mammary arteries apparent on posterior surface; lungs lack 2.5 cm. of meeting over pericardium; a few enlarged glands in anterior mediastinum, dark in color; venæ innominatæ and superior vena cava distended with blood; thyroid gland about usual size; no remains of thymus could be found. Pericardium opened, 50 c. c. of clear serum found; coronary arteries thickened and tortuous; scarcely a trace of fat on heart; heart opened in situ; in diastole; right ventricle contained a little fluid blood and a long clot, part white, part black, extending several centimeters into the pulmonary artery; right auricle contained about 75 c. c. of black and white clots, and some fluid blood; left ventricle contained small quantity of fluid blood; no clots; left auricle a few black clots and about 50 c. c. of fluid blood. Aortic opening, 2.5 cm. in diameter, coats thick; pulmonary artery, 2.5 cm., coats thin; walls of left ventricle 2.5 cm. thick; of right ventricle, 5 cm.; of auricles, 1.5 cm. Aortic and pulmonic valves competent. Mitral and tricuspid seemed competent, though edges were thickened and nodular. Weight of heart, 240 grams; about size of subject's fist. Lungs: No adhesions or fluid in left pleural cavity; right, no fluid, but old adhesions of upper lobe posteriorly. Left lung small, gray with black spots, especially marked posteriorly; weight, 185 grams; right lung, larger, redder, and on section shows congestion, especially of posterior part of upper lobe; weight, 260 grams. Diaphragm rises to seventh intercostal space on both sides. Nothing abnormal about pneumogastric and phrenic nerves. Abdomen: Omentum very thin; intestines moderately full of liquid food and gas; no peritonitis; walls of abdomen and edge of left lobe of liver adherent to stomach at the fistula. Tongue, œsophagus, stomach, larynx, and trachea, removed. Thirty-two centimeters from the tip of the tongue was found a hard, cancerous mass in the œsophagus, surrounding the tube and extending 5 cm. down and about 7 cm. in circumference, the lower end being 10 cm. from the cardiac orifice. The interior of the mass was rough, irregular, ulcerated, and did not entirely close the lumen, but admitted the passage of a No. 23 F. sound. No perforation. Stomach contained about 500 c. c. of liquid food. The fistula was located nearer the pyloric than the cardiac orifice; about 5 cm. long from skin to interior of stomach and admitted No. 23 F. sound. The folds of the stomach were well united and reinforced by adhesions of the omentum, edge of left lobe of the liver, as well as to the parietal peritoneum. A test was made by putting water in the stomach, closing the

cardiac and pyloric orifices and squeezing the stomach. Not a drop of fluid escaped through the fistula, even when great force was used. Upper 10 cm. of rectum were the seat of a large cancerous mass which extended into the surrounding tissues, including the vesicular seminalis and retrovesical tissue. There was no obstruction of the lumen of the rectum and not much ulceration, and that was limited to the mucous membrane of the rectum. The mass was soft and on section of a greyish-white color, about the consistence of thick jelly. Kidneys: Right, weighed 100 grams; left, 140 grams; both good examples of granular contracted kidney, with adherent capsules, numerous small cysts under the capsules containing a jelly-like material, thinning of cortical parenchyma, increase of connective tissue, and granular surface. Suprarenal capsules appeared normal. Liver weighed 1,100 grams; gall bladder moderately full of bile; ducts patulous. Pancreas weighed 80 grams; two enlarged lymphatic glands attached to it. Spleen small, weighed 80 grams; externally, pale; internally, greyish red; rather firm on sections. Several calcareous patches found in the aorta, one especially marked at the origin of the cardiac axis.

G. T. V.

SYPHILIS.

R. F.; colored; age 21; native of Tennessee; was admitted to the United States Marine Hospital, Memphis, Tenn., on October 24, 1896.

History.—He gave a history of syphilis of three years' standing. Had been suffering a great deal of late with "bone pains" and muscular soreness. The cervical glands on the left side were much enlarged. One or two of the glands had suppurated and sinuses had ensued upon the spontaneous opening of the resulting abscesses. He was placed upon the usual treatment, the sinuses were curretted and packed and his case progressed rather satisfactorily until November 11, when his pulse became irregular and poor in quality, and his strength and appetite failed rapidly. Temperature, 37.6° C. He speedily developed a very labored respiration, the respiratory acts falling to 10 per minute, and died of apnœa on November 15.

Necropsy (twenty-four hours after death).—Body well developed. Syphilitic macules on lower limbs. An inguinal hernia of moderate size. Dura adherent near superior longitudinal sinus and fissure of Rolando. Serous effusion in subdural space. Perivascular lymph spaces very full of clear serum. Brain weighed 1.34 kilograms. Considerable thickening of the falx cerebri. Puncta vasculosa enlarged. Fibrinous clots in lateral sinuses. Slight degeneration of internal capsule on the left side. Ventricles full of fluid; blood clot in fourth ventricle. Basilar and vertebral arteries normal. Thorax: Pericardium contained 35 c. c. of fluid; heart weighed 470 grams; slight endoarteritis in coronary arteries; valves slightly atheromatous; lungs free from adhesions; slightly emphysematous. Abdomen: Liver weighed 2.02 kilograms and contained a few miliary abscesses, and presented slight syphilitic cirrhosis; spleen weighed 145 grams normal; left kidney weighed 150 grams; right kidney weighed 90 grams, and was in a condition of marked atrophic cirrhosis; mesenteric glands much enlarged and some presenting foci of cheesy softening; stomach, intestines, and bladder presented a normal appearance.

G. T. Y.

GENERAL ANÆMIA.

M. T.; aged 36 years; nativity, Norway; admitted to United States Marine Hospital, New York, June 10; died June 23, 1897.

History.—He had been receiving treatment at the city office for several weeks and for a time showed marked improvement. When he first came to the office a count of his red corpuscles was made, giving 1,936,000. After treatment had been carried on for some time he gradually grew worse again, and was accordingly advised to enter the hospital. Upon being admitted he was extremely anæmic in appearance, with a very heavily coated tongue and a fetid odor to his breath. His throat was quite sore, making it difficult for him to eat. His blood was again examined and great quantities of leucocytes found. The choroid found to be very pale and several

hæmorrhagic spots scattered throughout. Has four dioptres of myopia. Claimed to have perfect vision before he was taken sick. Was first put on sulphate of quinine and Fowler's solution. This was soon changed to the ferric sulphate in 3-decigram doses every four hours. A slight tendency to constipation was corrected by pills of aloin, belladonna, and strychnine. He gradually grew worse, taking little or no food. On the morning of June 23 he grew worse rapidly, and, though stimulated freely with both whisky and strychnine, died rather suddenly at 9.30 a. m.

Necropsy (twenty-four hours after death).—Body well nourished but skin was very white. Section through the skin showed very little blood in tissues. There was no œdema. The calvarium removed. Membranes adherent to brain along longitudinal sinus. Sinus and blood vessels empty, but normal. Section of the brain showed normal tissue. The heart was considerably enlarged, flabby, and bloodless. The muscular tissue seemed firm enough, but almost devoid of fluid in the cells. Very little fluid could be expressed from the muscle tissue. The pericardium contained about 50 c. c. serum. The great blood vessels, the pleuræ, and lungs were normal. The omentum was very thin and bloodless. It was difficult to find a distended vein in any part of the body. The intestines were pearly white. Spleen, kidneys, adrenals, urinary bladder, organs of generation, rectum, duodenum, gall ducts, pancreas, mesentery, small intestines, large intestines, and great blood vessels were normal. The liver was bloodless and pale, otherwise normal.

J. O. C.
G. W. S.

PYONEPHROSIS.

F. H. M.; aged 56; nativity, Maine; entered United States Marine Hospital, Portland, Me., May 27, 1897; died May 31, 1897.

History.—The patient complained of having been sick for several months, though able to work to within a few days prior to his application for relief. His general appearance seemed to indicate fair health, with no symptom of organic disease. There was no rise of temperature, no thirst, and no pain save in the back, which the patient attributed to rheumatism. He stated his habits had always been most temperate and that he could not remember when he had been sick before. There was a desire to pass urine frequently. The amount of urine passed in twenty-four hours was 70 c. c.; in appearance it resembled thick cream of a dusky color; it had a disagreeable odor and of an excessive high specific gravity, 1.052. Ten-twelfths of the amount was sediment, which consisted of pus, mucus, disintegrated kidney tissue, and urates. Two days after entering hospital he was taken with acute pain in the iliac regions, supposed at the time to be renal colic, which lasted twelve hours, followed by a chill and coma.

Necropsy (fifteen hours after death).—Cadaveric rigidity only slightly marked; body well nourished; no discoloration. Apart from the kidneys, ureters, and bladder both thoracic and abdominal organs appeared healthy. Both kidneys were surrounded by fatty tissue; had lost all their usual outer characteristic appearance, being of pale color, with flat, serrated edges, the capsule scarcely apparent; they were flabby and soft. The cortical and medullary portions were almost completely disorganized, with suppuration and disintegration throughout the uriniferous tubular structure. The ureters dilated and, with the pelvis of the kidney, filled with foul and thick secretions. There were no calculi or solid formation in either. The bladder was contracted, the walls thick, and with a capacity for not more than 30 c. c. The case seems noticeable in the fact that the patient had fairly good health and that his physical condition showed no sign of severe chronic disease, while his kidneys had been for a long time greatly impaired in their functions.

F. W. M.

CEREBRAL HEMORRHAGE.

A. S.; aged 23 years; nativity, South Carolina; admitted to St. Francis Xavier Infirmary, Charleston, S. C., July 13, 1896; died August 1, 1896.

History.—Upon admission he complained of constant headache and vertigo, the

latter causing the patient to fall on several occasions. The tongue was somewhat coated. The temperature normal. There was no history of syphilis, and the glands were not enlarged. Iodide of potassium was well borne, and it was thought produced a beneficial effect. On August 1, after a vivid flash of lightning, he became unconscious, and died within a few minutes.

Necropsy (*four hours after death*).—No rigor mortis; body well developed and well nourished. Head: The skull was extremely thin, especially for a negro. The frontal sinus was unusually capacious. Upon removing the skull cap a continuous flow of blood occurred from an opening in the dura mater, made by the breaking of adhesions of the dura mater to the skull as the latter was removed. This flow continued to the extent of 200 c. c., draining a recent hemorrhage under the dura mater, which had occurred from the superior longitudinal sinus. Along the inner margins of the falx cerebri were several calcareous nodules, and it is probable that the pressure of one of these corroded the walls of the sinus, predisposing to rupture. The hemorrhage had occurred into the subdural space on the left side, but had not coagulated. The membranes of the brain were opaque. The brain weighed 1,500 grams. The ventricles were distended with fluid. In the left lobe of the cerebellum, near its center, was a partly organized clot, the serous portion remaining separate beside the coagulum. On section the brain presented no other pathological appearance. The abdominal wall was muscular, with little fat. The omentum was thin; intestines presented a normal appearance. The vermiform appendix was about 6 cm. in length, red on the surface, and accluded in its terminal half. The proximal end contained fecal matter. The bladder and external genitals were normal. The kidneys were firm; cut surface normal; capsules slightly adherent. Suprarenal capsules hard, and contained a large number of small yellowish bodies. Ureters were normal. Spleen presented numerous points of thickening of the capsule resembling cicatrices. The organ was much enlarged; weight, 576 grams. The liver was enlarged; weight, 2,600 grams; presented the appearance of fatty infiltration. The diaphragm and stomach were normal. The anterior mediastinum, thymus gland, and thyroid gland were normal. The lungs were dark colored through the lower lobes, but there was no consolidation. The pleuræ were normal. Pericardium and great vessels normal. Heart firm; valves normal. Weight of heart, 416 grams.

P. C. K.

CHRONIC NEPHRITIS.

T. McL.; age, 37; nativity, New York; admitted to the United States Marine Hospital, Cleveland, Ohio, July 24, 1896; died September 4, 1896.

History.—Albuminuria variable, at times marked, at others absent. Œdema very marked, especially in legs. Extreme pallor was present. Patient was treated by digitalis, tonics, and diuretics.

Necropsy (*twenty-one hours after death*).—Rigor mortis slight. Fifty cubic centimeters clear fluid in pericardial sac. Heart weighed 420 grams. Small fibrous cast found in aorta. Small, sharp, calcareous deposits found on segments of aortic valves. Heart wall thickened on left side. Cavity empty. Usual amount of fluid in pleural cavity. Lungs darkly pigmented. Bronchi, on section, found full of mucus. Lower and upper lobes of left lung adherent to the chest wall and lower lobe adherent to the diaphragm. Posterior aspect of left lung congested. Left lung weighed 900 grams; right lung weighed 1,080 grams. Upper lobe (right lung) adherent to chest wall by an area size of a dime. Bronchial glands filled with broken-down caseous matter. Posterior aspect of right lung congested. At apex of right lung under adhesions was found a large caseous tubercle. Hard tubercular masses found diffusely distributed throughout right upper lobe. Liver: Surface pale-yellow colored, mottled; substance soft, easily torn; weight, 1,290 grams. Gall bladder slightly distended. Spleen congested; very red; weight, 200 grams. Kidneys: Left, weight, 82 grams; small; contracted; light colored; tough; difficult to cut; pyramids one-half inch from apex to base; capsule adherent, taking part of cortex

when stripped off; surrounded by much fat. Right kidney small; contracted; containing at lower end a cyst the size of an almond; substance light colored, tough, fibrous; capsule adherent, same as left kidney; weight, 60 grams; perinephritic fat abundant. The kidneys were considered to be in the late stage or contracted form of a large white kidney—chronic parenchymatous nephritis. Stomach and intestines normal. Brain: Dura mater normal in appearance, being removed readily. Surface of brain congested. Blood clot in occipito-temporal sinus. Lateral ventricles contained clear serum; about 50 c. c. of serum extradural left after removal of brain. Brain weighed 1,350 grams. Small quantity of urine found in bladder. Seminal vesicals normal.

R. M. W.

HEMIPLEGIA.

J. A.; negro; said to be 42 years old, but apparently about 60 years of age; nativity, Kentucky; was admitted to United States Marine Hospital December 4, 1896; died March 15, 1897.

History.—Patient states that he has been sick for three months. Complains of headache and pain in shoulders. The man has almost entirely lost use of right arm and leg and is comparatively helpless. Sensation: Mechanical irritability and temperature sense all below the normal. There was partial paralysis of bladder and rectum at first, but these symptoms soon disappeared as to bladder, but rectal trouble continued until death. Bed sores developed over sacrum and hips, and these were probably the direct cause of death from exhaustion.

Necropsy (three hours after death).—Body that of small, poorly developed, emaciated male. Height about 1.65 meters. Incision into body allowed escape of fluid blood. The body presents no particular characteristic, only that arm and leg of right side are atrophied and smaller than those of left. The prepuce is unusually long and the glans penis large, even for a negro. The nails of fingers are long, curved, and filled at edges with black dirt. Both feet are swollen and œdematous. An ulcer 1 cm. in diameter is located on outer anterior aspect of right ankle. Bed sore on right hip 4 cm. in diameter; also a small sore on left hip and a large one 5 cm. in diameter over the sacrum. No foreign body about nostrils or mouth. The teeth are nearly all missing and those left are carious. Rigor mortis moderate. Internal examination: Cranial cavities: The soft parts covering the skull were divided and reflected back; a contusion with slight extravasation of blood was found over occipital protuberance. The skullcap sawed through with difficulty, and when divided could not be removed until tough dura mater was cut through. The brain being removed, there was no appearance of serum or any other effusion on the basis cranii. The large sinuses in that situation contained but a moderate amount of fluid blood. There was no sign of injury to bones of base. There was no gross change of base of brain itself. The surface of brain well formed, the pia mater congested, the veins filled with blood, tumid on left side, somewhat less so on right side. Lateral ventricles contained a small quantity of straw-colored fluid; cavities of normal size; septum soft and easily torn; choroid plexus and vessels of velum of dark-red color and greatly distended. On cutting into hemispheres of the brain the tissue was found to be moist; the white substance exhibits numerous blood points from which drops of blood exude. Ruptured vessel and numerous small clots were found in the internal capsule, left corpora striatum; the surrounding brain substance was softened and gave way under a stream of water. The medulla oblongata was of a decidedly pinkish color. Weight of brain, 1,150 grams. Thorax and trachea: Muscles when cut appeared pale and flabby. Vicid mucus in trachea and larynx. The pericardial sac contained about 50 c. c. of fluid. The aorta contained atheromatous plates. The heart weighed 270 grams; the valves were competent. Both lungs collapsed. Vessels of lungs contained dark, coagulated blood. Right lung weighed 300 grams; left lung weighed 260 grams. Both lungs were stained in places with dark pigment. Liver: Dark brown in color; did not bleed on section; weight, 1,370

grams. Spleen contained an old hemorrhagic infarct about 2 cm. in diameter; weight of organ, 120 grams. Both kidneys appeared normal; the capsule peeled easily; weight—left, 170 grams; right, 150 grams. Urinary bladder thickened and contained a small quantity of mucus and pus. Intestines congested and nearly empty; otherwise normal.

W. P. M.

ADENO-CARCINOMA OF STOMACH (ULCERATED).

J. K.; aged 58; nativity, Ireland; admitted to United States Marine Hospital, New York, N. Y., February 26, 1897; died March 14, 1897.

History.—Patient was treated at this hospital in 1891 for tubercular elbow. The joint was entirely removed, with the result that the diseased condition was cured. Previous to this time he had been a hard drinker. The disease of the elbow was the only trouble he has ever had, and he has not been in any hostital since that time. When admitted he had been drinking, and an unsatisfactory history was obtained. He was in a bad condition and was very stupid, so no reliance was placed upon his statements. At this time he was vomiting black, slimy matter, and could retain nothing on his stomach. Bowels constipated; tongue foul and coated; urine dark red. Denies history of venereal disease. On the next day after admission his temperature was found to be 34° C. The vomiting was as bad as before, and it was necessary to stimulate him quite freely. With the exception of distress due to excessive vomiting, he never complained of pain. Thirteen days after admission a note was made that "abdominal percussion reveals an area of dullness about region of the cardiac orifice of the stomach. On palpation, when lying on right side, a cylindrical, rather hard mass is felt in region extending transversely toward liver. Liver seems diminished considerably. Examination yesterday of stomach vomited matter showed absence of hydrochloric and lactic acids, dark yellowish brown and thick slimy fluid, some coagula, albumen, and milk. No test meal had been given. The skin was dry and like parchment. When pinched up it would remain wrinkled for several minutes. He became very much emaciated, and was constantly vomiting. He became comatose twenty-four hours before death, dying of heart exhaustion.

Necropsy (*nine hours after death*).—Body poorly nourished. Rigor mortis marked. No external marks on body except the scars made for excision of the right arm. Abdomen sunken. Very little fat in abdominal walls. Omentum thickened and adherent to stomach and pancreas. The stomach was distended with gas. In tearing off the adhesions a small abscess of the head of the pancreas was ruptured. The stomach was pulled up and the pyloric end was found to be very much thickened; the walls were found to be 2.54 cm. thick. The growth infiltrated the entire circumference of the pyloric end of the stomach, and upon microscopic examination proved to be an adeno-carcinoma, ulcerated. The pyloric opening had not been encroached upon. An ulcer had perforated the entire wall opening into the head of the pancreas. The liver tissue was friable. The pericardium contained about 50 c. c. fluid. There were no other pathological conditions found.

J. O. C.
G. W. S.

CONTRIBUTED ARTICLES.

CONTRIBUTED ARTICLES.

The following articles relating to the work of the Service have been contributed by the several officers named. Included under this head, also, is an address delivered by myself before the Pan-American Medical Congress, in Mexico, and a report on international quarantine submitted to the same body.

A series of interesting historical sketches of the Marine-Hospital Service at the ports of Portland, Me., New Orleans, Cincinnati, Chicago, St. Louis, Memphis, and Port Townsend are grouped together in the latter part of this chapter.

Historical sketches of the Marine-Hospital Service at Detroit, Boston, San Francisco, Vineyard Haven, Evansville, Louisville, and Cleveland are to be found in the annual report for 1896.

INTERNATIONAL RESPONSIBILITY WITH REGARD TO EPIDEMIC DISEASES.

Address by WALTER WYMAN, A. M., M. D.,

Surgeon-General United States Marine-Hospital Service.

[Before the Pan-American Medical Congress in the City of Mexico, November 17, 1896.]

Mr. PRESIDENT AND GENTLEMEN: At the meeting of the American Public Health Association, held in Buffalo in October last, the following preamble and resolutions were adopted:

Whereas yellow fever is believed to be the most subtle and dangerous of all epidemic diseases; and

Whereas it is ordinarily conveyed into one country from an infected seaport of another; and

Whereas the continued and persistent presence of this disease in any seaport is believed to be unnecessary, and may be prevented by proper engineering and other sanitary measures: Therefore,

Resolved first, That it is the duty of every government possessing seaports thus infected to institute such engineering and other sanitary measures as will remove this menace to the seaports of other nations; and

Resolved second, That it is the duty of all governments continuously threatened with invasion of yellow fever from a seaport in which the disease is allowed to persist to make such representations to the government in possession of the offending seaport as will induce it to adopt the sanitary measures necessary to remove this obstruction to commercial intercourse and menace to human life.

Resolved, That a copy of these resolutions be transmitted to the executives of the several governments represented in this association.

At the conference of quarantine and sanitary officers of the United States, which was held in Montgomery, Ala., in March, 1889, the following resolution was adopted, and was reaffirmed by the American Medical Association at its annual meeting in the following June:

Resolved, That this conference is of opinion that it is a duty devolving on all nations to take measures to eradicate any plague center from their territory, and that the existence of such plague centers is a menace to all other nations; and that our State Department be requested to take measures, through proper diplomatic channels, for the conveyance of this opinion to the governments deemed obnoxious to the opinion as herein expressed.

These are the first expressions, so far as I know, recorded by representative bodies having the nature of a demand upon the national administration of any country to remove conditions which threaten the health and lives of the people of other countries. They call attention to the responsibilities resting upon the different governments in their relations with one another, and are simply a corollary to the golden rule of Christianity which declares that we should do unto others as we would that they should do unto us.

The human family has been described as a great organism, and an organism is defined as a body in which every member is at the same time a means and an end with regard to every other member. The hand ministers to the body, and the body gives strength to the hand. So, every nation affects, and is affected by, every other nation. Now, in all the treatises on international law there can be found no mention of the responsibilities of governments to one another in matters of public health. Therefore, this association has it in its power to take preliminary action that may result in a new chapter being added to the code which regulates the association of nations. As the world grows older it is to be presumed that the nations grow wiser. Steam and electricity have brought distant countries into close union, and new principles are being evolved, and the settlement of seemingly irreconcilable differences between nations is now often effected by arbitration. More than this, reciprocity holds a prominent place in the administration of all foreign relations. To these features of international compact one more should be added—an acknowledgment of responsibility in the matter of communicable disease and agreement to adopt necessary measures to suppress it. It can not be said that this sentiment does not exist among the people of various countries, but it *may* be said that a feeling of *responsibility* has never been *manifested* by *governments* with reference to one another. It is true international sanitary conferences have been held in Paris, in Philadelphia, in Rome, in Dresden, and again in Paris. These conferences, however, have resulted chiefly in pointing out a way which could be adopted by the several governments to prevent the spread of disease from one to another, but I can find no record that, so far as executive force is concerned, they have been followed by tangible results. The delegates to these conferences have not been invested with full powers, and too many of the propositions have been affirmed by vote qualified with the ad referendum proviso, and being referred have become dead matter. The conferences have pointed out the way, but the governments have failed to follow in the way set forth.

It remains to be seen whether methods productive of greater results can not be inaugurated, particularly with regard to the two great epidemic diseases, cholera and yellow fever—the one a matter of grave concern to both the east and the west, the other affecting the Western Hemisphere only.

CHOLERA.

Already there is being urged in the press the responsibility which naturally falls upon certain governments with regard to the continued existence and spread of cholera. It is now asserted that the perpetual breeding ground and abiding place of this great destroyer of the human race may, by engineering and other sanitary measures, be rid, at least in large measure, of its reproductive causes. A strong administration

of law by the more intelligent nation exercising sovereignty over the natives of India may diminish this disease, ever present in the low lands around the mouth of the Ganges. Then, too, its conveyance by pilgrims to the holy city of Mecca can be obviated. It is within reasonable bounds of possibility to rid these pilgrimages of their cholera-bearing features, and it is to the interest of every nation on the face of the earth to make such representations to the British and Turkish Governments that it will be done.

In a recent communication to the Marine Hospital Bureau from Dr. James F. Love, an American citizen of long residence in Alexandria, Egypt, concerning the severe epidemic of cholera in Egypt during the past summer, the writer says:

The present epidemic of cholera in Egypt emphasizes the importance which attaches to international sanitation and the geography of disease. * * *

As the ultimate inquiry deals with the exact origin of the scourge, we may accept without cavil the finding of the Koch commission that the home and source of the comma bacillus is in the delta of the Ganges.

The researches of Professor Proust, inspector-general of the French sanitary service, are of immense interest in this connection. He reiterates that cholera is endemic in the portions of India named, and that under illy defined or comprehended conditions the scourge becomes epidemic.

As is well known, there was the origin of the epidemic which devastated Egypt in 1830, 1840, 1865, 1883, and in 1895.

Professor Proust's studies indicate increase in the virulence of the germs at their very source. That region of the Ganges bounded upon the west by one of the branches of the Hoogly River and upon the east by the Brahmapootra, and extending as far into the interior as Benares, is the seat of endemic cholera. The region is triangular—its upper part inhabited, its base a desolate waste. The latter is the Swaderban region, covering an area of 7,500 square miles. Each high tide resembles an inundation, and on subsiding leaves vast areas of slimy ooze. Pernicious fever is almost certain to anyone staying in the locality. Add to these marshy masses the sewage brought by the great rivers from Upper India, and there is furnished the soil for the development of the cholera bacillus. These contaminated waters are used for drinking purposes by the natives. The introduction even of filters instead of sterilizing apparatus has reduced the death rate from cholera in Calcutta from 4,000 to 1,400 per year. * * * From this and similar geographical situations a stream of travel of Mohammedans is constantly going toward Mecca by way of the Red Sea. These pilgrims undergo no sanitary examination prior to their departure nor before their entry into Mecca. Pilgrims from other regions come by way of the Suez Canal and through the Red Sea.

Leaving Mecca there is a constant stream of travelers from Mecca to Damietta, Alexandria, and Cairo. Coming in contact with pilgrims from the regions where cholera is endemic, it necessarily follows that in their return the pilgrims from Egypt import the bacillus. This was unquestionably the source of the epidemic of 1895.

If cholera is to be successfully combated, the warfare must be carried into its own country and the destroying agent aimed directly at the source of the dreadful scourge. Mr. Baldwin Fathom, an English sanitary officer sent to India to study the subject, found that the great heat and decomposing matter but partially explained the high death rate. He asserts that there is absolutely no attention paid to hygiene

or sanitation. If properly carried out by the sanitary department of the British police in India, the scourge would be kept well in hand, its spread prevented, and eventually its source confined in a much smaller section of the country. To prevent the spread of cholera from India certain precautions should be and can be taken.

The Mohammedan exodus from India should be effectually stopped until it is shown that no pilgrim carries contagious or infectious disease with him. When pilgrims congregate prior to the departure for Mecca, rigid sanitary measures should be enforced in order that no germ-laden devotee shall depart. Again, all pilgrims should be detained to determine whether any cholera exists among them. The secondary points of departure from Mecca should also be carefully guarded, which might best be done at the entrance of the Suez Canal. These recommendations should be impressed upon the British Government and their officials in India, to the end that the Asiatic cholera, in the present day of rapid transportation and large transcontinental travel, might be permitted to follow all who may pass through India and have intercourse with those who have resided there, as it did with the recent arrival of a body of British troops from Bombay to Suakim, in Egypt, where several cases of the dread disease broke out, proving the fact that the source of the evil is in India.

Commenting on the above, an editorial in a recent medical journal says:

England is now reconquering the Valley of the Nile, and reestablishing the fortified cities which she deserted shortly after the fall of Khartoum. Surely she will realize her moral responsibility in a matter of such prime importance as the protection of the Western World against a plague which can so easily be controlled.

Formerly, this matter of cholera in Egypt, the Hedjas, and India was a subject of but passing interest to the people of the Western Hemisphere. To-day it is one of acute interest, as may be seen by a rapid review of the events of 1892 and 1893. In 1892 cholera succeeded in progressing on its western march to the ports of western Europe. Infected ships from the infected port of Hamburg arrived in the port of New York, where, but for strenuous efforts, a foothold would have been gained, and its extension to other cities of the Union and thence to the countries of the Spanish main and South America through commerce would have been but a matter of time.

In 1893 so great was the danger that the Congress of the United States passed a law intended specially to meet the coming danger, and medical officers of the United States were sent to twelve different ports in Europe to personally inspect the immigrants coming from infected cholera districts, to hold them at the port of debarkation, to disinfect their baggage, and take all other precautions to prevent their carrying this dread disease to the United States. To show the utility of this service and at the same time the direct interest of our Western Continent in the sanitary conditions which prevail in India, the Hedjas, Egypt, and Europe, it is interesting to note that of seven vessels leaving the infected port of Naples in July and August, 1893, three were bound for the United States and were subjected to all the United States sanitary requirements at Naples and arrived at New York without evidence of infection. Four left for South American ports without being

subjected to these precautions and became floating pesthouses. All were turned back by the South American authorities and returned to Naples with a record of 50, 90, 84, and 230 deaths, respectively. (See Annual Report, M. H. S., 1893, Vol. II, p. 8.)

The foregoing demonstrates the direct interest of the Western Hemisphere in the administration of affairs on the Eastern Hemisphere, though separated by 3,000 miles or more of ocean.

YELLOW FEVER.

But a matter of nearer and more vital interest to the members of this association and the governments which they represent is a disease scarcely known on the other side of the water, one which we may call peculiarly our own, for which we can blame no European or Asiatic nation, and for whose existence we ourselves are responsible.

If we assume that cholera is a disease for which the Eastern Hemisphere is responsible and that yellow fever is a disease for which the Western Hemisphere is responsible, we must admit that while in the east the duty has been half performed, in that the true nature of cholera has been discovered, and Haffkine is progressing with his protective inoculation, and that it remains now only for the governments to apply the knowledge obtained, in the west it must be admitted neither the true nature of yellow fever has been discovered nor are governments alive to the suppression of the disease in seaports. Yellow fever is a disease of the Western Hemisphere. Is it necessarily a part of our western life? Can it not be eradicated? In reading the medical literature of the times, one can but be impressed with the vast number of earnest scientific workers in the investigation of the causes of disease—and the earnestness of the public sanitarians who yearly meet at points remote from their homes to give exchange of information and to encourage one another in the noble work they have assumed. One is also impressed with the breadth of the field which they occupy. Diphtheria, variola, enteric and malarial fevers, leprosy, tuberculosis, and other diseases are to-day constantly under the microscope in almost every city and town. But in the effort to eliminate disease the operations of the medical profession are too diffuse. We have not a single enemy, but a dozen enemies, and, taking the medical profession as a whole, their shots are fired indiscriminately, without plan or order, at one enemy or another. To those whose duty it is to prevent and suppress the greater epidemic diseases, and who have had practical experience in administration, it would seem to be a wise plan to concentrate our forces upon one enemy at a time. I know of no more necessary campaign upon which to enter with concentration of forces than one against yellow fever in the Western Hemisphere. Cholera no longer inspires its old-time dread. It is now an unmasked enemy, requiring only vigilance, skill, and pecuniary resources to down it. A lapse in any of these particulars may give it a headway, but with these three particulars carefully observed the conquest of this enemy

as soon as it appears is a fixed certainty. The same can not be said of yellow fever; its entity is unknown.

Our duty with regard to it is a double duty, requiring (1) an investigation into its exact nature and cause, and (2) an insistence upon sanitary engineering and other sanitary measures which will remove it.

With regard to scientific investigation, it is hoped that the Congress of the United States will be induced at its next session to initiate a plan providing for continuous labor in this direction, and I quote herewith an extract from the last report of the Marine-Hospital Service:

The facts detailed in this and in the last annual report concerning the presence of yellow fever in Havana and Rio de Janeiro and the resolution passed by the American Public Health Association at its meeting in Buffalo regarding yellow-fever-infected ports, together with the well-known history of the disease, its frequent visitations to this country, causing loss of life and commercial distress and an annual trepidation throughout our southern seaboard—all together furnish a potent argument for the adoption of measures looking to the discovery of the true nature of this disease and its scientific prevention.

The discovery of the bacillus of cholera has robbed that disease of much of its terror. While still a scourge to be dreaded, its true character is so thoroughly known that its invasion may be met with confidence, the sanitary officers feeling absolute assurance that, with energy and means, it may be checked and made to disappear. Not so with yellow fever. The germ of this disease, if there be a germ, has never been discovered, though many attempts have been made.

While it is urged in this report that yellow fever can and should be made to disappear from ports that are constantly infected, by pressure brought to bear upon the government in possession of an offending seaport by the governments which are threatened therefrom, this effort should be supplemented by an earnest attempt to ascertain its precise cause. This can only be done by regular, systematic investigation and laboratory work, conducted by a number of observers, and under such provision of law and appropriation as will enable the work to be prosecuted without limitation as to time, even though it might require a number of years to achieve success. It is believed that it will be entirely appropriate for Congress to allot from the epidemic fund, from year to year, an amount sufficient to conduct this investigation.

COMMISSION FOR THE STUDY OF YELLOW FEVER.

It is of interest here to note that Boletin de Medicina Naval y del Cuerpo de Sanidad de la Armada, of Madrid, for February, has announced that steps have been taken by Señor Fernandez Losada, now at the head of the sanitary department of the army in Cuba, for the appointment of a commission to consist of a surgeon from the army and another from the navy, who shall have associated with them two professors from the bacteriological laboratory of Havana, which is under the direction of the eminent scientist, Santos Fernandez, to make a complete and scientific study of yellow fever.

Concerning the work of this commission the following letter has been received from the sanitary inspector of the Marine-Hospital Service at Havana:

OFFICE OF THE MEDICAL OFFICER IN COMMAND,
MARINE-HOSPITAL SERVICE,
Havana, Cuba, October 31, 1896.

MY DEAR DR. WYMAN: Referring to your letter of the 24th instant making inquiries in regard to the work of a commission which sanitary journals published would

be appointed by Dr. Cesáreo Fernandez Losada, head of the sanitary department of the army in Cuba, to make a complete and scientific study of yellow fever, I have to say that such a commission was appointed, and it consists of Drs. Acosta and Dávalos, of the laboratory of Dr. Santos Fernandez, with two surgeons of the army and two of the navy, and that they have been at work since last January. The surgeons of the army and navy have been making their investigations with the disease in the hospitals, clinics, etc., with the object of finding the etiological germ, and claim to have found a microbe which they think may be the cause of the disease, but it is believed by others that they have not been successful. Drs. Acosta and Dávalos are making investigations with the urine of yellow-fever patients in the laboratory, and claim that there can be found in that fluid on certain days and at certain times a poisonous substance which they call "toxine," and that the more of that ingredient there is in the urine the less serious the condition of the invalid, because the urine should eliminate that very poison in large quantities. They say that when the toxine exists it proves the case to be one of yellow fever. Sometimes it is impossible to find the toxine. They have been making experiments with the toxine on rabbits, and say that 4 grams of it injected into that animal will kill him in two days, but that if a serum prepared from the blood of a horse which has been properly treated is first injected into the rabbit and afterwards the 4 grams of toxine, the little animal will live sometimes forty days.

They are experimenting and investigating on this line and hope to find in it a way to treat yellow fever successfully, although they have not as yet made any experiments with it on persons sick with yellow fever.

Very sincerely, yours,

D. M. BURGESS,
Sanitary Inspector, Marine-Hospital Service.

DR. WALTER WYMAN,
Surgeon-General Marine-Hospital Service, Washington, D. C.

It would be an object of friendly rivalry if each of the governments interested would appoint a commission whose term of service would not be limited as to time, and amply endowed with every needed facility to investigate this disease, all honor to be accorded to that government which first should find its true nature.

SEAPORTS.

But the ultimate object to be attained, the focal point of all our efforts should not be lost sight of in the interesting details connected with the study of the etiology of this disease. We can not wait on scientific investigation. Our knowledge of yellow fever is incomplete, but enough is known of its nature and the causes which propagate it to enable us to take necessary action to suppress it wherever evident. We know that, while it may spread in clean places, it is nevertheless a filth disease, and that, when permitted to permanently exist, it is an evidence of a want of proper care on the part of public administration. Moreover, it is a disease preeminently of seaports. In the Annual Report of the Marine-Hospital Service for 1895 is a table showing the years in which yellow fever has visited the seaport cities of the United States. From 1800 to 1896 there have been only nine years in which the United States has not been visited by yellow fever. Twenty-

three visitations, it is proven, came from Havana, 12 were from Cuba (exact port unknown). Since 1862 there have been 26 invasions. The source of 19 of these is positively known, viz, 16 from Havana, 2 from Cuba, 1 Honduras. In some years two or more places in the United States have been infected independently of each other from Havana; thus, in 1862, Key West and Wilmington; 1871, Cedar Keys, Tampa, and New Orleans; 1873, New Orleans and Pensacola. There are five principal seaports in our Western Hemisphere which maintain this infection. They are Havana, Santiago, Rio, Santos, and Vera Cruz. Doubtless these different seaports which now threaten the whole of the continent have been infected one from another, and the port in which the disease had its initium is undoubtedly Havana. The first undoubted invasion of Cuba by yellow fever was in 1761, when it was brought to the city of Havana from Vera Cruz by the Spanish man-of-war *Reina* and *America*, and it is said that this date marks the beginning of the permanent presence of yellow fever in Havana. There are earlier records, however, of epidemic outbreaks in Havana, undoubtedly of yellow fever, though not recognized as such, namely, in 1620, 1648, 1649, 1653, 1654, 1655, so that it is impossible to say whether Vera Cruz may not have received its infection first from Havana. Yellow fever was unknown in Rio until 1849, when it was brought by an American ship to Bahia and thence to Rio. The disease was brought to New Orleans from Vera Cruz in 1843 and again in 1847. In 1868 it was again imported into Rio by another American ship. The last epidemic in the United States, 1893, a mild one, was imported from Havana. Since that date there has been no yellow fever in the United States, and the records show that the disease, although frequently imported, has never become a fixed habitat of our shores. The same can not be said of Vera Cruz, Havana, Santiago, Rio, or Santos, and history shows that when one of these ports does for a time become free from the disease it becomes again infected from one of the others.

Now, I am pleased to state that Vera Cruz, which in former years has been one of the most dreaded yellow-fever ports, appears no longer to occupy that unenviable position. I am informed that during the last year, while there were some cases, there were no deaths from the disease, and that sanitary measures are being taken in that city which are directly in line with the reforms which are herein advocated.

HAVANA THE CHIEF OFFENDING SEAPORT.

As has been said in a previous part of this paper it is desirable to concentrate our efforts upon one disease, but we may go further and say that it is desirable to concentrate them upon a single port. It is obvious to all that the chief offending port on the Western Continent is Havana. So greatly was I impressed by this fact while compiling the table showing the sources of yellow-fever infection of the United

States, that it seemed to be a duty to prepare the following letter, to be used as a protest by the proper authorities:

LETTER OF PROTEST AGAINST THE SANITARY CONDITION OF HAVANA.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL, M. H. S.,
Washington, D. C., December 4, 1895.

SIR: I have the honor to submit for your consideration the following statements relating to the island of Cuba and its chief port, Havana, and the jeopardizing relation which the latter in particular constantly bears to the United States by reason of insanitary, but remediable, conditions, causing it to be a focus of the infection of yellow fever, the most subtle and dangerous of all the epidemic diseases, and one which annually threatens the lives and property of a large portion of the United States.

I transmit herewith a table, which I have caused to be prepared for the Annual Report of the Marine-Hospital Service for 1895, showing the years in which yellow fever has visited the cities of the United States, the cities visited, and the source of the infection. It will be seen from the table that during the present century, from 1800 to 1894, there have been but seven years in which yellow fever has not visited the United States. The source of the infection is known in only forty-one of the eighty-seven years. In twelve of these forty-one years the source of infection is given as simply the West Indies, which may or may not mean the island of Cuba, but in twenty-three of the years the source is given definitely as Havana. Taking a more limited period—namely, between 1862 and 1894—our shores have been infected with yellow fever twenty-six different years. The source of the infection is known for nineteen, and of these nineteen yearly visitations sixteen have been traced definitely to Havana. The records further show that in some years a number of places in the United have been infected independently of one another from Havana, as, for example, in 1862, Key West, Fla., and Wilmington, N. C.; in 1871, Cedar Keys, Tampa, and New Orleans; and in 1873, New Orleans and Pensacola. The last epidemic of yellow fever in this country—namely, in Brunswick, 1893—was brought on vessels from Havana; and the last great epidemic—namely, in 1878—is traceable to the same source. The epidemic of 1878 invaded 132 towns of the United States and caused a mortality of 15,934 persons, and the pecuniary loss to this country has been stated at the lowest estimate as $100,000,000 in gold. The disease is not indigenous to our soil, but is always imported.

So great is the danger of its introduction from Cuba and Havana, that it has become a trite saying among sanitary officers that the only absolute safety lies in nonintercourse.

This subject is by no means a new one. Attention has frequently been called in the reports of the Marine-Hospital Service to Havana as a constant menace to the health of the United States, and the subject was one of exhaustive inquiry by the United States Yellow Fever Commission, whose report may be found in the Annual Report of the National Board of Health for 1880. I quote from this report as follows:

"Cuba, as its prosperity and commerce increased, has become the greatest nursery and camping ground of one of man's most ruthless destroyers. Itself most seriously afflicted, it annually disseminates to other lands, as from a central hell, disease and death." (Page 78.)

"Cuba makes no such efforts to limit the spread of yellow fever as have apparently proved successful in Martinique and others of the West Indies. * * * Our present knowledge justifies the hope that, if the periods when this tendency to die out was very manifest were utilized in efforts for protection, even Havana might be freed from the poison of yellow fever and require a fresh importation for the renewal of the disease." (Page 104.)

"So far is Cuba from making any efforts to control yellow fever, that much is done to favor its dissemination." (Page 105.)

"Until their accomplishment (sanitary measures) Havana will continue to be a source of constant danger to every vessel within its harbor and to every Southern port to which these vessels may sail during the warm season. * * * Since the United States Commission found in Cuba only well-known causes for its insanitary condition, it was concluded with perfect confidence that the means to render this condition satisfactory should consist of those well-tried remedies above indicated, which, wherever else applied, have always succeeded." (Page 107.)

I beg leave further to invite your attention to Senate report No. 1263, Fifty-second Congress, second session, February 4, 1893, being a report from the Committee on Immigration under resolutions of the Senate of July 16 and December 14, 1892, and of a special subcommittee of members of the Senate and of the House of Representatives, to examine into the condition of immigration from Cuba and West India Islands and the danger of the importation of epidemic and contagious diseases into the United States through immigrants from these islands. I quote from the report of this committee as follows:

"The evidence shows that the most fatal form of yellow fever is always present in Havana, and in the summer and autumn it is liable to be imported into the United States by both immigrants and merchandise passing through the State of Florida, unless the most thorough and preventive measures shall be constantly used. The sanitary condition of Havana is a perpetual menace to the people of the United States, and invites the entry into the island of contagious and infectious diseases of the most virulent and fatal character."

The city of Havana is unprovided with proper drainage or sewerage. The harbor of Havana is a cesspool which for years has received the drainage of the city, and is virtually a cul-de-sac, with no means of its being scoured by the tides or fresh-water streams. The wharves on the Havana side of the harbor are notorious as foci of infection. An examination of the records of the quarantine stations on the South Atlantic and Gulf coasts for the year 1894 shows that there were eleven cases of yellow fever taken from six vessels arriving at the Dry Tortugas quarantine station. All of these vessels came from the wharves in Havana. In the year previous, 1893, at Ship Island, there were five vessels which arrived at the quarantine station having had eight cases of yellow fever on board, and all of these yellow fever vessels lay at the wharves in Havana with the exception of one which lay very near a vessel which had been at Tallapiedra wharf and was infected with yellow fever. Two of these wharves, namely, the Tallapiedra and the San Jose, are particularly dangerous. Under this latter empties the sewer from the military hospital where the yellow fever patients of the Army are treated. It has been said that no vessel has ever been tied to this wharf with a nonimmune crew on board without yellow fever appearing among them. So well known is it as a danger point that it is called "dead man's hole" by ships' captains, and so great is the danger of being obliged to tie up to it that captains of American vessels have been known to pay for the privilege of discharging cargoes in the open bay on lighters, the payment being made by deduction from freight charges, amounting frequently to $200 or $300. Captains of American vessels have frequently asserted that the United States Government should not allow vessels to go to this wharf. The personal danger to the American seaman is increased by reason of the fact that the law compels him to remain on his vessel, even though tied to Tallapiedra wharf in "dead man's hole."

A description of the sanitary imperfections of Havana may be found in the Annual Reports of the Marine-Hospital Service, and in the report of the United States Yellow Fever Commission, previously referred to. I have made an inquiry as to whether any improvements in the conditions have been made in recent years, and the reports received show there have not been.

Sanitary Inspector Burgess reports that, while a new water supply has been pro-

vided for Havana, there has been no sewerage to correspond. He states that the few sewers are badly made of pervious material, so uneven in their course and so leaky that the city would be better off without them. It is already being reported that many houses, as also the city generally, are damper than before the new supply of water, and, naturally, this must obtain and increase until some appropriate drainage system is constructed.

The furnishing a new supply of water to a city before providing an extra amount of drainage is sometimes called by sanitarians "the cart before the horse" procedure. The danger is actually increased by the increased supply of water. The dread caused by this condition of affairs in Cuba, and particularly in Havana, is illustrated by a concise review of the quarantine regulations deemed necessary by local and state, as well as by the national quarantine authorities. Between May and November every vessel from Havana, and most other Cuban ports, arriving at any port in the United States between Norfolk, Va., and Brownsville, Tex., whether yellow fever has been aboard the vessel or not, is required to discharge ballast at quarantine, to have its hold washed and filled with fumes of sulphur, all the dunnage of the crew and baggage of passengers placed in steam disinfecting chambers, and after completion of disinfection the vessel is then held from three to five days before being allowed to enter port.

Some exception is made to the above with regard to iron steam vessels bringing passengers, but other specific and stringent requirements are added. Moreover, the regulations forbid absolutely persons not immune to yellow fever to come to Florida from Cuba during this period. By an immune person is meant one who has had yellow fever, or who has resided in a yellow fever locality a period of ten years. This rule therefore excludes children under ten years of age, and, notwithstanding that efforts have been made to abrogate this regulation, no health officer dares venture to recommend its abrogation. To carry out this regulation the United States is obliged to maintain two inspectors in Havana, in order to give the proper certificates to passengers leaving that port for the United States. All the above entails, in addition to responsibility, large expense.

It is a matter of common remark that the Spanish Government applies little or none of the large revenues of the island of Cuba to sanitary improvements.

I wish as a sanitary officer, having in view the safety of the United States from visitations of yellow fever, to protest against these conditions, so strikingly in contrast with the sanitary enlightenment of the age, and so threatening to the commerce and lives of the people of other countries, and particularly our own.

I have respectfully to request that the matter be brought to the attention of the Department of State.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

The SECRETARY OF THE TREASURY.

LETTER OF SECRETARY OF STATE TO SECRETARY OF THE TREASURY CONCERNING SANITARY CONDITIONS IN HAVANA.

DEPARTMENT OF STATE,
Washington, February 7, 1896.

SIR: The letter of Mr. Acting-Secretary Wike, of the 11th of December last, with which was communicated a letter from the Surgeon-General of the Marine-Hospital Service, inviting attention to the constant presence of yellow fever in Havana, due, as he states, to causes which are remediable, has had my careful consideration.

Owing to the existing state of affairs in the island of Cuba, and the unlikelihood of bringing about the prompt and radical remediable measures to which Surgeon-General Wyman's report adverts, in a time of political disturbance and financial embarrassment, I am led to present the subject to the Spanish Government in as considerate a tone as the facts of the case permit, and not as presenting a grievance,

but rather as pointing out a condition disastrous to the interests of both countries alike, and no less important to Spain than to the United States.

I inclose for your information copy of the note which I have addressed to the Spanish minister on the subject, and I shall communicate the correspondence in the matter to the United States minister at Madrid for his information, with the suggestion that he endeavor to impress the Home Government with the gravity of the situation and the necessity of such timely consideration of the matter as will lead to its eventual remedy.

I have the honor to be, sir, your obedient servant,

RICHARD OLNEY.

The SECRETARY OF THE TREASURY.

[Inclosure.]

LETTER OF SECRETARY OF STATE TO THE SPANISH MINISTER.

DEPARTMENT OF STATE,
Washington, February 7, 1896.

SIR: The Secretary of the Treasury has brought under my notice an elaborate report of the Supervising Surgeon-General of the Marine-Hospital Service, concerning the continuous danger to the health of the seaports on the Atlantic coast, and particularly those of the Southern States, and in the Gulf of Mexico, by reason of the endemic existence of yellow fever in the city and harbor of Havana.

Dr. Wyman, whose responsible position as the officer charged with the conduct of quarantine and health precautions so far as the same shall fall under the purview of the Federal Government especially qualifies him for intelligent observation of the conditions of infection existing in neighboring foreign ports with which this country maintains extensive commerce, has fortified his report on this subject with a table showing the years in which yellow fever has invaded the seaboard cities of the United States, the cities so visited and the source of the infection, from which it will be seen that during a recent period of over thirty years, in which time more accurate and specific observations have been recorded than in the early years of the century, a very large proportion of the epidemics which have desolated the coast States of this Union have had their origin in infection directly traceable to Havana, while of those epidemics theretofore generally described as originating in the West Indies since 1868, the appended remarks show that Havana was likewise, in many cases, the course of the disease.

The sanitary condition thus described has necessarily been a source of anxiety and well-grounded alarm to the authorities of the United States and of the several seaboard States, calling for sanitary precautions and measures of effective quarantine which bear onerously upon the intercourse of the United States and the chief commercial port of the island of Cuba, through which the bulk of our Antillean commerce passes. From time to time, also, the development and spread of actual epidemics, besides ravaging populous districts and entailing rigorous domestic quarantine, has paralyzed commerce and caused widespread hardships, not only as respects the Cuban trade, but as respects the trade of the United States themselves with other countries.

The correspondence of this Department with your legation for many years past shows that these restrictions upon the Cuban traffic in the ports of the United States have not infrequently been the occasion of remonstrance on the part of the Spanish representatives here, while on the other hand the sanitary condition of Havana has furnished obvious justification for the course pursued by the Federal and State health officers.

I am not aware of the actual situation of the island of Cuba, and I can not assume that the present time is auspicious for inviting consideration of the sanitary condi-

tion of the harbor and city of Havana with a view to removing the danger which perennially lurks there and imperils the health of neighboring communities. I feel, however, that it is my duty to lay this report before you and invite the most earnest consideration thereof by your Government. Another summer is not far distant, and with the advent of warmer weather renewal of the annual precautions against the introduction of yellow fever will be necessary, with all their concomitant restrictions and burdens upon a mutually beneficial commerce. Sooner or later the problem of attacking the pestilential conditions which exist and have existed for more than a century at Havana will demand the attention not only of Spain but of other endangered countries, with a view to devising an effective remedy for the state of things disclosed in Surgeon-General Wyman's report, and the gravity of the situation invites timely attention and action.

Accept, sir, the renewed assurances of my highest consideration,

RICHARD OLNEY.

Señor Don ENRIQUE DUPUY DE LÔME.

NECESSITY OF INTERNATIONAL SENTIMENT.

There are other seaports habitually infected with yellow fever; but it is believed if we will concentrate our energies first upon one, and that one the most dangerous, we may have greater hope of improving the present conditions; and actual results once obtained will furnish a precedent to aid in effecting like changes in other ports.

To this end we must awaken public sentiment—a sentiment that will cause the people to appeal to their respective governments.

At the Centennial International Medical Congress held in Philadelphia in 1876, Dr. John M. Woodworth, the first surgeon-general of the Marine-Hospital Service, a sanitarian in advance of his time, submitted six propositions for the consideration of the section on sanitary science, the last of which is as follows:

The endemic homes of cholera and yellow fever are the fields which give the greatest promise of satisfactory results to well-directed and energetic sanitary measures, and to this end an international sentiment should be awakened so strong as to compel the careless and offending people to employ rational means of prevention.

The time has come when we should submit no longer to this annual trepidation concerning yellow fever and when the restrictions to commerce caused by infected seaports should be removed.

And we should not fail to impress upon others their responsibility with regard to this public sentiment. In fact, we may claim as physicians and sanitarians that our work has so far progressed that it is the duty of others to take it up and press it to more practical results.

The dangers have been demonstrated, the causes have been made known, the methods to be adopted have been pointed out. Now, gentlemen of the exchange, of the legislature, and you who are skilled in diplomacy, it is time for you to bear a hand. Join your efforts with ours that commerce may be free, unobstructed by sanitary restraints, and this disease be eliminated from the friendly intercourse of nations.

REPORT OF THE COMMITTEE ON INTERNATIONAL QUARANTINE ADOPTED BY THE PAN-AMERICAN MEDICAL CONGRESS HELD IN THE CITY OF MEXICO, NOVEMBER 16 TO 19, 1896.

[Published in the New York Medical Journal, March 6, 1897.]

CITY OF MEXICO, *November 18, 1896.*

To the President and Members of the Pan-American Medical Congress.

SIRS: The committee appointed upon international quarantine have the honor to report that in the prosecution of the work imposed upon them they have carefully examined and considered the quarantine provisions embraced in the findings of the international sanitary conventions held at Rio Janeiro in 1887 and at Lima, Peru, in 1889, and the report of the committee on sanitary regulations in the international American conference held in Washington, D. C., in 1890. They have also examined the provisions of the quarantine law passed by the Congress of the United States in 1893 and the regulations made thereunder to be observed in foreign ports with regard to vessels bound to the United States, and the regulations to be observed while at sea and upon arrival at the port of destination.

The results also of the several European conferences, so far as they relate to maritime quarantine and have a practical bearing upon the subject in relation to the Western Hemisphere, have been duly considered in the preparation of the regulations herein mentioned.

The conclusions of the committee with regard to maritime quarantine are as follows:

1. Each nation should enact quarantine laws and maintain quarantine stations for its own protection. In protecting itself it protects the others.

2. Quarantine operations should have their initium at the port of departure.

To this end each nation should require of every vessel leaving a foreign port and bound to one of its own ports a bill of health signed by its own consul and certifying that all requirements and regulations necessary to insure a sanitary condition of the vessel, cargo, and passengers have been complied with.

The consular bill of health should contain all possible sanitary information regarding the port of departure and the territory connected therewith. This information should include a statement regarding the prevalence or nonprevalence of contagious diseases, the various diseases being arranged on the bill of health in tabulated form and an entry made against each.

There should be a requirement forbidding a blank report concerning any of the diseases so tabulated. The consul should be aided in furnishing the information required by a sanitary representative of the government having the port jurisdiction, as provided for hereafter.

The regulations of the Treasury Department of the United States, a copy of which is submitted herewith, are recommended as a basis for all regulations to be observed in foreign ports.

3. Each government should maintain quarantine stations in its domestic ports. Quarantine stations should be of two descriptions:

(*a*) Inspection stations.

(*b*) Refuge stations.

(*a*) *Inspection stations.*—All ports of entry should be provided with inspection stations, where inspection of vessels from all foreign ports and inspection of vessels from infected domestic ports should be required. These inspections should be required throughout the entire year.

(*b*) *Refuge stations* are stations provided with a lazaretto for the treatment of the sick with contagious disease; a hospital for the treatment of noncontagious or doubtful cases; a detention house for the accommodation of those who have been exposed and are held under observation; and apparatus for the disinfection of the vessel, cargo, wearing apparel, and other dunnage. The quarantine regulations of the Treasury Department of the United States, to be observed at domestic ports, a copy of which is attached, are recommended as minimum requirements, special provisions to be added as may be deemed to be necessary on account of special conditions.

Refuge stations should be sufficient in number and conveniently located to accommodate without undue loss of time the vessels remanded thereto.

4. Vessels arriving at an inspection station and requiring sanitary treatment should be remanded to the nearest refuge station.

5. The treatment required of vessels arriving at domestic ports being dependent in large measure upon the sanitary information included in the bill of health, it is the duty of each government to give full and free information to the consul at the port of departure, and to this end each government should appoint a properly qualified physician whose duty it should be to furnish on request of the foreign consuls the exact information necessary to comply with the requirements of the bill of health, and also from time to time such additional sanitary information concerning the harbor, shipping, port, and surrounding territory as may be of value or interest to the sanitary authorities of other governments.

6. Each government shall obligate itself to transmit to any other government making request therefor, through the proper official channels, the name of the physician appointed or detailed for the above-named service at any port mentioned in the request, and the compensation of said physician shall be paid by his own government.

In making the foregoing recommendations the committee have had in view measures of the most practical character and have sought to avoid suggestions which might, theoretically, answer the demands of international quarantine, yet, practically, become inoperative.

To those who have had practical administrative experience it is plain that in any scheme presented liability to error and an inclination to shift responsibility must be taken into account; therefore, so far as possible, there should be no division of responsibility.

Again, quarantine is essentially a defense to be maintained by each individual nation, and no international plan is feasible which will infringe in the slightest degree upon the sovereignty of any nation. International quarantine stations, for example, to be operated jointly by the several governments, are as impracticable as would be international forts or ships of war. Therefore, in the foregoing report, the responsibility is fixed definitely upon the agent of the government to be protected, whether the measures are enforced in domestic or in foreign ports.

But there are two distinctly international agreements suggested. The first is that each government will protect itself by adequate quarantine establishments and regulations in its own ports, and by assurance of perfect sanitary condition of vessel, cargo, and passengers at the port of departure, to which its own consul should certify. It may seem strange that governments are thus importuned to protect themselves, but an examination of the quarantine practice on the American continent shows that adequate precautionary measures are not always taken, and when the intimate commercial relations between all ports are considered and the history of the infection of one port from another this provision seems to be a necessary one.

The second international agreement suggested is one that will insure to the consuls in the several ports the accurate knowledge necessary to enable them to take the required sanitary precautions and to inscribe on the bill of health the statistical information regarding contagious diseases which is so important to the quarantine officers at the port of arrival.

The information is to be given by a duly accredited medical officer, in accordance with instructions from his government, and hence becomes official, and the medical officer is relieved of the heartless censure visited on those who give voluntary information of this character. In the plan suggested, if accurate knowledge is desired with regard to one, or several, or all ports in a given country, it is only necessary that request through the proper sanitary and diplomatic channels be made for the appointment of a medical officer in the ports named who shall furnish the required information.

Many United States consuls have reported upon the difficulty and, in some cases, the impossibility of obtaining the facts. In some instances they are only obtained by purchase, for which no fund is provided, and

in others they have been obtained by unwilling and ungracious assent. This agreement, if carried out, will remove these difficulties, and the medical officers thus appointed will together constitute a corps of international health officers through whom it may be possible ultimately to establish an international sanitary union.

The object of modern scientific quarantine is two-fold: First, to combat contagious diseases, and second, to remove unnecessary restrictions upon commerce. The first appeals to the people at large; the second appeals to the great shipping and commercial industries. We have thus two powerful levers with which to move the apathy or indifference of nations in this regard, and both levers should be used.

Sentiment does not enter into the ordinary consideration of quarantine, yet your committee can not refrain from expressing the hope that an international sentiment will be awakened with regard to sanitation of seaport cities and their harbors, so that a perpetually infected seaport will be regarded as an unnecessary menace to other countries and an intolerable obstruction to commerce; and that, yielding to this sentiment, the various governments will remove conditions which subject them to international opprobrium, that trade may go on unfettered and friendly intercourse be maintained without danger to human life.

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HEMIPLEGIA OCCURRING DURING THE COURSE OF ENTERIC FEVER.

By Surg. GEORGE W. STONER.

J. A.; aged 27 years; nativity, Germany; was admitted to hospital at Norfolk, Va., August 23, 1895, where he was under the care of Surg. Henry R. Carter, United States Marine-Hospital Service, until January 15, 1896, when he was transferred to Baltimore. He arrived at the United States Marine Hospital and was admitted at 8.30 a. m., January 16, 1896.

The disease (typhoid), as reported by Surgeon Carter, was above the average in severity, the diarrhea being especially severe and persistent, and the nervous symptoms, hebitude and coma, were well marked. On the fourteenth day of the disease, at the morning round, the left arm was found to be powerless, but no paralysis was observed in the left leg, although looked for until the next day, when both extremities on the left side were similarly affected (left hemiplegia). The use of electricity (Faradic) was begun very soon after the paralysis was observed, to which the muscles responded fairly well; it was kept up with more or less regularity for a long time, but without much improvement, until about the first week in December, 1895, when he began to move the arm; and this gradually improved, but it was not until about ten days before he was transferred to Baltimore that he began to have a little grasp in his hand, but he could not extend the fingers. At the same time he could extend the foot with considerable force, but was unable to flex it on the ankle.

On admission to hospital at Baltimore knee jerk was found to be exaggerated on left side, but entirely absent on right knee. No ankle clonus. Nor were there any signs indicating heart lesion or source of embolism, though such formation may have taken place later because of the severe type of the fever and tardy circulation of the blood through the heart. During his stay at the hospital in Baltimore the electricity was continued and patient improved slowly. He regained considerable use of his arm and hand, but the improvement was less marked in the leg, though he was able to get about without the use of crutches, and his general condition was good. He was discharged May 4, 1896, at his own request, and he left for his home in Germany.

Since writing the foregoing, Surgeon Carter has, at my request, kindly furnished the following additional information:

On the fourteenth day of the disease, at the morning round, the patient being then dull, but easily roused, the left arm was found to be nearly powerless, the forearm

and hand absolutely so. The lower extremity was examined and no loss of power was discovered. That evening the loss of power of the arm was absolute; the lower extremity was not examined. He was decidedly more comatose. On the next day both extremities on the left side were evidently paralyzed. His condition was such that a satisfactory examination of the muscular power was not possible, but the above condition was fully made out. There seemed, as far as could be judged, no change in sensation. The coma was much greater this day than the preceding, and during the last of this and the first of the next day the breathing was slow and at times slightly stertorous. There was also dilitation of the pupils and internal strabismus. During all this time, after the morning of the second day, the patient's condition was so bad, especially his coma so profound and his heart's action so weak, that a satisfactory examination was impossible and a prolonged one unsafe. From about September 14 he gradually and very slowly improved, the paralysis lessening up to his transfer to you. At this time the only muscles paralyzed absolutely were extensors of the hand and the flexors of the foot. When he first got up from bed all the muscles of the lower and all of the upper, save the deltoid, were powerless. Those of the upper extremity recovered faster or rather less slowly than those of the lower. The heart was examined carefully several times when the motor lesion was first observed, but beyond being very weak and irregular nothing was observed. From the slowness of the onset of the motor symptoms and their symmetry I think it was a thrombosis in the basal ganglia.

TUBERCULAR TESTES—INGUINAL HERNIA—URETHRAL ORGANIC STRICTURE—OPERATIONS.

By P. A. Surg. P. C. KALLOCH.

J. H.; aged 30 years. Admitted to St. Francis Xavier Infirmary, Charleston, S. C., August 13, 1896; discharged January 1, 1897. He had gonorrhea ten years ago and the same disease several times since. Six years ago was treated by the Marine-Hospital Service in Philadelphia for stricture, the treatment being gradual dilatation. There is no history of syphilis. When admitted here there was an ulcer on the lower side of meatus urinarius somewhat excavated. There was a hard indurated spot at junction of penis with scrotum, involving the urethra. The patient suffered from night sweats and cough. The general condition improved under treatment, but the ulcer of penis was sluggish and required cauterization. A second ulcer formed at the frænum and perforated to the urethra.

August 13.—A perineal abscess has formed just outside the urethra. An anæsthetic was administered and the abscess freely opened. This opportunity was taken to perform external urethratomy at the peno-scrotal junction, the urethra at this point being found almost entirely closed by the induration named above. A new urethra was made through the induration, as the old one could not be traced. A catheter was left in the bladder a greater part of the time, the wounds being dressed daily and the bladder irrigated with boracic-acid solution. The perineal abscess healed rapidly, but the urethra in front of the opening at the junction of the penis with scrotum became hard and fibrous, and by August 20 did not admit of the passage of a sound. The urethra in this locality felt as hard as cartilage and about 1 cm. in thickness. The left testicle, which had shown some enlargement for some time, presented a very hard growth posteriorly, apparently tubercular. There was an old scrotal hernia on this side. On September 21 chloroform was administered and an incision made as in Bassini's operation, but continued downward so as to allow room for removal of the testicle; the hernial sac separated and, being empty, closed above the internal ring with "purse-string" suture. The redundant portion was excised. The spermatic cord was separated with its vessels, also the testicle with its tunica vaginalis. The cord and its vessels were then tied at the internal ring and excised outside the ligature. The abdominal opening and inguinal canal were closed with continuous suture of cromicized catgut, the skin with silkworm gut. A few strands of the latter were used under the skin sutures for drainage.

This wound was protected with gauze, and the hardened urethra now excised for a distance of about 5 cm., a catheter introduced into the bladder and the skin brought together over it, to make a new urethra. This was wound with iodoform gauze, which checked the bleeding, and the permanent dressing over the hernial wound applied.

October 20.—The hernial wound healed by first intention, a small stitch abscess occurring, however, several days after the apparent healing was complete. The urethra has been kept open by use of the catheter, but a local necrosis occurred from pressure of the catheter, and the opening at the peno-scrotal junction has puckered from cecatrization.

October 30.—Complains of pain during last three days in region of right kidney. This attended at first with vomiting, headache, and fever. To-day fever continues, and sensitiveness remains in right side. The urine slightly albuminous.

January 1, 1897.—Transferred to-day to Wilmington, N. C. Anæmia and debility. Hernia apparently cured. No bulging at seat of operation.

ENLARGED PROSTATE—SARCOMATOUS TESTICLE—TESTICLES REMOVED UNDER COCAINE.

By P. A. Surg. P. C. KALLOCH.

C. S.; aged 63 years; nativity, Germany; admitted to St. Francis Xavier Infirmary, Charleston, S. C., August 22, 1896; discharged September 22, 1896. At 10 years of age had trouble in urinating, but this passed away. Has had gonorrhea, but gives no history of syphilis. Has had trouble in passing his urine for two or three years and thinks he has used a catheter about a year. His memory seems quite defective, and one of his friends states that he lost the faculty of speech for a time, several years ago, from paralysis. When admitted was suffering from enlarged prostate, hydrocele tunica vaginalis, with enlarged epididymis, somewhat inflamed and painful. He was unable to empty his bladder without a catheter, but passed small quantities of urine at frequent intervals. The residual urine, about 50 c. c. in quantity, was thick and of an ammoniacial odor. The size of the prostate, as felt through the rectum, was about 7 cm., in the line of the urethra, the index finger barely reaching its limit. Laterally its extent was in proportion to that named. The urine was turbid, the residual portion thick with pus and mucus.

August 28.—Operation under cocaine; both testicles removed. The scrotum on right side red and vesicular from bichloride application. Hydrocele on this side containing about 200 c. c. of serous fluid. Testicle atrophied and discolored on section through about three-fourths of its extent. The epididymis was hard and bent into a rigid half circle about 1 cm. in thickness, this induration also affecting a portion of the vas deferens. The left testicle atrophied; joined by cyst extending to and occupying position of the epididymis. The tunica vaginalis was removed with testicles. The patient's temperature rose to 38.8° C. on the evening of the operation and remained at about this point for three days. The patient was delirious and restless at night and somewhat so during the day. There was an improvement in the ability to urinate, but no apparent reduction in the size of the prostate. On the 5th of September, eight days after the operation, the temperature again rose and remained high for several days, this time apparently yielding to quinine. On September 17 the catheter was used for the last time, the patient being able to empty the bladder without it.

Dr. B. E. Baker, pathologist, examined the tumor of the testicle and reported that it was "a sarcoma with rather a predominance of connective tissue over cellular elements; there was quite a large cyst

containing a liquid with white granular material, but no spermatozoa, thought to be due to the retention of the spermatic fluid in some of the larger ducts." Patient was discharged on the 22d much improved in general condition, but the prostate still enlarged, though somewhat reduced from its former size.

October 30.—The urine now contains no albumen, and he usually passes it without a catheter, though he finds it gives him additional comfort to use the catheter once a day. The patient looks much better and seems much improved by the operation.

March 6, 1897.—Patient still passes urine about every two hours, the urine being quite cloudy with mucus and pus. He does not completely empty his bladder, but is far more comfortable than prior to operation.

FORMALDEHYDE GAS IN TUBERCULOSIS.

By Surg. P. C. Kalloch.

During the month of August last, it occurred to me that the inhalation of formaldehyde might be of value in the treatment of tubercle of the lungs. I therefore began its use.

The first case upon which it was tried was one in the last stage of the disease, but the patient reported great relief from some of the most distressing symptoms, up to the time when it was last applied. I went away, however, in October and can not tell what the result would have been had it been continued.

A second case in the hospital, from being very weak and having had hemorrhages, improved wonderfully after a month's treatment and returned to his work, that of engineer on a river boat. He continued the use of the gas as furnished by a very imperfect lamp on the boat, and was in excellent condition, when in November he was exposed to cold and wet during a storm. This brought on a renewal of the trouble, and he is at the present time a patient in the hospital, again improving under treatment, after serious hemorrhages.

Third case, a painter with bad cough, loss of flesh, and hemorrhages; improved steadily under treatment. He has left the city, but was practically well at last account.

Two other cases in hospital recently. One, a young man with undoubted symptoms of tubercle, but no bacilli in sputum, has improved and has gone to his home. The other, a man of 50 years of age, with tubercular laryngitis and extensive lung involvement, still under treatment and improving, but not as rapidly as the others.

I have used the "Moffat generator" (Eli Lilly & Co., Indianapolis) in evolving the gas from wood alcohol, and have found no unpleasant effect from its use, except an occasional headache, and in one case, not noted above, that of a nervous young lady fainting. In this case, however, the gas was given in too concentrated form, being directed to the face by a funnel. I believe, however, that, properly given, one or two sittings a day of one-half hour each, formaldehyde will prove a most important remedy in tubercle. The lamp should be placed in a small closed room, at a little distance from the patient. To delicate patients the gas should first be given in small quantities. I have also tried the Knapp generator, but find the gas from it, though perhaps purer than that from a lamp, much too irritating, and hard to manage in small quantity.

The results as observed by me have been: (1) Improvement in the character and quantity of the expectoration; (2) healing properties, as shown in lessening the tendency to hemorrhages; (3) curative, as shown by general improvement of symptoms.

Hygienic and other treatment are, of course, to be used at the discretion of the physician. This report is made with the hope that, as there are such excellent opportunities in the Service for giving this treatment a trial, the patients of the Service may be among the first to profit by any relief for this extremely common and most fatal disease.

YELLOW FEVER FROM A CLINICAL AND EPIDEMIOLOGICAL POINT OF VIEW AND ITS RELATION TO THE QUARANTINE SYSTEM OF THE UNITED STATES.[1]

By H. D. GEDDINGS,

Passed Assistant Surgeon, United States Marine-Hospital Service.

The disease which forms the subject of this communication is one of peculiar interest to the medical profession and to the sanitary authorities of the United States, and has there been discussed in all its bearings until the subject has lost much of its novelty; but it is believed that the comparative rarity of its appearance in Europe, the lack of information as to the reason for its former frequent appearance in the United States and the measures which have of late years prevented these fatal visitations, and a well-defined desire to have the matter discussed from an international standpoint, render a dissertation on the subject not only permissible, but justifiable and desirable at the present time. The earliest appearance of the disease upon the Western Continent is lost in the mazes of tradition, and the difficulty of arriving at any conclusion upon this point is heightened by the inaccuracy and variability of the earlier descriptions and the lack of much desired information derivable from systematically kept clinical records and the observation of properly conducted necropsies. But as early as the year 1493, one year after the discovery of the Western Continent by Columbus, we have record of the appearance in San Domingo of a disease which, from the descriptions given at the time, was probably yellow fever. In 1508 it appeared in Porto Rico; in 1620 it appeared in Cuba; in 1647 in Barbadoes, in 1691 in Jamaica, and at some period during the seventeenth century it had made its inroads into almost every one of the West Indian Islands. According to the most reliable information, its first appearance in the United States was in New York in 1668, and it is interesting to observe that it was then due to the same cause to which its now infrequent outbreaks may usually be traced, viz, to importation by infected vessels from one or other of the ports of the island of Cuba. At one time or another from this period up to the year 1893 it has prevailed in the form of a more or less severe epidemic in almost every city on the Atlantic seaboard, and, as will subsequently be shown, by far the larger number of these epidemics can be traced not only to one of the West India Islands, but to one city in that island. Several cities have suffered most severely from repeated epidemics—Charleston, S. C., Norfolk, Va., Savannah, Ga., Mobile,

[1] Read at the Twelfth International Medical Congress, Moscow, Russia, August 19–26, 1897.

Ala., New Orleans, La., Philadelphia, Pa., and others too numerous to mention. With this hurried historical and chronological sketch we pass on to the consideration of the disease from a clinical standpoint.

Yellow fever may be described as an acute, infectious, specific, febrile disease of one paroxysm, characterized by the suddenness and violence of its onset, the rapidity of its course, the gravity of its symptoms, its large mortality, and fortunately its almost total lack of disagreeable or dangerous sequelæ in the cases ending in recovery. It is painful to have to again record here what has been so often mentioned before—that the specific cause of the disease has yet to be discovered and demonstrated. During the present year two claimants have appeared for the honor of having discovered this cause, but a careful investigation of their claims will, it is believed, lead those best acquainted with the malady to arrive at the conclusion here given, that it remains for someone in the future to demonstrate scientifically and satisfactorily the true cause of this interesting and puzzling disease. The failure has not been due to lack of effort, for as to none of the acute diseases have so many theories been propounded, on none have so many fruitless efforts been expended. Long ago the plausible theory that it was due to malarial or paludic infection was abandoned as untenable. One of America's most distinguished workers failed after years of the most patient and laborious research to arrive at any satisfactory conclusion, and every year has witnessed announcements which have raised hopes, only to be dashed down by the cold, dispassionate investigation of scientific workers. That the disease is of microbial origin there can be little doubt. That the organism is one of great virulence and capable of producing very potent toxines is evident to everyone who has ever studied the disease clinically, but it is with regret that the opinion is reiterated that the specific cause has not yet been discovered. The onset of the malady is in the vast majority of cases sudden and without prodromal symptoms, though this is not an invariable rule. In a large proportion of cases the onset of the disease comes during the night, and takes the form of a chill more or less violent and sometimes of long duration. This is quickly followed by fever, which reaches quickly 39° to 40° C., and sometimes even higher, though it is here to be said that yellow fever is not as a rule a disease of high temperatures, 41° C. being rarely passed or indeed reached. The onset of the disease is attended with most violent and distressing nervous phenomena, such as intense headache, intraorbital pain, acute pain in the back and legs, intense excitement and alarm, which, together with the physical suffering, cause the patient to toss wildly about his bed, while in the vast majority of cases preserving his full consciousness. The face takes on a dusky flush, the eyes become congested and suffused, and, with the later appearance of the icteric coloring, the facies is one which, when once seen in a typical case, is never forgotten. Twenty-four hours usually produces a decided change

in this condition. While the pain still persists, it is ameliorated—the patient has ceased to complain loudly and is already becoming apathetic. There is great gastric irritability, frequent and distressing vomiting, and a constant feeling of oppression in the epigastrium increased into a violent pain on the slightest pressure. Now begins to be manifested one of the most singular features of the disease. While the temperature still remains high—indeed, there may have been not the slightest remission—the pulse rate has already begun to show a marked decline. With a temperature of 39° to 40° C. the pulse has fallen to 90 or perhaps 80 per minute, and this diminution of the pulse keeps on steadily, becoming more marked, until it is no uncommon thing on the fourth or fifth day of the disease to find the patient with a high temperature and a pulse not exceeding 60 to 70 per minute. Indeed, in the experience of the writer a case is recalled which showed a temperature of 39.5° C. and a pulse of 42. About the third day one or possibly two symptoms of grave significance make their appearance, one constantly, the other frequently, viz, albumen in the urine (and this, I believe, without exception) and the black vomit, in many cases in almost inappreciable amount, in others in large quantity and suddenly. The former shows the effect of the disease upon the kidneys, the latter the beginning of a general hemorrhagic condition, for the black vomit is nothing more nor less than effused blood altered by the hyperacid secretions of the stomach. Hemorrhages into other cavities and in other regions sometimes occur at this time into the intestines, the throat, from the gums, the lips, the nose, and into the connective tissue of the scrotum. The patient may succumb to the violence of the toxæmia and the exhaustion due to the hemorrhages as early as the second or third day, but in the vast majority of cases there are from six to eight days of fever, sometimes ten or more, and recovery is rather by lysis than crisis. But, on the other hand, after an apparent amelioration of symptoms the condition may become suddenly worse, the vomiting and the hemorrhages may become intensified, the urine more and more scanty, high colored, and albuminous, delirium and coma supervene, and the patient passes away either in convulsions due to uræmia or by exhaustion. Death is always in a state bordering on collapse. The yellow-fever patient *always dies cold*, thus forming a striking contrast to the malarial fevers, where the contrary condition usually obtains.

Epidemics of yellow fever, whatever their origin, have many features in common, and a feature which strikes every student of epidemiology is the slow, insidious spread of the disease and the length of time which seems to be necessary for the malady to assume an epidemic form. For this there are a variety of reasons, and principal among them is the fact that the disease is not contagious (that is, communicable from person to person), but requires that a locality should become infected before it is dangerous to others. Another prime cause

is the difficulty which always attends the recognition of the first cases in a given year in a given locality. While there is little doubt that this is sometimes due to a willful blindness, still it must be remembered that of late years yellow fever is rather an uncommon disease in the United States, that the first cases occurring in a locality are usually of a mild type and generally end in recovery, and it is only later, when the foci of infection become greater in number, the cases more virulent, and the victims begin to die with symptoms not readily to be accounted for by the common diseases prevailing in the given locality, that suspicion begins to be aroused, and by this time it is usually all too late to undo the damage that has already been done, and there follows an epidemic of yellow fever, with all its horrors and terrors. Nor is the difficulty of diagnosis alone responsible for the nonrecognition of the first cases. There is a commercial aspect to the question which must not be lost sight of. An epidemic of yellow fever in a city or town means absolute nonintercourse, or at least very guarded intercourse, for a period of from four to five months; all business or trade is naturally cut off, and the financial cost of a yellow-fever epidemic is hardly to be computed. The business prospects of several cities have been permanently injured by the occurrence of epidemics at a critical period of their growth, and apart from the thousands of lives which have been sacrificed to the disease in the United States in the past two hundred years, it is impossible to estimate the millions of dollars of wealth which have been lost from the same cause. Therefore it is desired to impress upon this gathering that it is not only from a scientific and pathological point of view that we must regard the disease, but also from an economic one.

For the reasons given above there is always a melancholy sameness about epidemics of yellow fever, and a brief description of one will suffice with certain modifications for all. There is always a period of an unexplained malady, at first usually mild, gradually becoming more severe, and finally causing deaths. The cases begin to occur in widely separated localities, but upon later investigation they may generally be traced to the one original source. Then comes the period of uncertainty and dread; the cases become more frequent and more severe, the deaths correspondingly more numerous, and finally the dread truth can be suppressed no longer; a panic ensues and there is a flight from the stricken city of all who are financially able to leave. At this time other cities take alarm, and this period is marked by the enforcement of quarantine regulations, all more or less barbarous and absurd, and totally lacking in uniformity. A refugee from the infected city is shunned and looked upon with suspicion, and often is obliged to wander about from city to city, before he can find an abiding place. Owing to the peculiarity of the health laws of the United States, the reasons for which it is not necessary to go into here, the General Government has no right to interfere in these matters except to protect one State from

another, or until the authorities of a given State make formal announcement that there is an epidemic disease in their midst, which, with the facilities at their command, they are unable to cope with. At this point the National Government takes charge, usually at a time when all that can be done is to limit as far as possible the spread of the disease from the originally infected city or town to those either immediately adjacent, or in most direct communication either by railroad or sea. The following is usually the plan adopted: So far as possible the infected city is cut off from communication with the rest of the world, all intercourse that is still allowed being under supervision and rigid inspection. The best possible arrangements are made within the limits of the infected area for the care of the sick, the observation of the suspects, and the disinfection by approved methods of the dwellings and personal effects of those suffering with the disease. The depopulation of the infected city is rather encouraged than otherwise, for it is logical to suppose that with a lack of susceptible material to feed upon, and with the smallest possible intercommunication between the inhabitants, the quicker the disease will be arrested, and the smaller will be the number of cases and the consequent deaths. But the flight is regulated and supervised, in order to expose the other cities and towns to the smallest possible danger. The infected city is surrounded by a sanitary cordon, or preferably a double cordon, one at some distance outside of the other, and no person is allowed to pass these cordons without written authority from the proper officer. At a safe distance from the city is established a camp of detention or probation, and this camp is made the only outlet for those desiring to pass on to other localities. In these camps, under careful medical supervision and stringent sanitary conditions, well sheltered and fed, all refugees are compelled to pass a period of ten days. All baggage and personal effects brought by them from the infected locality is subjected to disinfection by steam, and is then stored in a special building outside of the limits of the camp. Only the necessaries of clothing and equipment are allowed to be brought into the camp, and these are again disinfected prior to departure. Upon the completion of the ten days of detention, those discharged are conveyed in a special train attached to the camp to a convenient railroad station, and are there at liberty to proceed to their destination, each individual having been previously provided with a certificate of discharge, which, for the sake of greater precaution, has attached to it a descriptive list of the person to whom issued. Inspectors board the passenger trains at various points, and all travelers are required to give a satisfactory account of their points of departure, and if from the infected locality, to produce their certificate of discharge. Failing in this, they are remanded to the camp of observation. Within the camp a rigid, but not onerous discipline is preserved; inspections are made twice each day of all inmates, and those sick with any disease or ailment are kept under observation, and

if their disease proves to be yellow fever, they are at once removed from the main camp to an infectious hospital, situated at least one-half mile from the main camp. Upon recovery their clothing is disinfected and they are returned to camp there to remain until fit to travel. Upon their certificate of discharge is noted the fact of their having had yellow fever and of the recovery.

The value of these camps of detention has been abundantly proved, and forms an important feature of epidemic management. Out of several thousand persons thus detained for a period of ten days there is no case on record of yellow fever having appeared in a single one, and many cases of yellow fever have occurred during the period of detention and been treated with excellent results, which would otherwise have developed elsewhere and been the cause of fresh panics if not of other outbreaks. Within the infected city itself there are many things to do. As an epidemic of yellow fever always produces a complete commercial and industrial stagnation there is always more or less distress among the poorer classes. The necessities of these must be ministered to; there must be supervision of the corps of nurses and relief physicians; efforts must be made to prevent the establishment of new centers of infection, and, finally, when the epidemic is concluded, there is the necessity of the disinfection of every dwelling in which the disease has occurred before allowing the return of those who have fled. It may be said in general terms that a period of from three to four months is usually filled by an epidemic of average severity. It takes, as has been said, some time for the disease to gather force, and its termination is usually determined by climatic conditions, the epidemic usually lasting until the occurrence of heavy frosts in the latter part of the month of November or early part of December. Such, in brief, are the leading features of yellow fever from a clinical and epidemiological standpoint. In an article of this description it would be obviously improper to dwell upon any pathological features or upon therapeutic measures. We will, therefore, at once pass on to another feature of the subject, viz, the influence and effect of the danger of yellow fever on the commerce, industries, and public health of the United States.

As has before been said, the earliest record which we have of the appearance of the disease in the American Colonies was in the city of New York in the year 1668. Since that time epidemics of yellow fever have been frequent, fatal, and devastating. Taking the period from the year 1800 to 1895, there are but seven years in which yellow fever has not visited the shores of the United States. The source of the infection is known in only forty-one of the eighty-eight years. In twelve it is given simply as the West Indies, but in twenty-three it is given definitely as Havana. Taking a more limited period—between 1862 and 1895—the United States has been visited by yellow fever 26 times, and from definite information of 19 of these outbreaks the source of infection has been traced 16 times to Havana. In several

years, too, more than one city has been infected by Havana—two in 1862, two in 1871, and two in 1873. The last epidemic, viz, that of Brunswick, Ga., 1893, was introduced from Havana, and the epidemic of 1878 is clearly traceable to the same cause. This last-mentioned epidemic invaded 132 cities and towns, caused a mortality of 15,934 persons, and the money loss is conservatively estimated at $100,000,000. This is an isolated instance, possibly an extreme one, but who can say what has been the cost to the United States in money and lives of the eighty-seven years in which yellow fever has prevailed? Could it be estimated it would be a total truly appalling. And yet year after year we are threatened and menaced by the same danger. Every year, with the coming of the warm weather of summer, the health authorities of every seaboard city of the United States look with apprehension toward the plague spot from whence comes all this trouble, and realize that it is only by an unceasing vigilance they can hope to escape the depredations of an enemy more dreaded than foreign foe or invading army.* And whence comes this peril? The figures previously given of the origin of yellow fever will show that in a large proportion of the epidemics not only has the infection been traced to one island in the West Indies, but to one city in that island, viz, the city of Havana, in the island of Cuba, the poetically styled "Gem of the Antilles," fair and beautiful, but for the people of the United States a veritable Augean stable, for the cleansing of which a Hercules has been looked for in vain. As far back as 1880 the condition of Havana was thus described in the Report of the Yellow Fever Commission of the National Board of Health:

Cuba, as its prosperity and commerce increased, has become the greatest nursery and camping ground of one of man's most ruthless destroyers. Itself most seriously afflicted, it annually disseminates to other lands, as from a central hell, disease and death. Cuba makes no such efforts to limit the spread of yellow fever as have appeared to be successful in Martinique and others of the West Indies. Our present knowledge justifies the hope that if the periods when the tendency of the disease to die out were utilized in efforts for protection, even Havana might be freed from the poison of yellow fever and require a fresh importation for the renewal of the disease. So far is Cuba from making any efforts to control the disease that much is done to favor its dissemination. Until the accomplishment of sanitary measures, Havana will continue to be a source of constant danger to every vessel in its harbor, and to every Southern port to which these vessels may sail during the warm season. Since the United States commission found in Cuba only well-known causes for the unsanitary conditions, it was concluded with perfect confidence that the means to render this condition satisfactory would consist only of those well-tried remedies which, wherever elsewhere tried, have always succeeded.

Another report says:

The evidence shows that the most fatal form of yellow fever is always present in Havana, and in the summer and autumn is liable to be imported into the United States by both immigrants and merchandise passing through the State of Florida, unless the most thorough and preventive measures shall be constantly used. The sanitary condition of Havana is a perpetual menace to the people of the United States, and invites the entry into the island of contagious and infectious diseases of the most virulent and fatal character.

The sanitary condition of the harbor of Havana is the most frightful that could be well imagined. There is comparatively little current in any direction, the water is almost stagnant, and into the harbor empty the few sewers with which the city is provided. Indeed, certain portions of the harbor, and those most frequented by shipping, have earned from shipmasters the title of "dead man's hole," for never does a vessel tie up to any of the wharves in this vicinity, but yellow fever makes its dreaded appearance among the crew.

But it is useless to multiply instances and to quote authorities upon this subject. It is notorious that few cities in the world are in a more unsanitary condition than Havana, and it is reasonably certain that this unsanitary condition is largely responsible for the constant presence of yellow fever in the city and harbor. True, the disease almost disappears every year with the approach of the cool winter months, but with the advent of spring the infection, finding conditions most favorable for its development in the filth which abounds, acquires new virulence, and thus the tale has been repeated for two hundred years. Is yellow fever therefore to be considered a preventable disease? The answer is that in the past yellow fever was as prevalent in other of the West India Islands as it is to-day in Cuba, notably in Martinique and Jamaica. In these islands, thanks to the adoption of enlightened sanitary measures, it seldom makes its appearance, and if it does it gains no foothold, but is promptly suppressed. Barbados was once a badly infected locality. To-day, in spite of its exposed position, being in constant communication with Cuba on the one hand and Brazil on the other, yellow fever never prevails, thanks to sanitary measures and careful quarantine restrictions. Could such a condition of affairs be successfully inaugurated in Havana? The answer is that while the task would certainly be greater, it is only reasonable to suppose that careful application of the most ordinary sanitary measures would at least meet with a certain measure of success. It is at least worth a trial, for in the past decades nothing of the kind has been attempted. Having thus stated the conditions and hinted at the remedy, it remains to consider the question of the responsibility for the conditions, and their effect upon other nations, principally upon the United States.

Who is responsible for the abominable condition of the city of Havana and its harbor, and why is such a condition of affairs allowed to exist?

As to the responsibility, there can be no question that the Government having territorial jurisdiction is alone responsible for the inaction which has existed in all sanitary matters in past years. None of the vast revenues formerly derived from Cuba were in any way applied to internal improvements, but all went to enrich corrupt officials and for the expenses of the home Government. It is safe to say that the amount spent in the island of Cuba and the city of Havana for systematic sanitation would form but a fractional part of 1 per cent of the reve-

nues realized in one year. Nor has effort been wanting on the part of other Governments in inviting the attention of the Spanish authorities to the conditions, their effects, and the remedy. These communications and protests have always been met with specious promises of reform, but year by year the conditions have grown steadily worse instead of better, and there seems to be now no hope of ever accomplishing anything by these methods of diplomatic representations.

As to the effects of the sanitary condition of Havana upon the United States the case may be stated in a few words, viz, that the whole quarantine system of the United States is practically a quarantine against yellow fever, and has to be maintained at large expense during the entire year, and year after year. Havana is situated within eight hours steaming of Key West, the southernmost port of entry of the United States, within three days of New York and Philadelphia, and within even a shorter distance of large ports upon the Gulf and South Atlantic coasts of the United States. It is rare that any other disease than yellow fever occupies the attention of quarantine officials. At intervals the existence of Asiatic cholera in the seaports of Europe renders special precautions necessary; smallpox is to be expected at almost any time of the year, but causes little uneasiness; at the present time the existence of the pest in the East is causing some apprehension; but ever and always is yellow fever dreaded, and so long as the truly abominable conditions exist almost within sight of our shores, so long must we expect to avoid it only by the strictest vigilance. Therefore while the quarantinable diseases as defined by our regulations are nominally cholera, smallpox, yellow fever, typhus fever, plague, and leprosy, still it is only yellow fever whose shadow ever crosses our path, and is always a source of dread, a constant source of expense, and at once a danger to our people and an onerous burden upon commerce. For it admits of no argument that while the expense of the quarantine system of the United States is large, still it is as a trifle compared with the indirect tax upon commerce resulting from the delay and detention of vessels.

It is to be distinctly understood that we do not apologize for our quarantine system. It is fully justified by our commercial relations with notoriously infected localities, by the extent of our territory and the enormous stretch of our coast line, with the added factor of danger of the enormous foreign immigration seeking our shores. We know full well that England maintains that a quarantine system is useless, but it is to be remembered that several of our States exceed in area the United Kingdom, that an immigrant arriving to-day may to-morrow be a thousand miles from the seaboard, and may thus expose a vast stretch of territory to infection. If any further corroboration of our position in the matter were needed, we could derive great comfort from the fact that our British neighbors on our northern borders have a quarantine system modeled upon ours to meet like conditions, fully

equaling our own in the rigor of their requirements, and in time of danger working in full accord with us to a common end, viz, the protection of a continent from the introduction of exotic contagious and infectious disease. But we ask no commendation, no indorsements, no substantial aids. We endeavor to the best of our abilities to preserve the rest of the world from danger traceable to lack of sanitary precautions in our cities and country. We feel that we have an equal right to demand such consideration from others.

A question which to-day is a burning one with us is, Has a power, presumably friendly, a right to maintain at our doors a condition of things which threatens the lives, the happiness, and the well-being of our people? When a nation feels that its commercial privileges are being encroached upon by another it is quickly resented, and emphasis is given to the resentment by retaliatory measures more or less sharp and decisive. If national honor be ever so lightly impugned there is a storm of popular indignation which does not subside until the fullest satisfaction has been obtained. Yet within 80 miles of our shores there is willfully maintained a crying grievance, which must be tolerated because it does not involve honor but only human life.

In a gathering of this kind, representing as it does the leading thought of the civilized world in sanitary matters, it is desired to propound the question whether the time has not arrived when an international sentiment should be aroused and the issue should be plainly stated that at this time of the nineteenth century no nation has a right to maintain in its midst a plague spot to the detriment of another nation and the world at large. Human life is a sacred thing. The taking of it unlawfully is severely punished, yet year after year the lives of a large portion of a nation are menaced by the maintenance of a disgraceful sanitary condition within all too easy reach of its shores. Year after year the whole world, old and new, is menaced by the existence in India of an area supposed to be the home and constant abiding place of the dreaded Asiatic cholera, and yet up to this time appeals and protests have been in vain to produce any amelioration of either condition. The question is a vast one; its consideration has many aspects and is not to be entered into lightly or unadvisedly, but some day it must be met and dealt with firmly and decisively, and it is thought that some association like this may well take the initiative in hastening that time. If the period can be advanced by one single day the time consumed in attention to this communication will not have been wasted.

This article cannot be brought to a more fitting close than by the following quotations from an address delivered by the Supervising Surgeon-General of the United States Marine-Hospital Service before the Pan-American Medical Congress held in the city of Mexico:

> Earnest efforts to protect the United States from the invasion of foreign pestilence have demonstrated the necessity of so great watchfulness, such great expense, such

a handicapping of commerce that inquiry is now being urged by those directly interested with regard to the conditions which give rise to our annual fears and necessitate these expenditures and restrictions upon commerce. Nearly all these fears and precautions are rendered necessary by but two diseases—cholera and yellow fever. Without these maritime quarantine would be but an inspection service with occasional disinfection for typhus fever, plague, etc., and its restrictions upon commerce would be practically nil. Therefore a question engaging the public mind to-day is whether it would not be cheaper and safer and prevent our annual perturbation of mind if these two diseases were attacked in their habitats. Quarantine authorities are beginning to demand that conditions which favor the continuous propagation of cholera at its home in India should be removed; that its conveyance from India by pilgrims to Mecca and from Mecca to Egypt and the northern coasts of Africa and to the continent of Europe should be prevented. And the same inquiry is being made with regard to yellow fever upon the Western Continent. I know of no more necessary campaign upon which to enter than one calling for a concentration of force against yellow fever in the Western Hemisphere. Cholera no longer inspires its old time dread. It is now an unmasked enemy, requiring only vigilance, skill, and pecuniary resources to overcome it. A lapse of any of these may give it headway, but with these three particulars carefully observed the conquest of this enemy as soon as it appears is a certainty. The same can not be said of yellow fever. Its entity is unknown. Our duty with regard to it includes (1) an investigation into its exact nature and cause, and (2) an insistance upon sanitary engineering and other sanitary measures which will remove it.

SOME REMARKS ON THE TREATMENT OF APPENDICITIS, WITH REPORT OF CASES.

By P. A. Surg. J. C. Perry.

So much has been added to our knowledge of appendicitis in recent years that its treatment has been established on a scientific basis, but the practitioner often meets with cases that puzzle him in deciding upon the proper treatment to adopt at the time when the patient is first seen. I shall endeavor to briefly describe the most rational methods to be employed in treating patients suffering from the different types of this disease, citing a few cases that have come under my care during the past two years as illustrative of what will be said concerning the management of this the most frequent of all acute abdominal diseases.

The treatment of appendicitis will depend principally upon the time at which the patient is first seen by the surgeon, the severity of the existing symptoms, and whether these improve or grow more severe in the first two or three days of the attacks.

Many surgeons advocate operative procedures as soon as the diagnosis is made, claiming that this causes less risk to the patient than by allowing an inflammatory process to continue that may rapidly become more severe, ending in perforation, gangrene, etc. They also base their treatment on the fact that these cases often after apparent recovery only enjoy a temporary period of good health, since another attack is apt to occur that will probably be more severe and still further endanger the patient's life. One of the most noted advocates of this plan of treatment is Dr. John B. Deaver, of Philadelphia, who says, in his recent monograph on the subject, that all cases should be operated upon as soon as the diagnosis is made, except those which are not seen until diffuse peritonitis exists and the patient is in a condition of collapse.

Another class of surgeons advise, if the symptoms are mild and improve in two or three days under expectant treatment, such as the administration of laxatives, etc., tiding the patient through the attack to enable the operation to be performed in health, when the operative procedure is much better borne, the mortality being only about 2 per cent.

When the patient is seen early in the attack (within twenty-four hours) and the symptoms are mild—temperature not above 38° C., pain slight and little rigidity of the abdominal walls, and pain on pressure is not severe—it is justifiable to wait with the hope that an operation

will not be necessary, or that it may be done after the acute symptoms have subsided, since it will then be more successful and more easily performed. The treatment should consist of rest, starvation, hot fomentations or cold to the abdomen, and laxative doses of calomel, followed by salines. In many of these cases a marked amelioration of the symptoms will occur after purgation and in thirty-six or forty-eight hours.

As illustrating the mild catarrhal type of this disease and as showing the efficacy of the above measures, I will briefly describe the following cases:

Case 1.—W. C.; aged 22 years; was admitted to the marine ward, St. Vincent Hospital, Portland, Oreg., October 21, 1895. Twelve hours before admission he was seized with pain in the umbilical region and vomiting. When first examined he was suffering with pain in the right iliac region, which was increased by pressure, the most sensitive point corresponding to that of McBurney's. There was occasional vomiting, the temperature was 38° C., and slight rigidity of the abdominal muscles existed. The treatment consisted of rest, light diet, small doses of calomel followed by sulphate of magnesium, and cold applications over the appendix. The medicine produced free evacuations from the bowels, and as a result all the symptoms improved. At the expiration of forty-eight hours the temperature was normal, and only slight pain was produced by pressure over the affected region. The patient being anxious to leave the hospital, he was discharged on the fifth day. This was evidently a slight catarrhal inflammation, resulting, in all probability, from a slight twist of the appendix produced by an engorged cæcum, and as soon as this was relieved by purgation the inflammatory process was arrested. This patient has not had a subsequent attack.

Case 2.—C. Z.; age, 29 years; was admitted to the marine ward, St. Vincent Hospital, Portland, Oreg., February 20, 1897. The patient was taken suddenly ill sixteen hours previous to his admission with vomiting and severe pain in the umbilical region. When first seen he had a temperature of 38.5° C., and was suffering with much pain in the region of the appendix; the tenderness on pressure, especially over McBurney's point, caused much suffering. No exudate could be detected by palpitation or percussion: The bowels were constipated, and had been so for several days before the commencement of the attack. A diagnosis of appendicitis was made, and it was decided to wait twenty-four hours before advising an operation. He was placed at rest, hot fomentations were applied to the abdomen—as cold was not well borne—a starvation diet was prescribed, and small doses of sulphate of magnesium were administered until three or four copious stools were produced. At the expiration of twenty-four hours the symptoms were less severe, the temperature was 37.5° C., and the pain was not as marked. This change for the better continued, and in four days the temperature was normal, and only slight pain was elicited by pressure over the affected region. He was discharged on March 2, feeling well and strong.

The above cases are good examples of the beneficial effects of the laxative treatment of the milder forms of appendicitis in the early stages, and of the expediency of waiting for a short time in those cases that do not present severe symptoms in their onset, as it is much easier for the surgeon and safer for the patient to operate after the subsidence of the acute inflammatory process. Such cases form the larger proportion of those that come under observation, and in them the infective process is not very marked. If, however, no amelioration of the symptoms, even in the mild forms, occur in thirty-six or forty-eight hours, or if there is an increase in their severity, and pain and rigidity of the muscles remain and coexist with a tendency to distension of the abdomen, delay is dangerous and an operation should be done immediately.

In cases in which the attack has come on with great suddenness and severity, and there is present severe abdominal pain, extreme tenderness over the appendix, and marked rigidity of the rectus muscle, high fever and a much quickened pulse, an immediate operation is clearly indicated. In this connection I will report the following case as emphasizing the absolute necessity for prompt operative procedure in this class of cases, and as showing the rapidity with which the vitality of the inflamed tissues is destroyed in the fulminating type of this disease.

Case 3.—M. G.; age, 28 years; was admitted to the marine ward, St. Vincent Hospital, Portland, Oreg., May 6, 1897. The patient was seized with pronounced vomiting and severe pain in the abdomen twelve hours before admission to the hospital, but the pain was not localized in any particular region. He had suffered from constipation for several days preceding the attack. When first seen the pain in the abdomen was still severe, pressure over the appendix causing intense suffering, and marked rigidity of the abdominal muscles on the right side existed. The temperature was only 38.5° C. and the pulse was not much accelerated. Still the severity of the local symptoms caused me to make a diagnosis of a severe form of appendicitis and advise an immediate operation. The patient objected to this, and consequently I was forced to postpone it. He was placed at rest, on a light diet, and given laxatives, as described above. The medication produced three copious stools, but no improvement in the symptoms was noted. Twenty-four hours later the symptoms had become much more severe and the condition of the patient was much worse than on the preceding day. The pain was excruciating, so much so that the slightest pressure over the appendix would cause the patient to scream with agony; the muscles on the affected side were board-like in their rigidity; temperature was 40° C., and the facies was that of intense suffering. The pulse, however, had not been much affected, and this was taken as a favorable sign that the peritonitis was still local. An operation was advised as the only means of saving life, and this time the patient gave

his consent. The simple incision was made, commencing one inch above a line drawn between the umbilicus and the anterior superior spine of the ilium, and intersecting this one-half inch on the umbilical side of its center. The incision through the muscles was made three inches in length and the peritoneum was divided to the extent of one and one-half inches. After dividing the external oblique fascia all the tissues were found edematous, and as soon as the peritoneal cavity was opened a foul odor was noticed. An intensely inflamed condition of the tissues in the right iliac fossa was found, and no attempt on the part of nature had been made to limit the inflammatory process by the formation of adhesions. The appendix was found embedded in a mass of exudate and some difficulty was experienced in freeing it. During this stage of the operation the general peritoneal cavity was walled off with pads of gauze. The whole appendix was gangrenous, there only remaining sufficiently healthy tissue at its base for ligation. Two perforations were found in the organ, but they had evidently occurred only a few hours before the operation, as no pus was found. The appendix was ligated with silk and removed and the stump disinfected by touching it with pure carbolic acid. The connective tissue in the iliac fossa was intensely inflamed, and as suppuration was expected, packing of sterilized gauze was so placed as to wall off the affected area from the general peritoneal cavity. The wound was partially closed by inserting sutures at the upper and lower angles. In a few days there was profuse discharge of pus, which necessitated daily irrigation; the odor of the discharge was very offensive, and several large sloughs of connective tissue were removed. This continued for six weeks, and for several days immediately following the operation the patient was very ill and little hope was entertained for his recovery. The discharge, however, gradually ceased, and the patient was discharged on July 20, 1897.

In this case the odor was so foul as to contaminate all the wards on the floor on which the patient was, and to counteract this I used a dressing of several layers of gauze moistened with a strong solution of permanganate of potassium. This acted as a sufficient deodorizer, in fact, so much so that no unpleasant odor could be detected in close proximity to the patient.

This case has been fully described because it is an excellent example of the fulminating type of the disease, and also to emphasize the fact that the only hope of saving the patient's life in such cases lies in immediate operative procedure; such symptoms as have been described clearly indicating that delay of even a few hours might sacrifice a life. In this case a diffuse suppurative peritonitis would have been established in a few hours and the operation would have been of no avail.

So far, I have only spoken of those cases seen early, but as many patients do not come under the care of the surgeon until the third or fourth day of the disease, it is important to have clear and well-defined

ideas concerning their treatment. Rules may be briefly formulated as follows: If the symptoms are severe and there is no tendency to localization of the inflammation by the formation of adhesions, an immediate operation is indicated, as it is much safer to take the slight risk of infecting the peritoneal cavity than that incident to delay. If, however, the symptoms are mild and are subsiding, it is probably preferable to wait and operate after the acute symptoms have disappeared.

Again, in cases seen after the fourth day in which there is a slowly forming, well-defined mass in the right iliac fossa, or when there is a sharp increase in the pain, indicating perforation, an immediate operation should be performed. Dr. J. William White says that to this rule there should be no exception. Under this heading I wish to report my fourth case:

Case 4.—C. J.; aged 69 years; was admitted to St. Vincent Hospital, Portland, Oreg., March 8, 1896. Four days before applying for hospital treatment he was suddenly seized with vomiting and pain in the abdomen; had some fever, but did not feel especially sick. When he came under my care he was suffering with localized pain in the right iliac fossa; had a temperature of 38.5 C., and an examination revealed a small mass parallel to Poupart's ligament and just external to the internal abdominal ring. Much pain was produced by pressure over this site, but very little was felt at McBurney's point. A diagnosis of appendicitis was made, with the organ in all probability pointing over the brim of the pelvis, with the focus of inflammation in the tip, and an operation was performed a few hours later. An incision 3 inches long was made parallel to Poupart's ligament, and on cutting through the peritoneum about 20 cubic centimeters of pus was evacuated. The abscess cavity was irrigated with saline solution, and then a search was made in the mass of exudate for the appendix. In doing so it was necessary to break down the wall of adhesions, but as the general peritoneal cavity was protected with gauze pads no infection of it resulted. The appendix, after considerable difficulty, was located and removed, and on examination a small perforation was found in its tip, the remaining portion of the organ being only slightly inflamed. Gauze packing was placed so as to shut off the affected area from the general cavity, and the wound dressed in the usual way. In forty-eight hours the packing was removed, and sufficient adhesions had formed to act as a protective barrier. Under antiseptic dressings the cavity rapidly closed by granulation, and in four weeks the patient was discharged. There is nothing unusual in this case, but it is reported as illustrative of the proper treatment to be adopted.

This is a good place to say a few words about the treatment of the appendix in these cases. Some surgeons, Dr. Deaver and others, teach that the appendix should always be removed, breaking down the wall of adhesions if necessary to do so. They claim that with proper care and skill the danger to the patient is not materially increased,

whereas if the appendix is left in situ the organ is subject to other attacks of inflammation, and the life of the patient is again jeopardized. Dr. Deaver, however, further says that if the operator has not had much experience and does not possess skill, he had better be contented with simply opening and draining the abscess. Dr. Richardson says that it is better to leave the appendix than to risk infecting the peritoneal cavity by breaking down the adhesions, and for the ordinary operator who only sees a few cases a year this is the safer procedure.

The incompleteness of this short article would be more apparent if I neglected to mention the treatment of chronic or relapsing appendicitis. While most attacks are followed by another at longer or shorter intervals, still we know that the attack may result in perfect recovery that is not followed by any more trouble with the organ. Therefore it is important to have some rule established by experience that will enable us to decide whether we should operate after the subsidence of the first attack, or should wait to see if a recurrence will take place. It is safe to say that if the first attack has been severe, or if two or more attacks have occurred, the appendix should be removed without delay.

FRACTURE BASE OF SKULL, WITH REPORT OF THREE CASES OF RECOVERY.

By P. A. Surg. J. C. Perry.

Fractures of the base of the skull have been recognized from the earliest times. The factors entering into their production have received much study, and many theories have been formulated to explain their mechanism. The French surgeons in their communications to the Paris Academy of Surgery between 1760 and 1774, advanced, as a result of their studies of this accident, the theory that the violence of the blow on the skull was transmitted in all directions until it found its final expression in the lesion of the bones of the base, believing that the force traversed both sides until a point was reached where the waves met, at which point the continuity of the bones was destroyed. This theory was almost universally received until Aran, after extended observations, assailed the correctness of this teaching. He claimed that all fractures of the base were produced by irradiation; that the fissure did not proceed from the point where the injury was first received, but traveled in the line of least resistance from the point to the base. But as this did not explain those cases where an injury was discovered diametrically opposite the point at which the injury was received, many adopted the theory advanced by Bruns and others, that the solution of these fractures was to be found in the elasticity of the skull.

Aran's deductions are in the main correct, and in this connection Phelps (in his recent work, Traumatic Injuries of the Brain, etc.) says that the usual basic fracture extends between the region in which the primary injury is received and the corresponding basic fossa; and the explanation of Aran, that the force follows the shortest anatomical route and in the direction in which there is least resistance, seems adequate. Phelps shows that basal fractures are the result of violence inflicted on the vault, and of these more than 78 per cent extend from vault to base, and believes that fracture of the base occurs in 60 per cent of all severe injuries to the head. Park says that the secret of this accident lies in the elasticity of the skull, and that the amount of violence and the swinging direction of the force have to be taken into consideration in estimating the extent and location of this injury.

We know that fracture involving the middle fossa is most often due to violence to the side of the head, and that the fissure is generally transverse; that a blow on the forehead generally produces fracture of

the anterior fossa; and violence to the occiput causes fracture of the posterior fossa, and that in these the fissure is generally longitudinal.

Diagnosis.—The symptoms that possess marked diagnostic value in basal fractures are: The spread of blood from the point of injury until it appears beneath the skin as an ecchymosis; the escape of blood, serous fluid, or brain substance from the cranial cavity. Phelps considers hemorrhage of great diagnostic value. The escape of serous discharges from the ear is of great importance, but is of rather infrequent occurrence, only being present in 13 of 286 of Phelps's cases. Of value as confirmatory of the diagnosis is the presence of disturbed function of some of the cranial nerves, which may involve the facial, auditory, optic, motor occuli, and abducens.

Prognosis.—The prognosis will depend upon the amount of damage done the cranial contents by the injury, and whether infection takes place or not. In cases treated with the same surgical asepsis as characterize operative procedures, the mortality is not as high as many believe. Konig saw 8 recoveries in 10 cases, and as good results have been reported by other surgeons.

The following cases that have come under my treatment, while not unusual in many respects, are still of sufficient interest to warrant their report.

Case 1.—A. J.; age, 35 years; was admitted to the marine ward, St. Joseph's Hospital, Savannah, Ga., February 10, 1890. The history was as follows: He was found on the street in an unconscious condition by some friends and taken to the hospital. It was afterwards learned that while in an intoxicated condition he had fallen, striking his head against a rock. Examination revealed a large contusion on the right side of his head, and there was some hemorrhage from the right ear. A small tear in the tympanic membrane was noted, but no fissure in the bones could be detected. He was unconscious, and of course no personal history could be elicited. The bleeding from the ear ceased on the second day, and a slight discharge of serous fluid escaped from the ear, about 100 c. c. in the twenty-four hours, which lasted three days. A diagnosis was made of the fracture of the base of the skull involving the petrous portion of the temporal bone. The external auditory canal was cleaned of clotted blood and gently irrigated with boracic acid solution, and the external meatus plugged with sterilized gauze. The patient remained in a comatose condition for seven days, and then commenced to improve, although he suffered with some headache for two weeks longer. At the expiration of a month he was discharged from the hospital. Hearing was much improved on the right side.

Case 2.—J. C.; age, 22; was admitted to the marine ward, German Hospital, Philadelphia, Pa., February 19, 1895. A few hours before admission, while engaged in loading a vessel with lumber, he fell on the deck and before he could arise a fellow laborer not seeing him threw

a piece of lumber 3 inches thick and 24 feet long on his head. When admitted he was unconscious and remained so for fourteen hours. He had hemorrhage from the right ear, nose, and mouth. The bleeding from the ear only lasted a few hours, and was followed by a discharge of serous fluid small in amount and lasting one day. He suffered with severe pain in the head for four days, which existed to a slight degree for twenty days longer. He was unable to see for three days, but at the expiration of this time he could distinguish objects with the left eye, but was still blind in the right. His vision gradually improved until it was fairly good at the expiration of seventeen days. The left pupil was larger than the right, and both responded to light and accommodation. The external rectus muscle of the right eye was completely paralyzed and that of the left eye was weaker than normal, consequently when the patient used both eyes he suffered from double vision. The optic disk and retina were hyperæmic. A diagnosis of fracture of the petrous portion of the temporal bone was made, and the treatment consisted of salines, cold to the head, and the local measures described above. Patient remained in the hospital for two months and at the expiration of this time he was discharged recovered, except the paralysis of the ocular muscles.

Case 3.—W. D.; age, 26; was admitted to the marine ward, St. Vincent Hospital, Portland, Oreg., October 24, 1897. The patient, while engaged in painting the wheel of one of the river steamboats, had his head caught between the side of the boat and the wharf, and when rescued was unconscious. He was seen soon after the accident and sent to the hospital. He had profuse hemorrhage from the ears, especially the right, and there was also bleeding from the nose and mouth. He regained consciousness in three hours, although some stupor existed for three days. The hemorrhage from the left ear ceased in twenty-four hours, but that from the right ear lasted for a week and was quite profuse. The tympanic membrane was torn on the right side, but not on the left. Soon after the injury, complete paralysis of the facial nerve on the right side was noted. There was no serous discharge in this case. A diagnosis of fracture involving the petrous portion of the temporal bone and the inferior petrosal sinus was made, and under local antiseptic treatment and rest in bed, the patient made prompt recovery, and was discharged in twenty-three days. A study of the three cases described above shows that the violence was applied to the side of the head, and that fracture involved the middle fossa; that there was not much damage to the cranial contents, and under aseptic and antiseptic precautions no infection took place, and the simple fissures soon closed.

THE MALARIAL FEVERS OF MEMPHIS, TENN.

By P. A. Surg. G. B. YOUNG.

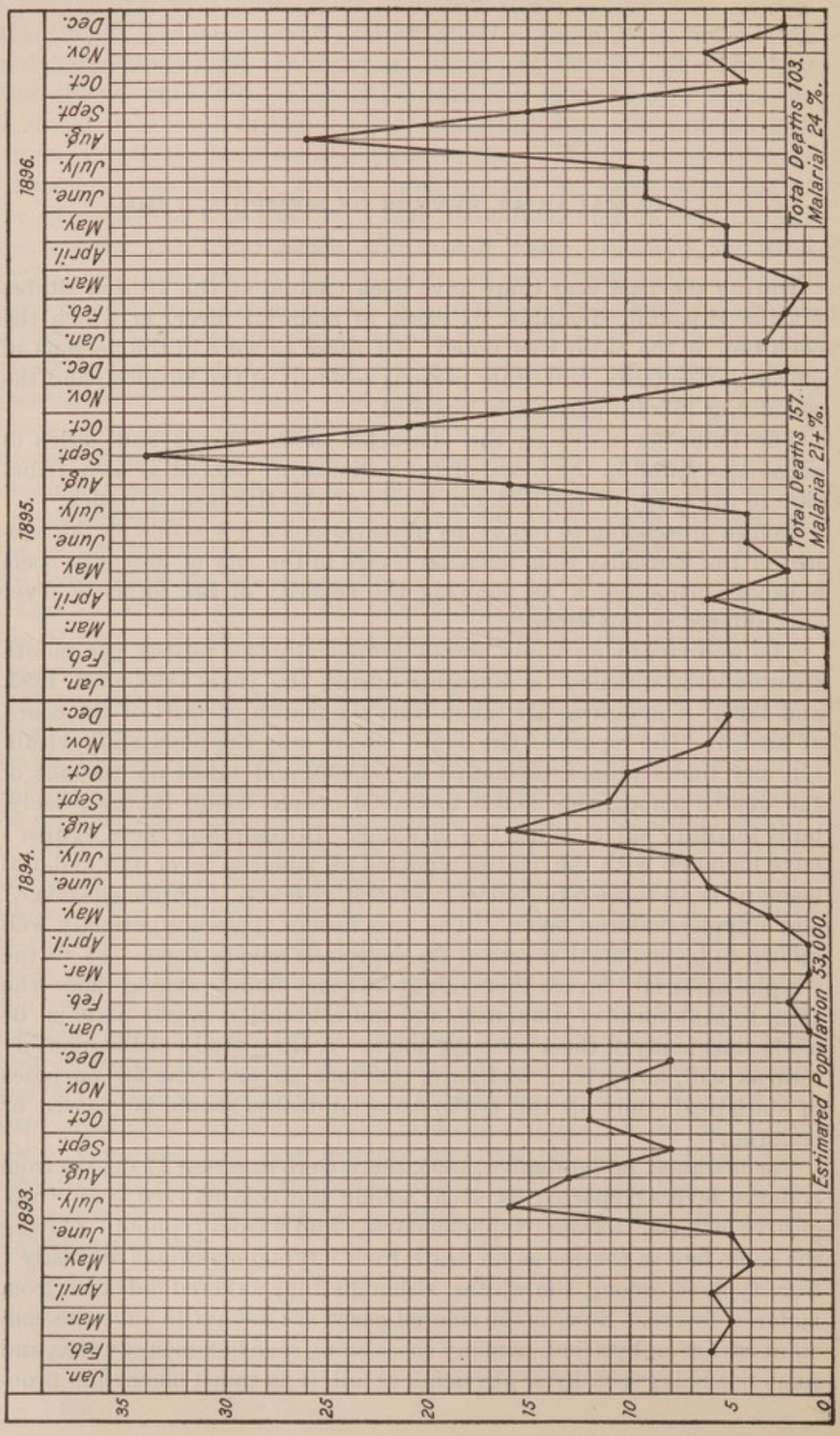
During the past year there have been treated at the United States Marine Hospital, Memphis, 61 cases of malarial fever, in which the condition of the blood was noted. Of these 15 were in the persons of officers, attendants, and other persons resident at the hospital, and the remaining 46 were patients in hospital.

The following notes on the character of the fevers and forms of organisms found in the blood of the patients are offered as a contribution to the study of the malarial fevers of the Mississippi Valley.

Before proceeding to report my observations a few words on the subject of the mortality from malarial fevers in the city of Memphis seem a proper introduction, as showing the severity of the forms of fever encountered in this vicinity.

The accompanying chart shows graphically the deaths per month from malarial diseases in Memphis during the years 1893, 1894, 1895, and 1896. The figures are taken from the monthly report of the board of health. The report of the board covers only the population within the city limits proper, estimated at 53,000, and takes no account of the deaths among the 25,000 to 30,000 people living in the closely-built territory surrounding the city line. In compiling these figures I have included with the deaths reported as malarial fever and malarial hæmaturia all those reported as "congestive fever," "pernicious fever," and "typho-malarial fever." The two former types are perfectly well known to be malarial fevers of an especially severe type. As to the "typho-malarial" fevers there might be some dispute among those who cling to that form of diagnosis, and the contention might perhaps be made that many of them were typhoids. A little study of the monthly returns will, however, I feel sure, convince anyone that for purposes of statistical study all the typho-malarial deaths should be classed as malarial.

For instance, in September, 1895, there were reported 17 deaths from malarial fevers (reported as such) among the colored race, 3 of "congestive malaria," 3 from "typho-malaria," and 6 from typhoid. During the same month there was no death from "typho-malarial," and only 1 from typhoid among the whites, although they suffered 8 deaths from malarial fevers. Now, as the colored cases are not apt to have the constant care of a physician, in many cases being seen but once or twice, and some not being seen by a physician at all, it is much more than prob-


1893.
1894.
1895.
1896.
Jan.
Feb.
Mar.
April.
May.
June.
July.
Aug.
Sept.
Oct.
Nov.
Dec.
0
5
10
15
20
25
30
35
Estimated Population 53,000.
Total Deaths 157.
Malarial 21+%.
Total Deaths 103.
Malarial 24 %.

able that more of the cases of 6 typhoid were malarial than of the 3 typho-malarials were typhoid, so that the total deaths from malarial fevers is not improperly swollen by including the typho-malarials. Anyone familiar with Memphis, supplied as it is with excellent artesian water, would find it difficult to believe that there were 5 deaths from typhoid among colored people in the month of September, or about 7 per cent of the total deaths from all causes among the colored race during that month.

Again, in October, 1895, there were reported 4 deaths from "typho-malarial fever" among the colored race, and 3 from typhoid, only 1 death from each occurring among the whites.

In July, 1894, there were 7 deaths from malarial fever among the colored, and 5 deaths from typhoid, and no typho malarial.

These figures, which could be reenforced by similar ones from other months, show conclusively that so far from overestimating the malarial death rate, it is considerably underestimated, many of the deaths from typhoid among the colored race being really malarial.

The view expressed by Barker in his Study of Some Fatal Cases of Malaria (Johns-Hopkins Reports, Vol. V, p. 263) that "the majority of cases of so-called typho-malarial fever * * * are really genuine cases of typhoid fever," may be correct as far as the cases seen on the North Atlantic seaboard are concerned, but I think the majority of those who study the cases of so-called typho-malaria in the Lower Mississippi Valley, with the aid of the microscope, will agree that at least four-fifths of them are malarial, pure and simple. A study of the malarial mortality in Memphis shows at once that the fevers hereabouts are very much more fatal than those of the Central Atlantic Seaboard.

Thayer and Hewetson report 333 cases of malaria observed in the wards of Johns Hopkins Hospital, with 4 fatal cases. Contrast this with the return for Memphis for September, 1895. In that month there were among the whites a total of 68 deaths from all causes; of these 11, or 16.17 per cent, were malarial, including 4 "congestive" and 3 hæmaturia. Among the negroes there were 89 deaths from all causes, of which 23 were malarial, or 25.84 per cent, while of the nonmalarial deaths 6 are returned as typhoid, a number well known to be excessive. To sum up, out of a total of 157 deaths from all causes, 34 were known to be malarial, or 21.65 per cent. Moreover, we find among "Digestive diseases" 4 deaths returned as from "Congestion." I have not included these in my count, but probably should have done so, for Professor Krauss, formerly city health officer and now professor of bacteriology and pathology in the Memphis Medical School, informs me that the cases so returned are almost certainly malarial.

Memphis is situated on a series of bold bluffs overlooking the Mississippi. The country all about is high rolling upland, with a rather sandy clay soil. The city has an exceptionally fine system of sewers, gets its water from a very deep artesian well, and is unusually well

paved, and yet we find that in some months nearly 22 per cent of all deaths are from malarial fevers. It certainly seems that a disease capable of causing such a death rate is worthy of the closest study, both as to causation and the classification of different types.

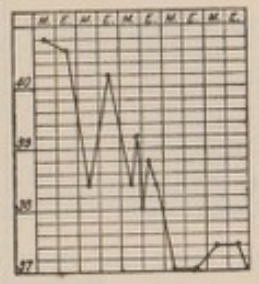
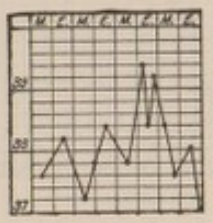
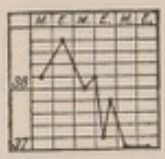
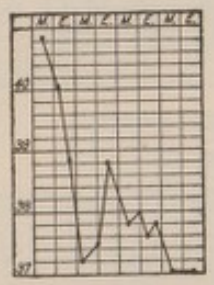
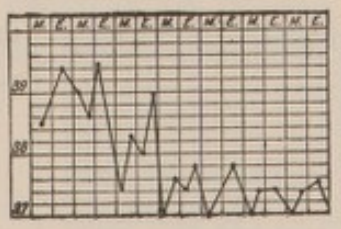
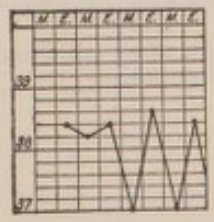
Following the views of Thayer and Hewetson and others in this country and the very generally expressed view of foreign observers, we would classify the vast majority of fevers seen hereabouts as "Æstivo-autumnal," but anyone who watches the clinical history of these cases inevitably comes, I think, to differentiate certain types, and begins to ask himself if it is proper to lump all these types together as due to the identical form of organism.

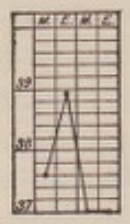
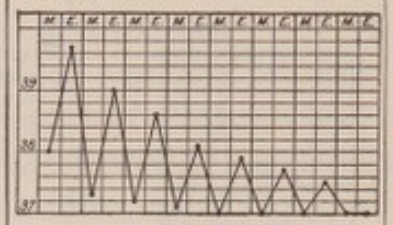
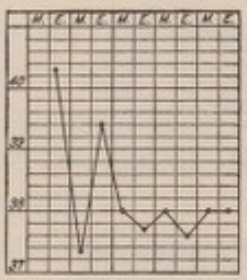
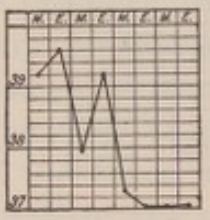
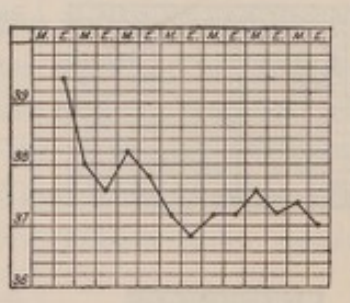
There is a concensus of opinion on the part of practically all observers, except on the part of Loveran and his immediate followers, as to the type of organisms found in simple tertian and quartan fevers, and as to the entire distinctness of the two, one from the other, no matter where these fevers occur. Do not analogous differences in the continued fevers of malarial origin seem probable? I have seen the greater part of a ship's crew lying about the decks at one time, having fallen in some instances as suddenly as if stricken with apoplexy, all showing plainly that terrible nervous tremor seen in "Chagres fever." Surgeon Carter, of this Service, once boarded a vessel in which all but two of the crew were dead where they had fallen—the captain in his cabin, the cook in the door of the galley, the crew about the deck or in the forecastle. It is hard to believe that there is no difference between organisms causing such fevers and those causing the ordinary æstivo-autumnal fevers of the temperate zone.

It is to the study of this problem, the possible differentiation of varieties of the æstivo-autumnal organisms associated with different types of fever, that I have tried to devote some attention. Of the patients seen here 4 were females, 57 males; all were in young to middle-aged adults. Six of the cases were simple intermittents. I have not reported these in detail in the appended table, because they presented the typical tertian forms, but have noted them at the bottom. All the intermittents were among the hospital patients. The cases among the personnel of the station were all æstivo-autumnal or vague cachetic type. Of the 40 cases of æstivo-autumnal fever seen in patients of the Service 3 died. This gives a death rate of 7.5 per cent.

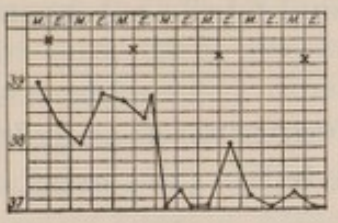
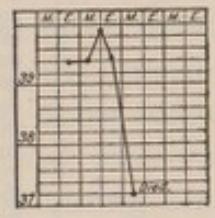
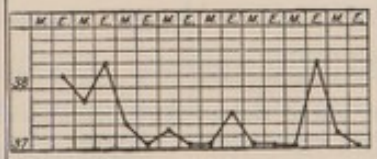
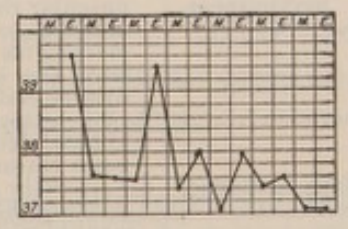
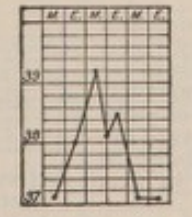
The death rate during the yellow-fever epidemic at Brunswick, Ga., in 1893, was 4.2 per cent.

I have grouped the cases according to clinical histories. In the first group are the cases presenting daily paroxysms; sometimes signalized by chill; more often not. In most of these the fever was continuous. In others there was a brief intermission.

No.	Time since taken sick.	History.	Temperature.	Results of blood examination.
1	4 days.	No chill, but high fever, severe nausea, and back ache.		Abundant hyaline, "ring-like" bodies, some free pigment clumps, corpuscles brassy and shrunken.
2	1 hour.	No chill, severe back ache, dizziness.		Pigmented intro-corpuscular forms, some segmenting, free pigment clumps. Second day, ring-like hyaline intro-corpuscular bodies, with still some segmenting bodies and free pigment.
3	1 day ..	Malaise and nausea daily.	Hovered between 37.2° and 37.7°, going up every day at onset of nausea.	Intro-corpuscular, ring-shaped hyaline bodies, free pigment clumps, marked leucocytosis.
4	3 days.	Severe chill at onset, and recurrence every day, fever continuous.		Intro-corpuscular hyaline forms.
5	5 hours.	One severe chill at onset.		Very numerous intro-corpuscular hyaline forms; very numerous phaogocytes, some containing pigment clumps.
6	2 days.	Violent onset; no chill; unconscious; hæmaturia.		Small intro-corpuscular hyaline bodies, macro-cytes and micro-cytes in great abundance.
7	8 days.	Daily intense paroxysms of ciphalalgia; fever continuous.		Intro-corpuscular bodies small and impigmented; later extro-corpuscular bodies with pigment arranged in ring in these centers.

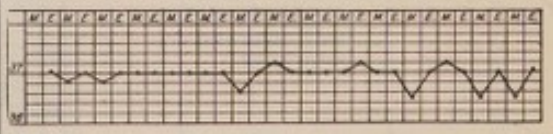
No.	Time since taken sick.	History.	Temperature.	Results of blood examination.
8	6 days.	Daily chill with continuous fever for five days, only one paroxysm after admission.		A few very small intro-corpuscular hyaline forms, some extra-corpurcular bodies with pigment "crowns" at their centers.
9	12 days.	Daily chill with continuous fever.		A number of granular disintegrating extra-corpuscular pigmented bodies and a few very small extra-corpuscular bodies with one or two blocks of actively motile pigment.
10	3 days.	Quotidian chilly sensation.	Continuous low fever and daily chilly attacks.	Small intro-corpuscular pigmented bodies, some granular extra-corpuscular forms (degenerative) with scattered pigment.
11	13 days.	Daily severe chill with continuous fever.		(During chill.) Sutro-corpuscular, small ring bodies containing one or two pigment grains, also similar ones nonpigmented. Several very small and very active extra-corpuscular bodies with one block of active pigment. Several phogocytes containing pigment grains.
12	14 days.	No chill; fever continuous.		Small intro-corpuscular and extra-corpuscular forms containing pigment.
13	12 days.	Daily slight chilliness with continuous fever.		Ring-like, very small, hyaline, intro-corpuscular bodies, very small extra-corpuscular bodies with very active pigment blocks, one or two.
14	6 days.	Continuous severe frontal headache and bone pains. Two chills on successive nights.	Temperature after admission remained normal.	One shrunken, brassy corpuscle containing 3 hyaline bodies. One corpuscle with a hyaline body that appeared half in and half out.

The next group of cases embraces 6 in which there were evidences of a mixed infection with tertian and æstivo-autumnal forms.

1	3 days.	A tertian headache of great severity, accompanying a continuous high fever, with quotidian exacerbations.	 X indicates attacks of violent cephalalgia.	At first typical tertian forms, large, with abundant fine, active pigment; later very young intro-corpuscular æstivo-autumnal forms and one or two extra-corpuscular small forms, with one or two pigment blocks.
2	7 days.	Severe tertian chills accompanying continuous fever.		Admitted at night; next day blood showed small intro-corpuscular forms with one or two grains of pigment.
3	14 days	Chill every evening.		Extra-corpuscular, round, hyaline bodies with pigment in central crown; large bodies containing small, highly refracting spheres of pigment. One burst and scattered contents.
4	5 days.	Continuous fever with quotidian chills later; in hospital this changed to tertian exacerbations with intermissions.		Very large extra-corpuscular forms with abundant fine pigment; three days later, numerous extra-corpuscular small segmenting forms. A few extra-corpuscular, very small bodies with one or two active pigment blocks.
5	4 days.	Very severe tertian chills, fever continuous and very high.		Record not preserved.
6	13 days	Tertian chill, continuous back ache and bone ache.		Typical æstivo-autumnal intra-corpuscular forms, with pigment clumped near periphery. Numerous large, vacuolated bodies (Hopkins Report, Pl. I, Nos. 23 and 24).

The next group comprises cases of the class that presented vague symptoms of various sorts, cases hardly protracted enough to be classed as malarial cachexias, but in which the appearance of the disease does not manifest itself in the usual febrile paroxysms.

No.	Time since taken sick.	History.	Temperature.	Result of blood examination.
1	*Hour.* 1	Sudden nausea and pain in stomach.	Temperature rose once to 38°, remained normal afterwards.	Several perfectly typical ring-shaped bodies extra-corpuscular. These bodies presented a distinct exterior zone of highly refracting hyaline substance, surrounding a central area of much lower refraction. They were small—not over one-eighth diameter of a red-blood corpuscle, and contained two or three motile pigment blocks. There was very marked leucocytosis. The next morning several similar bodies, but leucocytosis had disappeared; there were a few very active nonpigmental hyaline bodies about twice the size of the rings. Several phogocytes, one in active pursuit of a ring body. Seven hours later: Extra-corpusculous ring bodies as before, moving actively about field; one intro-corpuscular nonpigmental ring body, numerous phogocytes, one containing a pigmental ring, of which the pigment was motionless and the substance of ring swollen.

No.	Time since taken sick.	History.	Result of blood examination.
2	21 days .	Continuous low fever, never rising above 37.8°. Irregular paroxysms of gastritis.	Intro-corpuscular small hyaline bodies and several very small and very active extra corpuscular bodies with one active pigment block, very marked leucocytosis and phogocytosis.
3	14 days .	Anæmia and malaise with irregular attacks of intense nervousness. Normal temperature.	Seven or eight very small perfect extra corpuscular rings (as in case 1) with one or two active pigment blocks—leucocytosis. Many macrocytes and microcytes. Five hours later the same and one intro-corpuscular hyaline body.
4	5 days ..	Malaise, temperature normal	A few extra-corpuscular pigmented bodies. Marked leucocytosis, some containing pigment grains.
5	36 hours.	Temperature normal, daily headache, and obstinate diarrhea.	Several very small and very active extra-corpuscular bodies with one or two active pigment blocks. A great many microcytes.
6	1 day ...	Patient had been in hospital a month with a broken arm. A very vigorous man with a pulse normally never over 70. Temperature normal but marked increase in rapidity of pulse at irregular intervals. Toward the last, temperature ranged daily .5° subnormal. Left hospital in this condition.	 Active extra-corpuscular, ring-shaped bodies containing one or two pigment blocks. Later a number of large granular degenerative looking forms and marked phogocytosis.

The next group comprises 24 cases in which the fever presented no discernible regularity in type and in which the blood gave the usual variety of æstivo-autumnal forms. In none of these were found either the extra-corpuscular rings as noted in the last group nor the very

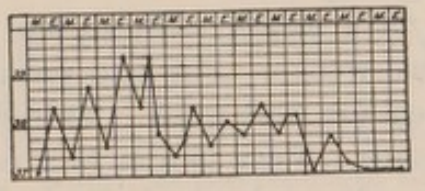
small and active pigmented extra-corpuscular forms noted in a number of instances.

The next group embraces 4 cases in which the fever was of the type often called typho-malarial, indeed commonly called so by many physicians. Two at least of these cases presented unusual complications and are of sufficient interest to merit report in detail, but here I confine myself to summarizing as in the other groups.

No. 1 (seven days since taken sick).—Had several chills during summer (three months ago); onset of present attack a "dumb chill," followed by high and continuous fever; bowels constipated. Very marked ænemia. Spleen much enlarged. At no time had any abdominal symptoms. Markedly typhoidal mental state. Quinine given very freely, hypodermically, without apparent effect until the last.

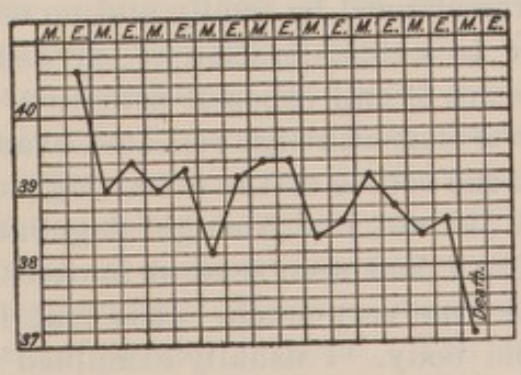
Blood.—Contains a few extra-corpuscular, granular-looking forms containing pigment. Marked ænemia. Later there were a few small extra-corpuscular forms containing pigment. Blood obtained from ear only.

Temperature:



Case 2 (three days since taken sick).—Severe quotidian chill, three days with continuous fever. Severe diarrhea from the first, discharges watery and preceded by griping. Tongue moist and slightly furred. No iliac tenderness or gurgling. Mental condition rather dull. Death on ninth day after admission. Quinine seemed to produce very little effect.

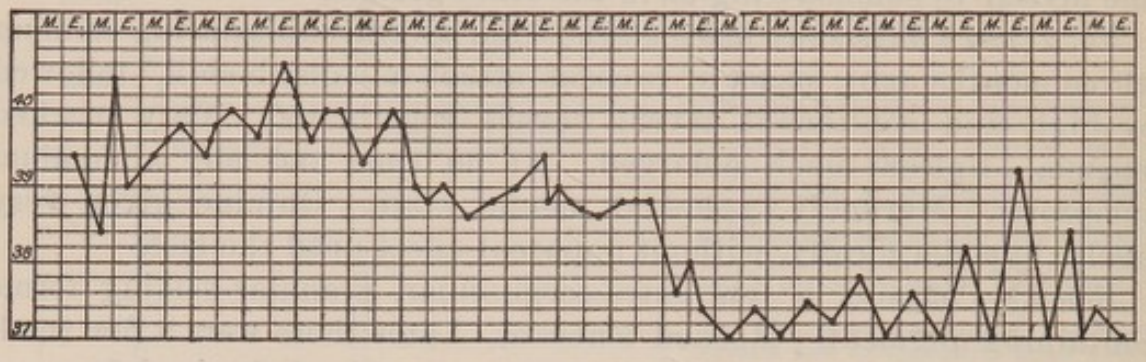
Blood.—Showed a number of small extra-corpuscular segmenting bodies. Later, a great many small intra and extra corpuscular hyaline, with 2 or 3 active pigment blocks.



Case 3 (fourteen days since taken sick).—Vague chilly sensation, malaise, fever, and profuse watery diarrhea for two weeks. No chills in hospital but rises of temperature, preceded by "cold feelings." Liver and spleen much enlarged. Never seemed to feel sick. Pulse

excellent throughout; once rose to 100, but remained 85 to 96 the rest of the time.

Blood.—Very numerous small extra-corpuscular bodies, with central pigment block. Later, small segmenting forms. Just before discharge one small intro-corpuscular, hyaline body, the only one seen during disease.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nations of the blood of fever cases in this locality, extending over several years, he has never found a crescent. I have seen abundance of crescents in the blood of patients from the Northern Atlantic seaboard, and also in cases examined in Key West, the patients having contracted their disease on the mainland of Florida, and I am utterly at a loss to account for not finding them here, unless we accept the views of Canalis and others, that there are two forms of æstivo-autumnal organisms, the short and the long cycle, the latter only associated with the development of crescents. If we assume that the fevers of the Southern Mississippi Valley are of the short-cycle variety, as clinically most of them seem to be, the nonappearance of the crescents in the cases showing quotidian exacerbations is readily understood; but how about the cases of continuous fever with apparently longer cycles of development, as in cases reported in the so-called "typho-malarial" group? Marchiafava and Bigami hold that there is a distinct type of organism found in the quotidian æstivo-autumnal fevers, and that they are never associated with the development of crescents.

Grassi and Felletti also hold that the type leading to the production of crescents is distinct from the "hæmamœba præcox," or parasite of quotidian æstivo-autumnal fever. Sachorrow also thinks the crescents belong to a separate type. Golgi, as the result of his later studies, speaks of the crescents as "forms of which the biology has not yet been determined." On the other hand, Hewetson and Thayer and many foreign observers hold that while the crescents are often missing they are not in any way connected with a distinct type of the æstivo-autumnal fever. My number of cases observed here, 61, is too few perhaps to justify an expression of a decided opinion, but the nonappearance of the crescents, associated as it is by the pretty striking uniformity in other respects of the organisms found, justifies me, I think, in being inclined to accept the views of Marchiafava and Bigami and others I have quoted.

We come now to the consideration of the question, Do the results of these examinations give any ground for thinking that there are different types of æstivo-autumnal fever associated with particular types of organisms? The failure to find crescents would seem to be evidence that there is such a difference between the forms found in the quotidian cases, the fevers in the so-called "typho-malarial" group, the 25 irregular cases, or the 6 cases of vague or cachectic manifestations. Clinically there is the most striking difference between the quotidian and the continued fevers of longer interval. The small number of the latter, moreover, only 4, precludes the formation of a decided opinion. It has seemed to me, however, that the bodies seen in the cachectic and continuous fevers were distinctly smaller than those usually found in the others, but this may be only due to a difference in the stage of development. I desire to call attention here to the fact that in 4 of the

quotidian cases, in 2 of the mixed cases (tertian-quotidian), in all, 6 of the cachectic cases, and in all 4 of the continuous cases, or 14 in all, I note the finding of very small extra-corpuscular forms containing one or two blocks of pigment.

In none of the plates or literature to which I have access have I seen anything figured or found anything described that just exactly tallies with these. They are clear hyaline bodies, contain one or two, oftener one, proportionately large pigment blocks, and are never more than one eighth the size of a red blood corpuscle. They are very active, scudding along among the many corpuscles at twice or more the rate of speed with which the corpuscles themselves stream across the field. They coast along the margins of the groups of blood corpuscles, stopping now and then in contact with a corpuscle for a few moments, and then make off again. The pigment block meanwhile moves actively from one point to another of the bodies' periphery and occasionally from center to periphery. In several cases these small bodies have shown a typical "ring-like" contour. They look strikingly like the small bodies shown in a group at fig. 23, Pl. II, of Hewetson and Thayer's Report, plus a block, or sometimes two, of pigment. They are sometimes fairly numerous, as many as a half a dozen being seen in one field. In three of the cachectic cases these extra-corpuscular bodies took the form of typical "ring-bodies," having a zone of a high-refracting ectoplasm surrounding an area of endoplasm of much darker appearance and containing an active pigment block. These "ring-like," extra-corpuscular forms I found only in the cachectic cases. I am inclined to think that these bodies are derived from the small round bodies, which result from the bursting of the segmenting forms, as shown in fig. 23, Pl. II, Hewetson and Thayer's Report; that for some reason they fail to make prompt entrance into a corpuscle and go on to the development of pigment extra-corpuscular without, probably, proceeding any farther in their cycle of development. The fact that these extra-corpuscular rings were found in the cachectic cases alone strengthens this belief, since impaired or irregular development, but not total failure to develop, on the part of the infecting organism should logically produce a type of disease atypical in its characteristics. This explanation seems reasonable and probably the explanation of the abundance of the other very small pigmented extra-corpuscular forms noted in the cachectic, and other cases turns on a similar lack of development.

My conclusions are (1) that as yet sufficient differences have not been made out between the organisms found in the different types of æstivo-autumnal fever in this vicinity to warrant the connecting of particular forms with particular types of fever. (2) That the entire absence of crescents and ovoids, however, point to the correctness of the view held by Marchiafava and others that the short cycle forms do not go on to the production of crescents. (3) That if the explanation I have advanced for the numerous extra-corpuscular "ring-forms" found in the cachexias

is true, namely, that they are forms of deviate, but not arrested, development, producing consequently atypical manifestation of disease, then it points the way to understanding how the same organism can produce manifestations of disease so different in virulence and in clinical features as are found in the various types of æstivo-autumnal fevers.

The difference in conditions of development is probably the key to the whole matter.

We probably know but a small fraction of the truth as yet, and very extensive studies must yet be made before the facts are fully known. The accumulation of observed facts is desirable even if the observer fails to draw proper inferences from them, and it is for this reason I have ventured to report my observations.

A CASE OF COCAINE POISONING.

By P. A. Surg. G. B. Young.

J. L.; colored; age, 28 years; native of Tennessee; was admitted to the United States marine hospital at Memphis on February 24, 1897, suffering with ulcerated external piles, and died March 1, 1897, from a self administered overdose of cocaine. Patient had a small ulcerated external pile, and a balanoposthitis, with a small ulcer at the base of frænum. He was given the usual treatment, and the local lesions responded promptly. From the time of his admission, however, he suffered with a depression and lack of vitality for which no cause was apparent. On the evening of the 27th he was found to be failing rapidly, and yet no malady of a recognizable nature was present. His temperature was slightly subnormal, respiration slow, and pulse small and weak. He was given supportive and symptomatic treatment. During the night respiration became very slow, labored, and shallow, and his pulse very rapid. There was diminished resonance over the upper portion of both lungs; temperature slightly subnormal. Was given active symptomatic treatment without much effect. No history could be obtained from the patient; but a few hours later a patient was admitted to hospital who recognized him as a notorious cocaine "fiend." In spite of active and persistent efforts for his relief the patient died at 3 a. m., March 1, 1897. He had never been conscious since the night of February 27. It is probable he had brought a supply of his favorite drug with him and taken an overdose.

The picture presented by this case was very striking and never to be forgotten. The diagnosis of hypostatic congestion consequent on deficient respiratory and cardiac action, for which the cause was then unknown, was made soon after seizure.

Necropsy (*ten hours after death*).—A well-developed, though rather emaciated young negro; no external scars or marks, except a slight scar above left nipple; marked rigor mortis. Head: Dura nonadherent and markedly œdematous and thickened; superior longitudinal sinus normal; perivascular lymph spaces much congested. Pia: Venous congestion, but no signs of inflammation; brain substance firm, and puncta vasculosa much enlarged; pons Varolii rather firmer in consistency than normal and much congested; no degeneration in motor tracts; cerebellum congested. Thorax: Pleura congested; both lungs collapsed on opening pleura; marked adhesions to parieties; both lungs were profoundly congested. Pericardium: Marked venous

congestion; pericardial fluid increased in amount; marked arterial anæmia. Heart normal in size; adhesions between the two leaves of the mitral valve; adhesions also marked in aortic valves and present to a slight extent in tricuspid; a small thrombus in aorta. Intestines: Enormous congestion of the entire intestinal tract and mesentery; appendix reaching to brim of pelvis; marked spasmodic (?) constrictions of intestines, beginning at jejunum, alternating with dilatations; similar spasmodic constrictions found in large intestine; mesenteric glands much enlarged. Stomach: Mucous membrane presented a number of ecchymotic patches. Liver presented evidence of interstitial hepatitis, presumably syphilitic; venous congestion very marked; size about normal. Spleen shrunken and shriveled distinctly. Pancreas: Consistency considerably harder than normal; connective tissue increased. Diaphragm normal. Kidneys: Both presented adherent capsules and congested pyramids and anæmic cortex. Bladder contained 500 c. c. urine; the mucous membrane was anæmic.

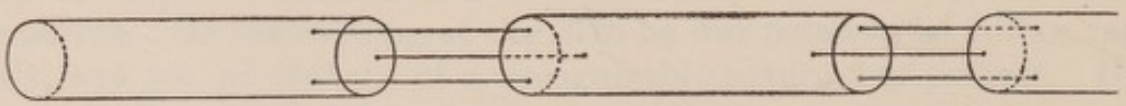
SULPHUR HOSE IN USE AT NATIONAL QUARANTINE STATION, ANGEL ISLAND, CAL.

By P. A. Surg. M. J. Rosenau.

Marine-Hospital Service,
National Quarantine Station, Surgeon's Office,
Angel Island, Cal., August 26, 1897.

Sir: Complying with your request (P. H. B.), I have the honor to submit the following description of the sulphur pipe used at this station:

Sections of light galvanized iron pipe are joined with three pieces of copper wire thus:



A cylinder of canvas is then sewed in place and made to fit snugly over the ends of the adjoining sections. This piece of canvas overlaps about 3 inches of the iron pipe. The canvas is then thoroughly soaked with white lead and oil, and another cylinder canvas is put on over this, overlapping about 5 inches. This is also well coated with paint.

The canvas must be slack enough to allow the wires to take all the strain, but must fit very firmly over the ends of the iron sections, in order to prevent leaking. They may be made higher and more secure by tying them on with twine.

It will be seen that the pipe consists of a series of iron sections, with canvas joints. The canvas joints, however, act only as capsular ligaments, the wires serving as the suspensory or binding cords.

Experience has taught us that single layers of unpainted canvas soon burn out; that the wiring of the joints relieves the canvas of much strain, and thereby lengthens its life; that single layers of canvas saturated with paint are efficient, but that double layers make lighter joints and last longer.

The pipe in use here is 8 inches in diameter. Each link is 2 feet 6 inches long, and the interval between each link 3 or 4 inches.

In practice we find it advisable to use rigid galvanized iron pipe, of which we have various lengths, for straight leads, reserving the jointed pipe to get around corners, into hatches, in leading to the ship, etc.

With 5 or 6 lengths of jointed pipe, 25 and 50 feet long, varying lengths of straight, rigid pipe, and numerous elbows and tees, we find no difficulty in conducting the sulphur fumes from the *Omaha* to any part of another vessel.

The only desideratum to make this pipe quite perfect for the purpose is to protect the inside of the canvas with asbestus, or some fire-proof material or paint.

This pipe may be commended as being trustworthy, light, cheap, easily managed, quickly adjusted, and superior to any that I know of for the purpose.

Very respectfully,

M. J. ROSENAU,
Passed Assistant Surgeon, M. H. S.

The SUPERVISING SURGEON-GENERAL
MARINE-HOSPITAL SERVICE,
Washington, D. C.

SUGGESTIONS FOR THE GUIDANCE OF NURSES IN THE MARINE-HOSPITAL SERVICE.

By Asst. Surg. L. E. Coper, M. H. S.

I. THE MORAL OBLIGATION AND DUTY OF A NURSE.

The nurse is the most valuable of all the instruments which the advance of science has given to the doctor, because he is the only instrument which thinks and acts for itself. Should a nurse object to having himself regarded in the light of a tool by the physician, or should he lack the ambition to transform himself into a well-appointed and useful piece of machinery, he had better try some other occupation. The nurse has as his mission in life a position between doctor and patient, or between doctor and instruments, wherein he is held morally responsible for the proper execution of such orders as the medical officer may give in reference to the patient or instruments, as the case may be. His duty is very plain. If, after accepting this highly important position of trust, the nurse finds that he is either mentally, morally, or physically incapable of performing the duties of his office in a perfectly conscientious manner, he should abandon his vocation before his incompetency causes irreparable damage. It is obvious that the Marine-Hospital Service must employ only male nurses in its hospitals, the opinion held by the great majority of physicians in this country that men make poor nurses to the contrary notwithstanding. So it remains for the male nurses to remove the stigma which has been cast on them as a class by the exercise of honesty, intelligence, and observation, combined with the determination to make their calling a science.

II. SELECTION OF APPLICANTS FOR POSITION OF NURSE.

(*a*) *Honesty.*—The fundamental principle in the making of a good nurse is honesty. A dishonest nurse is a most dangerous human being. How easy it is to forget the medical officer's orders and then lie about it. How simple it is to give a hypodermic of morphia to keep a troublesome patient quiet, when the medical officer has ordered a hypodermic of water as a plecebo. What a temptation it is to keep quiet and say nothing about having broken the aseptic technique and trust to luck that everything will turn out all right. It is much easier to lie under these circumstances than to tell the truth, and many has been the number of lives lost by such lies. Many has been the death turned in on the certificate as caused by "heart failure" when it was really caused by septic poisoning due to dishonesty on the part of a nurse.

(*b*) *Nationality.*—Englishmen make the best nurses, then Germans, Scandinavians, and, lastly, Americans. There are a great many rea-

sons why Americans, so proficient in every other calling, do not make good nurses, but scarcity of space will not permit of a discussion of this point.

(*c*) *Temperament.*—The individual with a phlegmatic temperament is undoubtedly the one best suited, in the long run, to care for patients of the Marine-Hospital Service, for the reason that sailors as a class are prone to regard the nurse in the light of a servant paid to wait upon them, and a nervous or sensitive person will be sure to find the position hard to bear if they allow the grumblings and "growls" of the sailor man to worry him. Then he should never allow his sympathy for a patient to influence him; let a nurse be gentle and kind, but never sympathetic.

(*d*) *Physical condition.*—A nurse should never be employed when there exists in the mind of the surgeon in command the slightest doubt as to the perfect health of the applicant. Nursing is a trying occupation at best, and a man who is debilitated from any cause should not take it up as an occupation. If a nurse must attend to and worry over ills of his own there will not be left much patience, nervous energy, or good judgment for the care of the patient.

III. A GENERAL CONSIDERATION OF ASEPSIS AND ANTISEPSIS.

In his care of operating room, instruments, dressings, wards, floors, linen, and patients it should be the aim of the nurse to bring about that condition in which there is complete absence of septic material. Although it is true that an ideal technique which will insure protection from all germs is not possible, certainly from a bacteriological standpoint, yet it is certain that those who aim at perfect cleanliness in their work will obtain the best results. While the bacteriologists have shown us that infection rarely takes place from the air, they have also shown us that it is most frequently brought about by contact. From this the importance of preventing the introduction of bacteria on the instruments and dressings or the hands of the nurse can be readily understood. Now to bring about the absolute and complete destruction of bacteria we must resort to a process known as sterilization.

(*a*) *Principles of sterilization.*—Sterilization may be employed by any of the following methods: (1) Actual flame, (2) dry heat, (3) moist heat, (4) chemical disinfectants, (5) sterilization by formaldehyde gas. The actual flame or sterilization by fire should never be used except when ordered by the medical officer, as it is used only on rare occasions, except for doing away with worthless and dangerous objects, such as soiled linen, dressings, bandages, etc.

Dry-heat sterilization is accomplished by means of the hot-air sterilizer. This consists of a double-walled sheet-iron oven, fitted with shelves, on which the articles to be sterilized are placed. The heat is supplied by either a Bunsen burner, oil stove, or ordinary stove, and the temperature is registered by a thermometer which passes through the roof of the oven. Exposure to dry heat at 100° C. for one hour and

a half is required to kill the ordinary vegetative nonspore-forming bacteria, but where spores exist a temperature of 140° C. for three hours is necessary. This process of sterilization is seldom used except for glassware, as it is not only inconvenient and slow, but it destroys many substances of vegetable and animal origin. Sterilization by moist heat

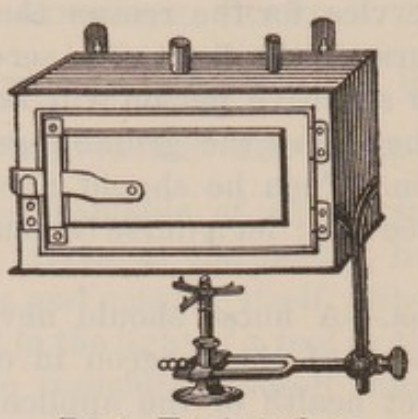


FIG. 1.—Hot-air sterilizer.

may be accomplished either by using boiling water or steam. Boiling water is one of the quickest and most convenient agents which we possess. Exposure to the action of boiling water for thirty minutes will insure complete sterilization.

FIG. 2.—Steam sterilizer.

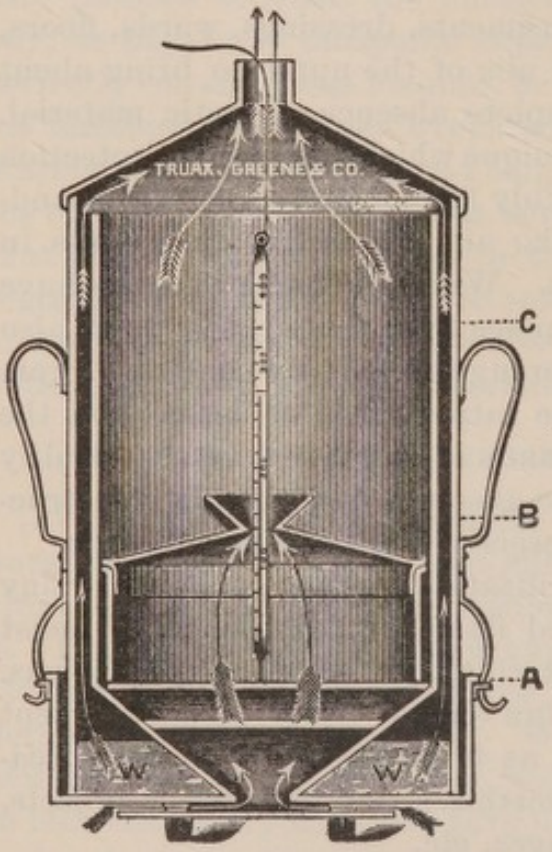


Diagram showing Boeckmann's sterilizer when used as a hot-air apparatus.

FIG. 3.—Steam sterilizer.

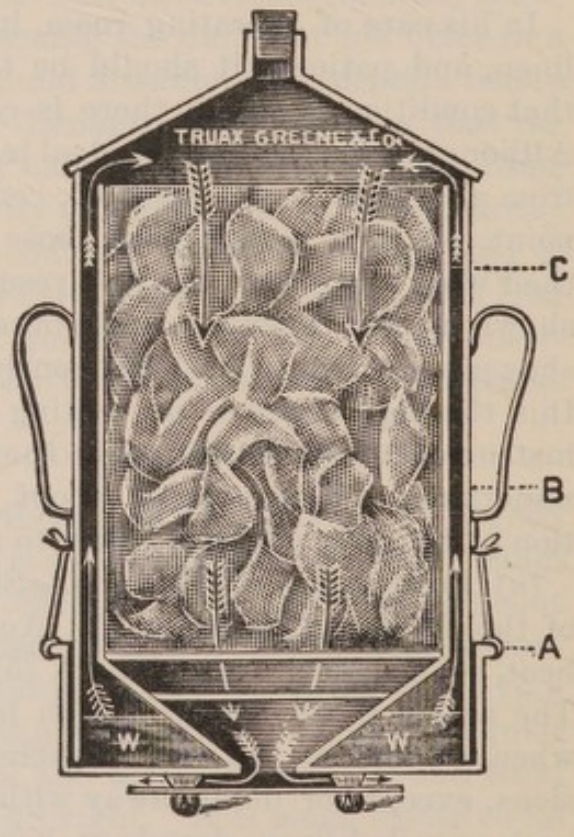


Diagram showing Boeckmann's steam sterilizer when used for dressings.

Sterilization by steam is another very simple and practical method. For this a cylinder must be used, from the inside of which all the air is expelled by the steam and an even temperature of 100° C. maintained throughout.

One of the most valuable methods of insuring complete sterilization is that known as fractional or discontinuous sterilization. If a fluid be kept at a temperature of 100° C. in a steam sterilizer for twenty minutes all vegetative forms of bacteria will be destroyed. If this fluid then be kept for twenty-four hours at the ordinary room or body temperature, any spores which have escaped destruction (certain spores are known to resist a two hours' exposure to streaming steam) at the first heating will have grown out into vegetative forms, and can then be killed by a similar exposure on the second day. If the process be repeated for a third time one can be reasonably sure of having secured a completely sterile fluid. Tyndall, Pasteur, and others have shown that complete sterilization is practicable with the use of much lower temperatures (60° C.) if the process is repeated on three or four successive days. (Robb's Aseptic Surgical Technique.)

Sterilization by formaldehyde gas requires the use of a special lamp and sterilizing oven. Passed Assistant Surgeon Kinyoun has thor-

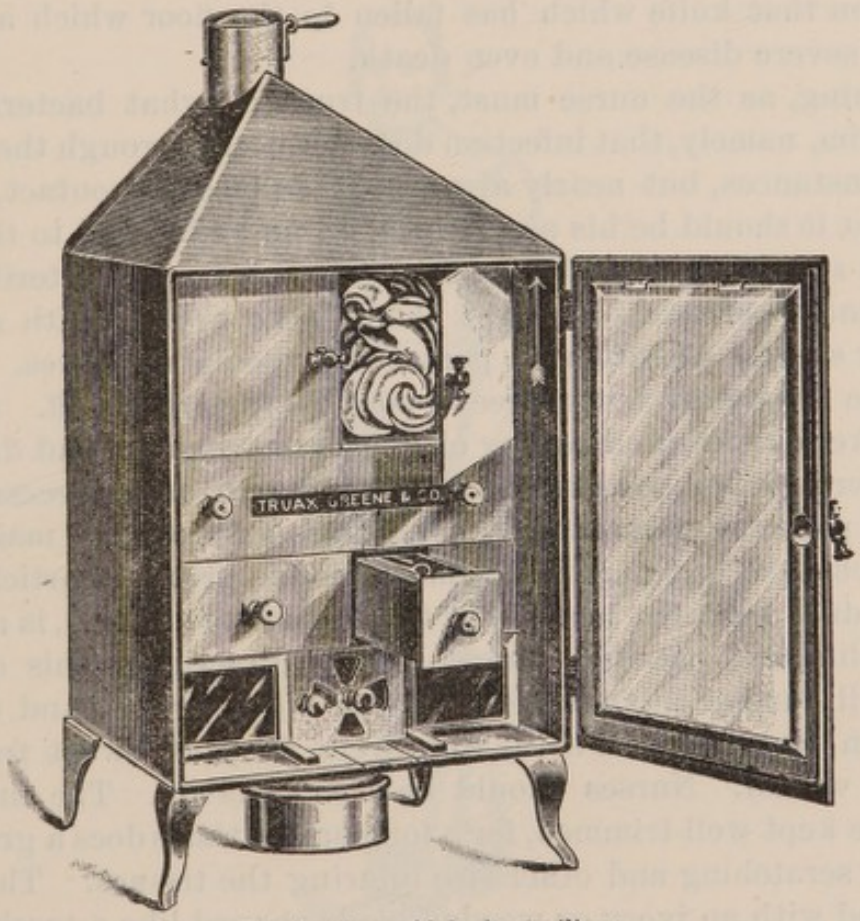


FIG. 4.—Formaldehyde sterilizer.

oughly and elaborately investigated the action of formaldehyde gas (Public Health Reports, January 29, 1897), and while he found that it was equal if not superior to any other method of sterilization, his failure to recommend it, especially for the sterilization of instruments and dressings, is proof that as yet boiling water is the surest and the simplest of all of the methods. This fact alone is unfortunate for those whose ever-ready excuse for not practicing sterilization is that they have no "appliances."

IV. THE PRACTICE OF STERILIZATION.

If the nurse could have even an elementary training in bacteriology he would appreciate the importance of the minute details which must

be carried out to establish a perfectly aseptic technique, but as, for obvious reasons, he has had no such training, he must accept and follow the principles which have been laid down by those who have proved their theories in a bacteriological laboratory. To begin with, the nurse should know the difference between ordinary cleanliness and surgical cleanliness. A knife which has been boiled for one-half to three-quarters of an hour may be said to be surgically clean, but let it slip out of your sterile hand and fall to the floor, and immediately it becomes unclean, even though it may look clean to the naked eye and show negative results under the miscroscope as far as pathogenic germs are concerned. It is in such a case as this that the nurse must take the word of the bacteriologist for it when he says that minute germs may exist upon that knife which has fallen to the floor which are able to produce severe disease and even death.

Assuming, as the nurse must, the truth of what bacteriology has taught him, namely, that infection does not occur through the air except in rare instances, but nearly always takes place by contact, it is very plain that it should be his aim to let nothing be handed to the medical officer as sterilized unless he is positive that it is really sterile.

Personal cleanliness.—A nurse should take a daily bath and otherwise pay special attention to personal hygienic measures. The hair should be kept short and as free as possible from dandruff. He should never take part in the handling of sterile instruments and dressings if he is suffering from a coryza or a mucous catarrh, as the necessary handling of a pocket handkerchief during the operation will make a break in the technique. A muslin cap, moistened to prevent particles of dandruff or dust from the head from falling into the wound, is a very safe way to eliminate possible danger in this direction. This cap can be made still further advantageous by having a sweat band of absorbent cotton fastened in it so as to prevent drops of sweat from falling into the wound. Nurses should be clean shaven. The finger nails should be kept well trimmed, for a long nail at times does a great deal of injury by scratching and otherwise injuring the tissues. They should be cleaned with an ivory or wooden blade shaped like a toothpick.

Uniforms.—Besides the uniforms required by the Marine-Hospital Service for ordinary use, nurses should be required to have special uniforms for use in the operating room. They should be made of some white material, such as twilled muslin. They should consist of a shirt and trousers. To sterilize these suits it is not sufficient to trust to the washing that has been given them in the general laundry of the hospital, as they could easily become infected after this from the hands of those employed in ironing and folding them. To sterilize the suits, wrap them in a towel and expose them to the streaming steam of the steam sterilizer for half an hour. Then dry them on a line which has either been sterilized or which is covered with sterilized towels. After they are thoroughly dried they are put away in sterilized towels until

required for use. The danger of contaminating the sterile suits by the hands of the nurse may be easily overcome by using rubber gloves which have been soaked in a solution of bichloride of mercury 1 to 500 before being used. Nurses should wear white canvas shoes with low tops and rubber soles. They are noiseless and they are easily cleaned by soaking in a solution of carbolic acid 1 to 500, and after allowing them to dry, they can be whitened with pipe clay, which gives them a very neat appearance. In putting on the operating suits, care must be taken to allow the hands to come in contact with the clothes as little as possible. All of the ordinary clothing should be removed, then the shirt and trousers are carefully put on, the shoes being put on last



FIG. 5.—Suit for nurse when engaged in operating room.

of all. This changing of clothes and shoes not only prevents the risk entailed by possible contact of street clothes with anything which has been sterilized, but it is a positive advantage and saving to the nurse, as it saves his uniforms and street shoes from being soiled in the operating room.

The sterilization of the hands and arms.—We are long past the day when an ordinary washing of the hands with soap and water, followed by dipping them into a solution of bichloride of mercury, will suffice to put them into a condition to handle dressings, ligatures, etc. On the other hand, it is evident that we can not boil or steam the hands as we can the instruments and dressings. However, Robb recommends

a method for the sterilization of the hands and arms which bacteriological tests have vouched for the efficiency of. After putting on the operating suit and rolling the sleeves up above the elbow, or better, to have the sleeves made short, the hands and forearms are scrubbed vigorously with a nailbrush, which has been previously sterilized by steam, and with Sapo virides (U. S. P.), which has also been previously sterilized. This should be continued for ten minutes by the clock, and the water used should be as hot as can be borne and should come from the faucet continuously. As the technique will be broken otherwise, the faucet should be turned on and off by covering it with a small sterilized towel. The hands and forearms are then immersed in a hot saturated solution of permanganate of potassium, and this should be well rubbed into the skin. Then the hands and forearms are washed in a saturated solution of oxalic acid until the stain of the permanganate of potassium has entirely disappeared. They are then well scrubbed in a solution of corrosive sublimate, 1 to 500, for two minutes, and are allowed to dry in this condition until it is necessary to handle anything sterile, when the corrosive sublimate is removed by washing in sterilized water. Remember that if the hands are allowed, either thoughtlessly or accidentally, to come in contact with an unsterile object the whole work will be undone and must be gone all over. It is here that sterile rubber gloves are of a great deal of service, as by their use the nurse can help the unclean nurse manipulate the patient.

Sterilization of instruments.—Bear in mind that the old method of simply lifting down the instruments from the case and placing them in basins or pans containing carbolic acid is now as obsolete as the old method of cleansing the hands. The method which requires the shortest time, involves the least trouble, and which, besides being the least expensive, does away with the danger of spoiling the instruments from rust is that of Schimmelbusch. It consists of placing the instruments in a boiling aqueous solution of sodium carbonate 1 to 100, and allowing them to remain there five minutes. The instruments should be placed in a "crash" bag before being lowered into the boiling sodium solution. After the instruments have been sterilized they must be dumped into sterilized trays containing enough sterilized water to completely cover them. Should an instrument fall to the floor or come in contact with anything which is not sterile, it can be easily thrown into the boiling sodium solution and allowed to remain there five minutes.

Care of instruments after an operation.—After washing them in cold water to remove pus, blood, or particles of tissue, they are stirred around vigorously in the solution of sodium and then scrubbed with soap and brush. After being rinsed off they are polished with a soft towel. Then they are boiled for five minutes in the sodium solution, and wiped dry and put away. The greatest care should be taken that cracks, crevices, and joints in the instruments are wiped perfectly dry, else they will soon be spoiled.

Sterilized dressings—Gauze—Bandages—Sponges—Cotton, etc.—Going back to our old text—"that infection nearly always takes place by contact, but not through the air"—it is evident that our dressings had better be left off altogether, and the wound be left entirely to the air, than to cover it with a dressing which is not sterile. Every nurse in the Marine-Hospital Service has seen open wounds come into the hospital covered with balsam, and the patient in the meanwhile suffering from a temperature rise from the absorption of the pent-up filth.

Antiseptic gauze.—By the term "antiseptic gauze" I do not mean the "antiseptic gauzes" sold by the manufacturers, but I mean gauze or cheese cloth which has been conscientiously prepared by formulæ founded on bacteriological experiments. The utter uselessness of gauze which has been soaked in antiseptics will be seen when we consider that the presence of antiseptics in strength or quantity sufficient to destroy germs or inhibit their growth would, to say the least, irritate the skin and the wound, even if it did not cause toxic disturbance from absorption. Then again the gauze would have to be kept moist in order to hold the antiseptic substance, and, as we will mention again, gauze must never be applied to a wound in a moist state; it should always be absolutely dry, as moisture favors the growth of microorganisms. For dressings common cheese cloth can be cut in lengths of 2 yards and boiled for one-half an hour in a 1 per cent solution of carbolic acid and sodium carbonate and then thoroughly rinsed in sterile water. It should then be handled with the sterile rubber gloves and placed in large glass jars which have been previously sterilized by steam heat, but not before they, as well as the strips of gauze, have been thoroughly dried in the hot-air sterilizer.

Absorbent cotton, absorbent gauze, and bandages.—These should be sterilized by being exposed for three-quarters of an hour in the steam sterilizer, and they should be packed very loosely. It is best to sterilize the dressings before each operation. The cotton, gauze, and bandages should be dried in the hot-air sterilizer before either being used or put away. Sterilized cotton and bandages may be kept on hand by storing them in sterilized jars and only handling them with sterilized rubber gloves. It is necessary to keep on hand a goodly supply of sterilized towels, which must be kept in jars until ready for use.

Iodoform gauze.—The medical officer may require this in some cases, and it must be prepared in the following manner: Gauze is cut into lengths of 3 yards each and immersed in the following mixture, which is just sufficient for 3 yards of gauze. Formula: Enough castile soap to make good soapsuds, with 200 c. c. of a 1 per cent aqueous solution of carbolic acid. To this 45 grams of powdered iodoform are added. The gauze must be well mixed and rubbed with the mixture. It is then rolled up, placed in a towel, and sterilized for three-quarters of an hour in the steam sterilizer. It is then placed in a jar and handled either with a sterilized instrument or a pair of rubber gloves. When a piece is needed it should be cut off with a pair of sterilized scissors.

Permanganate of potassium gauze.—This is frequently used on foul-smelling wounds, as it helps to diminish the odor. It is prepared by sterilizing (steam) ordinary gauze, cut in lengths of 39 inches, for one hour, and then saturating them with a solution of 10 grams of permanganate of potassium in 1,000 c. c. of hot water. This gauze is stored as usual in a glass jar, but the latter should be darkly colored to exclude light.

Bandages.—These, according to the preference of the medical officer, may be made either of gauze, flannel, or muslin. They can be made in the hospital cheaper than they can be bought. They should be of different widths and lengths, and should be cut by "drawn thread" to insure straight margins. They should be sterilized by steam one hour, handled with rubber gloves, and kept in a glass jar.

Sponges.—Sponges of gauze are almost exclusively used at the present time, because they are easily sterilized and are so inexpensive that they need never be used but once. They can be made of all sizes, and after being sterilized (steam) three-quarters of an hour can be stored in sterilized jars containing a solution of corrosive sublimate 1 to 500, to be taken out just before the operation and rinsed in sterile water.

Aseptic and antiseptic solutions.—The flasks in which the various solutions are to be kept should be sterilized by steam heat and the necks plugged with wads of sterilized dry nonabsorbent cotton.

Sterilized water.—This is made by subjecting filtered water to fractional sterilization for three days in flasks properly closed with nonabsorbent cotton plugs.

Normal salt solution.—This is made by dissolving 6 grams of sodium chloride to 1,000 c. c. of distilled water. This solution is then filtered into clean flasks, the tops of the flasks are plugged with nonabsorbent cotton, and then the plug is wrapped in a gauze bandage to protect the rim of the flask from dust. After being heated over a Bunsen burner until the fluid boils, it is placed into the steam sterilizer, already heated to 100° C., and allowed to remain there for half an hour. The process is repeated on the two following days. A dozen or more liters of this should always be kept on hand.

Thierschs's solution.—This is made by dissolving 2 grams of salicylic acid and 12 grams of boracic acid in 1,000 c. c. of distilled water. Treatment for sterilization same as for normal salt solution.

Sutures and ligatures and their sterilization.—The materials most frequently used for sutures and ligatures are silk, silk-woven gut, and catgut.

It is desirable to keep five sizes of silk twist in stock, Nos. 1, 2, 3, 4, and 5. No. 1 (fine) to be used in making carriers. No. 2 is used for superficial sutures. No. 3 for deep muscular sutures. No. 4 for deep muscular sutures. No. 5 (heavy) is used as a heavy ligature. They should be wound on glass reels, and placed in ignition "test-tubes," a piece of nonabsorbent cotton being placed in the bottom of the tube

upon which the reels rest. The reels can be made by filing off the spool-like handle and piston of the large size glass syringes issued to United States Marine Hospitals. Even if they have been used in gonorrhea, they may be made absolutely sterile by mechanical washing, followed by fractional sterilization. After the silk has been cut in lengths of 16½ inches each, they are wound upon previously sterilized glass reels, and these reels placed in large test-tubes, which should have been previously sterilized in the hot air sterilizer, and which should now have nonabsorbent cotton plugs in their necks. They should now be sterilized in the steam sterilizer for one hour the first day and for half an hour on each of the two succeeding days. In keeping the silk in stock, care should be taken that they are kept away from all dust and moisture. In removing the cotton plugs, remember that the whole process will have to be gone over again if you let that part of the plug which belongs in the neck of the tube touch anything which is not sterile.

Silkworm gut.—The twisted ends having been cut off, they are placed in tubes and sterilized in the same manner as are the silk ligatures. To render them more pliable and to keep them from breaking they should be placed in a sterilized tray containing sterilized salt solution about half an hour before the operation.

Silver wire.—Silver wire may be sterilized by steam or dry heat or by boiling it in the 1 per cent soda solution.

Catgut.—The method given below, that of Kronig, is highly recommended by Dr. Kelly, of the Johns Hopkins Hospital, and used exclusively and with great satisfaction by Dr. Edwards, of San Diego, Cal., in his private hospital. He has kindly loaned me his Book of Orders for Technique in Operating Room, from which I make the following copy of the method in question:

1. Cut the catgut into the desired lengths and roll twelve strands in a figure eight form so that it may be slipped into a large tube.

2. Bring the catgut gradually up to a temperature of 80° C. and hold it at this point one hour.

3. Place the catgut in cumol, which must not be above a temperature of 100° C., raise it to 165° C., and hold it at that point for an hour.

4. Pour off the cumol and either allow the heat of the sand bath to dry the catgut or transfer it to a hot-air oven at a temperature of 100° C. for two hours.

5. Transfer the rings with sterile forceps to test tubes previously sterilized. In making the catgut up into rolls it is only necessary to tie the ends in the isthmus of the figure of eight to hold them securely in proper shape. It is better to use the hot-air oven for the drying process. In drying or boiling the catgut should not come in contact with the bottom or sides of the vessel, but should rest upon cotton loosely packed in the bottom. During the drying process a thermometer is thrust through a pasteboard cover which is placed upon the beaker, and the

mercury bulb suspended about midway in the vessel. Remember that a higher temperature than 100° C. before the catgut is thoroughly dry renders it brittle. A copper-wire netting should be placed over the beaker glass to prevent the ignition of the cumol. It is not necessary to allow the cumol to boil. Cumol is changed to a brownish color when boiling. While cumol is not explosive it is very inflammable, and great care should be observed in lifting the wire screen from the beaker glass to prevent drops of the cumol from falling in the flame or on the heated piece of metal on which the sand bath rests, as it will take fire, flare up and ignite the fluid in the beaker glass. This accident has happened more than once.

The sterilization of rubber appliances.—It is impossible to sterilize gum or rubber catheters without injuring them. For this reason silver catheters are far preferable. However, both silver and rubber catheters should be be boiled in the 1-per-cent carbonate of sodium solution for five minutes. After they are used they should be well scrubbed with brush and soap, and have sodium solution syringed through them until they are clean, then after boiling them for five minutes in the 1-per-cent soda solution they are stored in jars containing 1-to-20 carbolic acid solution until ready for use. The same rule applies to rubber tubing and stopcock for irrigators, rubber drainage tubing, and rubber bags and gloves. It has been found by others, and I have, in the use of rubber catheters, noticed it myself, that rubber can be subjected to the action of the boiling soda solution a great many times before it is damaged.

The sterilization of hypodermic syringes.—The absolute importance of sterilizing the hypodermic syringe after using it upon one patient before employing it again is shown by the number of cases which have been reported where erysipelas, anthrax, and tuberculosis have actually been transmitted through the hypodermic syringe. To begin with, all fluids used for hypodermic injections should be sterile. Should it be necessary to keep stock hypodermic solutions in the operating room, the quantity should always be very small, and the solutions should be made fresh very often. Two drops of pure carbolic acid to 30 c. c. of the solution will prevent the development of bacteria, and at the same time not cause any untoward results to the patient. Cocaine keeps best in a solution of corrosive sublimate—1 to 10,000. The needles should be boiled five minutes in the 1-per-cent soda solution and kept stored for use in a 5-per-cent carbolic acid solution. The piston should be withdrawn from the barrel and both placed in the same solution. Just before the syringe is used sterile water is drawn through it. The hands of the nurse should be disinfected, and then the skin of the patient should receive the same treatment, and all of this in accordance with the rules, already laid down, for the disinfection of the skin. The nurse should see that the wires which come in the needles to prevent the rust from stopping them up are properly adjusted. Nothing will

annoy the medical officer more than to find that the hypodermic syringe will not work when he wants it in an emergency.

The operating room when the medical officers enter to begin to operate.—The walls, ceiling, and floor have been previously swabbed with a solution of bichloride 1–500, and the same treatment given to the furniture.

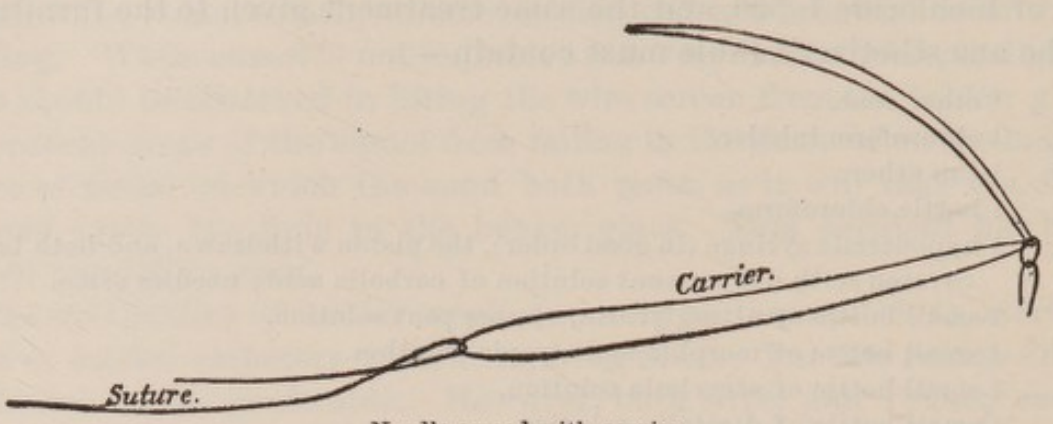
The anæsthetizer's table must contain—

1 ether cone.
1 chloroform inhaler.
1 can ether.
1 bottle chloroform.
1 hypodermic syringe (in good order), the piston withdrawn, and both being covered with a 5-per-cent solution of carbolic acid; needles same.
1 small bottle of nitroglycerin, $\frac{1}{100}$ per cent solution.
1 small bottle of morphia and atropia solution.
1 small bottle of strychnia solution.
1 small bottle of digitalin solution.
1 small bottle of ergotine solution.
1 small bottle of cocaine solution.
1 small bottle of brandy.
1 small sterilized round-bottomed glass tumbler.
3 towels.
1 pair tongue forceps.
1 wooden gag.
1 steel gag.
1 stool for anæsthetizer.
1 basin for mucus or vomiting.

The surgeon's washing-up department.—On a little shelf, just over the sink, should be placed one or more nonsterile nail brushes and a cake of soap. On another shelf near by should be placed the sterilized nail brushes, still protected by a sterilized towel and a jar of sterilized sapo virides, U. & P. Then near the sink should be placed a table large enough to hold (1) a basin of hot saturated solution of potassium permanganate, (2) a basin of hot saturated solution of oxalic acid, (3) a basin of bichloride of mercury solution, 1 to 1,000, and lastly a basin containing hot sterilized water. The table or shelf for washing-up patient should contain a jar of sterilized sapo virides, two flasks of sterilized water, one flask of creolin solution, $\frac{1}{8}$ to 100, and one flask of bichloride solution, 1 to 1,000.

The instrument table should contain at least three sterilized trays containing sterilized water, with which the instruments will be covered as soon as they are taken out of the boiling soda solution. The gauze sponges are near by in a sterilized basin, covered with sterilized water. On a shelf are six sterilized towels wrapped in an outer towel which has been sterilized, and one sterilized sheet wrapped in a sterilized towel. These are still in their respective jars and are to be used by the first assistant in covering all parts of the patient except the seat of the operation. On another table the surgical nurse has his needle holders, needles, ligatures, and sutures, all of which are sterile and are covered with sterile water. Let me say right here that if the medical

officer and nurse have some code by which the size of the needle and ligature or suture will be known to both a great deal of time may be saved. All of the needles should have their carriers as described by Robb. The rough drawing will explain it.



Needle armed with carrier.

The table containing dressings should have arranged on it in convenient order jars (sterilized) containing sterilized absorbent and non-absorbent cotton, sheets, towels, plain gauze, iodoform gauze, and permanganate gauze, safety pins, bandages, and the various kinds of sutures and ligatures. The irrigators should contain sterilized water, and there should be at least one flask of cool normal salt solution and one flask of hot normal salt solution. Now, if the nurse will see to all of these things, he can make himself invaluable to the medical officer. Of course at the large stations most of this work is under the supervision of a junior medical officer, but at the small stations in the Marine-Hospital Service it is almost impossible to do good work unless the nurse will take charge of these details and carry them out in a faithful manner. To be sure it is hard and tedious work, and will without a doubt prove distastful to a lazy man; but then there is no room in the Marine-Hospital Service for a lazy man, so this objection should be overruled.

The various methods of sterilization, etc., which I have described in this paper were gotten partly from Dr. Robb's "Aseptic surgical technique" and partly from my personal observation of the complete and efficient aseptic technique which is in vogue in the private hospital of Dr. William A. Edwards, of San Diego, Cal., in which hospital, by virtue of my position as first assistant, I have a constant opportunity to observe the brilliant results which accrue from cleanliness and asepsis as practiced by conscientious nurses.

THE INCREASE IN THE NUMBER OF CASES OF TUBERCULOSIS OF LUNG, DURING THE FIRST THREE MONTHS OF 1897, AT THE UNITED STATES MARINE HOSPITAL, ST. LOUIS, MO., WITH AN INQUIRY INTO ITS PROBABLE CAUSES.

By Asst. Surg. C. E. DECKER.

I do not know what has been the experience with tuberculosis of lung at the other river stations of the service during the first three months of this year, but I have been fairly startled at the great and sudden increase in the number admitted on account of this disease, during the period named, to the United States Marine Hospital at St. Louis. When I first went on duty at that station, early in August, 1896, there was not a single patient in the hospital who had consumption, whereat I was much surprised. Early in September an old man, presenting a typical case of the chronic fibroid phthisis of the aged, was admitted and soon discharged, the good food and the treatment he had during his short stay (less than six weeks) soon restoring him to his usual fair degree of health. During each of the last three months of 1896 only one case was admitted. With the first month of the new year, however, a sudden increase in the number of admissions on account of this disease was observed, and the increase continued during the following two months. So I have thought it might be profitable to state and examine the facts and the possible reasons for their existence.

Facts, when they are chiefly numbers, are usually best stated for comparison and contrast when tabulated. I have, therefore, contrasted, in Table I, (*a*) the number of new cases of *tubercle of lung* admitted during each of the six months from October 1, 1896, to March 31, 1897, with (*b*) the number of new cases of conditions *other* than tubercle of lung during the same period, (*c*) the total number of cases of each class for the whole six-month period also compared with the total number of the other, and finally (*d*) the proportions that the numbers of new cases of tubercle of lung are, both of the whole number of new cases admitted each month and of the total number admitted during the entire six-month period, are translated with percentages.

TABLE I.

	1896.			1897.			Total of new cases.
	October.	November.	December.	January.	February.	March.	
Cases (new) of tubercle of lung admitted..	1	1	1	4	8	10	25
Cases (new) other than tubercle of lung admitted	31	31	25	18	10	15	130
Total new cases admitted each month.	32	32	26	22	18	25	155
Percentages represented by the numbers of tubercle-of-lung cases of whole number of cases	3.2	3.2	2.6	18	40	40	16.13

It is hardly necessary to comment on the above figures; they speak for themselves. Yet I wish to call particular attention to the sudden increase of admissions on account of tubercle of lung in the *last half* of the six-month period, best seen in the percentages. While the absolute numbers are not large, the percentages are; and the consistent percentage increase also, *during* the same period, shows that here is not accident.

To further emphasize the increase of cases of tubercle of lung during the first three months of this year over those occurring during the preceding three months I present Table II, which shows: (*a*) The total number of days' reliefs given each group of cases appearing in Table I, and for the same periods; (*b*) the proportions that the numbers of days' reliefs given the tubercle-of-lung cases are, both of the number of reliefs given all cases each month and of the total number given during the whole six-month period, translated into percentages; the reliefs tabulated being those given in corresponding periods to the cases of each group tabulated in Table I.

TABLE II.

	1896.			1897.			Total days' relief.
	October.	November.	December.	January.	February.	March.	
Given tubercle-of-lung cases	10	25	56	81	167	238	577
Given all cases, other than tubercle of lung.	351	505	742	651	421	350	3,020
Total numbers of days' relief	361	530	798	732	588	588	3,597
Percentages represented by number of reliefs given tubercle-of-lung cases, of whole number	2.8	4.7	7.1	11.6	28.4	40.5	16

The results shown in this table are closely like those in Table I. Note especially the large percentages of the total relief which were given tubercle of lung cases in February and March. But I shall bring Tables I and II together in Table III, to show more sharply the contrasts which appear in the first two tables, by condensing the figures so as to show the numbers of new admissions and of days' reliefs given each of the

two groups of cases (viz, (1) tubercle-of-lung cases and (2) cases of disease other than tubercle of lung) in each half of the six-month period.

TABLE III.

Comparing the numbers of new admissions and of days' reliefs given during the first half and the second half of the six-month period (October 1, 1896, to March 31, 1897), condensing the figures of Tables I and II, on account of—

	New cases of tubercle of lung.		New cases other than tubercle of lung.	
	Number of admissions.	Number of days' reliefs.	Number of admissions.	Number of days' reliefs.
(*a*) First half of period	3	91	87	1,598
(*b*) Second half of period	22	486	43	1,432
(*c*) Increase during second period [(*a*) and (*b*) compared]	19	395	.....	.....
(*d*) Decrease during second period [(*a*) and (*b*) compared]	.....	.....	44	166
(*e*) Percentages of increase or decrease [(*c*) and (*d*)]	*633	*434	†50	†10.3

* Increase. † Decrease.

NOTE.—In all the above tables no patients are enumerated who were admitted prior to October 1, 1896; the numbers of reliefs tabulated are the reliefs given each of the new patients admitted during part or all of the six-month period; that is, a patient admitted in October, 1896, may have been in hospital continuously ten days in October, thirty in November, and ten in December; the total number of days' reliefs given him, 50, would so appear in Table II.

It then appears that, during the latter half of the period (or the first three months of 1897), there were admitted 22 cases of tubercle of lung, as contrasted with 3 admissions during the first half of the period (or the last three months of 1896); and these 22 cases received a total of 486 days' reliefs, as contrasted with the 91 the 3 cases received. In other words, there was an increase in admissions for tubercle of lung during the last half of the period of 633 per cent over the admissions during the first half of the period; and the increase during the same period, in the number of days' reliefs given this class of cases, of 434 per cent; and this against a decrease in the same period, in the number of admissions and of days' reliefs, respectively, giving all cases other than those having tubercle of lung, of 50 per cent and of 10 per cent.

NOTE.—The diagnosis in each case of tubercle of lung tabulated was confirmed by finding the bacillus in the sputum, excepting in 5 cases. Four of these 5 cases were admitted before there was a microscope objective at the station of sufficient power to disclose the organism. However, 3 of the 4 cases died, and the autopsy confirmed the diagnosis in each. The fourth of this group, as well as the case whose sputum was examined without the bacillus being found, presented all the usual signs of "incipient" consumption, while the one had a chronic (tubercular?) diarrhœa, and the other had a fistula in ano.

Among the tubercle cases were 3 who had galloping consumption—1 died in nine days, the second in six days, while the third was removed to his home by his father.

The average age of the 25 cases tabulated is 34. Fifteen cases are colored (60 per cent).

My object in writing this so far (and necessarily so) uninteresting paper is, with the above facts as a text, to again call attention to the miserable condition of the "hands" of river boats during the cold season. The tables I have presented show an unusual condition, if the condition of the corresponding period a year before is to be taken as a criterion. Between October 1 and December 31, 1895, there were four admissions to this hospital on account of tubercle of lung; and from January 1 to March 31, 1896, there were only three admissions for the same disease—a total of only 7 cases in that six months' period, as contrasted with the 25 cases admitted during the same months a year later. I can only account for the difference in this way:

The winter season just passed has been unusually open. There was no real closure of navigation at this port until about the middle of January, and several boats ran from here to the south and return practically all winter. But, though the weather was not cold enough to stop the boats, their crews, under the circumstances, were subjected to a cruel and, in many cases, necessarily fatal exposure—an exposure, to be sure, like that of previous seasons, but probably unusually prolonged. Here is a picture to be seen on any upper-river steamboat during the cold season: The boat is in midstream, slowly making its way against the current and an icy head wind. Hardly a man is to be seen about her in the open air. The numerous negro roustabouts and the few white deck hands to be seen on her decks in summer are, o course, under shelter. But what shelter! The negroes are in a sacred place, to judge from its name—a place, at any rate, sacred to them—the "St. Charles." Where is it? What is it? It is the fine roomy space between the bottom of the boilers and the top of the boiler-room floor. It is a warm place, too. Oh, yes, it is warm—so warm the white deck hands are seldom found there, and so only the negroes occupy it—sweltering, packed like sardines in the filth, and breathing an air a white man could not stand five minutes. The boat is signaled from shore; some one has freight to ship. The boat is turned toward shore, and the roustabouts are kicked and clubbed out of their foul oven up onto the deck and into the icy wind. Here the poor fellows, wet with perspiration, clad only in shirt and trousers, as a rule, resisting the chill as best they can by jumping about and thrashing their arms, have to wait until the boat touches the landing, when ashore they rush, to get warm, if possible, by hard work. The freight on board, down they dive into their shelter—their Calcutta black hole. And so it is done, ten or fifteen or thirty times in the twenty-four hours. Whether or not I am right in the theory that the unusual length of the time during the past winter in which the boat crews have had to do their work as described above, is responsible for the increase in the number of cases of tubercle among the boat hands this year, it is cer-

tain that the environment of the colored roustabouts, during any cold season, could hardly be more favorable to the dissemination of tuberculosis of the lungs. The condition, too, of the few white deck hands on river boats is scarcely better than that of their negro mates. They are considered, of course, to be a grade higher than the colored men, and I believe they are, as a rule, provided with bunks in which to sleep, though their quarters are not warmed, as are the officers'. The white hands, however, are allowed to stop in the fire room or in the warm passages about it, and the temperature of these places being, of course, much lower than that of the "St. Charles," they are not subjected to such great changes of temperature as are the negroes. Yet 10 of the 25 new cases of tubercle of lung admitted in the six months (see tables) were white. The three cases of acute phthisis occurred in strong young white men. So it would seem as though the effect on them of their environment is scarcely less evil than that of the negroes' environment on them. Of course the fact is not lost sight of that a large part of the time of each one of these men, white or black, is spent on shore. Yet, if he contract consumption on shore (though it would be hard to establish the fact in any one case), it would probably be because of the depression of his vital forces caused by his oft-repeated exposures on the boats during the cold season.

There has been already, I believe, an effort on the part of the Bureau looking to the alleviation of the condition of river-boat crews during the cold season. I am unable to find among the publications at this station any regulations addressed to boat owners requiring them to furnish proper shelter for their men. If such have been promulgated they have been utterly ignored, as several vessel men with whom I talked a few days ago admitted; that is, they said no boat that they knew of had had quarters, other than those (?) customary, for its men. They admitted that the condition of the men should be improved, but doubted if the colored roustabouts could be made to occupy decent quarters. I answered that I believed that boats' officers usually found ways to enforce their orders. Yes; they supposed the men could be compelled to occupy decent quarters, "but it would be mighty hard at first."

I can scarcely imagine a more atrocious sanitary evil than the "St. Charles" of the river steamboat. Think of a consumptive wedged in down there among his mates, spitting and spitting and spitting. Is it any wonder that the poor fellows, their vitality lowered to the vanishing point by the exposure and abuse to which they are subjected and by the poor quality of what little food they get on the boats, contract phthisis by dozens? Rather is it a wonder that all of them do not become infected.

And what is the real good of improving the condition of the consumptive roustabouts who come to us if, when again able to work a little, they are to return to those fearful black holes, there to reinfect

themselves and again to communicate their disease to dozens of others? The public at large, too, is deeply concerned in this matter. These ignorant boatmen, white and black, scatter infection right and left. They make their already filthy lodging houses deadly pest holes. Surely something effective should be done as soon as may be.

It is, of course, self-evident that the boat owners should be compelled to furnish suitable quarters for their men; places kept properly clean, well ventilated, and in cold weather comfortable, but not overwarmed. Numerous cuspidors should be provided and decent lavatories. The institution of these simple reforms would quickly lower the death rate from consumption among the river-boat crews, and the bettered condition of these men would react on the health of the public at large, especially on that of the river communities.

CONSIDERATIONS CONCERNING TWO PROBLEMS IN THE HYGIENIC ADMINISTRATION OF HOSPITALS.

By Asst. Surg. C. E. Decker.

THE CLEANING OF WARD FLOORS.

One of the most important matters to which the medical officer in charge of a hospital must give his attention is the cleaning of the floors of the wards. These floors, in almost all of the hospitals administered by the United States Marine Hospital Service, were constructed before the danger lurking in unseen dirt was appreciated and were made of comparatively soft wood. Seldom, indeed, has a really hard wood, like maple, been used. The floors of the wards of the Service's hospital at St. Louis, Mo., are, I think, fairly representative of the ward floors of its hospitals generally, and of most civil charity hospitals as well. They are composed of two strata: The first is made of boards of a cheap quality of pine, a foot in width and an inch thick (not tongued and grooved), and are laid at right angles to the long dimension of the buildings; the top stratum is composed of yellow pine, the boards being 3¼ inches wide and 1 inch thick, tongued and grooved, and are laid at right angles to the first stratum, extending, therefore, lengthwise of the wards. When first laid, in 1884, the floors were stained and oiled. So far as I can ascertain, they have received no treatment in the way of painting or oiling since.

After ten or fifteen years the floors built as described above will be found to be about in this condition: Paths have been worn in the surface here and there; there is to be seen much cracking and splintering (though the amount of this damage is largely proportionate to the amount of water used on the floors in cleaning); the individual boards, being of considerable width, have become a good deal warped, which means large spaces under their edges between them and the foundation boards beneath; the boards have also shrunk, and because, again, of the comparatively great width of the individual boards the spaces between them left by their shrinking are of considerable width, on an average at least an eighth of an inch, varying between a sixteenth to an occasional fourth inch. These cracks and spaces are to be taken serious account of in considering methods of cleaning the floor in which they occur. In these wide cracks the "tongue" has become so widely separated from its groove that water easily flows down between the boards, and the space beneath is ready to catch and hold any solid matter that may be carried down by the water.

The two wards used for patients at the United States marine hospital at St. Louis present an approximate aggregate of 8,900 square feet of floors, having, at present, the characteristics described above. Among the patients living in them we find a great variety of surgical and medical affections—syphilis, gonorrhea, fractures, ulcers of skin, tuberculosis of lungs (8 cases undoubted, 2 more suspected) and of bowels, bronchitis, typhoid fever, heart disease.

However, it will be found on examination that the total daily amount of the so-called "dirt" on a ward floor is small. The bulk of it is made up of lint from the bedding; with this there is a little earthy matter tracked in by muddy shoes or blown in from the street. There is very little filth in it traceable to the diseases present; indeed, none at all. Even the microscopic disease germs are not very numerous (unless the condition of the floor favors the growth of the few that find their way into the cracks of the boards), owing to the great care exercised nowadays in the disposal of sputum and pus. In any case, they can hardly be got rid of by methods looking only to the removal of the visible "dirt" from the floor, and it is this form of filth and the way to best remove it that we are now considering. If in any given case disease germs become dangerously numerous, special methods of "disinfection" will be necessary.

How best and most economically to remove this daily small amount of dirt is the question. The method chosen must fulfill the following principles, which will, I think, be taken as axiomatic:

First, the method must remove the dirt.

Second, it must not injure the floors.

Third, it must not add any unhygienic condition to the wards, as dampness.

Fourth, it must not add any condition favorable to germ growth.

Fifth, it must be uncomplicated and easy of application.

The method most in vogue to-day among the hospitals of the Service, and also at most civil charity hospitals, is the following: Each morning, in cold and warm seasons, the floors are flooded with water, poured over them from pails or hose. With mops, which from their very construction can not be rubbed down hard into the floor (the handle being at one end of the mass of cloth or cotton waste, which thus simply trails about the floor), the flood is washed about, and, by wringing out the mops, as much as possible—really not more than half—of the water used is replaced in the pails and carried away, the rest either soaking into the floors or the air. On entering the wards soon after such a proceeding—an hour after—one finds the air noticeably damp and musty. The floors are sodden with moisture, and when the mopping has been done hastily (which, indeed, is the usual case), patches, almost pools, of dirty water can be seen under beds and in dark corners. When the floor surfaces have dried the dragging about of the mops can be traced in the streaks of dirt left by the evaporating of the filthy water.

The baseboards are seen to be spattered with dirty spots and are fairly black where they join the floor. The boards of the floor surface are badly warped and cracked by the repeated soakings and dryings, and both the cracks in the boards and the spaces left between them by their shrinking are seen to be packed with wet filth. It is easy to surmise what would be found in the spaces between the two layers of boards forming the floor. Here are home and food for tubercle bacillus and pneumococcus and streptococcus and staphylococcus, and all their relations, great and small. And what are these grayish-white shreds so thickly scattered over the surface of the dried floor? Minute pieces of the filthy mops, each shred torn off by one of the multitude of little splinters raised from the board surfaces by the oft-repeated wetting and drying of the soft pine. Where could one see used a more ineffectual method of floor cleaning? Its results are these: (*a*) Failure to clean; (*b*) accumulating and storing of filth; (*c*) furnishing the conditions favorable to germ growth; (*d*) adding an unhygienic condition besides the foregoing, namely, great dampness of air and floor, and, (*e*) finally, the ruining of the floors. The labor also involved in the application of this most inefficient method is considerable, usually representing the efforts of the nurse and two or three convalescents, when a large area must be gone over in the short time allotted to the morning floor cleaning. It would seem as though almost any plan that could be mentioned would be superior to this, which violates, with its sins of omission and commission, every axiomatic principle which we agreed at the opening of this discussion ought to govern any method of floor cleaning.

Allow me to describe the method for the removal of floor dirt which I have employed for the last five or six months, with great satisfaction and success, in the wards of the St. Louis Marine Hospital. In distinction from the method described above, it might be very well called the "dry method" of floor cleaning. It consists simply in the daily *brushing* of the dry floors with a T floor brush, the implement being pushed in the direction in which the floor boards lie, and never across them. In showing attendants how to use the brush, great stress is laid on the importance of not lifting the brush until the end of the push stroke, as otherwise dirt is lifted into the air, later settling, and then appearing as "dust," as the housewife calls it, and is not removed until the next cleaning. The raising of dirt into the air by faulty sweeping is also to be deprecated, because of the probably noxious character of the dirt and the danger to persons breathing the dust particles. But the floor brush, properly used, *does not raise dust.* Herein lies its superiority to the ordinary broom. No matter how carefully the latter is used, more or less dirt is always raised by it from a dry floor into the air. My plan has also included, besides the dairly brushing, the careful mopping of the floor once a week, or once in two weeks, as has seemed necessary, all soaking of the wood being avoided. This scrubbing is only necessary

for the removal of stains, appearing from various causes, and infrequently—the wet, muddy tracking of a visitor, the overturning of a plate of food, the spilling of a dose of medicine.

The results obtained by this method of dry brushing have been these: First, *the cleaning of the floors*, practically all of the dirt being removed, not only that on the surface of the floor, but also that filling the cracks in and between the boards; second, keeping dry the floors; third, elimination of all dampness and mustiness from the air; fourth, disappearance from the floor surfaces of the multitude of small splinters; fifth, a polishing of the floor surfaces—they really shine almost as if waxed. Besides, as contrasted with the laboriousness of the mopping method, the dry-brushing method is very easy of application. One man can in a few minutes thoroughly rid a large floor area of all its dirt. Then, too, as the condition of the floors improves they become easier to clean. In short, for the cleaning of the average soft-wood ward floor this is the ideal method, completely meeting every requirement. The only possible objection to it is the cost of the floor brushes. Yet one of these, if of good quality (and a poor one is of little use), though costing about $1, wears longer than several brooms or mops. Brushes that have been in constant use for three months are still in good condition, and will surely last two, perhaps three, months longer. In any case, the great improvement in the hygienic condition of the wards over that resulting from the mopping plan would justify a much greater expenditure.

I do not claim any originality in the devising of this method of dry brushing; indeed, the plan will be found described in every text-book treating of the hygiene of hospitals. I hope that the contrast I have drawn between the almost total inefficiency of the much-used mopping method and the complete efficiency of the hitherto little-used dry-brushing method will lead to the abandonment of the former for the latter in all the hospitals of the Service.

TUBERCLE-OF-LUNG CASES.

The second matter to which I would invite attention is the hygienic conduct of our tubercle-of-lung cases. At first sight this may not seem related to floor cleaning; yet what does all cleaning in hospitals nowadays have for its object if that object is not logically the prevention of infection?

In my view, it is not enough simply to supply the patient who has tuberculosis of the lungs with an "individual" sanitary spit-cup. Why? Because his cup does not get all his sputum. A certain amount always adheres to the lips; and if, as in the majority of cases, he has a beard or mustache, an additional amount to these, only to be wiped off with a nasty handkerchief, or the coat sleeve, or the back of the hand, or with the bedclothes.

Here is an offense only secondary to spitting on the floor—a disposal

of infective matter in such a way as to favor its diffusion throughout a ward.

We hear of complaints from certain parts of this country, which have been much resorted to by consumptives, that the localities have become infected with tuberculosis, so that now, so far from these places being specially salubrious—favored, health-restoring regions—they have become mountains and valleys of death, dangerous even to their natives. It is reported that the State board of health of Colorado is considering the necessity of taking measures to prevent the entrance into that State of any more tuberculous persons.[1]

Mentone, in France, formerly a popular resort for consumptives, is now pest-ridden.[2]

If whole towns and tracts of country can become noxious—dangerous to live in—how much more easily the contracted space of a marine hospital reservation, with its always relatively larger tuberculous population! It behooves the medical officer in command to take every possible precaution to prevent the infection of his station, which is, otherwise, sooner or later bound to occur. At how many stations are tuberculous patients required to refrain from spitting on the surface of the ground—the roadways, the spaces about the verandas, the steps, the out-of-door lounging places? Authorities say that sunlight kills the tubercle bacillus, and that when deposited on the ground in the open air its life is short. I rather think, however, that the dust from the surface of the patch of dry earth spit upon by half a dozen consumptives day after day, while lounging on the bench by it, would prove intensely infective if guinea pigs were inoculated with it; or the earth bordering a walk over which several consumptives go to their three meals a day, spitting on this side or spitting on that side, or spitting on the walk. I shall not specify further. I think I have demonstrated the necessity for taking further measures for preventing infection of a ward and of the station in general than simply the giving of "sanitary" spit cups, which are required to be used only in the wards, and which do not by any means collect all the matter voided there.

What further measures can be enforced among these ignorant fellows? Let me detail the rules I have found effective at St. Louis. In the first place every coughing and spitting patient, as soon as he enters, is furnished with the following articles and is kept supplied with them as long as he coughs and spits while he remains in the hospital: First, an individual sanitary spit cup, the paper receptacle of which is changed as often as necessary, in any case once daily; second, 2 dozen (more or less) pieces about 3 inches square of soft, clean, white cotton cloth (cut-up condemned sheets); third, a tin gauze box, half full of solution (5 per cent) of phenol. (A large-mouth bottle does as well as or perhaps better than the box for the particular purpose; but the boxes have happened to be numerous here and have proven to be

[1] H. Arrowsmith, Medical News for January 16, 1896.

[2] H. Arrowsmith, ibid.

extremely well adapted for the use to which they have been put.) The spit cup the patient is directed to carry *wherever he goes on the reservation, and he must spit nowhere except into it.* The squares of cloth take the place of handkerchiefs in all the uses of the latter. The patient is required to shave his face clean and to use each time he expectorates one of the little squares of cloth, carefully wiping his lips with it, and then placing it in the box of solution. When he goes out of doors he is allowed to leave the box in the ward, and he then places the squares of cloth when used in the top of the spit cup, transferring them to the solution, however, when he returns to the ward. These solution boxes are emptied each morning and thoroughly cleansed and then, along with the metal parts of the sanitary spit cups, they are sterilized by steam, freshly sterilized articles of both kinds having, meanwhile, been supplied to the patients. The paper sputum cups with their contained sputum and the used squares of cloth are, meanwhile, taken to the furnaces and burned.

To the objection sure to be made that such measures can not be carried out, I reply that I have carried them out, gradually introducing them without any trouble whatever for the last four or five months. I had my own doubts, when I decided to promulgate the rules outlined, whether I could enforce them without an occasional clash, but there has been none. The secret of this has been that I have taken pains to explain to every patient, who seemed likely to be a disseminator of infection, the dangerous character of his expectoration; and I have appealed to him, asking if he did not think he ought to take every precaution against conveying disease to others. The invariable response has been a ready acquiescence and a real and careful and successful effort to carry out the directions. I think that the sputum in every hospital case of disease of the respiratory apparatus should be considered dangerous, and be treated accordingly. How many cases of "bronchitis acute" or "chronic" have turned out to be, after all, tubercle, the examination in the first instance having been careless, or if careful, the bacile overlooked, and the sputum, after all really tuberculous and infective, carelessly disposed of for weeks. If every sputum is regarded as dangerous and so treated, a mistake in diagnosis will not have evil consequences.

In addition to the rules respecting the sputum I have enforced the following: Patients who have pronounced cough and expectoration eat their meals in the ward and not in the general dining-room, the aim of this rule being to prevent infection of the latter. (Tuberculous patients ought also to eat from dishes sent only to them. I have not yet, however, reached this point in the evolution of precautionary measures.) The sheets and pillowcases of the beds of those who spit a good deal, especially those who are bed-ridden, are required to be changed each day, and the blankets at least once a week, sometimes oftener.

I believe that the precautions described above are the very least that

ought to be insisted on at every hospital, whether it is under the administration of city or State officers or those of the General Government. In addition, at hospitals where there are the facilities, the outer clothing of tubercular patients should be disinfected by steam once in about ten days or two weeks. Dishes and other utensils used by consumptives should not be used by others unless carefully disinfected. Finally, at every hospital where it is possible (and provision should be made where it is not now possible) tuberculous patients should all be gathered into a ward by themselves. If all these precautions were taken in every institution—and who will deny they ought to be—it would be rare indeed for any person connected with a hospital to there contract consumption or other form of tuberculosis.

Since writing the above, regulations quite like those I have detailed have been promulgated by the village authorities of Saranac Lake, N. Y.[1]

[1] Medical News, March 27, 1897, p. 408.

A CASE OF DOUBLE INFECTION WITH THE TYPHOID BACILLUS AND THE PLASMODIUM OF MALARIA.

By Asst. Surg. J. B. GREENE.

L. C.; age, 32; nativity, England; admitted to United States Marine Hospital, Baltimore, Md., February 1, 1897. Family history contained nothing of interest. Patient escaped the usual diseases incident to childhood. His illness began one week previous to his admission, with an attack of nausea and vomiting, attended with headache and vertigo. Ears feel as if they were "stopped up." Had several chills, followed by fever. For three days prior to admission he had fever in the afternoons, but no chills. No nosebleed. On admission patient did not have the appearance of a very sick man. Temperature, 39.2 C.; pulse, 78, and of good volume. Tongue covered with a white coating. Appetite poor. Bowels regular. No rose spots. Spleen and liver enlarged. Examination of the blood revealed a number of intracorpuscular bodies. No ovoids nor crescents found. No albumen in the urine. The case at this time was regarded as one of simple malaria. Treatment was begun with calomel, followed up immediately with quinine. On February 5 the 18 grains of the sulphate of quinine administered daily had had no appreciable effect on the temperature curve.

February 12.—Patient has done very well, though the fever has kept up in spite of the quinine. Bowels have continued to move freely. A specimen of the blood is sent to the hygienic laboratory of the Marine-Hospital Service.

February 15.—Dr. Kinyoun reported in regard to the "agglutination" test that the reaction was marked. We then for the first time noted rose spots, and there was slight tympanites.

February 18.—Temperature remained practically normal for the first time since admission. Complained of hunger. His diet had been soft from the beginning. Convalescence was uneventful.

As the plasmodium malarial was found in the blood of the patient almost daily during the first week of his illness, and later presented the clinical symptoms of a mild case of typhoid fever, with the blood presenting the "typhoid reaction," we can but regard it as one of those rare conditions of double infection. Dr. Osler says, in the John Hopkins Hospital Reports:

> Among the 1,000 cases of malaria and the 500 of typhoid fever, almost everyone of which has had a blood examination, there has been but one doubtful case of double infection.

This report coming from Baltimore, where both malaria and typhoid fever are common enough, shows how rare the two diseases occur together. A few authentic cases have been reported by Dr. Dock, of Ann Arbor, Mich.

A CASE OF COCAINE POISONING.

By Interne GEORGE R. GILBERT, M. D.

H. M.; a nurse in the United States Marine Hospital, New York; aged, 30 years; nativity, Ireland; white man, dark hair and eyes, medium build. At 5.40 p. m. patient prepared for the removal of ingrowing large toe nail of right foot. Twelve minims of a 4 per cent solution of muriate of cocaine were injected about the base of matrix of nail. A few drops of the solution were necessarily exuded or were washed away by the slight subsequent hemorrhage or the irrigation of the wound. The quantity of the drug actually absorbed being so small and the time being so short for the production of the following toxic symptoms, personal idiosyncrasy was ascribed as the cause. The entire surgical procedure occupied no longer than ten minutes, the patient experiencing no pain. When concluded he did not feel inclined to arise from the table. He looked pale. He began to feel his arm and finger muscles contract strongly. He felt cold. The pulse became rapid, almost imperceptible. He experienced dizziness followed by vomiting, which was of short duration. His tongue became paralyzed, so that he could not speak. He seemed to be in a state of stupor. Strychnine sulphate, one-thirtieth grain, was immediately injected, and patient removed to the ward. His pupils soon dilated widely and he became comatose for a short time, respirations being shallow and quick. Friction, massage, heat, and artificial respiration were employed for about a half hour. At 6.40 p. m. the pulse was 135 per minute, thready and weak, increasing to 160 and above at 8 p. m., dropping between 8.30 and 11 p. m. from 135 to 112 per minute. Respirations, 22 per minute, continued quick and shallow, but fairly regular. Between 7 and 9 p. m. a total quantity of 1,500 c. c. hot coffee was injected per rectum in small doses at intervals, with the result that the pulse lost its thready nature and became slower and more full. Amyl nitrite by inhalation (5-drop doses) deepened the respirations. This was repeated twice. The patient became delirous at 8 p. m., and all night he had hallucinations and delusions. He showed great fear of bodily harm by his attendants. He seemed also to see objects in the air, which he would frequently arise in bed to grasp, necessitating some force to restrain him. He did not speak at all, but at times uttered a peculiar sound, which was evidently due to his lingual paralysis. He became more quiet later on. At 11 p. m. he was quiet and only moved at intervals, his pulse and respiration being full, strong, and regular. At 5.30 a. m. patient returned to consciousness and suddenly realized where he was.

He was immediately given a cold saline enema, which produced a free evacuation. He has since been in good health, the pupils remaining dilated the usual length of time. Although the friction, massage, heat, and artificial respiration, and strychnine, digitalis, and morphine, which were each used a few times hypodermatically, tided the patient over several dangerous periods, the hot coffee by the rectum and the amyl nitrite certainly deserve considerable credit for the prompt benefits derived from their use, although it was the combination which probably did the work.

HISTORICAL NOTES OF THE MARINE-HOSPITAL SERVICE AT NEW ORLEANS, LA.

By Surg. HENRY W. SAWTELLE,
United States Marine-Hospital Service.

Early in the history of our country the attention of the Government was called to the necessity of legislative action for the relief of sick and disabled seamen at this port. In 1801, when Louisiana belonged to France, Mr. Evan Jones, in a letter to the Secretary of State, reported that a great number of American seamen and boatmen died here yearly for want of hospital accommodations, the Spanish Poor Hospital being insufficient to care for them. In consequence he says "they lie in their ships or boats or get into wretched cabins, in which they die miserably after frequently subjecting the humane among their countrymen to much trouble and expense." The opening up of the Western country naturally increased the traffic on the Ohio and Mississippi, which brought many boatmen to this port annually in addition to the considerable number of sailors from the fleet of deep-water vessels entering the port. During the year ended August, 1801, about 200 American bottoms arrived from sea and from 350 to 400 flat-boats of various kinds came down the Mississippi. These vessels, being manned as a rule by crews unaccustomed to the semitropical climate of New Orleans, sufficiently accounts for the large amount of sickness reported among seamen in port. The appeals made in behalf of American sailors by our philanthropic people to the people's representatives were not made in vain. In 1802 Congress authorized the President to take necessary measures to provide relief and to appoint a "director" for the hospital. Dr. William Barnwell, of Philadelphia, was appointed "physician and surgeon to the hospital," notwithstanding the law provided for a director. The doctor was instructed, under date of May 3, 1804, to purchase in Philadelphia the necessary medical supplies for the equipment of a hospital, and a suitable building was fitted up for use as such, no hospital having been established by the Government. Prior to his date the sick had been cared for in the Hospital of Charity. Dr. Barnwell absented himself from the hospital without leave April 15, 1807, whereupon Dr. Blanquet was appointed to fill the vacancy temporarily. In 1809 sick seamen were again sent to the local hospital, which indicates that the temporary hospital provided for their care exclusively had been discontinued; and this arrangement appears to have been continued until the com-

pletion of the hospital authorized by an act of Congress of 1837, appropriating $70,000 therefor. In those days medical officers of the Army were detailed by the President, under the authority of Congress, to select sites and execute contracts for deeds subject to the approval of the Secretary of War; and on November 30, 1837, plans for the new hospital were submitted, which were transmitted to Congress.[1] The hospitals of that period were all constructed upon plans which were usually without adequate appointments, especially in respect to ventilation and drainage, so necessary to insure the best results in hospital management.[2]

The only official record obtainable relating to this hospital consists of the following item, namely: "Purchased or commenced in 1837; occupied in 1849 (?); cost $122,772; sold in 1866 for $300, but the amount does not appear to have been received."

June 24, 1841, Dr. James Ritchie, of New Orleans, was appointed physician and surgeon to the hospital by the President, vice Dr. John McFarlane, with salary of $1,000 per annum. The hospital buildings were incomplete at that time. April 21, 1843, Dr. C. A. Luzenberg was appointed by the President physician and surgeon in place of Dr. Ritchie, with compensation of $1,000 per annum. June 17, 1844, Congress appropriated $30,000 for the construction of "remaining portion of hospital." May 12, 1848, the President appointed Dr. John J. Ker, of New Orleans, as physician and surgeon to the hospital, vice Dr. Luzenberg, with salary of $1,000 per annum. It appears that the organic act of 1798 was so construed as to exempt slaves and apprentices from the payment of 20 cents per month which collectors of customs were directed to collect from masters and owners of vessels, the amount to be deducted from the wages of seamen, which money was deposited to the credit of the marine-hospital fund thus created, to be expended in the care of sick and disabled seamen. This construction of the law had been continued by different Department officials unquestioned until June 29, 1843, when the Department instructed the collector at New Orleans to "change the practice," but, on March 9, 1844, Secretary J. C. Spencer reversed the decision in the subjoined letter:

WASHINGTON, D. C., *March 9, 1844.*

SIR: Referring to a letter addressed to your predecessor on the 29th June last by this Department, in which he was instructed to change the practice of exempting slaves and apprentices from the payment imposed by the act of 16th July, 1798, I have to state that upon further examination of the records of the Department it is found that the practice of exempting such persons has been authorized by circular instructions from Comptroller Steel in 1798, and has been uniformly continued under the direction of successive officers of the Department. Under these circumstances I am unwilling to disturb such a settled construction of law without an act of Congress. You will therefore consider the instructions of the 29th June last in

[1] Vide Departmental Records.

[2] Vide "Remarks on hospitals, by writer," Annual Report Marine-Hospital Service, 1893, Vol. I, pp. 48–49.

regard to slaves and apprentices as withdrawn. It is to be understood, however, that such persons are not to be admitted to the relief of the fund.

I am, respectfully, your obedient servant,

J. C. SPENCER,
Secretary of the Treasury.

G. DORSEY, Esq.,
Collector of Customs, New Orleans, La.

April 10, 1844, Secretary Spencer informs the collector of customs, in reply to letter of 27th ultimo, that "the unfinished building on the opposite shore of the river, designed for a marine hospital, is considered to be under the charge of the collector, and you are accordingly authorized to employ a suitable person to guard it against depredations of the neighborhood." He states further, that "appropriations for completion of the building are withheld because of objections to location, and directs collector to get opinion of the mayor, two eminent physicians, and some respectable merchants as to the fitness of the location, and also to have it examined by two mechanics, who are to submit proposals and specifications for completing it according to original plan."

March 3, 1847, Congress appropriated $21,696 to complete the marine hospital.

February 11, 1848, the Acting Secretary of the Treasury informs the collector of customs that "the honorable Secretary of War, under the pressing necessities of that Department for a military hospital at New Orleans, has applied for the temporary use of the new marine hospital, and it has been decided to grant such use when the building is completed."

June 3, 1848, the Secretary of the Treasury advises collector of customs that the "War Department has decided it does not want the marine hospital."[1]

The following account is taken from the history of Algiers.[2]

This hospital was situated at McDonogh, just above the parish line in Jefferson, and occupied a square, measuring 350 feet each way, which was inclosed by a good substantial fence. The edifice measured in front 160 by 78 feet deep, from the side of which two adjuncts extended 50 feet farther back, leaving sufficient room between them for a spacious court immediately behind the center of the main building. The whole building was laid off into three stories. It was 50 feet from the ground to the eaves, and 130 feet to the top of the flagstaff which surmounted the belvidere. It was built in the Gothic style; it was commenced in 1834,[3] but many years elapsed before final completion. When finished the total cost was $130,000, and it would accommodate 269 persons. The grounds laid out were embellished with shrubbery. As seen from the Mississippi River or from the city front, the structure presented a very majestic appearance. It stood in a healthy position, elevated, and dry, and from its great height commanded a complete view of the river, city, surrounding country, and a whole forest of masts from the sailing vessels on the city side, afford-

[1] The writer is indebted to Surg. Charles E. Banks of the Service for some valuable data compiled from Department records covering the period from 1841 to 1848.

[2] The Story of Algiers. By Judge Wm. H. Seymour, 1896.

[3] This date is incorrect. The appropriation for this hospital was made in 1837.—H. W. S.

ing at once a delightful and a busy prospect that must have had a great tendency to cheer the hours of the convalescent within its walls. After the secession of Louisiana from the Union the buildings were taken possession of by the Government officers or provost marshal of the Confederates. In the grounds adjoining were established powder magazines. An explosion occurred there during the nighttime, toward the close of December, 1861, which was heard for miles around, and the entire edifices on the ground entirely destroyed.

Some of the oldest citizens inform me that the hospital was a brick structure and was located a few hundred yards from the river, nearly opposite the city. Dr. Hammond Mercier was appointed physician, vice Dr. P. B. McKelvay, in April, 1853, and Dr. Howard Smith succeeded Dr. Mercier, who resigned in September, 1854. Dr. Stanford E. Chaille,[1] in a letter to the writer, stated that he was appointed assistant physician of the hospital in August, 1853, in place of Dr. G. W. Dismeyer, declined, and held the position about one year, when he was succeeded by Dr. J. W. Breedlove. He also stated that the hospital was a commodious and excellent building for its day; had an unusually good basement and two stories, with attic rooms; that there were usually from 100 to 150 patients in hospital. Several of the oldest river men, including an ex patient, testify that the hospital was abandoned in 1856, as it was considered unsafe and unfit for further use, probably owing to the gradual encroachment of the Mississippi, and, finally, the remains of the hospital were carried into the river some thirty years ago (1866), and the old site is now under water about 200 feet distant from the river bank. In 1855 a site for the second hospital was purchased for $12,000, consisting of a square of ground, about 5 acres, located about 2 miles from the river front. The work of construction of the building was commenced soon thereafter, but only the exterior was completed. It was built of iron and is fireproof. The building is of the Roman style of architecture, consisting of three parallelograms, the ends of the center one meeting the sides of the other two, as shown by the inclosed sketch plan.[2] The interior is unfinished, the walls and ceilings being simply covered with whitewash. The ceilings were constructed with brick arches resting on iron beams. The roof is made of concrete resting on brick arches; the roofs of galleries or verandas are built of corrugated iron. The roof of each section is ornamented by a dome. The roof of the whole building and all galleries or verandas are surrounded by wrought-iron railings. The main or central portion has three stories, while the two wings have practically only two. The second-story gallery and roof of same is supported by iron columns with molded capitals. The roofs of wings form a large promenade, accessible from the third floor of center of building. The northwest wing is now (July, 1896) used as a house of refuge, and the center of building and southeast wing are occupied by negro squatters. The unfinished building cost $530,090.84.

[1] Dean medical department Tulane University.

[2] Sketch plan kindly furnished the writer by Mr. André Fourchy, builder.

The site was, unfortunately, in a swampy and unhealthy locality, and consequently it was deemed inadvisable to complete the building. Accordingly, work was stopped just prior to the war of 1861, and in 1873 Congress passed an act providing for its sale. The land about the hospital at the present day (1896), while below the street level in places, is about as dry as in many portions of the city—the result of general improvements in the vicinity. It appears that some difference of opinion existed as to the advisability of completing this building, and in 1882 a board of officers after a thorough inspection decided that the building[1] "is in no single particular suitable for hospital purposes." Moreover, it was reported that the money required to complete the work would exceed the amount appropriated for hospital construction at this port in 1882, namely, $100,000. Hence, under the authority of the act of Congress referred to, it was sold to the city of New Orleans, the highest bidder, in August, 1896, for $25,000. Had this hospital been completed in a suitable location and equipped with all modern appointments, it would have been one of the most imposing structures ever provided for the Service. The construction of the present hospital was, therefore, authorized, the $100,000 appropriated in 1882, referred to above, being available for the work. A commission, with the Surgeon-General of the Service as chairman, selected the site September 23, 1883. The land consists of about 22 acres and the batture, and is located on Tchoupitoulas street, between Henry Clay avenue and State street, two squares below Audubon Park. Electric street cars running between Audubon Park and the custom-house pass the hospital gate. The land was purchased for $35,000; the location is the best that could have been secured in the city, and the property is valuable. It was formerly an orange grove, with a plantation house and six negro cabins, of no special value, on the premises. The grounds are inclosed on three sides by a brick wall 7 feet in height, with a substantial iron fence along the levee on the river front. The hospital was completed and occupied in 1885, and now consists of three wooden one-story pavilion wards, with a capacity for 100 patients, constructed on plans similar to those at several other ports, except that the wards are somewhat shorter and ridge ventilation is provided for. The executive building is connected with the wards, kitchen, and senior assistant surgeon's quarters by covered corridors. The other buildings include a house for the surgeon; the old plantation house, which is occupied by one of the assistant surgeons; stable, including necropsy rooms; six old cabins used as storerooms, and a lodge house. It is lighted by electricity and is furnished with a system of electric bells. Wooden cisterns are provided for the storage of rain water, which is the only potable water available at the station. The water supply for ordinary use is pumped from the Mississippi River into two tanks, capacity 8,000 gallons each, which stand on a trestle 31 feet in height, from which it is distributed

[1] Vide Report Marine-Hospital Service for the year 1883, pp. 32–35.

to all the buildings after passing through a Hyatt filter. The sewage is collected in catch basins, and is pumped out daily into the Mississippi River. A new brick power house and laundry has just been completed (1896) and a steam-laundry plant has been installed.

A full description of the first two hospitals has been impracticable, as all of the official records relative to them at the station were lost or destroyed during the late war; but perhaps the facts herein given show fairly well the general trend of the Service here, as well as at other seaports throughout the country. It is shown that the original law authorized the President to appoint a director for the hospital, which carried with it the idea that it would be directed by such an officer; but in carrying out the law a "physician and surgeon to the hospital" only was appointed, which position gave him no authority over hospital matters except those relating directly to the care of patients. Collectors of customs became custodians of the hospital buildings and general managers of local service affairs. In the light of the present day it appears remarkable that such a system of administration was continued seventy-three years, or until Congress created a medical head in 1871 to direct and supervise the conduct of affairs, and it is gratifying to note that under the more rational and advanced methods instituted under the provisions of the act of reorganization much good work has been accomplished which has been fully recognized in the annals of the times.

A REPORT ON THE HISTORY OF THE UNITED STATES MARINE-HOSPITAL SERVICE, PORT OF CHICAGO, ILL.

By Surg. H. R. CARTER.

Owing to the destruction of the United States records in the great fire of 1871, the data relative to the service here prior to that date is meager in the extreme. The marine hospital was destroyed by that fire, and the earliest letters on file show the service patients in the marine ward of the Mercy Hospital under the care of Dr. E. O. F. Roler. This hospital stood on the old Fort Dearborn Reservation, just above Goodrich's wharf on the Chicago River, the present salt-fish houses occupying the site. An old register of patients from July, 1862, to September, 1863, shows that it was used during that time as a military hospital, as I believe was the case with all the marine hospitals, a considerable number—1,080—of soldiers being treated between the above dates. It doubtless was so used during the whole of the war.

Dr. Ralph N. Isham was in charge of it in 1857. When he was replaced by Dr. Roler—if Dr. Roler was his immediate successor—is not a matter of existing record.

The service patients were treated in Mercy Hospital until July 3, 1873, when the hospital now in use was opened, and they were transferred to it, Dr. Roler being in charge of the service up to the transfer, but being replaced by Dr. Isham when it was made.

At the time an assistant surgeon, Dr. Truman W. Miller, resided at the hospital and the surgeon in charge came out to see the patients daily, save when "unavoidably prevented." Considering the distance of the hospital from town and the condition of travel at that time, it is probable that considerable responsibility fell on the assistant surgeon, who in 1877 was appointed surgeon, relieving Dr. Isham. Surgeon Miller remained in command of the station until February, 1885, a period of nearly eight years, his term of service—the maximum by the Regulations of 1879 was three years—having been extended by the Secretary.

The present hospital building is a sufficiently large one and, save that it lacks an elevator, is fairly well adapted for hospital purposes.

It is situated on the lake shore and in a quiet, sparsely settled residence portion of the city. The location is extremely advantageous, the open front and large grounds insuring sufficient air and the nature of the suburb rendering it free from smoke, and as nearly free from dust as is possible in Chicago.

Since the hospital was opened a number of changes have been made, the leveling of the grounds and building the breakwater on the lake being the most extensive. So far as is known to the writer no changes have been made in the building, save the addition of an operating room in 1896. This, designed by Surgeon Hamilton and built under his supervision, is handsomely finished inside with white marble floors and wainscoting, and has a perfect light.

The clientele of the station has lessened considerably the past few years, reaching low-water mark in 1896, only 394 patients being received in hospital that year. In 1897, however, the number had risen to 438. It was 730 in 1892 and had averaged over 700 for the ten years preceding.

A second office in connection with this station has been opened this year—in June—at South Chicago. Although this subport is only 20 miles distant, yet so large a proportion of the tonnage of the port goes there (about three-fifths of what enters Chicago) that it was judged necessary to furnish relief to the men on these vessels at this port.

The arrangement here is essentially for office relief, but a few patients requiring it have been sent up to the hospital on the Illinois Central Railroad.

This is, I think, the only port in the Service having two offices for the reception of patients.

In the opinion of many South Chicago, on account of its greater depth of water, will in the future outrank Chicago proper in its shipping, and at present it has the bulk of the grain and iron ore lake traffic, and the office there will increase in both relative and absolute importance.

HISTORICAL SKETCH OF MARINE-HOSPITAL SERVICE, CINCINNATI, OHIO.

By Surg. W. A. Wheeler.

The early history of the Marine-Hospital Service in Cincinnati is enveloped in doubt. The records of the custom-house, which have been diligently searched, throw no light upon the subject. Previous to the civil war it is likely that boatmen were cared for at the Cincinnati hospital, being sent there by the surveyor of customs, for it is a matter of tradition at the Cincinnati hospital that the first boatman was admitted in 1854. They were treated in the general ward by the attending staff. At the close of the civil war a contract evidently was made with the Good Samaritan Hospital, managed by the Sisters of Charity, and from that time until 1885, with the exception of two or three years when the City Hospital had the contract, all boatmen were sent there. The records of the Good Samaritan Hospital show that Frank Priestley was the first marine patient, and he was admitted November 28, 1866. Medical attendance was furnished by the visiting or resident staff of the hospital, and this arrangement was in force practically until the Marine-Hospital Service was reorganized by Dr. John M. Woodworth in 1871. Some time after this regular officers were detailed to take charge of the service at Cincinnati, and an outoffice was opened for the benefit of those not requiring hospital treatment. The records now in possession of the hospital do not extend back farther than the year 1870, at which time the surveyor of customs was sending all boatmen to the Good Samaritan Hospital to be cared for in the general wards. There was at that time no office for outrelief. In May, 1875, the first regular officer, Surg. F. W. Reilly, was assigned to duty at Cincinnati to look out for the interests of the service, and he established an office at No. 98 West Seventh street, through which boatmen entitled were admitted to hospital care and where outpatients could be treated. It still appears that while in hospital the boatmen were treated by the visiting or resident staff. Surgeon Reilly was succeeded in February, 1876, by Asst. Surg. W. H. H. Hutton, and that year a contract was made with the Cincinnati or City Hospital, the boatmen to be treated in the general ward. Assistant Surgeon Hutton remained but six months, when he was relieved by Asst. Surg. J. M. Gassaway, and this officer moved the outoffice in January, 1877, to No. 118 West Sixth street, and the next year, 1878, the boatmen were again sent to the Good Samaritan Hospital. Surg. John Vansant was the next officer detailed, and he remained in charge from

July, 1878, to March, 1879, when Asst. Surg. H. M. Keys relieved him. During his service the office was again moved, this time to the southwest corner of Third street and Broadway. This officer remained only three months, and was succeeded in turn by Surg. W. Wyman. His term of service was practically three years, and during that time, in 1881, the Cincinnati Hospital obtained for the last time the yearly contract for the care of marine-hospital patients. In March, 1882, Surg. H. W. Austin was placed in charge, and that same year the patients were again transferred to the wards of the Good Samaritan Hospital, where they remained until the present Government Hospital was established. It was during the service of Surgeon Austin that the present marine hospital was constructed, though he did not remain long enough to take occupancy of it. He, however, moved the out-office to the southeast corner of Third and Kilgour streets, on the Government reservation, soon after the property had been purchased.

In 1882 Congress appropriated $100,000 for the purpose of building a marine hospital at Cincinnati, and a commission to select a proper site was appointed by the Secretary of the Treasury. The commission included Dr. J. B. Hamilton, who was at that time chief of the Bureau, Mr. S. F. Covington, and Gen. A. T. Goshorn, the two latter being citizens of Cincinnati. The location finally chosen was a hillside, bounded by Pearl, Third, and Kilgour streets, directly overlooking the freight and passenger yards of the Pennsylvania and Louisville and Nashville railroads and the pumping station of the city waterworks, about 1 mile up the river from the city wharf. The plot of ground is 192 feet front on Pearl street by 369 feet on Kilgour, and the rear line 192 feet on Third street. Almost in the center of the lot is located a two-storied brick house, formerly used as a dwelling. Fifty thousand dollars was paid for the house and land. It was thought best to make use of the house as a nucleus for the hospital, and two wings were thrown out. The lot not being wide enough to allow of the wings stretching on either side of the house, they were placed in front at a slight angle and extend some hundred feet toward Pearl street. These wings are two storied and contain two wards each, with nurses' rooms, baths and closets, also piazzas. In the basement of the west wing is located the boilers for heating the buildings and generating steam for the laundry. In the basement of the central or executive building are the laundry, kitchen, storeroom, and dining rooms for the white and colored patients and attendants. The first floor of this building is taken up with the operating room, the pharmacy, the steward's office, the steward's quarters, and the surgeon's office, while the second story is given up to the assistant surgeon as family quarters. A cottage of five rooms was built behind the main building, adjoining the stable, and under the retaining wall, which holds in its place the sidehill to the east. This has been used as a surgeon's residence. It faces Third street.

The hospital was opened March 14, 1885, under the management of Surg. George Purviance, who remained in charge until November, 1888, when he was succeeded by Surg. W. H. Long, who died January 5, 1892. Surg. H. R. Carter succeeded him and remained in charge until November 1 of the same year, when he was in turn succeeded by Assistant Surgeon Eager, who, on January 14, 1893, was relieved by Passed Assistant Surgeon Kalloch. This officer remained in charge till March 11, 1896, when he was in turn relieved by P. A. Surg. J. O. Cobb. This officer only remained six months, when he was succeeded by Surg. W. A. Wheeler. The wards contain 40 beds, and the average annual number of patients treated since the opening of the hospital has been 365. Since 1890, however, the number is diminishing. Quarters for an interne are provided in a small building behind the hospital, used for office purposes before the grounds were purchased for a hospital. No office for outrelief is here maintained in the Government building, but the pharmacy, on the first floor of the executive building, is used for that purpose. No provision was made upon the reservation for quarters for the hospital attendants, but as more provision than necesary was made for patients, one of the lower wards has been converted into an attendants' dormitory, and it very fairly answers the purpose. The hospital force consists of a surgeon, an acting assistant surgeon, an interne, and a steward with twelve attendants.

NOTE.—As stated in the "Tabular record of United States marine-hospital buildings, from A. D. 1800 to close of fiscal year, 1875" (Annual Report, 1875, p. 27), the marine hospital at Cincinnati was purchased or commenced in 1856, and cost $182,665.48. It was sold in 1866 for $70,500, and occupied by the Good Samaritan Hospital Association. During the civil war it was under military control.—W. W.

HISTORICAL ACCOUNT OF THE MARINE-HOSPITAL SERVICE AT PORTLAND, ME.

By Surg. CHARLES E. BANKS, M. H. S.

The Marine-Hospital Service was established by act of Congress in 1798, but how soon it extended its operations to Portland is not known. The probability is that it did not attain any importance for several years, as the first record of the treatment of sick seamen appears in a small volume in the hospital archives and begins in 1805. The heading of the record is "A list of sick and disabled seamen receiving assistance from the agent of the marine hospital at the port of Portland." This "agent" was the collector of the port for the time being, but there was no marine hospital building, properly speaking. The agent of the fund selected a local physician to attend the patients, and rendered accounts of his transactions direct to the Secretary of the Treasury. The first marine-hospital physician was Dr. Nathaniel Coffin.

Dr. Coffin was the son of Dr. Nathaniel and Patience (Hale) Coffin, of Newburyport, Mass., where he was born April 20, 1744. He was brought to Falmouth as a young child by his parents, and his father died here January 11, 1766. Nathaniel, jr., was sent to England by his father in 1763 to study medicine at Guy's and S. Thomas hospitals, London, and when he returned to Falmouth in 1765 he entered upon a lucrative practice, which he enjoyed for over half a century. He was the leader of his profession in this section of the country, a position which he did not forfeit during the troublous Revolutionary times on account of his sympathies with the loyalists. He married Eleanor Foster, of Charlestown, Mass., by whom he had a large family. The doctor and his wife are described as a markedly handsome couple, characterized by graceful and dignified manners, gifts of person which all their children inherited. He died October 21, 1826, at the advanced age of 84 years. His portrait hangs in the office at the hospital.

It is not known whether Dr. Coffin retained the position of attending physician to the day of his death, but if so, there is an interregnum which I am not able to fill.

The next physician having charge of the seamen was Dr. John Merrill, whose connection with the Service first appears in the records in 1838. He held this position until 1849, when he was succeeded by Dr. James C. Weston, whose term of service lasted four years. The next in succession was Dr. George Fabyan, whose term began in 1853 and lasted two years. He was succeeded by Dr. Gardner Ludwig, who was appointed in 1855, and served four years, until the opening of the new hospital.

At first the applicants for relief were few. The earliest register extant shows 30 admissions to treatment during 1806, a number that was not again equaled for sixteen years, until 1822, when 76 were admitted as patients. As there was no Government hospital these sick and disabled seamen were "boarded out" at private houses or were permitted to remain with their families if they resided here, and the "marine physician" visited them as if they were private cases. This condition of affairs lasted through the war of 1812, and for a dozen years after. There is no record from January 24, 1814, to March 11, 1822, on this point, but from the latter date to May, 1824, the same policy prevailed.

The patients were boarded in private families, as appears from a statement in the report of the Committee on Commerce (Twenty-third Congress), in 1832. They say it was necessary during the war of 1812, "for want of suitable accommodations, to quarter the wounded officers and seamen in the families of private citizens." On May 9, 1824, by agreement with the town of Portland, the sick seamen were sent to the almshouse. This arrangement was effected in pursuance of the vote of the town passed May 3 of that year, the terms of which are indicated in the following copy from the town records:

Voted: That the selectmen or overseers of the poor be authorized to enter into a contract with the collector of the port, to provide for all sick and distressed seamen at the almshouse who may arrive at this place, in consideration of receiving the hospital money collected at this port.

This plan was in operation continuously till 1832, when the sentiment of the beneficiaries against it was manifested in a movement of the citizens of Portland to secure a marine hospital by act of Congress. The sailors naturally objected to go to an almshouse for treatment, especially as it was connected with the town jail. This movement had the earnest support of Francis O. J. Smith, esq., a prominent politician and member of Congress from this district, 1833–1839. The several reports of the House committees during that period in favor of erecting a United States marine hospital at Portland were probably from his pen. The first report is dated May 9, 1832, at which time the Hon. John Anderson represented the district, and the Committee on Commerce of the House of Representatives, to which the subject was referred, submitted the following report:

The Committee on Commerce reported that—

Portland is the principal seaport of the State of Maine, employing 57,000 tons of shipping and 2,500 seamen. Its trade is mostly with the West Indies, which is known to be of an unhealthy character and creates an undue proportion of sick and disabled seamen. From the circumstance of the lower harbor never being obstructed with ice, and of its very easy access, it is the refuge of weather-beaten vessels arriving on the coast in the winter season, many of which have more or less of their crew frost-bitten. It is also a place of great resort for coasting vessels, 400 of which are often known to be lying there at one time windbound. The only place in which the sick and disabled seamen, who are accumulated in this port in consequence of the above-recited facts, can find relief *is in the town almshouse, which is con-*

nected with a house of correction for vagrants and petty offenders, and which, of course, is a place totally unfit for the refuge of American seamen. Indeed it is so considered by the seamen themselves, and it is well known that the just pride of our mariners will and does induce them to suffer the extremities of want and disease, rather than to submit to what they consider the degradation of such relief.

The reports conclude with a recommendation that "a suitable hospital be erected;" for which purpose a bill appropriating $ ——— was reported.

Nothing was accomplished, however, at this time, and at the next Congress, F. O. J. Smith, esq., having followed Mr. Anderson as representative, succeeded in having a bill passed "by general consent," but it required a suspension of the rules to obtain consideration in the Senate, as it was not sent over by the House of Representatives till after the limit for consideration of new bills, viz, three days before adjournment. The rule was suspended, but too late for final action.

In the next (Twenty-fourth) Congress a bill appropriating funds was reported in January, 1836, but lost as before by nonaction of the House. Undaunted by previous misfortune the friends of the measure persevered and brought it up in the next (Twenty-fifth) Congress.

It appears that the subject had enlisted a general interest in the Service at large, and the Senate, by resolution of February 3, 1837, called upon the Secretary of the Treasury for information as to the expediency of erecting Government hospitals for the treatment of sick and disabled seamen. The Secretary, by circular letter of March 16 following, requested collectors of customs and others to furnish data bearing upon the subject. The Hon. John Anderson, who had lately retired as member of Congress, had been appointed collector of customs for this port, and under date of September 18, 1837, sent a report, of which the following extract is given:

A brick building, suitable for the residence of the superintendent and for the accommodation of the sick and disabled seamen of this district, could be built for $20,000. * * * Neither my predecessor nor myself has been able to procure, by contract with any responsible individual, suitable accommodations for the sick and disabled seamen of this district at the rate of compensation to which the collector of the district is limited, and have been obliged to place them in a part of the almshouse of the city on the terms and conditions specified in the accompanying copy of a contract with the overseer of that establishment. * * * There is a great aversion among our seamen to this arrangement, and although it is the best I have been able to make, many of them, and of the more valuable class, too, will expend every particle of their property and credit before they will go to a hospital which is a part of or connected with a poorhouse.

The physicians of Portland joined with their fellow-citizens in memorializing Congress to enact some measure of relief for the sick and disabled seamen, who in his days of sickness was cast among and counted as one of the municipal paupers. The memorial which follows was signed by the leading practitioners of the town, one of the signers, Dr. Elias Banks, being a grandfather of the writer.

To the Honorable Senate and House of Representatives of the United States in Congress assembled:

The undersigned, physicians of Portland, regard with no ordinary interest the exertions of their fellow-citizens for the establishment of a marine hospital in this city. The numerous claims of the large and increasing portion of our community, for whom the benefits of such an institution are exclusively designed, have been ably and eloquently urged upon the attention of Congress. We shall not recapitulate them, but in our professional character would respectfully submit for your consideration a few plain statements, which are the result of personal observation.

The building appropriated to the use of our disabled seamen is destitute of the many conveniences which are necessary in a receptacle of the sick. The apartments are ill-constructed and insufficient in number, thereby, with other serious evils, subjecting the inmates to the deleterious effects of imperfect ventilation. And, indeed, our experience convinces us that the existing provision for their relief is incompatible with the quietude, the careful attention, and the numerous observances of regimen and diet, which are so essential to the sick man's comfort and ultimate recovery.

Again, many of our seamen are debarred from partaking of the benefits, meager as they are, of the existing provision, by the consideration that the building designed for their use is connected with the almshouse, infirmary, and house of correction, and subject to the direction of the managers of those institutions. And it would be strange, indeed, if among the members of a profession characterized for elevation and generosity of feeling, we should find no repugnance to the ideas and associations resulting from a connection of such a nature. The consequences, however, are particularly to be deprecated, as many deserving seamen, in addition to the evils just averted to, are thus subjected to sacrifices and sufferings unavoidable in their nature and peculiarly burdensome and oppressive.

These considerations impress us with a deep conviction of the importance of an institution to be established in this city, sufficiently extensive to meet the wants of our seamen. And for a suitable appropriation to accomplish that object your petitioners will ever pray.

STEPHEN CUMMINGS.
SAMUEL WEED.
JOHN T. GILMAN.
WILLIAM L. HARMON.
JOHN BARRETT.
JOHN P. BRIGGS.
J. MERRILL.
SUMNER CUMMINGS.
ELIPHALET CLARK.
C. H. MCLELLAN.
ALBUS REA.
J. W. MIGHELS.
ELIAS BANKS.

PORTLAND, *January 8, 1836.*

Aided by this professional support, the Hon. F. O. J. Smith, of Portland, a member of the Committee on Commerce of the House, made a stirring report to the House, under date of December 22, 1837 (House Doc. No. 82, second session Twenty-fifth Congress).

Committee on Commerce reported, December 22, 1837, through F. O. J. Smith, Portland district, the history of the previous legislation, and made an especially strong appeal for the passage of the appropriation which they recommended. They cited the fact that prior to 1836 the Government had collected in hospital dues from seamen "at Port-

land alone" the sum of $36,488.89, and expended in their behalf but $31,119.44. During that same period there had been collected in Maine $105,160.54, and an aggregate expenditure of but $52,008.54. They rehearse the condition of the sailor, sick and disabled, for whom this same Government had provided no other home "than the city almshouse, which is connected with and constitutes also a penitentiary for common vagrants and petty convicts." They further say that "to take the earnings of such a denomination of men under the pledge to provide relief and a home for them in the day of their infirmity and destitution, and then to turn them over, when infirmity and destitution are weighing heavy upon them, to the common almshouse of a city and to the keeper of common vagrants and criminal convicts, for such relief and such a home, would expose the Government to a suspicion which it can never merit, of being willing to

> Keep the word of promise to our ear,
> And break it to our hope.

"With a single exception," they add, "it is believed that the history of our Government exhibits no similar instance of hardship or omission in its obligations to its benefactors."

In addition to this Mr. Smith proposed and presented to this session of Congress a report on the expediency of erecting marine hospitals (House Doc., Twenty-fifth Congress), based upon the information gathered by the Secretary of the Treasury.

These efforts, however, were fruitless, as Congress failed to enact the necessary legislation, and the subject was dropped by its friends. It may have been that the successor of Hon. F. O. J. Smith, whose term expired with this Congress, did not have the necessary interest to push it further. However, one change resulted. The contract with the city of Portland was terminated about 1840, and the care and board of the sick seamen was farmed out to one Osgood Noyes, a cordwainer, who is called in the Portland directory of 1841 "Keeper, marine hospital." This building, probably owned by Noyes, a two-story wooden dwelling house, stood at the head of Hancock street, and was used as a sort of sailors' boarding house. It was destroyed in the great fire of 1866. This person was succeeded July 1, 1849, by one George H. Wilson, who kept a seaman's mansion at No. 130 Fore street, in a brick block still existing, who continued to occupy the building until 1858 and 1859, when the house numbered 23 Oxford street, on the northeast corner of Smith street, was secured by Mr. Wilson and used as a hospital for seamen. Meanwhile the efforts of the mercantile and seafaring interests of the port had brought forth fruit from continued agitation to demonstrate the necessity of a suitable Government structure for the treatment of sick and disabled seamen.

In 1853 the first appropriation of $11,000 was made for a site, and a commission was appointed, consisting of the collector of the port, the late Hon. John B. Brown, and another citizen, for the selection of a

suitable site for the building. This committee recommended the beautiful peninsula jutting out into Casco Bay on the Foreside road in the present village of East Deering. This site was formerly occupied by a summer hotel, known as "The Veranda," which had been destroyed by fire in 1851. This property, consisting of about 20 acres, was owned by Hon. F. O. J. Smith, before alluded to as the member of Congress from the Portland district. It was purchased May 30, 1855, and cost $11,000. The hospital building is of the same style of architecture as the present marine hospitals at Boston and Detroit and others built at that period, and the contract for its completion, dated April 16, 1855, involved the sum of $66,200. It was reported as completed August 1, 1856, but from information which was given to me by the late Surgeon Fessenden it seems that in consequence of faulty construction of the roof occupancy was not immediately made. Subsequent appropriations were made in 1857 and 1858, amounting in the total to a sum exceeding $40,000, which made the building ready for use.

The following list shows the amount of money appropriated by Congress for the purchase of site and completion of the building:

1853	$11,000.00
1854	137.00
1855	8,854.67
1856	34,354.70
1857	25,343.19
1858	14,050.32
1859	2,018.85
Total	95,758.73

On July 1, 1859, the patients then under treatment were removed from the city to the new building, which was opened for business by the first superintendent or physician in charge, Dr. Samuel H. Tukesbury, of Portland, then a young and energetic, and since then, in his maturer years, one of the leading surgeons of the city and State.

The following notices from the local papers descriptive of the opening of his hospital are here inserted:

Marine hospital.—Mr. George H. Wilson was appointed superintendent of the marine hospital July 1, 1849, and continued in office until June 30, 1859, during which time there have been admitted 901 patients, 35 of whom died, being an average of only 3½ per year. Eleven were turned over to the new marine hospital in Westbrook, which was opened for their reception on the first day of the present month. Family worship has been continued without intermission for the ten years that Mr. Wilson has presided over the affairs of the past marine hospital, and he was greatly encouraged in his Christian duty by the attention manifested by the inmates, an average of two-thirds of them gladly availing themselves of this special means of grace. Mr. Wilson won the respect of all by his strict attention to the performance of his duties, and by his general courtesy and kindly deportment on all occasions. A better man for his place could not be found, as all testify who knew him. (Portland Advertiser, July 8, 1859.)

Marine hospital.—This beautiful asylum for the invalid mariner is now in full operation under the superintendence of Dr. S. H. Tukesbury, whose professional skill, active energy, and courteous bearing admirably fit him for the responsible position.

The site of the hospital is unsurpassed for its beauty. Even the villas in the vicinity of Naples, world-renowned for the loveliness of surrounding scenery, do not afford more varied and charming prospects than are afforded at this season of the year, all of which the patients can enjoy to their hearts' content and their healths' benefit. The hospital building, recently constructed in the most approved style, is a handsome edifice, and is now fitted up in a plain, neat, and substantial manner. We took a look into its various departments a few days since, and found everything well arranged and in perfect order. The patients appeared as cheerful and happy and comfortable as possible to conceive. It is but right that those who "go down to the sea in ships," encounter the perils of the deep, and contribute from their wage for the purpose should have the best of asylums when disabled by accident or disease, and we are gratified that we now have in Maine a marine hospital that is in every respect equal to the very best. (Portland Argus, July 12, 1859.)

On the change of Administration, at the opening of the great civil struggle, when Lincoln succeeded Buchanan, the late Surg. Charles S. D. Fessenden was appointed physician in charge by Hon. Salmon P. Chase, Secretary of the Treasury, through the influence of his father, Gen. Samuel Fessenden, an old political associate of the Secretary in the Free Soil Party, Dr. Tukesbury being removed as a Democrat. Through the later influence of his half brother, Senator William Pitt Fessenden, who afterwards became Secretary of the Treasury, the term of service of Surgeon Fessenden was secure during the lifetime of the Senator, and he remained on duty at Portland until the reorganization of the Service in 1871, when he was assimilated into the general service as a surgeon, continuing in such grade until his death in 1896. In 1879 Surgeon Fessenden was transferred to another post, and was succeeded by Surg. Edmond J. Doering, who served as surgeon in charge until 1881, when he resigned to enter private practice. Surg. George W. Stoner succeeded him in charge of the station, remaining there until 1884, when Surg. James M. Gassaway was ordered to relieve him. The subsequent succession of commanding officers is as follows: P. A. Surg. C. E. Banks, 1887–1889; Surg. H. W. Sawtelle, 1889–1891; P. A. Surg. S. C. Devan, 1891–92; P. A. Surg. C. E. Banks, 1892–1895; Surg. F. W. Mead, 1895.

The service at Portland maintains perhaps to a greater extent than any other the original character and intent of the Marine-Hospital system. A vast majority of its patients are seamen of the old New England type of sailors from coasting vessels—the genuine "Happy Jacks" of song and story. With these, of course, are to be found some of the class of seafaring men on steam vessels, but none of the bastard type of seamen to be seen on rivers under the title of "roustabouts." The building is one of the best of its kind, in excellent repair, and, having been built on a solid rock foundation, is good for half a century more if properly cared for. It is at present finely equipped, and from the character of the work at the station it promises a pleasant service to whomsoever may be designated as surgeon in command, although from its extreme northern latitude there are long winters, and spring "lingering in the lap of summer" to test the endurance of those not inured to that climate.

HISTORICAL SKETCH OF THE UNITED STATES MARINE-HOSPITAL SERVICE AT ST. LOUIS, MO.

By P. A. Surg. A. H. GLENNAN.

As directed in Bureau letter (B. W. B.), dated April 14, 1897, I have the honor to submit the following sketch of the service at this station, which I have compiled after considerable research from the records on file in this office and from histories of the city of St. Louis in the public library.

It appears that, by an act of Congress dated March 3, 1837, an appropriation was made and authority given the President to cause to be selected suitable sites for marine hospitals on the Western waters for the benefit of sick seamen, boatmen, and all other navigators on the Western rivers and lakes; three on the Mississippi, three on the Ohio, and one on Lake Erie.

The commission appointed under the provisions of this act reported in November, 1837, that St. Louis was especially in need of a marine hospital, and contracted a site for the sum of $7,468. The report further stated that the Ohio and Mississippi rivers were navigated by 638 steamboats, employing 15,950 hands, and that the number upon keel and flat boats was about 30,000, making a total of 45,950.

An act of Congress approved August 29, 1842, appropriated the sum of $7,468, but, owing to the lapse of time, the contractor, a William C. Carr, declined to carry out his agreement, and the money reverted to the United States Treasury. In the meantime the Department contracted to care for patients in the Charity Hospital for $3 per week each.

On January 13, 1846, Hon. James H. Relfe introduced a resolution in Congress instructing the Committee on Commerce to inquire into the expediency of establishing a marine hospital at St. Louis. Proper legislation was secured, and a board of surgeons appointed in 1848 to select a site, the purchase money being limited to $10,000. In 1849 an additional $20,000 was appropriated. A site was selected on the magazine lot, about one-half mile from the United States Arsenal, between Carondelet avenue and the Mississippi River, which was transferred by the War Department in 1850. The hospital building was opened and occupied August 1, 1855, by marine patients who were transferred from the City and Charity hospitals, and Dr. J. N. McDowell appointed hospital physician.

Dr. William M. McPheeters served as surgeon in charge from December 12, 1856, to April 17, 1861. He was born in Raleigh, N. C., December 3, 1815; was educated at the State University, and graduated from the medical department of the University of Pennsylvania in 1840. He located in St. Louis in 1841; was professor of clinical medicine and pathological anatomy; afterwards of materia medica and therapeutics in the St. Louis Medical College until 1861; also editor of the St. Louis Medical and Surgical Journal. During the period of the civil war he served on Gen. Sterling Price's staff in the Confederate army.

The hospital, as described at this period, was located upon 17 acres of land, which is the area now occupied, at the corner of Marine and Miami avenues. The building is a substantial brick structure, 87 by 108 feet, three stories—attic, basement, and cupola—the last named since removed. The east and west side ends are inclosed by porticos 10 by 54 feet, which connect with the wards by one large central and two end halls.

In the light of proper sanitary construction the building does not appear to have been adapted for the care of the sick, although the location is unexcelled, being high and rolling, overlooking the Mississippi River. As a matter of fact the building several times became infected, necessitating radical measures of relief, which will be referred to later in chronological order.

During the civil war the premises were converted into and occupied as a military hospital; barrack wards were erected north of the main building, which were 451 feet in length, 19¼ feet in width, and 9½ feet in height, roughly finished, as characterized the army barracks of that period, and the marine patients were cared for in the Sisters' Hospital, then at the corner of Fourth and Spruce streets.

A large number of sick and wounded soldiers of both sides were treated in the main building, barracks, and tents. Many were landed directly on the river front, especially after the battle of Shiloh or Pittsburg Landing; a number dying out upon the lawn, owing to the crowded condition of transfer. Mr. W. H. D. Brown, now a resident of Galena, Kans., was the army steward at this time. He writes me that he was ordered to report to Surg. S. M. Melcher, in charge of the marine hospital, by Medical Director J. J. B. Wright, and served here until ordered to Springfield, Mo. He also acted as steward of the service at this hospital in 1872, and remained until Dr. Allen relieved Dr. Melcher.

Dr. C. H. Hughes, now a resident of this city, writes me that he was the hospital interne to Dr. McPheeters in 1857, and in 1862 was assigned to the marine hospital by Medical Director Madison Mills as assistant surgeon to Surg. Samuel H. Melcher. Dr. Hughes was afterwards promoted to be full surgeon with the rank of major of cavalry.

Thinking that some further record of the history of this period would

be of interest, I addressed some inquiries, to which the following replies were received:

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
Washington, May 15, 1897.

SIR: I have to inform you that your letter of the 12th instant, requesting history of the marine hospital at St. Louis, Mo., during its use as a military hospital from 1861 to 1866, with names of surgeons in charge during that time, has this day been referred to the chief of the Record and Pension Office, War Department, who is charged by law with the custody of the military and hospital records of the volunteer armies.

Very respectfully,

GEO. N. STERNBERG,
Surgeon-General United States Army.

Dr. A. H. GLENNAN,
Passed Assistant Surgeon, United States Marine-Hospital Service, St. Louis, Mo.

RECORD AND PENSION OFFICE, WAR DEPARTMENT,
Washington City, May 22, 1897.

SIR: In reply to your letter of the 12th instant, addressed to the Surgeon-General of the Army, and by him referred to this office, in which letter you request to be furnished with certain information relative to the hospital now under your command, while it was in possession of the Government, from 1861 to September 25, 1866, I have the honor to advise you as follows:

As shown by the records of this office, marine general hospital, St. Louis, Mo., was opened for patients on May 4, 1862, and was closed in June, 1866, and during that period 4,598 patients were admitted thereto.

The records further show that during that period it was under charge of the following-named medical officers, viz: S. H. Melcher, brigade surgeon, Missouri State Militia; Thomas F. Azpell, Thomas G. Catlin, and G. M. Varnum, surgeons, United States Volunteers; James H. Peabody, assistant surgeon, United States Volunteers; A. Hammer, I. K. Rogers, and J. H. Grove, surgeons, United States Volunteers; S. M. Horton, assistant surgeon, United States Army, and John F. Randolph, brevet lieutenant-colonel and surgeon, United States Army. The records also show that on September 10, 1866, the hospital was under charge of Capt. D. C. McVean, brevet major, Veteran Reserve Corps.

No further record has been found.

Very respectfully,

F. C. AINSWORTH,
Colonel, U. S. A., Chief Record and Pension Office.

Dr. A. H. GLENNAN,
Passed Assistant Surgeon, Marine Hospital, St. Louis, Mo.

On September 25, 1866, the hospital was returned to the Service and reopened by Surg. E. F. Smith, for the care of sick and disabled seamen of the merchant marine, in accordance with the original act of 1798.

On May 11, 1870, Dr. Smith was relieved by Dr. S. H. Melcher, who in turn was relieved by Surg. George Allen, December 21, 1872. Dr. Allen remained in charge until his death in the hospital, September 5, 1876. Asst. Surg. Walter Wyman assumed charge of the hospital, and was shortly after promoted to be a surgeon; now Supervising Surgeon-General of the Service.

At this time the treatment of office patients was instituted; prior to this period simple cases being admitted to hospital which could be treated with dispensary relief, as the table at the end of this article will show.

Under the revised regulations of the Service, then being formulated, Surg. Henry W. Sawtelle, who had been in charge at Norfolk, Va., was ordered in charge at this port, June, 1876, and Surg. Walter Wyman directed to assume command of the Service at Cincinnati, Ohio. The officers were also made custodians of the buildings, greatly to the advantage of the Service.

In the autumn of 1879, on account of the bad sanitary condition of the main building, the old barrack wards were repaired, heated by stoves for winter use, and the patients treated therein to better advantage.

On September 15, 1881, ground was broken for the construction of the present executive building, which was completed and occupied February 15, 1882. It is built of brick, 42 by 44 feet, limestone caps, and front veranda, two stories, concrete basement, attic, and observatory. The main hall is 10 feet wide, with marble-tiled floor, and the interior finishings are of Eastlake design. Ventilating registers open into the flues, and are piped to the roof lunettes of the observatory. The first floor is occupied by the surgeon's office, dispensary, stewards' office, and operating room, with the stewards' quarters above and medical stores in the basement.

On November 9, 1882, Surgeon Sawtelle was directed to assume command of the port of New York, and was relieved by Surg. C. S. D. Fessenden.

The history of the station up to this time appears to show the difficulty of properly caring for the patients in the old main building—undoubtedly infected, and the necessary use of the old barrack wards with temporary relief of this condition, while the total amounts expended for buildings, repairs, etc., to the year 1873 was $109,302.12.

In the Annual Report for that year, page 52, Supervising Surg. John M. Woodworth, in an interesting article on "Hospitals and hospital construction," states that:

> On the 1st of May last erysipelas broke out in the marine hospital at St. Louis as the result of overcrowding, the wards, like those of Chelsea hospital, being badly planned and poorly ventilated. In a very few days nearly every patient showed evidences of the poisonous influences to which they were exposed.
>
> The supervising surgeon visiting the hospital at this time directed that the patients should be removed from the building and the wards cleansed and thrown open for a number of days to the free circulation of the winds. He also quotes a statement of Dr. T. K. Cruse, house surgeon of Bellevue Hospital, referring to that institution, that "recovery from amputation of the thigh for injury is without the recollection of the oldest inhabitant."

This is historically interesting in this day of aseptic and antiseptic surgery.

In the Annual Report for 1875 Dr. Woodworth (now entitled Supervising Surgeon-General) says that—

> During the war two temporary pavilions were constructed for the wounded of the Army, and the service has continued to use these temporary barracks during warm weather with great convenience and advantage. But upon the approach of

cold weather it has been necessary to vacate these wards, as they can not be kept sufficiently warm for winter use. The clinical results obtained in the temporary wards have been more satisfactory than in the hospital proper. This is, no doubt, owing to the imperfect hygienic conditions existing in the arrangement, ventilation, etc., of the old hospital, which is very defective in all these particulars.

If the temporary barrack wards were replaced by others sufficiently substantial to be habitable in winter, the usefulness of the hospital would be greatly increased. Two pavilion wards can be built upon the old foundations for about $15,000.

Owing to these conditions, on September 22, 1883, the patients were transferred to the main building for the clearing away of the old barracks and the construction of the new pavilion wards, similar in arrangement and general plan to those constructed at other stations of the Service, and which cost, exclusive of heating apparatus, etc., $33,710.70.

On May 20, 1884, Surgeon Fessenden telegraphed as follows:

Two cases of erysipelas developed in old building, can not gas fixtures and apparatus for heating water be immediately put in new wards and patients transferred?

To which Assistant Secretary French wired:

Have gas fixtures and apparatus for heating water immediately put in new hospital,

and the patients were transferred May 24.

This outbreak was a confirmation of the long-continued infection and unsanitary condition of the old main building, which had been vacated and in disuse a number of times, and the wards "exposed to the free circulation of the winds." In the annual report for 1885, its tearing down is suggested, and officers' quarters erected in its stead.

The brick laundry building with basement for steam-heating apparatus was finished in 1885, thus completing the general plan of the pavilion hospital, the sanitary and hygienic administration of which has been generally satisfactory to this day. This spring the operating and surgical dressing rooms have been fitted with the latest aseptic furniture, white enameled iron and glass instrument case, tables, and stands. Plans have also been prepared for a small isolation ward, with basement room for a disinfecting steam chamber, for which the money has already been appropriated.

SANITARY HISTORY OF THE PORT.

Aside from the occasional outbreaks of erysipelas, already mentioned, the registers of patients from the year 1866 do not show that cholera or yellow fever was treated in the hospital, although occasionally cases of smallpox were detected and removed to the municipal quarantine station.

In an interesting article, "Notes upon yellow fever epidemic of 1878 in St. Louis and at St. Louis quarantine," by Surg. Walter Wyman (Annual Report for 1878–79), it appears that for the first time in the history of the city the disease developed locally in a few cases, some 14 in all, with 10 deaths. From August 21 to October 22, 88 cases were

treated at quarantine, of whom 42 died. The bulletins of the public health, issued by the Supervising Surgeon-General, Nos. 7 to 15, 1878, give the weekly statistics of the cases.

CONCLUSION.

The history of the Service at this port presents two especially interesting points for observation.

The first is the gradual evolvement and necessity for the pavilion block plan of hospital, which met and corrected the bad sanitary conditions of the older form of structure. The pavilion hospital has now reached the limits of its stage of usefulness, due to our better knowledge of aseptic and antiseptic principles. The pavilion wards were intended for temporary use, to be torn down and destroyed as occasion might require. As a matter of fact, this has never been done. Their construction and fitting have become more elaborate, and the expense of repairs is continual, owing to the extensive area of woodwork. With our present improved mechanical devices for the heating, ventilation, and lighting of buildings, automatic transportation, and maintenance of aseptic conditions, the pendulum will undoubtedly swing at an early day toward a more compact construction of hospital buildings. This will be desired for an easier and less expensive administration, lessened cost of ground area required, and repairs to scattered frame buildings, as well as the permanence and appearance of construction.

The second point is the immediate availability of the hospital and quarantine reservations of the service for the care of the sick and wounded in case of war or other public calamity. Space is ready for the treatment of any additional number of patients, and shelter can be quickly increased by the addition of tents and barracks, which, however, in such an emergency, should remain under the care of the trained corps of this Service and the direction of the Supervising Surgeon-General, rather than by transfer to another department not immediately upon the ground and equipped for this work.

I am indebted to Surgeon Sawtelle for facts noted in the Medical Officers' Journal and to Scharf's History of the City of St. Louis.

A table of the number of patients treated at this port is appended, and also a list of the medical officers in command.

Operations of the Service (St. Louis) from 1857 to the fiscal year 1897.

Year.	Hospital relief.	Office relief.	Total.	Died.	Year.	Hospital relief.	Office relief.	Total.	Died.
1857 *a*	1,230	.....	1,230	70	1881	768	1,154	1,922	22
1858	1,237	.....	1,237	64	1882	1,055	1,576	2,631	35
1859	931	.....	931	40	1883	802	1,032	1,834	34
1860	1,030	.....	1,030	30	1884	646	1,074	1,720	27
1867 *b*	405	.....	405	19	1885	661	1,174	1,835	17
1868	740	.....	740	55	1886	474	987	1,461	14
1869	549	.....	549	33	1887	356	849	1,205	12
1870	517	.....	517	27	1888	288	857	1,145	19
1871	470	.....	470	35	1889	325	946	1,271	14
1872	465	.....	465	23	1890	456	1,152	1,608	13
1873	509	.....	509	32	1891	495	1,202	1,697	23
1874	646	.....	646	22	1892	709	1,117	1,826	28
1875	728	687	1,415	23	1893	615	1,311	1,926	17
1876	750	752	1,502	28	1894	507	1,308	1,815	25
1877	592	592	1,184	20	1895	429	1,353	1,782	17
1878	577	535	1,112	15	1896	484	1,129	1,613	17
1879	589	542	1,131	16	1897	433	936	1,369	9
1880	621	617	1,238	24					

a All patients applying for relief were treated in hospital until the year 1875, when the dispensary office relief was instituted.

b Dates a partial year from reopening of hospital September 25, 1866.

Chronological list of medical officers in charge of the United States Marine Hospital, St. Louis, Mo.

Name.	From—	To—	Name.	From—	To—
J. N. McDowell	1855	1856	John Vansant	1885	1888
William McPheeters	1856	1861	F. W. Mead	1888	1890
E. F. Smith	1866	1870	C. T. Peckham	1890	1894
S. M. Melcher	1870	1872	D. A. Carmichael	1894	1895
George D. Allen *a*	1872	1876	S. D. Brooks	1895	1896
Walter Wyman	1876	1879	C. E. Decker *b*	1896	1897
Henry W. Sawtelle	1879	1882	A. H. Glennan	1897	.....
C. S. D. Fessenden	1882	1885			

a Died in the hospital.

b Temporary.

HISTORICAL SKETCH OF THE UNITED STATES MARINE-HOSPITAL SERVICE AT MEMPHIS, TENN.

By P. A. Surg. Geo. B. Young.

In compliance with Bureau letter (B. W. B.) of April 14, 1897, I have the honor to submit the following brief sketch of the history of the operations of the Service at the port of Memphis.

I have been unable to procure any data as to the operations before the war, and only vague report of any relief having been extended at all.

Since 1870 the records are full, well arranged, and readily consulted. The first entry bears date of April 1, 1870, but as it is numbered 59, it is evident that there must have been an older register that has since been lost.

At that time the patients were cared for at the Memphis General Hospital, and the summary for April, 1870, gives the—

Number of patients remaining from the previous month	21
Number admitted during the month	19
Discharged	27
Deceased	3
Remaining at the end of the month	10

The summary in the register is signed "G. B. Thornton, physician in charge, City Hospital," and the rate charged per day is given as $1 per patient.

It is interesting to note, as an indication of the advance made since then in the method of handling contagious diseases, that among the admissions were 2 cases of smallpox, and subsequent months show other admissions for the same disease.

The number of admissions to hospital during the fiscal year 1870–71 was 401; at that time there was no out-patient relief.

It was then the custom to number permits in series, beginning January 1 instead of July 1.

In May, 1873, I note the admission of 3 cases of cholera, of which 2 were fatal.

From May, 1870, to June, 1873, there is no signature attached to the monthly summary written in the register, but in the latter month the signature of Dr. G. B. Thornton again appears. Dr. Thornton subsequently distinguished himself by his exertions during the yellow-fever epidemic and has for a number of years past been the health officer of Memphis.

About 1874 and 1875 the first attempt seems to have been made to send smallpox cases to the county pesthouse.

Some curious facts can be noted with reference to the yellow-fever epidemic of 1878. Beginning early in the summer, a very marked decrease in the number of admissions is noted; this goes on, until in June there were only 4 patients left in hospital.

In July, out of 16 admissions, 2 were reported as *intermittent malarial* and 7 *remittent;* one of the latter being fatal.

In the following month the truth becomes apparent, and the remittents have been demonstrated to be the first mild cases of the impending epidemic. In that month, out of 8 admissions, 3 are yellow fever and all recovered; 1 in nineteen days, 1 in twenty-three days, and 1 in *forty-eight* days. Does not this last at least suggest a confusion of diagnosis? All fevers now are "yellow."

In September there are 2 admissions to hospital; 1 remittent, cured in four days, and 1 yellow fever, cured in five days.

In October there was 1 admission; yellow fever, died, so that of the 5 cases of yellow fever admitted during the epidemic only 1 died, and of the 9 cases of remittent 1 died.

In November, the Service resumed its regular course.

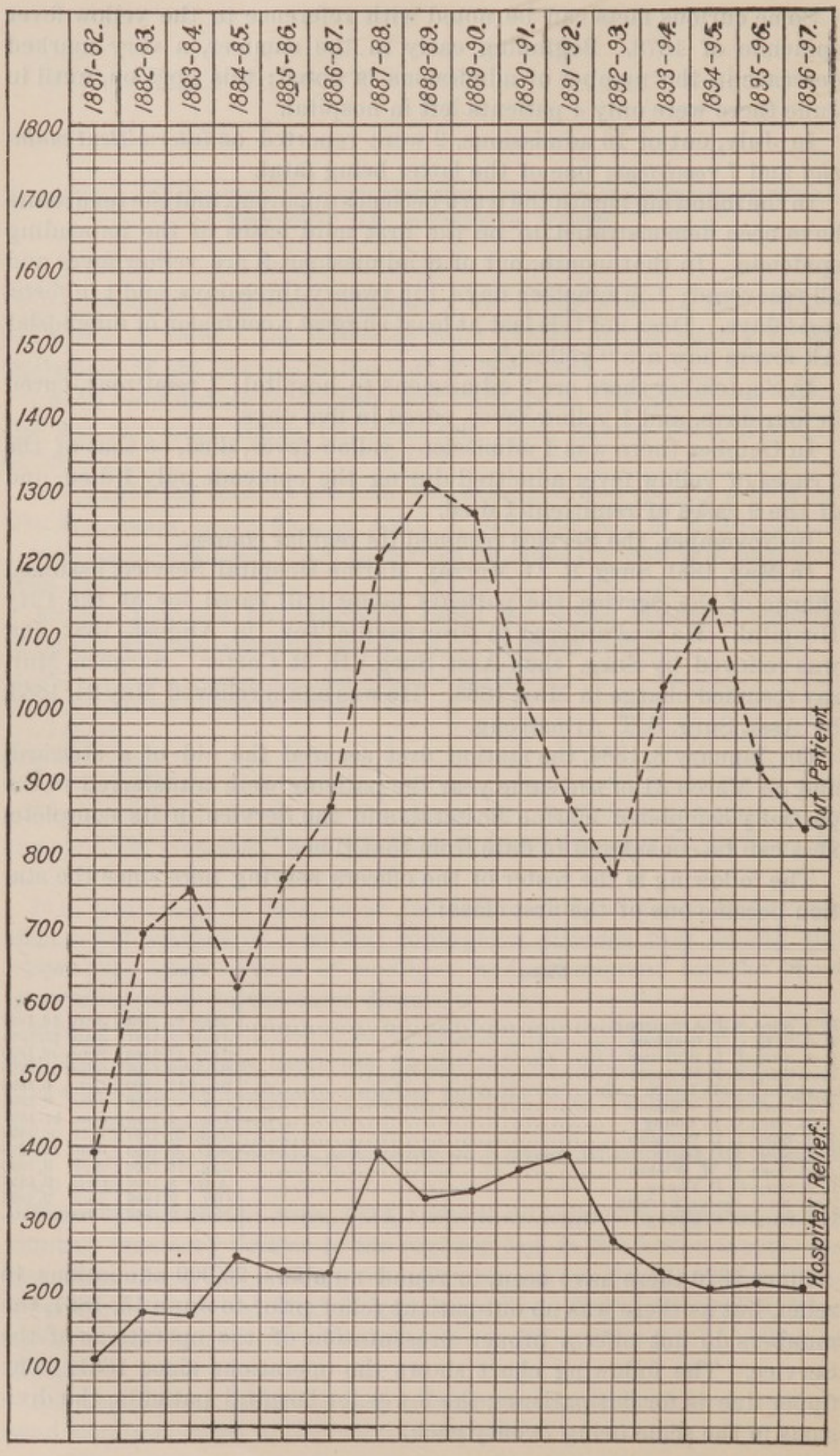
In May, 1881, Surg. R. D. Murray, Marine-Hospital Service, assumed charge of the Service, the patients being still cared for at the City Hospital. He was ordered to Brownsville, Tex., in August, 1882, and was relieved by Surg. (then Asst. Surg.) H. R. Carter. Surgeon Murray resumed charge in May, 1883. He was again relieved May 24, 1883, by Asst. Surg. S. T. Armstrong.

On January 8, 1884, the station first secured the aid of a steward, and on March 31 of the same year the patients were transferred to the partially completed marine hospital, and the Service in its completeness can be considered to date from that time.

The following is the roster of the officers serving here since the station became one of the first-class:

Name.	From—	To—
P. A. Surg. S. T. Armstrong	May 24, 1883	July 18, 1887
P. A. Surg. C. T. Peckham	July 18, 1887	July 17, 1890
P. A. Surg. L. L. Williams	July 17, 1890	Sept. 10, 1890
P. A. Surg. R. P. M. Ames	Sept. 10, 1890	Sept. 17, 1890
Asst. Surg. G. B. Young	Sept. 17, 1890	Oct. 6, 1890
P. A. Surg. L. L. Williams	Oct. 6, 1890	Dec. 2, 1890
Asst. Surg. G. B. Young	Dec. 2, 1890	Jan. 21, 1891
P. A. Surg. L. L. Williams	Jan. 21, 1891	Mar. 30, 1893
P. A. Surg. A. C. Smith	Mar. 30, 1893	Jan. 16, 1896
Asst. Surg. H. W. Wickes	Jan. 16, 1896	Apr. 8, 1896
P. A. Surg. G. B. Young	Apr. 8, 1896	Oct. 2, 1896
Asst. Surg. Seaton Norman	Oct. 2, 1896	Nov. 2, 1896
P. A. Surg. G. B. Young	Nov. 2, 1896	Present date.

Since 1870 there have been, in round numbers, 25,000 admissions to relief, but as there was no out-patient relief prior to June 15, 1881, the numbers do not offer a proper presentation of the operations of the Service. The following chart shows the operations since 1881. The upper line is for out-patients, the lower for hospital patients, the divisions in the scale being twenty each.


1881-82.
1882-83.
1883-84.
1884-85.
1885-86.
1886-87.
1887-88.
1888-89.
1889-90.
1890-91.
1891-92.
1892-93.
1893-94.
1894-95.
1895-96.
1896-97.
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
Out Patient
Hospital Relief.

HISTORICAL SKETCH OF THE UNITED STATES MARINE-HOSPITAL SERVICE AT PORT TOWNSEND, WASH.

By P. A. Surg. W. GORDON STIMPSON.

The first surgeon in charge of marine-hospital work at this port was Dr. Samuel McCurdy. He began his duties in 1855. Soon afterwards, however, he went into the Indian war of 1855–56 as surgeon of the Northern Battalion of Washington Volunteers. Upon his return he resumed the hospital work and continued it until the autumn of 1858, when he was succeeded by Dr. P. M. O'Brien, of San Francisco.

Dr. McCurdy had no contract with the Government for caring for sick sailors, and received no remuneration for his labors until March, 1860. The Hon. Isaac I. Stevens, the first governor of Washington Territory, who was a Delegate to Congress at that time, succeeded in getting a bill through Congress for the benefit of Dr. McCurdy, allowing him $3.50 per day for each patient. A check for $11,000 was received by Dr. McCurdy, which had to be sent as far as San Francisco to be cashed.

When Dr. O'Brien took charge in 1858 he built a dwelling house for himself and family and several small whitewashed barracks for the patients in block 91 in Port Townsend. This was the first marine hospital in Port Townsend. In 1862 the custom-house and the marine-hospital patients were removed to Port Angeles, with Dr. Thomas in charge. He was succeeded by Dr. Redfield, who, in June, 1866, was followed by Dr. G. V. Calhoun, a graduate of the University of Glasgow.

In November, 1866, the custom-house and hospital at Port Angeles were destroyed by a flood. Strange to say, no one was injured. The marine-hospital patients were then taken care of for a few months by Dr. Calhoun at Fort Townsend, which is situated a few miles from Port Townsend, across the bay.

In 1867 Dr. Calhoun obtained possession of the old hospital buildings in Port Townsend, formerly owned by Dr. O'Brien, and there he treated the patients until 1870, when he sold out to Dr. T. T. Minor. Dr. Minor was in charge until 1878, when he was succeeded by Surg. James M. Gassaway, the first officer of the Marine-Hospital Service in command of this station. The hospital has always since then been in charge of

the marine-hospital officers, the following being a list of those who have served here, with the dates of their appointments:

Name.	From—	To—
Dr. F. M. Mead	Aug. 5, 1880	May 9, 1884
Dr. S. C. Devan	May 9, 1884	Apr. 7, 1888
Dr. A. H. Glennan	Apr. 7, 1888	Mar. 24, 1892
Dr. D. A. Carmichael	Mar. 24, 1892	Apr. 18, 1892
Dr. B. W. Brown	Apr. 18, 1892	May 11, 1892
Dr. G. M. Magruder	May 11, 1892	Dec. 23, 1892
Dr. B. W. Brown	Dec. 23, 1892	Jan. 11, 1893
Dr. J. O. Cobb	Jan. 11, 1893	Mar. 7, 1896
Dr. C. T. Peckham	Mar. 7, 1896	July 4, 1896
Dr. W. G. Stimpson	July 4, 1896	Oct. 2, 1896
Dr. S. D. Brooks	Oct. 2, 1896	

August 7, 1882, Congress appropriated $18,000 for the purchase of lots 91 and 102, together with the hospital buildings thereon, to be used as a marine hospital, and on January 17, 1883, the transfer of the property was made by Dr. Minor.

Surg. F. M. Mead makes the following statement in regard to this property in a letter to the Surgeon-General, dated February 14, 1883:

> The property recently purchased by Government at Port Townsend, Wash. T., has for many years been known as the Port Townsend Hospital, and has until very recently been the largest establishment of its kind north of San Francisco. This property is situated near the town on a high bluff of sand formation, and commands a view of many miles of Puget Sound, and a picturesque scene of water, wood, and mountain, perhaps nowhere excelled. It consists of a series of frame buildings, erected from time to time as want dictated or the fancy of its owners elected, with but little regard to sanitary rule or hygienic requirements. The foundations of the structures are cedar logs from 1 to 2 feet in diameter and 2 or more feet high, placed on the ground, on which the frame is placed, the space between the ground and frame being left unclosed.

The buildings consisted of a surgeon's house, hospital and executive building, storehouse, kitchen, stable, pump house, windmill, tool house, chicken house, and pigpen.

An act of Congress approved March 3, 1893, made an appropriation of $30,000 for the erection of a new hospital, as the old frame buildings had by this time become badly decayed. September 9, 1893, all the old buildings except the surgeon's house, the stable, and the storehouse were destroyed by fire. The fire is believed to have originated through the fault of a defective flue, between the ceiling and the roof. The patients were taken out without injury and the records and furniture saved. The actual loss sustained probably did not exceed $2,000.

A number of small houses were rented near the hospital reservation, and these buildings were used as a hospital until February 1, 1896, when the new hospital was completed.

The following table shows the number of patients treated at the hospital, and the number of seamen furnished office relief during the years 1881, 1885, 1890, 1892, 1893, 1894, 1895, and 1896:

Year.	Number treated at hospital.	At office.	Year.	Number treated at hospital.	At office.
1881	183	272	1893	216	312
1885	226	154	1894	157	179
1890	415	283	1895	186	202
1892	254	217	1896	167	145

In 1890 this whole western country underwent a great development. Large numbers of people came to Puget Sound, and this place, like many others, experienced a "boom" which lasted several years. During this time there were many more vessels on the Sound, which brought more patients to the hospital. Port Townsend was formerly the port of entry of all vessels coming to Puget Sound, and consequently many vessels brought sick here which are now carried to Seattle or Tacoma, since other ports of entry have been established.

Heretofore the accommodations for patients at this port have not been very good, but now that the new hospital is built, that trouble is obviated, and undoubtedly when this is understood by the sailors, many will prefer to come here than go to other places on the Sound.

STATISTICS

OF THE

UNITED STATES MARINE-HOSPITAL SERVICE.

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STATISTICS OF THE UNITED STATES MARINE-HOSPITAL SERVICE.

The following statistical tables are self-explanatory:

TABLE I.—COMPARATIVE TABLE OF NUMBER TREATED—1868 TO 1897.

The following tabular statement will serve to illustrate its growth since the reorganization of the Marine-Hospital Service in 1871:

Operations of the Marine-Hospital Service from July 1, 1868, to June 30, 1897.

Fiscal years.	Number of places at which relief was furnished.	Number of sick and disabled seamen furnished relief.
Prior to reorganization:		
1868	64	11,535
1869	64	11,356
1870	74	10,560
After reorganization:		
1871	72	14,256
1872	81	13,156
1873	91	13,529
1874	91	14,356
1875	94	15,009
1876	94	16,808
1877	100	15,175
1878	210	18,223
1879	210	20,922
1880	210	24,860
1881	.....	32,613
1882	.....	36,184
1883	.....	40,195
1884	.....	44,761
1885	.....	41,714
1886	.....	43,822
1887	.....	45,314
1888	.....	48,203
1889	.....	49,518
1890	.....	50,671
1891	.....	52,992
1892	.....	53,610
1893	.....	53,317
1894	.....	52,803
1895	.....	52,643
1896	.....	53,804
1897	.....	54,477

TABLE II.—EXHIBIT OF OPERATIONS OF THE SERVICE DURING THE YEAR ENDED JUNE 30, 1897.

Ports.	Total number of seamen treated.	Patients in hospital July 1, 1896.	Admitted during the year.	Total treated in hospital.	Discharged.	Died.	Remaining in hospital June 30, 1897.	Number of days relief in hospital.	Number of persons furnished office relief.	Number of times relief was furnished.	Number of persons examined physically, including pilots.	Amount expended.	Tonnage tax collected.
Total	**54,477**	**744**	**11,410**	**12,154**	**10,990**	**396**	**768**	**324,542**	**42,323**	**66,141**	**3,116**	**$538,356.68**	*a*$731,769.61
Albany, N. Y	3	.....	3	3	2	.....	1	41	.....	.....	.....	141.00	.....
Alexandria, Va	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	132.60
Apalachicola, Fla	83	.....	30	30	30	.....	.....	445	53	74	.....	805.00	2,759.01
Ashland, Wis	60	1	15	16	.....	.....	1	390	44	45	.....	400.75	.....
Ashtabula, Ohio	201	2	28	30	28	1	1	394	171	399	.....	691.35	.....
Astoria, Oreg	63	2	15	17	15	1	1	319	46	66	.....	583.60	8,850.48
Bangor, Me	92	3	36	39	37	.....	2	492	53	80	16	1,006.69	921.57
Barnstable and subports	125	.....	1	1	1	.....	.....	5	124	319	.....	351.80	164.91
Baltimore, Md	2,331	37	448	485	433	22	30	18,895	1,846	2,783	58	18,175.82	47,132.91
Bath, Me	48	.....	.....	.....	.....	.....	.....	.....	48	58	.....	365.48	121.98
Beaufort, N. C	263	1	5	6	6	.....	.....	55	257	523	20	470.52	.....
Beaufort, S. C	67	.....	.....	.....	.....	.....	.....	.....	67	88	.....	163.80	2,598.75
Belfast, Me	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	111.54
Bismarck, N. Dak	18	.....	5	5	5	.....	.....	82	13	29	.....	275.80	.....
Boston, Mass	3,160	60	801	861	783	26	52	25,818	2,299	3,245	195	24,891.23	60,009.99
Bridgeport, Conn	14	2	8	10	10	.....	.....	119	4	6	.....	123.15	126.50
Bridgeton, N. J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	56.27
Brownsville, Tex	1	.....	.....	.....	.....	.....	.....	.....	1	5	4	123.61	.....
Bristol, R. I	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.24
Brunswick, Ga	178	3	55	58	53	3	2	1,153	120	132	.....	1,387.90	10,620.42
Buffalo, N. Y	2,031	10	194	204	194	4	6	3,540	1,827	2,553	88	6,708.40	.....
Burlington, Iowa	21	1	20	21	.....	.....	.....	384	.....	.....	.....	378.60	.....
Burlington, Vt	3	.....	3	3	3	.....	.....	120	.....	.....	.....	163.09	424.47
Cairo, Ill	1,125	10	262	272	261	6	5	4,442	853	1,031	7	9,283.01	.....
Cape Vincent, N. Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	423.75
Castine, Me	4	.....	.....	.....	.....	.....	.....	.....	4	7	.....	7.00	92.10
Cambridge, Md	105	.....	11	11	11	.....	.....	152	94	281	.....	280.45	.....
Cedar Keys, Fla	87	.....	.....	.....	.....	.....	.....	.....	87	139	.....	139.00	.....
Charleston, S. C	1,226	6	172	178	166	4	8	3,028	1,048	1,416	36	5,610.00	4,742.82
Chattanooga, Tenn	35	.....	2	2	1	.....	1	20	33	115	.....	312.29	.....
Chicago, Ill	2,304	55	439	494	429	23	42	18,510	1,810	2,904	121	21,977.52	.....
Cincinnati, Ohio	884	23	244	267	238	7	22	7,947	617	952	38	12,872.82	.....
Cleveland, Ohio	1,696	14	358	372	331	7	34	8,572	1,324	2,037	32	12,712.93	114.93
Coos Bay, Oreg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.31
Corpus Christi, Tex	8	.....	5	5	5	.....	.....	96	3	6	7	436.15	.....
Darien, Ga	26	.....	.....	.....	.....	.....	.....	.....	26	31	.....	224.85	.....
Delaware Breakwater, Delaware	82	1	14	15	13	2	.....	380	67	69	39	1,673.73	.....
Detroit, Mich	1,951	34	263	297	251	19	27	12,852	1,654	2,724	81	15,935.60	56.71
Dubuque, Iowa	40	4	27	31	27	.....	4	438	9	9	15	749.14	.....

Duluth, Minn	295	5	51	56	51	3	2	717	239	307	36	837.82	72.33
Eastport, Me	11								11	51		51.00	913.89
Edenton, N. C	145		2	2	2			10	143	227		287.50	
Edgartown, Mass	1								1	1		17.25	169.95
Elizabeth City, N. C	48		1	1	1			28	47	66	170	271.00	
Ellsworth, Me	26		2	2	2			56	24	110	6	321.50	41.55
Erie, Pa	66		26	26	23		3	513	40	41		619.52	
Escanaba, Mich	42	1	22	23	20		3	372	19	19		535.33	
Eureka, Cal	49		9	9	8		1	158	40	46	13	510.44	116.20
Evansville, Ind	1,017	11	227	238	223	6	9	5,106	779	1,158	15	8,677.64	
Fall River, Mass													82.29
Fernandina, Fla	76		16	16	16			266	60	106		641.10	2,848.47
Fredericksburg, Va	109		14	14	14			189	95	198		321.80	
Gallipolis, Ohio	219	2	146	148	141	4	3	2,551	71	153		2,240.75	
Galveston, Tex	542	7	151	158	146	6	6	2,683	384	499	119	6,293.55	28,229.96
Georgetown, D. C													7.81
Georgetown, S. C	79		4	4	4			56	75	218		330.40	
Gloucester, Mass	361								361	448		648.90	1,067.37
Government Hospital for the Insane, Washington, D. C	26	21	5	26	1		25	8,525				5,480.35	
Great Falls, Mont													145.72
Grand Haven, Mich	48	1	9	10	10			189	38	85	53	511.95	
Green Bay, Wis	60		5	5	5			66	55	68		354.84	
Hartford, Conn	5		5	5	5			74				75.50	2.94
Jacksonville, Fla	227	5	108	113	108	2	3	1,977	114	198		2,446.76	256.29
Juneau, Alaska	43		15	15	14	1		365	28	106		1,237.05	
Key West, Fla	1,418	11	130	141	124	4	13	4,678	1,277	2,034	29	8,107.64	1,572.81
La Crosse, Wis	186	4	31	35	31		4	327	151	396	2	886.49	
Little Rock, Ark	33								33	90	3	240.95	
Louisville, Ky	472	7	147	154	142	4	8	4,234	318	778	18	10,233.78	
Los Angeles, Cal												8.50	880.84
Ludington, Mich	35		3	3	3			33	32	49		214.80	
Machias, Me	58		21	21	21			426	37	60		715.11	181.44
Manistee, Mich	137		15	15	15			240	122	274	25	547.85	
Marblehead, Mass													72.30
Marquette, Mich	35	1	6	7	7			174	28	33		539.27	
Marshfield, Oreg	107		22	22	21	1		276	85	155		731.20	
Memphis, Tenn	1,041	5	202	207	189	14	4	4,510	834	1,100	23	9,010.52	
Milwaukee, Wis	865	7	236	243	230	2	11	4,365	622	1,029	97	4,892.66	
Mobile, Ala	1,562	7	222	229	195	13	21	7,669	1,333	2,162	94	10,194.69	13,337.16
Nashville, Tenn	91	1	19	20	18	2		327	71	197		748.94	
Newark, N. J													464.48
New Bedford, Mass	46		3	3	3			50	43	91		418.40	279.21
Newbern, N. C	176		21	21	20		1	315	155	372		764.99	10.11
Newburyport, Mass													7.74
New Haven, Conn	71		49	49	44		5	963	22	34	22	1,398.00	327.96
New London, Conn	81		11	11	9	1	1	244	70	71		887.56	45.48
New Orleans, La	2,518	23	565	588	542	19	27	11,382	1,930	2,592	96	17,961.24	65,948.43
Newport, Ark	55		18	18	18			236	37	50		516.35	
Newport, R. I	77		32	32	29	1	2	376	45	47	64	726.05	125.88

a The amount actually received in the United States Treasury during the fiscal year was $729,316.92.

TABLE II.—EXHIBIT OF OPERATIONS OF THE SERVICE DURING THE YEAR ENDED JUNE 30, 1897—Continued.

Ports.	Total number of seamen treated.	Patients in hospital July 1, 1896.	Admitted during the year.	Total treated in hospital.	Discharged.	Died.	Remaining in hospital June 30, 1897.	Number of days relief in hospital.	Number of persons furnished office relief.	Number of times relief was furnished.	Number of persons examined physically, including pilots.	Amount expended.	Tonnage tax collected.
Newport News, Va	67	.....	.....	.....	.....	.....	.....	.....	67	67	.....	$250.65	$16,825.69
New York, N. Y	4,988	93	1,191	1,284	1,109	58	117	44,974	3,704	6,186	360	54,422.00	237,778.53
Norfolk, Va	2,252	12	330	342	316	10	16	5,757	1,910	2,600	80	9,006.00	13,461.03
Ogdensburg, N. Y	57	.....	3	3	2	.....	1	37	54	88	.....	325.87	2,375.67
Oswego, N. Y	103	1	8	9	8	.....	1	124	94	139	.....	484.11	878.22
Pensacola, Fla	148	10	108	118	114	2	2	2,020	30	151	.....	2,716.20	21,983.16
Perth Amboy, N. J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	257.82
Petersburg, Va	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20.69
Philadelphia, Pa	1,862	30	463	493	455	11	27	10,039	1,369	1,716	333	16,613.21	62,354.13
Pittsburg, Pa	1,825	8	206	214	202	5	7	3,013	1,611	2,292	52	6,397.84	.....
Plattsburg, N. Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,326.97
Plymouth, Mass	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20.76
Port Huron, Mich	124	.....	12	12	11	.....	1	142	112	271	.....	349.50	.....
Portland, Me	848	17	200	217	198	6	13	6,151	631	683	41	10,588.06	9,525.17
Portland, Oreg	445	2	54	56	53	.....	3	942	389	543	14	3,556.42	.....
Portsmouth, N. H	34	.....	9	9	7	1	1	113	25	26	.....	318.60	93.33
Port Tampa, Fla	128	.....	39	39	38	.....	1	604	89	353	.....	1,064.67	.....
Port Townsend, Wash	427	16	199	215	191	5	19	9,242	212	316	21	11,644.93	19,041.15
Providence, R. I	256	6	109	115	105	5	5	1,689	141	187	.....	2,117.40	339.90
Richmond, Va	66	1	28	29	27	1	1	406	37	37	.....	735.60	171.21
Rochester, N. Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	67.74
Rockland, Me	129	.....	2	2	2	.....	.....	36	127	326	.....	599.89	.....
Rome, Ga	39	.....	.....	.....	.....	.....	.....	.....	39	61	.....	185.12	.....
Sag Harbor, N. Y	16	.....	.....	.....	.....	.....	.....	.....	16	89	.....	89.00	.....
Saginaw, Mich	152	2	36	38	37	.....	1	516	114	199	42	715.28	.....
Salem, Mass	14	.....	3	3	3	.....	.....	40	11	11	.....	78.56	377.94
St. Augustine, Fla	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.03
St. Marys, Ga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	148.56
St. Louis, Mo	1,369	30	403	433	393	9	31	9,482	936	1,432	43	14,065.34	.....
St. Paul, Minn	19	3	8	11	11	.....	.....	190	8	19	.....	532.00	.....
Sandusky, Ohio	141	1	62	63	62	.....	1	1,013	78	112	.....	1,224.50	.....
San Diego, Cal	130	.....	27	27	23	1	3	807	103	168	7	1,753.97	1,519.89
San Francisco, Cal	2,964	79	598	677	562	42	73	32,141	2,287	4,113	326	24,799.10	47,430.74
San Pedro, Cal	79	4	48	52	51	1	.....	1,081	27	79	.....	1,153.60	.....
Sault Ste. Marie, Mich	154	7	47	54	52	1	1	630	100	142	.....	948.98	.....
Savannah, Ga	1,126	9	196	205	197	2	6	2,313	921	1,217	33	5,337.88	14,428.11
Seattle, Wash	1,122	5	280	285	265	9	11	5,198	837	1,653	76	4,406.21	.....
Shieldsboro, Miss	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,601.47
Shreveport, La	120	.....	15	15	14	.....	1	171	105	600	1	828.71	.....
Sitka, Alaska	2	.....	2	2	2	.....	.....	19	.....	.....	.....	57.00	543.68
Solomons, Md	453	.....	16	16	16	.....	.....	183	437	525	.....	608.73	.....

Stonington, Conn													38.70
Sturgeon Bay, Wis	1		1	1			1	3				60.49	
Superior, Wis	136	2	24	26	24	1	1	416	110	178		708.65	
Tacoma, Wash	83		33	33	31	1	1	497	50	69		445.50	
Tampa, Fla													2,513.58
Tappahannock, Va	294		114	114	114			916	180	347		1,872.50	
Toledo, Ohio	267	2	121	123	121		2	2,188	144	379		2,054.95	
Vicksburg, Miss	60		56	56	49	3	4	615	4	7		1,271.90	
Vineyard Haven, Mass	292	10	105	115	101	3	11	2,956	177	179	12	7,923.36	
Waldoboro, Me													477.27
Washington, D. C	129		28	28	25	2	1	337	101	119		23,956.19	72.21
Wheeling, W. Va	39		14	14	13	1		265	25	40		490.05	
Wilmington, Del													6,928.14
Wilmington, N. C	449	6	96	102	91	4	7	2,915	347	416	25	7,741.30	2,241.09
Wiscasset, Me	1								1	1		1.00	219.96
Cape Charles Quarantine	8		2	2	1	1		18	6	42		(a)	
Delaware Breakwater Quarantine	12		12	12	11	1		231					
Gulf Quarantine	64		26	26	25		1	205	38	59			
Port Townsend Quarantine	1		1	1		1		8					
Reedy Island Quarantine	6		6	6	6			126					
San Diego Quarantine	3								3	5			
San Francisco Quarantine	13		13	13	12		1	230					
South Atlantic Quarantine	12		12	12	12			87					
South Port Quarantine	25								25	31	8		
Tortugas Quarantine	29		9	9	4	1	4	41	20	23			

a Expenditures for quarantine given elsewhere.

TABLE III.—SUMMARY OF PHYSICAL EXAMINATIONS OF SEAMEN MADE BY OFFICERS OF THE UNITED STATES MARINE-HOSPITAL SERVICE, YEAR ENDED JUNE 30, 1899.

Summary of examinations and causes of rejection.	Total.	Pilots.	Revenue marine.	Merchant marine.	Life-Saving Service.	Light-House Service.
Summary of examinations:						
Total number examined	3,116	936	395	97	1,687	1
Number passed	3,006	912	382	92	1,619	1
Number rejected	110	24	13	5	68	.....
Causes of rejection:						
Albuminuria	1	.....	1	.....	.....	.....
Alcoholism	2	.....	.....	.....	2	.....
Bronchitis	1	.....	.....	1	.....	.....
Caries of dental tissue	1	.....	1	.....	.....	.....
Chancre	3	.....	1	.....	2	.....
Cirrhosis of liver	2	.....	.....	.....	2	.....
Color blindness	27	21	2	.....	4	.....
Curvature of spine	1	.....	.....	.....	1	.....
Debility (weakness of spine)	1	.....	.....	.....	1	.....
Deafness	1	.....	.....	.....	1	.....
Disease of heart	15	.....	4	1	10	.....
Aortic insufficiency	1	.....	.....	.....	1	.....
Hypertrophy	5	.....	2	.....	3	.....
Mitral insufficiency	1	.....	.....	.....	1	.....
Mitral regurgitation	1	.....	1	.....	.....	.....
Valvular	7	.....	1	1	5	.....
Hemorrhoids	4	1	.....	.....	3	.....
Internal	3	1	.....	.....	2	.....
External	1	.....	.....	.....	1	.....
Hernia	11	.....	2	.....	9	.....
Inguinal	5	.....	.....	.....	5	.....
Oblique	4	.....	2	.....	2	.....
Scrotal	1	.....	.....	.....	1	.....
Ventral	1	.....	.....	.....	1	.....
Hydrocele tunica vaginalis	1	.....	1	.....	.....	.....
Insufficient chest expansion	1	.....	.....	.....	1	.....
Myopia	6	1	.....	1	4	.....
Nasal catarrh	1	.....	.....	.....	1	.....
Rheumatism	2	.....	.....	.....	2	.....
Syphilis	10	.....	.....	.....	10	.....
Primary	2	.....	.....	.....	2	.....
Secondary	8	.....	.....	.....	8	.....
Synovitis of knee joint	1	1	.....	.....	.....	.....
Tubercle of lungs	3	.....	.....	.....	3	.....
Ulcer of legs	3	.....	.....	1	2	.....
Under size	1	.....	1	.....	.....	.....
Varicocele	4	.....	.....	.....	4	.....
Varicose veins	7	.....	.....	1	6	.....

TABLE IV.—STATEMENT, BY DISTRICTS, OF THE NUMBER OF PATIENTS TREATED DURING THE YEAR ENDED JUNE 30, 1897.

District.	Total cases.	Patients in hospital July 1, 1896.	Admitted during the year.	Total number treated in hospital.	Discharged.	Died.	Patients in hospital June 30, 1897.	Number of days hospital relief furnished.	Number of seamen furnished office relief.
Grand total	**54,477**	**744**	**11,410**	**12,154**	**10,990**	**396**	**768**	**324,542**	**42,323**
North Atlantic	5,586	96	1,327	1,423	1,295	42	86	38,328	4,163
Middle Atlantic	7,122	126	1,744	1,870	1,647	72	151	56,834	5,252
South Atlantic	9,918	101	1,670	1,771	1,621	50	100	47,476	8,147
The Gulf	6,654	58	1,265	1,323	1,208	44	71	29,748	5,331
The Ohio	4,582	52	1,005	1,057	978	29	50	23,463	3,525
The Mississippi	3,967	57	1,032	1,089	1,005	32	52	20,706	2,878
The Great Lakes	10,961	146	1,984	2,130	1,929	61	140	55,996	8,831
The Pacific	5,514	108	1,302	1,410	1,236	62	112	51,045	4,104
The quarantine stations.	173	.....	81	81	71	4	6	946	92

TABLE V.—RATIO OF PATIENTS TREATED IN HOSPITAL IN EACH DISTRICT.

District.	Per cent of total number of patients.	District.	Per cent of total number of patients.
North Atlantic	25.47	The Mississippi	27.45
Middle Atlantic	26.25	The Great Lakes	19.52
South Atlantic	17.85	The Pacific	25.57
The Gulf	19.96	The quarantine stations	46.82
The Ohio	23.07		

TABLE VI.—AVERAGE DURATION OF TREATMENT IN HOSPITAL IN EACH DISTRICT.

District.	Average number of days' relief furnished to each patient.	District.	Average number of days' relief furnished to each patient.
North Atlantic	26.93	The Mississippi	19.00
Middle Atlantic	30.39	The Great Lakes	26.27
South Atlantic	26.80	The Pacific	33.20
The Gulf	22.41	The quarantine stations	11.69
The Ohio	22.20		

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Grand total of all Cases	**744**	**11,410**	**6,756**	**3,932**	**302**	**396**	**768**	**42,323**	**54,477**
GENERAL DISEASES	299	5,058	2,923	1,826	121	194	293	18,637	23,994
LOCAL DISEASES	345	4,536	2,573	1,625	159	177	347	20,069	24,950
INJURIES AND AMPUTATIONS	100	1,816	1,260	481	22	25	128	3,617	5,533
NORTH ATLANTIC.									
TOTAL CASES	**96**	**1,327**	**882**	**377**	**36**	**42**	**86**	**4,163**	**5,586**
General Diseases	**43**	**528**	**362**	**148**	**11**	**16**	**34**	**1,704**	**2,275**
Cowpox	.....	.....	.....	.....	.....	.....	.....	1	1
Chicken pox	.....	.....	.....	.....	.....	.....	.....	1	1
Measles	.....	9	9	.....	.....	.....	.....	3	12
Influenza	.....	23	19	4	.....	.....	.....	58	81
Mumps	.....	5	5	.....	.....	.....	.....	7	12
Diphtheria	.....	2	2	.....	.....	.....	.....	.....	2
Simple continued fever	.....	2	2	.....	.....	.....	.....	1	3
Enteric fever	4	22	18	2	1	4	1	6	32
Dysentery	.....	5	3	2	.....	.....	.....	5	10
Malarial fever:									
Intermittent	4	106	101	5	.....	.....	4	184	294
Remittent	1	29	25	2	.....	1	2	7	37
Erysipelas	1	.....	1	.....	.....	.....	.....	2	3
Septicæmia	.....	.....	.....	.....	.....	.....	.....	3	3
Tetanus	.....	1	1	.....	.....	.....	.....	.....	1
Tubercle	8	39	.....	32	3	10	2	51	98

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases—Continued.									
Syphilis:									
Primary	.....	2	.....	2	.....	....	.....	11	13
Secondary	5	49	.....	47	1	....	6	263	317
Gonorrhœa	4	69	58	13	.....	....	2	573	646
Diseases dependent on animal parasites	.....	2	2	.....	.....	....	.....	1	3
Sarcoptes scabiei	.....	1	1	.....	.....	....	.....	7	8
Diseases dependent on vegetable parasites	.....	.....	.....	.....	.....	....	.....	5	5
Microsporon furfur	.....	.....	.....	.....	.....	....	.....	1	1
Trichophyton tonsurans	.....	.....	.....	.....	.....	....	.....	10	10
Effects of animal poisons	.....	1	1	.....	.....	....	.....	.....	1
Effects of vegetable poisons	.....	.....	.....	.....	.....	....	.....	1	1
Effects of inorganic poisons	.....	1	.....	.....	.....	....	1	4	5
Effects of cold	.....	.....	.....	.....	.....	....	.....	18	18
Effects of excessive exertion and strain	.....	.....	.....	.....	.....	....	.....	5	5
Scurvy	.....	1	1	.....	.....	....	.....	1	2
Alcoholism	1	18	17	2	.....	....	.....	11	30
Rheumatic fever	4	27	21	8	.....	....	2	5	36
Rheumatism	9	93	63	22	4	1	12	350	452
Osteo arthritis	1	1	.....	1	.....	....	1	.....	2
Cyst	.....	2	2	.....	.....	....	.....	.....	2
New growth:									
Nonmalignant	.....	7	7	.....	.....	....	.....	16	23
Malignant	.....	2	.....	1	1	....	.....	4	6
Anæmia	.....	1	.....	1	.....	....	.....	4	5
Purpura	.....	.....	.....	.....	.....	....	.....	1	1
Diabetes mellitus	1	1	.....	1	.....	....	1	7	9
Debility	.....	7	3	3	1	....	.....	76	83
Congenital malformation—hypospadic fissure of the urethra	.....	.....	.....	.....	.....	....	.....	1	1
Local Diseases	**44**	**591**	**364**	**187**	**24**	**24**	**36**	**2,047**	**2,682**
DISEASES OF THE NERVOUS SYSTEM	8	38	8	23	3	6	6	103	149
Of the nerves:									
Inflammation	.....	1	.....	1	.....	....	.....	6	7
Of the spinal cord and membranes—Membranes:									
Inflammation of pia mater and arachnoid	.....	.....	.....	.....	.....	....	.....	1	1
Of the spinal cord and membranes—Cord:									
Inflammation	1	.....	.....	1	.....	....	.....	8	9
Degeneration—									
Of lateral columns	.....	2	.....	1	.....	....	1	.....	2
Of posterior columns	1	.....	.....	.....	.....	1	.....	1	2
Acute ascending paralysis	.....	1	.....	.....	1	....	.....	.....	1
Of the brain and its membranes—Membranes:									
Inflammation of dura mater	.....	3	.....	1	.....	2	.....	.....	3
Of the brain and its membranes—Brain:									
Hæmorrhage	.....	6	.....	3	.....	3	.....	.....	6
Hyperæmia	.....	1	.....	1	.....	....	.....	.....	1
Functional nervous disorders with other diseases of undetermined nature:									
Apoplexy	.....	2	.....	1	.....	....	1	.....	2
Paralysis—									
Paraplegia	1	.....	.....	1	.....	....	.....	8	9
Hemiplegia	3	6	.....	6	.....	....	3	3	12
Local paralysis	2	1	1	1	1	....	.....	1	4

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE NERVOUS SYSTEM—Continued.									
Functional nervous disorders with oth r diseases of undetermined nature—Continued.									
Incomplete paralysis	.....	1	.....	1	.....	....	.....	4	5
Epilepsy	.....	3	.....	2	1	....	.....	3	6
Vertigo	.....	.....	.....	.....	.....	....	.....	9	9
Headache	.....	.....	.....	.....	.....	....	.....	9	9
Megrim	.....	.....	.....	.....	.....	....	.....	2	2
Anæsthesia	.....	.....	.....	.....	.....	....	.....	1	1
Neuralgia	.....	11	7	3	.....	....	1	37	48
Hysteria	.....	.....	.....	.....	.....	....	.....	1	1
Nervous weakness	.....	.....	.....	.....	.....	....	.....	9	9
MENTAL DISEASES	3	2	.....	1	2	....	2	7	12
Mania	2	.....	.....	.....	.....	....	2	.....	2
Melancholia	1	2	.....	1	2	....	.....	6	9
Delusional insanity	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE EYE	4	7	4	2	2	....	3	53	64
Conjunctivitis	1	2	1	.....	1	....	1	39	42
Keratitis	1	.....	1	.....	.....	....	.....	1	2
Iritis	1	2	1	1	1	....	.....	3	6
Atrophy and degeneration of optic nerve or papilla	1	.....	.....	.....	.....	....	1	.....	1
Lenticular cataract	.....	1	.....	.....	.....	....	1	.....	1
Ranophthalmitis	.....	1	.....	1	.....	....	.....	.....	1
Functional night blindness	.....	.....	.....	.....	.....	....	.....	1	1
Amblyopia	.....	.....	.....	.....	.....	....	.....	1	1
Amaurosis	.....	.....	.....	.....	.....	....	.....	3	3
Ametropia	.....	.....	.....	.....	.....	....	.....	1	1
Hypermetropia	.....	.....	.....	.....	.....	....	.....	1	1
Asthenopia	.....	.....	.....	.....	.....	....	.....	1	1
Fistula of lachrymal sac	.....	1	1	.....	.....	....	.....	.....	1
Sty	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE EAR	.....	13	6	7	.....	....	.....	34	47
Inflammation of the external meatus—									
Acute	.....	.....	.....	.....	.....	....	.....	1	1
Abscess	.....	1	1	.....	.....	....	.....	.....	1
Hæmatoma of the auricle	.....	1	.....	1	.....	....	.....	1	2
Hyperostosis	.....	.....	.....	.....	.....	....	.....	1	1
Accumulation of wax or epidermis	.....	.....	.....	.....	.....	....	.....	7	7
Inflammation of the middle ear—									
Nonsuppurative	.....	4	3	1	.....	....	.....	11	15
Suppurative	.....	7	2	5	.....	....	.....	7	14
Obstruction of Eustachian tube	.....	.....	.....	.....	.....	....	.....	3	3
Deafness	.....	.....	.....	.....	.....	....	.....	3	3
DISEASES OF THE NOSE	.....	4	3	1	.....	....	.....	41	45
Inflammation of soft parts	.....	1	1	.....	.....	....	.....	39	40
Necrosis	.....	.....	.....	.....	.....	....	.....	1	1
Caries	.....	1	.....	1	.....	....	.....	.....	1
Epistaxis	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the naso-pharynx	.....	2	2	.....	.....	....	.....	.....	2
DISEASES OF THE CIRCULATORY SYSTEM	4	35	2	26	2	7	2	52	91
Pericarditis	.....	.....	.....	.....	.....	....	.....	4	4

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE CIRCULATORY SYSTEM—Continued.									
Adherent pericardium	.....	1	.....	1	.....	....	.....	.....	1
Endocarditis	1	.....	.....	1	.....	....	.....	.....	1
Valvular disease—									
Aortic	1	12	.....	9	1	2	1	4	17
Mitral	2	16	.....	14	.....	3	1	24	42
Degeneration of heart—fatty	.....	1	.....	.....	.....	1	.....	.....	1
Dilatation of heart	.....	1	.....	.....	1	....	.....	.....	1
Angina pectoris	.....	.....	.....	.....	.....	....	.....	1	1
Disordered action of the heart	.....	.....	.....	.....	.....	....	.....	8	8
Aneurism of arteries	.....	1	.....	.....	.....	1	.....	1	2
Phlebitis	.....	1	1	.....	.....	....	.....	2	3
Varix	.....	2	1	1	.....	....	.....	8	10
DISEASES OF THE RESPIRATORY SYSTEM	4	87	47	29	5	3	7	423	514
Inflammation of mucous membrane of larynx—									
Catarrhal	.....	1	1	.....	.....	....	.....	15	16
Ulcerative	.....	1	.....	.....	.....	1	.....	.....	1
Bronchitis—									
Catarrhal, acute	1	40	32	5	1	1	2	288	329
Catarrhal, chronic	.....	12	1	7	3	....	1	66	78
Spasmodic asthma	1	5	1	5	.....	...	.....	6	12
Hæmorrhage of lung	.....	2	1	1	.....	....	.....	5	7
Pneumonia	1	4	3	.....	.....	1	1	.....	5
Phthisis—									
Acute	.....	2	1	1	.....	....	.....	.....	2
Chronic	1	3	.....	3	1	....	.....	.....	4
Tubercular	.....	1	.....	.....	.....	....	1	.....	1
Pleurisy—									
Acute	.....	8	5	1	.....	....	2	27	35
Chronic	.....	8	2	6	.....	...	.....	16	24
DISEASES OF THE DIGESTIVE SYSTEM	4	119	91	22	5	2	3	520	643
Ulceration of the mouth	.....	.....	.....	.....	.....	....	.....	1	1
Caries of dentine and cementum	.....	1	1	.....	.....	....	.....	20	21
Abscess of dental periosteum	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of gums and alveoli	.....	.....	.....	.....	.....	....	.....	3	3
Ulceration of gums and alveoli	.....	.....	.....	.....	.....	....	.....	2	2
Caries of the alveoli	.....	1	.....	1	.....	....	.....	8	9
Suppuration of the alveoli	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the tongue	.....	1	1	.....	.....	....	.....	1	2
Sore throat	.....	.....	.....	.....	.....	....	.....	12	12
Inflammation of tonsils—									
Follicular	.....	16	14	2	.....	....	.....	28	44
Suppuration	.....	5	5	.....	.....	....	.....	5	10
Elongated uvula	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of salivary glands	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the pharynx—									
Catarrhal	.....	2	2	.....	.....	....	.....	18	20
Follicular	.....	.....	.....	.....	.....	....	.....	2	2
Ulceration of pharynx	.....	1	1	.....	.....	....	.....	.....	1
Dysphagia	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the stomach—catarrhal	.....	13	7	5	1	....	.....	50	63
Ulceration of the stomach—superficial	.....	1	.....	1	.....	....	.....	.....	1
Indigestion	1	11	10	2	.....	....	.....	130	142

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Inflammation of the intestines—									
Enteritis	.....	1	1	.....	.....	....	.....	3	4
Typhlitis	.....	4	3	1	.....	....	.....	.....	4
Colitis	.....	2	1	.....	.....	....	1	1	3
Catarrhal	.....	2	1	.....	.....	....	1	1	3
Hæmorrhage of the intestines	.....	.....	.....	.....	.....	....	.....	1	1
Hernia	.....	13	10	2	1	....	.....	69	82
Constipation	.....	3	3	.....	.....	....	.....	35	38
Colic	.....	2	1	.....	1	....	.....	3	5
Diarrhœa	1	16	15	2	.....	....	.....	72	89
Ulceration of the rectum	1	.....	.....	.....	.....	1	.....	1	2
Abscess	.....	3	3	.....	.....	....	.....	2	5
Fissure of the anus	.....	1	1	.....	.....	....	.....	.....	1
Fistula in ano	.....	2	2	.....	.....	....	.....	1	3
Recto-vesical fistula	.....	1	.....	.....	.....	....	1	.....	1
Hæmorrhage from the rectum	.....	.....	.....	.....	.....	....	.....	1	1
Piles—									
Internal	1	4	4	.....	1	....	.....	9	14
External	.....	5	4	1	.....	....	.....	21	26
Pruritus ani	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the liver—									
Acute	.....	1	.....	.....	1	....	.....	1	1
Acute abscess	.....	1	.....	1	.....	....	.....	.....	1
Chronic	.....	2	.....	1	.....	1	.....	.....	2
Hyperæmia of the liver	.....	1	.....	1	.....	....	.....	4	5
Hypertrophy of the liver	.....	.....	.....	.....	.....	....	.....	3	3
Jaundice	.....	2	.....	2	.....	....	.....	5	7
Biliary colic	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the peritonæum	.....	1	1	.....	.....	....	.....	.....	1
DISEASES OF THE LYMPHATIC SYSTEM	3	54	44	8	1	....	4	52	109
Hypertrophy of the spleen	.....	1	.....	.....	.....	....	1	.....	1
Hypertrophy of lymph glands	.....	.....	.....	.....	.....	....	.....	4	4
Inflammation of lymph glands	2	22	17	6	.....	....	1	45	69
Suppuration of lymph glands	1	31	27	2	1	....	2	3	35
DISEASES OF THE URINARY SYSTEM	2	20	4	12	1	4	1	79	101
Acute nephritis	.....	5	1	3	.....	1	.....	2	7
Bright's disease	2	4	.....	4	.....	1	1	10	16
Calculus in kidney	.....	.....	.....	.....	.....	....	.....	1	1
Albuminuria	.....	1	.....	.....	1	....	.....	.....	1
Lithuria	.....	1	.....	.....	.....	1	.....	7	8
Inflammation of bladder—									
Acute	.....	2	.....	2	.....	....	.....	26	28
Subacute	.....	1	1	.....	.....	....	.....	3	4
Chronic	.....	3	1	1	.....	1	.....	14	17
Calculus of bladder	.....	2	.....	2	.....	....	.....	2	4
Irritability of bladder	.....	.....	.....	.....	.....	....	.....	6	6
Retention of urine	.....	1	1	.....	.....	....	.....	3	4
Incontinence of urine	.....	.....	.....	.....	.....	....	.....	5	5
DISEASES OF THE GENERATIVE SYSTEM	6	108	84	26	1	....	3	304	418
Urethritis	.....	3	1	2	.....	....	.....	23	26
Gleet	.....	.....	.....	.....	.....	....	.....	1	1
Stricture of urethra—									
Organic	1	21	11	10	.....	....	1	44	66
Spasmodic	.....	1	.....	.....	.....	....	1	.....	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Urethral fistula	.....	.....	.....	.....	.....	....	.....	3	3
Inflammation of the prostate—chronic	.....	1	1	.....	.....	....	.....	.....	1
Hypertrophy of the prostate	.....	1	.....	.....	1	....	.....	.....	1
Posthitis	.....	1	.....	1	.....	....	.....	.....	1
Phimosis	.....	1	1	.....	1	....	.....	.....	1
Paraphimosis	.....	.....	.....	.....	.....	....	.....	3	3
Inflammation of glans penis	.....	1	1	.....	.....	....	.....	5	6
Abscess of penis	.....	.....	.....	.....	.....	....	.....	2	2
Ulcer of penis	3	23	20	6	.....	....	.....	59	85
Soft chancre	.....	28	27	1	.....	....	.....	97	125
Inflammation of the scrotum	.....	.....	.....	.....	.....	....	.....	1	1
Abscess of the scrotum	.....	1	.....	1	.....	....	.....	1	2
Varicocele	1	1	2	.....	.....	....	.....	8	10
Inflammation of tunica vaginalis	.....	.....	.....	.....	.....	....	.....	2	2
Hydrocele of tunica vaginalis	.....	3	2	.....	.....	....	1	18	21
Acute orchitis	.....	12	9	3	.....	....	.....	16	28
Chronic orchitis	.....	.....	.....	.....	.....	....	.....	9	9
Epididymitis	.....	10	9	1	.....	....	.....	5	15
Abscess of testicle	1	.....	.....	1	.....	....	.....	.....	1
Protrusion of tubule	.....	.....	.....	.....	.....	....	.....	1	1
Spermatorrhœa	.....	.....	.....	.....	.....	....	.....	5	5
Impotence	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE ORGANS OF LOCOMOTION.	3	37	22	11	2	2	3	58	98
Osteitis	.....	1	1	.....	.....	....	.....	.....	1
Periostitis	.....	1	.....	.....	.....	....	1	.....	1
Chronic abscess of bones	.....	1	1	.....	.....	....	.....	.....	1
Caries	.....	3	1	.....	1	....	1	.....	3
Necrosis	.....	6	3	2	.....	....	1	6	12
Ununited fracture or false joint	.....	1	1	.....	.....	....	.....	.....	1
Inflammation of joints, synovitis—									
Acute	.....	7	3	4	.....	....	.....	5	12
Chronic	2	1	1	1	1	....	.....	3	6
Dislocation of articular cartilage	.....	1	1	.....	.....	....	.....	.....	1
Psoas, lumbar, and other abscesses	1	.....	.....	.....	.....	1	.....	.....	1
Inflammation of muscles	.....	2	1	1	.....	....	.....	4	6
Suppuration of muscles	.....	1	1	.....	.....	....	.....	1	2
Myalgia	.....	3	2	1	.....	....	.....	17	20
Inflammation of tendons	.....	.....	.....	.....	.....	....	.....	7	7
Thecal abscess	.....	1	1	.....	.....	....	.....	.....	1
Ganglion	.....	.....	.....	.....	.....	....	.....	2	2
Contraction of tendons	.....	2	1	.....	.....	1	.....	2	4
Inflammation of bursæ	.....	4	4	.....	.....	....	.....	9	13
Bunion	.....	1	.....	1	.....	....	.....	1	2
Clubfoot	.....	.....	.....	.....	.....	....	.....	1	1
Hallux vulgus	.....	1	.....	1	.....	....	.....	.....	1
DISEASES OF THE CONNECTIVE TISSUE	1	16	15	2	.....	....	.....	62	79
Inflammation	1	3	3	1	.....	....	.....	24	28
Abscess	.....	13	12	1	.....	....	.....	36	49
Gangrene	.....	.....	.....	.....	.....	....	.....	1	1
Œdema	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE SKIN	2	51	34	17	.....	....	2	259	312
Erythema	.....	1	.....	.....	.....	....	1	5	6
Urticaria	.....	1	1	.....	.....	....	.....	6	7
Prickly heat	.....	.....	.....	.....	.....	....	.....	1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE SKIN—Continued.									
Eczema	1	7	4	4	.....	....	.....	57	65
Impetigo	.....	.....	.....	.....	.....	....	.....	2	2
Psoriasis	.....	1	1	.....	.....	....	.....	3	4
Herpes	.....	.....	.....	.....	.....	....	.....	24	24
Zona	.....	1	1	.....	.....	....	.....	5	6
Dermatitis herpetiformis	.....	1	.....	1	.....	....	.....	5	6
Acne	.....	.....	.....	.....	.....	....	.....	1	1
Sycosis	.....	1	.....	1	.....	....	.....	4	5
Melasma	.....	.....	.....	.....	.....	....	.....	1	1
Frostbite	.....	6	5	1	.....	....	.....	11	17
Ulcer	1	15	11	4	.....	....	1	30	46
Cicatrices	.....	.....	.....	.....	.....	....	.....	1	1
Boil	.....	14	8	6	.....	....	.....	69	83
Carbuncle	.....	1	1	.....	.....	....	.....	9	10
Whitlow	.....	1	1	.....	.....	....	.....	16	17
Onychia	.....	1	1	.....	.....	....	.....	4	5
Wen	.....	.....	.....	.....	.....	....	.....	5	5
Injuries	**9**	**208**	**156**	**42**	**1**	**2**	**16**	**412**	**629**
GENERAL INJURIES	.....	16	10	4	.....	....	2	19	35
Burns and scalds	.....	8	6	.....	.....	....	2	19	27
Multiple injury	.....	6	2	4	.....	....	.....	.....	6
Suffocation from coal gas	.....	2	2	.....	.....	....	.....	.....	2
LOCAL INJURIES	9	192	146	38	1	2	14	393	594
Strain of muscles	.....	.....	.....	.....	.....	....	.....	5	5
Wound of muscles	.....	1	.....	1	.....	....	.....	.....	1
Abrasion of skin	.....	.....	.....	.....	.....	....	.....	4	4
Contusion of scalp	.....	2	1	1	.....	....	.....	1	3
Scalp wound	.....	7	4	2	.....	1	.....	14	21
Fracture of the vault of the skull	.....	1	.....	.....	.....	1	.....	1	2
Contusion of face	.....	1	1	.....	.....	....	.....	4	5
Wound of face and mouth	.....	8	7	1	.....	....	.....	15	23
Fracture of facial bones	.....	5	1	3	.....	....	1	1	6
Contusion of the eyelid	.....	.....	.....	.....	.....	....	.....	1	1
Wound of eyelid	.....	.....	.....	.....	.....	....	.....	2	2
Contusion of the eyeball	.....	1	.....	1	.....	....	.....	1	2
Foreign bodies in the conjunctiva or cornea	.....	.....	.....	.....	.....	....	.....	7	7
Wound of the cornea	.....	1	.....	1	.....	....	.....	.....	1
Separation of cartilage from bone	.....	.....	.....	.....	.....	....	.....	1	1
Contusion of the chest	.....	4	4	.....	.....	....	.....	26	30
Dislocation of costal cartilages	.....	1	1	.....	.....	....	.....	.....	1
Fracture of the ribs	1	12	9	4	.....	....	.....	6	19
Contusion of back	.....	8	6	1	.....	....	1	15	23
Sprain of back	.....	10	7	2	.....	....	1	17	27
Concussion of cord	.....	1	1	.....	.....	....	.....	.....	1
Contusion of abdomen	.....	.....	.....	.....	.....	....	.....	2	2
Contusion of the pelvis	.....	1	1	.....	.....	....	.....	.....	1
Fracture of the ilium	.....	1	1	.....	.....	....	.....	.....	1
Wound of the male urethra, perinæum, scrotum, testis, or penis	.....	1	.....	1	.....	....	.....	.....	1
Fracture and dislocation of pelvis	.....	1	1	.....	.....	....	.....	.....	1
Contusion of testicle	.....	2	1	1	.....	....	.....	2	4
Contusion of upper extremities	.....	5	3	1	1	....	.....	38	43
Sprain of the shoulder	.....	2	2	.....	.....	....	.....	3	5
Sprain of the elbow	.....	.....	.....	.....	.....	....	.....	3	3

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Sprain of the wrist	.....	1	1	.....	.....	....	.....	19	20
Sprain of the thumb	.....	1	1	.....	.....	....	.....	1	2
Sprain of the fingers	.....	.....	.....	.....	.....	....	.....	3	3
Wound of the upper extremities	2	36	34	1	.....	....	3	101	139
Fracture of the clavicle	.....	2	.....	2	.....	....	.....	1	3
Fracture of the scapula	.....	.....	.....	.....	.....	....	.....	1	1
Fracture of the humerus	.....	2	.....	1	.....	....	1	3	5
Fracture of the ulna	.....	.....	.....	.....	.....	....	.....	2	2
Fracture of carpus, metacarpus, and phalanges	.....	1	.....	1	.....	....	.....	5	6
Dislocation of the humerus	.....	4	4	.....	.....	....	.....	2	6
Dislocation of the radius	.....	1	1	.....	.....	....	.....	.....	1
Dislocation of the radius and ulna	.....	1	.....	1	.....	....	.....	1	2
Dislocation of the phalanges of thumb	.....	1	1	.....	.....	....	.....	.....	1
Contusion of the lower extremities	.....	23	18	2	.....	....	3	39	62
Sprain of the knee	.....	1	1	.....	.....	....	.....	11	12
Sprain of the ankle	2	14	13	3	.....	....	.....	14	30
Sprain of the foot	1	1	2	.....	.....	....	.....	.....	2
Wound of the lower extremities	.....	7	5	2	.....	....	.....	15	22
Wound of joint, lower extremities	.....	1	1	.....	.....	....	.....	1	2
Fracture of femur	2	6	5	1	.....	....	2	1	9
Fracture of tibia	.....	4	3	1	.....	....	.....	1	5
Fracture of fibula	.....	1	.....	1	.....	....	.....	.....	1
Fracture of tibia and fibula	1	7	4	2	.....	....	2	1	9
Fracture of phalanges of toes	.....	1	1	.....	.....	....	.....	.....	1
Dislocation of the tibia	.....	.....	.....	.....	.....	....	.....	1	1
Dislocation of the metatarsus and phalanges	.....	.....	.....	.....	.....	....	.....	1	1

MIDDLE ATLANTIC.

TOTAL CASES	**126**	**1,744**	**858**	**714**	**75**	**72**	**151**	**5,252**	**7,122**
General Diseases	**49**	**803**	**362**	**336**	**37**	**45**	**72**	**2,231**	**3,083**
Cowpox	.....	1	1	.....	.....	....	.....	1	2
Measles	.....	5	5	.....	.....	....	.....	.....	5
Influenza	.....	18	14	4	.....	....	.....	45	63
Mumps	.....	2	1	1	.....	....	.....	.....	2
Simple continued fever	.....	2	2	.....	.....	....	.....	7	9
Enteric fever	3	22	20	2	.....	3	.....	2	27
Choleraic diarrhœa	.....	.....	.....	.....	.....	....	.....	1	1
Dysentery	1	7	7	.....	1	....	.....	4	12
Beri-beri	.....	1	.....	.....	.....	1	.....	.....	1
Malarial fever:									
Intermittent	7	192	176	14	3	1	5	291	490
Remittent	.....	10	9	.....	.....	....	1	30	40
Erysipelas	.....	1	1	.....	.....	....	.....	2	3
Tubercle	21	125	.....	72	18	33	23	116	262
Syphilis:									
Primary	.....	6	1	4	1	....	.....	18	24
Secondary	4	140	.....	115	5	1	23	578	722
Gonorrhœa	3	61	26	32	.....	....	6	596	660
Diseases dependent on animal parasites:									
Tænia solium	.....	2	1	.....	.....	....	1	4	6
Sarcoptes scabiei	.....	3	2	1	.....	....	.....	11	14
Pediculis vestimenti	.....	.....	.....	.....	.....	....	.....	2	2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases—Continued.									
Diseases dependent on vegetable parasites:									
Trichophyton tonsurans	.....	5	1	4	.....	....	.....	12	17
Effects of vegetable poisons	.....	1	.....	.....	.....	....	1	1	2
Effects of lead poison	.....	.....	.....	.....	.....	....	.....	1	1
Effects of heat	.....	1	.....	1	.....	....	.....	.....	1
Effects of excessive exertion and strain	.....	2	1	1	.....	....	.....	.....	2
Scurvy	.....	16	15	1	.....	....	.....	1	17
Alcoholism	.....	9	8	1	.....	....	.....	22	31
Rheumatic fever	4	31	23	11	.....	....	1	11	46
Rheumatism	4	109	36	61	5	2	9	375	488
Gout	.....	1	1	.....	.....	....	.....	1	2
Osteoarthritis	1	1	.....	.....	1	....	1	.....	2
New growth:									
Nonmalignant	.....	11	9	2	.....	....	.....	19	30
Malignant	.....	11	2	3	3	3	.....	5	16
Anæmia	.....	5	.....	4	.....	1	.....	26	31
Idiopathic anæmia	.....	1	.....	1	.....	....	.....	1	2
Purpura	.....	.....	.....	.....	.....	....	.....	7	7
Leucocythæmia	.....	1	.....	1	.....	....	.....	.....	1
Diabetes mellitus	1	.....	1	.....	.....	....	.....	.....	1
Debility	.....	.....	.....	.....	.....	....	.....	41	41
Local Diseases	**56**	**748**	**370**	**313**	**34**	**25**	**62**	**2,549**	**3,353**
DISEASES OF THE NERVOUS SYSTEM	4	52	11	28	5	1	11	115	171
Of the nerves—									
Inflammation	.....	10	4	4	1	....	1	7	17
Of the spinal cord and membranes—									
Membranes—									
Hæmorrhage	2	.....	.....	.....	.....	....	2	.....	2
Of the spinal cord and membranes—									
Cord—									
Degeneration—									
Of anterior cornua	.....	1	.....	1	.....	....	.....	2	3
Of lateral columns	.....	1	.....	.....	.....	....	1	.....	1
Of posterior columns	1	4	.....	.....	1	....	4	1	6
Of the brain and its membranes—									
Brain—									
Hæmorrhage	.....	1	.....	1	.....	....	.....	2	3
Anæmia, general	.....	7	5	2	.....	....	.....	.....	7
Functional nervous disorders with other diseases of undetermined nature—									
Apoplexy	.....	1	.....	1	.....	....	.....	.....	1
Paraplegia	1	.....	.....	1	.....	....	.....	.....	1
Hemiplegia	.....	5	.....	4	.....	....	1	4	9
Local paralysis	.....	2	1	1	.....	....	.....	1	3
Incomplete paralysis	.....	3	.....	1	.....	1	1	2	5
Torticollis	.....	.....	.....	.....	.....	....	.....	2	2
Epilepsy	.....	5	.....	1	3	....	1	2	7
Vertigo	.....	1	.....	1	.....	....	.....	9	10
Headache	.....	.....	.....	.....	.....	....	.....	32	32
Neuralgia	.....	8	1	7	.....	....	.....	47	55
Hysteria	.....	1	.....	1	.....	....	.....	.....	1
Nervous weakness	.....	2	.....	2	.....	....	.....	4	6
MENTAL DISEASES	1	2	.....	1	1	1	.....	2	5
Mania	.....	1	.....	.....	.....	1	.....	.....	1
Melancholia	1	1	.....	1	1	....	.....	2	4

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE EYE	.....	18	5	8	2	....	3	48	66
Conjunctivitis	.....	4	3	1	.....	....	.....	29	33
Keratitis	.....	1	.....	.....	.....	....	1	.....	1
Ulceration of cornea	.....	2	.....	2	.....	....	.....	2	4
Scleritis	.....	1	.....	1	.....	....	.....	1	2
Iritis	.....	2	1	.....	.....	....	1	4	6
Choroiditis	.....	3	.....	2	.....	....	1	.....	3
Hypopyon	.....	1	.....	1	.....	....	.....	.....	1
Rentinitis	.....	1	.....	1	.....	....	.....	.....	1
Lenticular cataract	.....	.....	.....	.....	.....	....	.....	1	1
Amaurosis	.....	.....	.....	.....	.....	....	.....	1	1
Ametropia	.....	1	.....	.....	1	....	.....	1	2
Asthenopia	.....	.....	.....	.....	.....	....	.....	1	1
Obstruction of nasal duct	.....	1	.....	.....	1	....	.....	1	2
Sty	.....	.....	.....	.....	.....	....	.....	3	3
Ecchymosis of eyelid	.....	1	1	.....	.....	....	.....	2	3
Lippitudo	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE EAR	.....	5	2	3	.....	....	.....	29	34
Inflammation of the external meatus—									
Acute	.....	.....	.....	.....	.....	....	.....	5	5
Abscess	.....	.....	.....	.....	.....	....	.....	1	1
Accumulation of wax or epidermis	.....	.....	.....	.....	.....	....	.....	10	10
Inflammation of the middle ear—									
Nonsuppurative	.....	1	1	.....	.....	....	.....	3	4
Suppurative	.....	4	1	3	.....	....	.....	7	11
Obstruction of Eustachian tube	.....	.....	.....	.....	.....	....	.....	1	1
Tinnitus	.....	.....	.....	.....	.....	....	.....	1	1
Deafness	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE NOSE	.....	3	.....	3	.....	....	.....	81	84
Inflammation of soft parts	.....	1	.....	1	.....	....	.....	75	76
Deviations of the septum	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the accessory sinuses	.....	1	.....	1	.....	....	.....	.....	1
Inflammation of the naso-pharynx	.....	1	.....	1	.....	....	.....	5	6
DISEASES OF THE CIRCULATORY SYSTEM	2	45	4	29	5	3	6	55	102
Pericarditis	.....	1	.....	1	.....	....	.....	.....	1
Valvular disease—									
Aortic	.....	4	.....	2	1	....	1	10	14
Mitral	1	26	.....	17	3	3	4	22	49
Degeneration of heart—Fatty	.....	1	.....	.....	.....	....	1	.....	1
Dilatation of heart	.....	1	.....	1	.....	....	.....	.....	1
Disordered action of the heart	.....	2	.....	2	.....	....	.....	13	15
Arterio-capillary fibrosis	.....	1	.....	1	.....	....	.....	.....	1
Aneurism of arteries	.....	.....	.....	.....	.....	....	.....	2	2
Rupture of arteries	.....	.....	.....	.....	.....	....	.....	1	1
Phlebitis	.....	.....	.....	.....	.....	....	.....	2	2
Thrombosis	.....	.....	.....	.....	.....	....	.....	1	1
Varix	1	9	4	5	1	....	.....	4	14
DISEASES OF THE RESPIRATORY SYSTEM	5	102	48	42	5	5	7	513	620
Hay fever	.....	.....	.....	.....	.....	....	.....	4	4
Inflammation of mucous membrane of larynx—Catarrhal	.....	3	.....	3	.....	....	.....	14	17
Œdema of the larynx	.....	1	.....	1	.....	....	.....	.....	1
Bronchitis—									
Catarrhal, acute	2	43	25	15	4	....	1	311	356
Catarrhal, chronic	1	14	1	12	1	1	.....	117	132

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Spasmodic asthma	1	4	1	2	.....	1	1	5	10
Hæmorrhage of lung	.....	.....	.....	.....	.....	.....	.....	2	2
Pneumonia	.....	18	11	2	.....	3	2	6	24
Phthisis—Acute	.....	.....	.....	.....	.....	.....	.....	1	1
Pleurisy—									
Acute	.....	14	8	5	.....	.....	1	40	54
Chronic	1	5	2	2	.....	.....	2	6	12
Adhesions of pleura	.....	.....	.....	.....	.....	.....	.....	7	7
DISEASES OF THE DIGESTIVE SYSTEM	12	167	103	47	9	10	10	685	864
Inflammation of the mouth	.....	.....	.....	.....	.....	.....	.....	4	4
Ulceration of the mouth	.....	.....	.....	.....	.....	.....	.....	3	3
Suppuration of the dental pulp	.....	1	1	.....	.....	.....	.....	.....	1
Caries of dentine and cementum	.....	.....	.....	.....	.....	.....	.....	5	5
Abscess of dental periosteum	.....	2	2	.....	.....	.....	.....	2	4
Inflammation of gums and alveoli	.....	.....	.....	.....	.....	.....	.....	1	1
Suppuration of the gums	.....	.....	.....	.....	.....	.....	.....	1	1
Toothache	.....	.....	.....	.....	.....	.....	.....	9	9
Inflammation of the tongue	.....	.....	.....	.....	.....	.....	.....	3	3
Ulceration of the tongue	.....	.....	.....	.....	.....	.....	.....	1	1
Sore throat	.....	.....	.....	.....	.....	.....	.....	52	52
Inflammation of tonsils—									
Follicular	.....	4	3	1	.....	.....	.....	24	28
Suppuration	.....	5	5	.....	.....	.....	.....	4	9
Hypertrophy of tonsils	.....	1	.....	.....	1	.....	.....	.....	1
Salivation	.....	1	.....	1	.....	.....	.....	1	2
Inflammation of the pharynx—									
Catarrhal	.....	2	.....	2	.....	.....	.....	10	12
Granular	.....	.....	.....	.....	.....	.....	.....	3	3
Inflammation of the stomach—									
Catarrhal	1	20	9	7	2	2	1	41	62
Ulceration of the stomach—Superficial	.....	4	.....	2	2	.....	.....	3	7
Hæmorrhage of the stomach	.....	2	1	.....	.....	1	.....	.....	2
Indigestion	1	3	1	3	.....	.....	.....	106	110
Gastralgia	.....	1	1	.....	.....	.....	.....	1	2
Loss of appetite	.....	.....	.....	.....	.....	.....	.....	6	6
Inflammation of the intestines—									
Enteritis	.....	4	4	.....	.....	.....	.....	10	14
Typhlitis	.....	8	5	1	.....	.....	2	2	10
Colitis	1	15	14	2	.....	.....	.....	5	21
Catarrhal	.....	3	1	2	.....	.....	.....	3	6
Hernia	.....	26	18	4	2	1	1	160	186
Constipation	.....	5	4	1	.....	.....	.....	75	80
Colic	.....	2	2	.....	.....	.....	.....	17	19
Diarrhœa	.....	10	7	2	1	.....	.....	77	87
Enteralgia	.....	1	.....	1	.....	.....	.....	.....	1
Inflammation of the rectum	.....	.....	.....	.....	.....	.....	.....	1	1
Ulceration of the rectum	.....	1	.....	1	.....	.....	.....	.....	1
Abscess	1	1	2	.....	.....	.....	.....	2	4
Ulceration of the anus	1	.....	.....	1	.....	.....	.....	.....	1
Fissure of the anus	.....	.....	.....	.....	.....	.....	.....	1	1
Fistula in ano	.....	18	13	2	.....	.....	3	12	30
Prolapse of the rectum	1	1	1	.....	.....	.....	1	1	3
Piles—									
Internal	.....	3	1	1	.....	.....	1	11	14
External	.....	10	3	6	1	.....	.....	11	21
Mixed	2	1	2	1	.....	.....	.....	3	6

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Pruritus ani	1	1	1	1	.....	....	.....	.....	2
Inflammation of the liver—									
Acute suppuration	.....	1	.....	.....	.....	1	.....	.....	1
Chronic	1	2	.....	1	.....	2	.....	2	5
Hyperæmia of the liver	.....	.....	.....	.....	.....	....	.....	7	7
Jaundice	1	5	2	3	.....	1	.....	3	9
Ulceration of hepatic ducts and gall bladder	.....	1	.....	.....	.....	....	1	1	2
Inflammation of the peritonæum	.....	1	.....	.....	.....	1	.....	1	2
Dropsy	1	.....	.....	.....	.....	1	.....	.....	1
Omental hernia	.....	1	.....	1	.....	....	.....	.....	1
DISEASES OF THE LYMPHATIC SYSTEM	3	59	31	29	1	....	1	106	168
Inflammation of lymph glands	3	17	11	8	1	....	.....	64	84
Suppuration of lymph glands	.....	42	20	21	.....	....	1	39	81
DISEASES OF THE URINARY SYSTEM	5	25	4	18	2	2	4	60	90
Acute nephritis	1	6	2	3	.....	....	2	4	11
Bright's disease	3	6	.....	5	.....	2	2	9	18
Pyonephrosis	1	.....	.....	1	.....	....	.....	.....	1
Hæmaturia	.....	1	.....	.....	1	....	.....	.....	1
Phosphaturia	.....	.....	.....	.....	.....	....	.....	4	4
Inflammation of bladder—									
Acute	.....	3	.....	2	1	....	.....	19	22
Subacute	.....	1	1	.....	.....	....	.....	3	4
Chronic	.....	8	1	7	.....	....	.....	10	18
Calculus of bladder	.....	.....	.....	.....	.....	....	.....	1	1
Retention of urine	.....	.....	.....	.....	.....	....	.....	3	3
Incontinence of urine	.....	.....	.....	.....	.....	....	.....	7	7
DISEASES OF THE GENERATIVE SYSTEM	12	131	86	46	2	1	8	360	503
Urethritis	.....	1	.....	1	.....	....	.....	12	13
Gleet	.....	.....	.....	.....	.....	....	.....	3	3
Stricture of urethra—Organic	2	21	6	14	2	1	.....	68	91
Urethral fistula	.....	1	.....	1	.....	....	.....	.....	1
Recto-urethral fistula	1	.....	.....	.....	.....	....	1	.....	1
Extravasation of urine	1	.....	1	.....	.....	....	.....	.....	1
Inflammation of the prostate—									
Acute	.....	.....	.....	.....	.....	....	.....	1	1
Chronic	.....	.....	.....	.....	.....	....	.....	1	1
Hypertrophy of the prostate	.....	.....	.....	.....	.....	....	.....	6	6
Posthitis	.....	.....	.....	.....	.....	....	.....	4	4
Phimosis	.....	5	4	1	.....	....	.....	2	7
Paraphimosis	.....	6	5	.....	.....	....	1	1	7
Inflammation of the penis	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of glans penis	.....	.....	.....	.....	.....	....	.....	14	14
Abscess of penis	5	45	37	13	.....	....	.....	81	131
Soft chancre	.....	15	7	6	.....	....	2	110	125
Pruritus of the scrotum	.....	.....	.....	.....	.....	....	.....	3	3
Hydrocele of the spermatic cord	.....	2	.....	2	.....	....	.....	1	3
Hæmatocele of the spermatic cord	.....	1	.....	1	.....	....	.....	.....	1
Varicocele	2	4	5	1	.....	....	.....	11	17
Hydrocele of tunica vaginalis	1	11	8	3	.....	....	1	5	17
Acute orchitis	.....	7	4	2	.....	....	1	5	12
Chronic orchitis	.....	1	.....	.....	.....	....	1	5	6
Epididymitis	.....	11	9	1	.....	....	1	22	33
Spermatorrhœa	.....	.....	.....	.....	.....	....	.....	3	3
Impotence	.....	.....	.....	.....	.....	....	.....	1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE ORGANS OF LOCOMOTION.	3	29	16	12	1	1	2	106	138
Inflammation of the bones—									
Osteitis	.....	1	.....	1	.....	...	.....	.....	1
Chronic osteo-myelitis	.....	2	.....	2	.....	...	.....	1	3
Periostitis	.....	1	.....	.....	.....	...	1	.....	1
Caries	1	1	1	.....	.....	...	1	.....	2
Necrosis	1	4	4	1	.....	...	.....	2	7
Ununited fracture or false joint	.....	1	1	.....	.....	...	.....	1	2
Inflammation of joints, synovitis—									
Acute	1	5	5	1	.....	...	.....	8	14
Chronic	.....	3	.....	3	.....	...	.....	8	11
Ankylosis	.....	2	.....	2	.....	...	.....	1	3
Dislocation of articular cartilage	.....	1	.....	1	.....	...	.....	.....	1
Loose body in joint	.....	.....	.....	.....	.....	...	.....	1	1
Suppuration of muscles	.....	1	1	.....	.....	...	.....	.....	1
Myalgia	.....	3	2	.....	.....	1	.....	74	77
Contraction of fasciæ	.....	1	.....	.....	1	...	.....	.....	1
Inflammation of tendons	.....	1	1	.....	.....	...	.....	5	6
Inflammation of bursæ	.....	2	1	1	.....	...	.....	4	6
Bursal cyst	.....	.....	.....	.....	.....	...	.....	1	1
DISEASES OF THE CONNECTIVE TISSUE	4	36	19	16	.....	....	5	114	154
Inflammation	.....	7	2	3	.....	....	2	34	41
Abscess	4	28	17	12	.....	....	3	76	108
Œdema	.....	1	.....	1	.....	...	.....	4	5
DISEASES OF THE SKIN	5	74	41	31	1	1	5	275	354
Erythema	.....	.....	.....	.....	.....	...	.....	1	1
Urticaria	.....	2	2	.....	.....	...	.....	8	10
Eczema	.....	6	3	2	.....	...	1	59	65
Impetigo	.....	1	.....	1	.....	...	.....	.....	1
Pityriasis rubra	.....	2	1	1	.....	...	.....	.....	2
Sudamina	.....	.....	.....	.....	.....	...	.....	1	1
Psoriasis	.....	2	.....	1	.....	...	1	2	4
Herpes	.....	.....	.....	.....	.....	...	.....	6	6
Zona	.....	1	1	.....	.....	...	.....	4	5
Pemphigus	.....	1	.....	.....	.....	1	.....	5	6
Acne	.....	.....	.....	.....	.....	...	.....	5	5
Sycosis	.....	.....	.....	.....	.....	...	.....	6	6
Frostbite	.....	2	1	1	.....	...	.....	2	4
Ulcer	4	38	19	21	.....	...	2	98	140
Boil	.....	13	10	1	1	...	1	51	64
Carbuncle	.....	1	1	.....	.....	...	.....	7	8
Whitlow	1	4	3	2	.....	...	.....	6	11
Onychia	.....	.....	.....	.....	.....	...	.....	4	4
Corn	.....	.....	.....	.....	.....	...	.....	4	4
Lupus	.....	1	.....	1	.....	...	.....	1	2
Wen	.....	.....	.....	.....	.....	...	.....	5	5
Injuries	**21**	**193**	**125**	**65**	**4**	**2**	**18**	**472**	**686**
GENERAL INJURIES	1	17	11	2	.....	1	4	33	51
Burns and scalds	1	14	9	2	.....	....	4	31	46
Heatstroke	.....	.....	.....	.....	.....	...	.....	1	1
Multiple injury	.....	3	2	.....	.....	1	.....	.....	3
Suffocation from coal gas	.....	.....	.....	.....	.....	...	.....	1	1
LOCAL INJURIES	20	175	113	63	4	1	14	438	633
Strain of muscles	.....	2	.....	2	.....	...	.....	5	7
Rupture of tendons	.....	.....	.....	.....	.....	...	.....	2	2
Abrasion of skin	.....	.....	.....	.....	.....	...	.....	3	3
Contusion of scalp	.....	2	2	.....	.....	...	.....	1	3

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Scalp wound	.....	7	6	1	.....	.....	.....	15	22
Fracture of the base of the skull	.....	.....	.....	.....	.....	.....	.....	1	1
Contusion of face	.....	2	1	1	.....	.....	.....	1	3
Wound of face and mouth	.....	6	4	1	.....	1	.....	14	20
Fracture of facial bones	.....	4	2	2	.....	.....	.....	1	5
Dislocation of nasal cartilage	.....	.....	.....	.....	.....	.....	.....	1	1
Contusion of the eye	.....	1	1	.....	.....	.....	.....	.....	1
Wound of eyelid	.....	1	1	.....	.....	.....	.....	1	2
Foreign bodies in the conjunctiva or cornea	.....	.....	.....	.....	.....	.....	.....	4	4
Wound of the cornea	.....	1	1	.....	.....	.....	.....	.....	1
Wound of pinna	.....	.....	.....	.....	.....	.....	.....	1	1
Contusion of soft parts of neck	.....	.....	.....	.....	.....	.....	.....	1	1
Wound of neck	.....	1	.....	1	.....	.....	.....	.....	1
Contusion of the chest	.....	.....	.....	.....	.....	.....	.....	5	5
Fracture of the ribs	.....	7	1	5	.....	.....	1	8	15
Wound of parietes of chest	.....	1	1	.....	.....	.....	.....	.....	1
Contusion of back	1	7	4	4	.....	.....	.....	7	15
Sprain of back	.....	.....	.....	.....	.....	.....	.....	12	12
Wound of back	.....	1	1	.....	.....	.....	.....	3	4
Contusion of abdomen	.....	2	2	.....	.....	.....	.....	.....	2
Wound of the male urethra, perinæum, scrotum, testis, or penis	1	.....	1	.....	.....	.....	.....	.....	1
Contusion of testicle	.....	.....	.....	.....	.....	.....	.....	1	1
Contusion of upper extremities	.....	9	3	5	.....	.....	1	51	60
Sprain of the shoulder	.....	.....	.....	.....	.....	.....	.....	3	3
Sprain of the elbow	.....	1	1	.....	.....	.....	.....	1	2
Sprain of the wrist	.....	3	1	1	.....	.....	1	21	24
Sprain of the hand	.....	.....	.....	.....	.....	.....	.....	1	1
Wound of the upper extremities	7	31	24	12	1	.....	1	151	189
Fracture of the clavicle	.....	3	3	.....	.....	.....	.....	1	4
Fracture of the humerus	.....	1	.....	1	.....	.....	.....	.....	1
Fracture of the radius	.....	1	1	.....	.....	.....	.....	2	3
Fracture of the ulna	.....	4	1	1	1	.....	1	1	5
Fracture of both bones of forearm	1	3	2	1	.....	.....	1	1	5
Fracture of carpus, metacarpus, and phalanges	.....	3	2	.....	.....	.....	1	9	12
Dislocation of the clavicle	.....	1	1	.....	.....	.....	.....	.....	1
Dislocation of the humerus	.....	2	1	1	.....	.....	.....	4	6
Dislocation of the phalanges of fingers	.....	.....	.....	.....	.....	.....	.....	3	3
Contusion of the lower extremities	3	23	9	13	1	.....	3	38	64
Sprain of the hip	.....	1	.....	1	.....	.....	.....	.....	1
Sprain of the knee	.....	3	2	.....	.....	.....	1	5	8
Sprain of the ankle	1	16	12	4	.....	.....	1	24	41
Wound of the lower extremities	2	8	7	2	1	.....	.....	29	39
Wound of joint, lower extremities	.....	1	.....	1	.....	.....	.....	1	2
Fracture of femur	2	5	5	1	.....	.....	1	4	11
Fracture of tibia	.....	2	2	.....	.....	.....	.....	.....	2
Fracture of fibula	1	.....	1	.....	.....	.....	.....	1	2
Fracture of tibia and fibula	1	3	3	.....	.....	.....	1	.....	4
Fracture of phalanges of toes	.....	1	.....	1	.....	.....	.....	.....	1
Dislocation of the femur	.....	1	.....	1	.....	.....	.....	.....	1
Dislocation of the tibia	.....	1	1	.....	.....	.....	.....	.....	1
Dislocation of the foot	.....	2	2	.....	.....	.....	.....	.....	2
Dislocation of the metatarsus and phalanges	.....	1	1	.....	.....	.....	.....	.....	1
AMPUTATIONS	.....	1	1	.....	.....	.....	.....	1	2
Amputation of leg	.....	1	1	.....	.....	.....	.....	1	2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

SOUTH ATLANTIC.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
TOTAL CASES	101	1,670	953	623	45	50	100	8,147	9,918
General Diseases	41	863	533	301	16	26	28	3,758	4,662
Chicken pox	.....	2	1	1	.....	....	.....	1	3
Measles	.....	11	10	1	.....	....	.....	.....	11
Influenza	.....	57	42	14	1	....	.....	236	293
Whooping cough	.....	.....	.....	.....	.....	....	.....	2	2
Mumps	.....	3	3	.....	.....	....	.....	4	7
Diphtheria	.....	1	.....	1	.....	....	.....	.....	1
Simple continued fever	.....	.....	.....	.....	.....	....	.....	2	2
Enteric fever	1	22	15	2	1	3	2	1	24
Choleraic diarrhœa	1	5	5	.....	.....	1	.....	4	10
Epidemic diarrhœa	.....	1	1	.....	.....	....	.....	2	3
Dysentery	1	22	17	4	.....	1	1	79	102
Beri-beri	.....	1	.....	.....	.....	....	1	.....	1
Malarial fever:									
Intermittent	7	260	232	27	2	1	5	934	1,201
Remittent	5	120	92	31	.....	....	2	130	255
Erysipelas	.....	13	4	8	.....	1	.....	5	18
Septicæmia	.....	1	.....	1	.....	....	.....	.....	1
Tubercle	15	63	1	46	6	18	7	121	199
Syphilis:									
Primary	.....	17	9	8	.....	....	.....	76	93
Secondary	2	86	.....	83	.....	1	4	509	597
Gonorrhœa	2	22	12	12	.....	....	.....	734	758
Anthrax	.....	1	.....	1	.....	....	.....	.....	1
Diseases dependent on animal parasites:									
Pediculis vestimenti	.....	.....	.....	.....	.....	....	.....	1	1
Sarcoptes scabiei	.....	.....	.....	.....	.....	....	.....	14	14
Tænia solium	.....	.....	.....	.....	.....	....	.....	1	1
Diseases dependent on vegetable parasites:									
Trichophyton tonsurans	.....	.....	.....	.....	.....	....	.....	14	14
Effects of animal poisons	.....	.....	.....	.....	.....	....	.....	2	2
Effects of vegetable poisons	.....	1	.....	1	.....	....	.....	4	5
Effects of the presence of foreign bodies	.....	.....	.....	.....	.....	....	.....	4	4
Effects of mechanical injuries	.....	.....	.....	.....	.....	....	.....	1	1
Effects of heat	.....	.....	.....	.....	.....	....	.....	1	1
Effects of cold	.....	.....	.....	.....	.....	....	.....	5	5
Effects of chemical agents	.....	1	.....	1	.....	....	.....	1	2
Alcoholism	.....	16	13	1	.....	....	2	7	23
Rheumatic fever	1	29	14	15	1	....	.....	33	63
Rheumatism	6	100	61	39	5	....	1	663	769
Gout	.....	.....	.....	.....	.....	....	.....	1	1
Osteo arthritis	.....	.....	.....	.....	.....	....	.....	1	1
New growth:									
Nonmalignant	.....	2	1	.....	.....	....	1	17	19
Malignant	.....	.....	.....	.....	.....	....	.....	5	5
Anæmia	.....	1	.....	1	.....	....	.....	14	15
Idiopathic anæmia	.....	1	.....	1	.....	....	.....	.....	1
Debility	.....	4	.....	2	.....	....	2	129	133
Local Diseases	54	607	289	261	28	22	61	3,798	4,459
DISEASES OF THE NERVOUS SYSTEM	11	40	12	22	4	3	10	251	302
Of the nerves—									
Inflammation	.....	2	1	1	.....	....	.....	5	7
Neuritis	.....	1	1	.....	.....	....	.....	.....	1
Of the spinal cord and membranes—									
Cord:									
Inflammation	1	1	.....	1	.....	....	1	1	3
Degeneration of posterior columns	1	.....	.....	1	.....	....	.....	1	2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases– Continued.									
DISEASES OF THE NERVOUS SYSTEM—Continued.									
Of the brain and its membranes—Membranes:									
Hæmorrhage	.....	1	.....	.....	.....	1	.....	.....	1
Of the brain and its membranes—Brain—									
Hyperæmia	.....	1	.....	.....	.....	1	.....	.....	1
Functional nervous disorders with other diseases of undetermined nature—									
Apoplexy	.....	2	.....	2	.....	....	.....	1	3
Paralysis—									
Paraplegia	2	.....	.....	.....	.....	....	2	.....	2
Hemiplegia	5	8	.....	6	1	1	5	28	41
Local paralysis	.....	2	.....	1	1	....	.....	4	6
Paralysis agitans	.....	.....	.....	.....	.....	....	.....	1	1
Spasm	.....	2	2	.....	.....	....	.....	.....	2
Torticollis	.....	.....	.....	.....	.....	....	.....	1	1
Epilepsy	.....	6	.....	4	1	....	1	12	18
Tetany	.....	.....	.....	.....	.....	....	.....	2	2
Vertigo	1	.....	.....	.....	.....	....	1	10	11
Headache	.....	1	.....	1	.....	....	.....	28	29
Megrim	.....	.....	.....	.....	.....	....	.....	3	3
Hyperæsthesia	.....	1	.....	1	.....	....	.....	.....	1
Anæsthesia	.....	.....	.....	.....	.....	....	.....	1	1
Neuralgia	1	12	8	4	1	....	.....	151	164
Hysteria	.....	.....	.....	.....	.....	....	.....	1	1
Nervous weakness	.....	.....	.....	.....	.....	....	.....	1	1
MENTAL DISEASES	21	10	1	2	3	....	25	2	33
Mania—									
Acute	.....	1	.....	.....	.....	....	1	.....	1
Chronic	8	1	.....	.....	.....	....	9	.....	9
Melancholia—									
Acute	.....	5	1	2	1	....	1	.....	5
Chronic	8	1	.....	.....	.....	....	9	.....	9
Dementia	3	1	.....	.....	1	....	3	2	6
Epileptic	1	.....	.....	.....	.....	....	1	.....	1
General paralysis of the insane	1	.....	.....	.....	.....	....	1	.....	1
Delusional insanity	.....	1	.....	.....	1	....	.....	.....	1
DISEASES OF THE EYE	2	16	6	9	1	....	2	72	90
Conjunctivitis	.....	4	3	1	.....	....	.....	48	52
Keratitis	.....	1	1	.....	.....	....	.....	2	3
Ulceration of cornea	.....	1	.....	1	.....	....	.....	3	4
Scleritis	.....	.....	.....	.....	.....	....	.....	1	1
Iritis	1	8	2	6	1	....	.....	7	16
Glaucoma	.....	1	.....	.....	.....	....	1	1	2
Optic neuritis	.....	.....	.....	.....	.....	....	.....	1	1
Atrophy and degeneration of optic nerve or papilla	.....	.....	.....	.....	.....	....	.....	2	2
Lenticular cataract	1	.....	.....	.....	.....	....	1	.....	1
Amblyopia	.....	.....	.....	.....	.....	....	.....	1	1
Day blindness	.....	.....	.....	.....	.....	....	.....	3	3
Amaurosis	.....	1	.....	1	.....	....	.....	.....	1
Blepharitis	.....	.....	.....	.....	.....	....	.....	1	1
Sty	.....	.....	.....	.....	.....	....	.....	1	1
Abscess of eyelid	.....	.....	.....	.....	.....	....	.....	1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE EAR	.....	6	3	3	.....	....	.....	42	48
Inflammation of the external meatus—									
Acute	.....	1	.....	1	.....	....	.....	3	4
Abscess	.....	1	1	.....	.....	....	.....	4	5
Accumulation of wax or epidermis	.....	.....	.....	.....	.....	....	.....	10	10
Inflammation of the middle ear—									
Nonsuppurative	.....	2	1	1	.....	...	.....	10	12
Suppurative	.....	2	1	1	.....	....	.....	10	12
Ulceration of membrana tympani	.....	.....	.....	.....	.....	....	.....	1	1
Obstruction of Eustachian tube	.....	.....	.....	.....	.....	....	.....	1	1
Tinnitus	.....	.....	.....	.....	.....	....	.....	3	3
DISEASES OF THE NOSE	.....	2	1	1	.....	....	.....	46	48
Inflammation of soft parts	.....	1	.....	1	.....	....	.....	45	46
Epistaxis	.....	1	1	.....	.....	....	.....	.....	1
Inflammation of the naso-pharynx	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE CIRCULATORY SYSTEM	3	25	2	17	4	3	2	48	76
Valvular disease—									
Aortic	.....	7	.....	5	.....	1	1	15	22
Mitral	1	11	.....	7	3	1	1	11	23
Hypertrophy of heart	.....	1	.....	1	.....	....	.....	2	3
Angina pectoris	.....	1	.....	.....	1	....	.....	.....	1
Syncope	1	.....	1	.....	.....	....	.....	.....	1
Disordered action of the heart	.....	1	1	.....	.....	....	.....	9	10
Arteritis	.....	.....	.....	.....	.....	....	.....	1	1
Endarteritis	.....	1	.....	1	.....	....	.....	4	5
Aneurism of arteries	.....	1	.....	1	.....	....	.....	3	4
Embolism	1	1	.....	1	.....	1	.....	.....	2
Obstruction of veins	.....	1	.....	1	.....	....	.....	1	2
Thrombosis	.....	.....	.....	.....	.....	....	.....	1	1
Varix	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE RESPIRATORY SYSTEM	1	96	50	35	3	7	2	797	894
Hay fever	.....	1	1	.....	.....	....	.....	.....	1
Inflammation of mucous membrane of larynx—catarrhal	.....	1	.....	1	.....	....	.....	16	17
Bronchitis—									
Catarrhal, acute	.....	44	32	12	.....	....	.....	607	651
Catarrhal, chronic	.....	8	.....	7	1	....	.....	110	118
Spasmodic asthma	.....	5	.....	4	.....	....	1	27	32
Hæmorrhage of lung	.....	3	2	1	.....	....	.....	1	4
Pneumonia	1	18	8	5	.....	6	.....	3	22
Broncho-pneumonia	.....	2	.....	1	1	....	.....	.....	2
Chronic interstitial inflammation	.....	1	.....	.....	.....	1	.....	.....	1
Phthisis—									
Acute	.....	1	.....	1	.....	....	.....	.....	1
Chronic	.....	1	.....	1	.....	....	.....	1	2
Pleurisy—									
Acute	.....	8	7	1	.....	....	.....	29	37
Chronic	.....	1	.....	1	.....	....	.....	3	4
Empyema	.....	2	.....	.....	1	....	1	.....	2
DISEASES OF THE DIGESTIVE SYSTEM	2	110	64	35	5	3	5	1,230	1,342
Ulceration of the lips	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the mouth	.....	1	.....	1	.....	....	.....	11	12
Ulceration of the mouth	.....	.....	.....	.....	.....	....	.....	9	9
Suppuration of the dental pulp	.....	.....	.....	.....	.....	....	.....	62	62
Caries of dentine and cementum	.....	.....	.....	.....	.....	....	.....	1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Necrosis of dentine and cementum	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of dental periosteum	.....	.....	.....	.....	.....	....	.....	5	5
Abscess of dental periosteum	.....	.....	.....	.....	.....	....	.....	6	6
Inflammation of gums and alveoli	.....	.....	.....	.....	.....	....	.....	1	1
Toothache	.....	.....	.....	.....	.....	....	.....	14	14
Inflammation of the tongue	.....	.....	.....	.....	.....	....	.....	1	1
Ulceration of the tongue	.....	.....	.....	.....	.....	....	.....	2	2
Sore throat	.....	3	2	1	.....	....	.....	57	60
Ulceration of the palate and fauces	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of tonsils—									
Follicular	.....	7	6	.....	.....	....	1	49	56
Suppuration	.....	9	4	5	.....	....	.....	7	16
Hypertrophy of tonsils	.....	.....	.....	.....	.....	....	.....	4	4
Elongated uvula	.....	.....	.....	.....	.....	....	.....	6	6
Salivation	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the pharynx—									
Catarrhal	.....	.....	.....	.....	.....	....	.....	34	34
Follicular	.....	.....	.....	.....	.....	....	.....	27	27
Inflammation of the stomach—catarrhal	.....	12	7	5	.....	....	.....	65	77
Ulceration of the stomach—superficial	.....	1	.....	.....	1	....	.....	.....	1
Hæmorrhage of stomach	.....	1	1	.....	.....	....	.....	.....	1
Dilatation of the stomach	.....	1	1	.....	.....	....	.....	.....	1
Indigestion	.....	3	2	1	.....	....	.....	226	229
Gastralgia	.....	3	2	1	.....	....	.....	13	16
Loss of appetite	.....	.....	.....	.....	.....	....	.....	8	8
Inflammation of the intestines—									
Enteritis	.....	.....	.....	.....	.....	....	.....	1	1
Typhlitis	.....	4	2	.....	.....	1	1	.....	4
Colitis	.....	2	1	1	.....	....	.....	.....	2
Catarrhal	.....	5	3	2	.....	....	.....	25	30
Ulceration of the intestines	.....	1	1	.....	.....	....	.....	.....	1
Hernia	.....	5	.....	2	1	1	1	80	85
Constipation	.....	3	3	.....	.....	....	.....	208	211
Colic	.....	1	1	.....	.....	....	.....	18	19
Diarrhœa	1	22	18	4	.....	1	.....	165	188
Enteralgia	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the rectum	.....	.....	.....	.....	.....	....	.....	1	1
Abscess	1	2	2	1	.....	....	.....	8	11
Fistula in ano	.....	7	3	2	1	....	1	7	14
Piles—									
Internal	.....	2	1	1	.....	....	.....	33	35
External	.....	4	2	.....	2	....	.....	28	32
Mixed	.....	2	.....	2	.....	....	.....	8	10
Pruritus ani	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the liver—									
Acute	.....	2	.....	2	.....	....	.....	1	3
Chronic	.....	1	.....	1	.....	....	.....	1	2
Hyperæmia of the liver	.....	3	1	1	.....	....	1	22	25
Hypertrophy of the liver	.....	.....	.....	.....	.....	....	.....	2	2
Jaundice	.....	2	1	1	.....	....	.....	4	6
Inflammation of hepatic ducts and gall bladder	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the peritonæum	.....	1	.....	1	.....	....	.....	.....	1
DISEASES OF THE LYMPHATIC SYSTEM	.....	51	29	19	.....	....	3	140	191
Hypertrophy of lymph glands	.....	2	.....	2	.....	....	.....	7	9

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE LYMPHATIC SYSTEM—Continued.									
Inflammation of lymphatics	.....	1	.....	1	.....	....	.....	5	6
Inflammation of lymph glands	.....	18	12	5	.....	....	1	114	132
Suppuration of lymph glands	.....	30	17	11	.....	....	2	14	44
DISEASES OF THE URINARY SYSTEM	4	43	10	28	1	5	3	111	158
Acute nephritis	.....	1	1	.....	.....	....	.....	2	3
Bright's disease	2	16	.....	12	.....	4	2	19	37
Abscess—pyonephrosis	1	.....	.....	.....	.....	....	1	.....	1
Congestion of kidney	.....	2	1	1	.....	....	.....	.....	2
Movable kidney	.....	.....	.....	.....	.....	....	.....	1	1
Calculus in kidney	.....	1	.....	1	.....	....	.....	2	3
Calculus in ureter	.....	1	1	.....	.....	....	.....	.....	1
Nephralgia	.....	1	1	.....	.....	....	.....	3	4
Suppression of urine	.....	.....	.....	.....	.....	....	.....	1	1
Hæmaturia	1	2	1	2	.....	....	.....	5	8
Lithuria	.....	.....	.....	.....	.....	....	.....	3	3
Albuminuria	.....	1	.....	.....	.....	1	.....	.....	1
Inflammation of bladder—									
Acute	.....	14	3	10	1	....	.....	27	41
Subacute	.....	.....	.....	.....	.....	....	.....	11	11
Chronic	.....	3	2	1	.....	....	.....	7	10
Calculus of bladder	.....	.....	.....	.....	.....	....	.....	3	3
Irritability of bladder	.....	.....	.....	.....	.....	....	.....	22	22
Retention of urine	.....	.....	.....	.....	.....	....	.....	1	1
Incontinence of urine	.....	1	.....	1	.....	....	.....	4	5
DISEASES OF THE GENERATIVE SYSTEM	3	82	34	43	4	....	4	406	491
Urethritis	.....	.....	.....	.....	.....	....	.....	19	19
Gleet	.....	.....	.....	.....	.....	....	.....	42	42
Abscess of the urethra	1	.....	1	.....	.....	....	.....	.....	1
Hæmorrhage of urethra	.....	1	1	.....	.....	....	.....	2	3
Stricture of urethra—									
Organic	.....	15	2	11	1	....	1	37	52
Traumatic	.....	.....	.....	.....	.....	....	.....	1	1
Urethral fever	.....	1	1	.....	.....	....	.....	.....	1
Urethral fistula	.....	1	.....	1	.....	....	.....	1	2
Inflammation of the prostate—									
Acute	.....	.....	.....	.....	.....	....	.....	2	2
Chronic	.....	.....	.....	.....	.....	....	.....	4	4
Abscess of the prostate	.....	.....	.....	.....	.....	....	.....	2	2
Posthitis	.....	.....	.....	.....	.....	....	.....	1	1
Phimosis	.....	3	2	.....	1	....	.....	2	5
Paraphimosis	.....	1	1	.....	.....	....	.....	2	3
Inflammation of glans penis	.....	2	.....	2	.....	....	.....	5	7
Abscess of penis	.....	1	1	.....	.....	....	.....	2	3
Ulcer of penis	.....	17	6	10	.....	....	1	172	189
Soft chancre	.....	14	9	4	1	....	.....	21	35
Abscess of the scrotum	.....	1	1	.....	.....	....	.....	.....	1
Pruritis of the scrotum	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the spermatic cord	.....	1	1	.....	.....	....	.....	1	2
Varicocele	.....	1	.....	.....	.....	....	1	12	13
Hydrocele of tunica vaginalis	1	4	2	2	1	....	.....	10	15
Inflammation of the testicle	.....	11	1	9	.....	....	1	34	45
Acute orchitis	.....	1	.....	1	.....	....	.....	5	6
Epididymitis	1	7	5	3	.....	....	.....	16	24
Spermatorrhœa	.....	.....	.....	.....	.....	....	.....	1	1
Impotence	.....	.....	.....	.....	.....	....	.....	4	4

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Amenorrhœa	.....	.....	.....	.....	.....	....	.....	1	1
Dysmenorrhœa	.....	.....	.....	.....	.....	....	.....	1	1
Menorrhagia	.....	.....	.....	.....	.....	....	.....	1	1
Leucorrhœa	.....	.....	.....	.....	.....	....	.....	3	3
DISEASES OF THE ORGANS OF LOCOMOTION	3	24	13	12	2	....	.....	89	116
Periostitis	.....	2	.....	2	.....	....	.....	.....	2
Caries	.....	1	.....	1	.....	....	.....	4	5
Necrosis	1	4	2	2	1	....	.....	3	8
Hypertrophy of the bones	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of joints, synovitis:									
Acute	.....	.....	.....	.....	.....	....	.....	3	3
Chronic	.....	.....	.....	.....	.....	....	.....	1	1
Ankylosis	1	1	1	1	.....	....	.....	1	3
Psoas, lumbar, and other abscesses	.....	1	1	.....	.....	....	.....	.....	1
Posterior curvature of spine, angular	1	.....	.....	1	.....	....	.....	.....	1
Inflammation of muscles	.....	3	2	1	.....	....	.....	18	21
Myalgia	.....	6	2	3	1	....	.....	48	54
Inflammation of tendons	.....	2	2	.....	.....	....	.....	2	4
Ganglion	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of bursæ	.....	3	3	.....	.....	....	.....	2	5
Bunion	.....	.....	.....	.....	.....	....	.....	1	1
Bursal cyst	.....	1	.....	1	.....	....	.....	2	3
Bursal tumor	.....	.....	.....	.....	.....	....	.....	1	1
Club hand	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE CONNECTIVE TISSUE	.....	37	23	8	1	1	4	92	129
Inflammation	.....	8	7	1	.....	....	.....	35	43
Abscess	.....	25	13	6	1	1	4	56	81
Gangrene	.....	1	1	.....	.....	....	.....	.....	1
Œdema	.....	3	2	1	.....	....	.....	1	4
DISEASES OF THE SKIN	4	65	41	27	.....	....	1	472	541
Erythema	.....	.....	.....	.....	.....	....	.....	4	4
Urticaria	.....	2	1	1	.....	....	.....	6	8
Eczema	.....	.....	.....	.....	.....	....	.....	106	106
Prurigro	.....	.....	.....	.....	.....	....	.....	3	3
Prurigo	.....	.....	.....	.....	.....	....	.....	1	1
Lichen	.....	.....	.....	.....	.....	....	.....	1	1
Psoriasis	.....	.....	.....	.....	.....	....	.....	19	19
Herpes	.....	.....	.....	.....	.....	....	.....	14	14
Zona	.....	1	.....	1	.....	....	.....	5	6
Dermatitis herpetiformis	.....	.....	.....	.....	.....	....	.....	3	3
Acne	.....	.....	.....	.....	.....	....	.....	10	10
Seborrhœa	.....	.....	.....	.....	.....	....	.....	7	7
Ichthyosis	.....	.....	.....	.....	.....	....	.....	1	1
Chilblain	.....	.....	.....	.....	.....	....	.....	1	1
Frostbite	.....	11	9	2	.....	....	.....	11	22
Ulcer	3	24	12	14	.....	....	1	116	143
Boil	.....	12	11	1	.....	....	.....	97	109
Carbuncle	.....	9	4	5	.....	....	.....	11	20
Whitlow	1	5	3	3	.....	....	.....	36	42
Onychia	.....	.....	.....	.....	.....	....	.....	1	1
Corn	.....	.....	.....	.....	.....	....	.....	4	4
Lupus	.....	.....	.....	.....	.....	....	.....	1	1
Wen	.....	1	1	.....	.....	....	.....	5	6
Pruritus	.....	.....	.....	.....	.....	....	.....	6	6
Rhinoscleroma	.....	.....	.....	.....	.....	....	.....	3	3

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries	**6**	**200**	**131**	**61**	**1**	**2**	**11**	**591**	**797**
GENERAL INJURIES	2	20	15	4	.....	1	2	54	76
Burns and scalds	.....	8	7	1	.....	.....	.....	41	49
Heatstroke	2	7	7	.....	.....	.....	2	8	17
Sunstroke	.....	.....	.....	.....	.....	.....	.....	2	2
Effects of cold	.....	2	.....	2	.....	.....	.....	1	3
Effects of chemical irritants and corrosives	.....	.....	.....	.....	.....	.....	.....	1	1
Multiple injury	.....	2	.....	1	.....	1	.....	1	3
Exhaustion	.....	1	1	.....	.....	.....	.....	.....	1
LOCAL INJURIES	4	180	116	57	1	1	9	537	721
Contusion of muscles	.....	1	1	.....	.....	.....	.....	5	6
Strain of muscles	.....	1	1	.....	.....	.....	.....	20	21
Abrasion of skin	.....	.....	.....	.....	.....	.....	.....	19	19
Contusion of scalp	.....	2	1	1	.....	.....	.....	1	3
Scalp wound	.....	7	4	3	.....	.....	.....	17	24
Contusion of face	.....	1	1	.....	.....	.....	.....	4	5
Wound of face and mouth	.....	8	4	4	.....	.....	.....	24	32
Fracture of facial bones	.....	3	1	2	.....	.....	.....	1	4
Injuries of the alveoli and teeth	.....	.....	.....	.....	.....	.....	.....	2	2
Contusion of the eyelid	.....	.....	.....	.....	.....	.....	.....	2	2
Wound of eyelid	.....	.....	.....	.....	.....	.....	.....	1	1
Subconjunctival hæmorrhage	.....	.....	.....	.....	.....	.....	.....	1	1
Contusion of the eyeball	.....	.....	.....	.....	.....	.....	.....	2	2
Foreign bodies in the conjunctiva or cornea	.....	1	1	.....	.....	.....	.....	13	14
Wound of the iris	.....	.....	.....	.....	.....	.....	.....	1	1
Wound of pinna	.....	.....	.....	.....	.....	.....	.....	1	1
Rupture of membrana tympani	.....	1	.....	1	.....	.....	.....	3	4
Contusion of soft parts of neck	.....	.....	.....	.....	.....	.....	.....	1	1
Scald of the pharynx	.....	.....	.....	.....	.....	.....	.....	1	1
Foreign body in the air passages	.....	.....	.....	.....	.....	.....	.....	1	1
Contusion of the chest	1	5	4	2	.....	.....	.....	21	27
Dislocation of costal cartilages	.....	.....	.....	.....	.....	.....	.....	2	2
Fracture of the ribs	.....	8	4	2	.....	.....	2	6	14
Wound of parietes of chest	.....	2	2	.....	.....	.....	.....	.....	2
Contusion of back	.....	5	3	1	.....	.....	1	24	29
Sprain of back	.....	2	1	1	.....	.....	.....	16	18
Wound of back	.....	1	1	.....	.....	.....	.....	.....	1
Contusion of abdomen	.....	.....	.....	.....	.....	.....	.....	2	2
Contusion of the male urethra, perinæum, scrotum, or penis	.....	.....	.....	.....	.....	.....	.....	1	1
Wound of the male urethra, perinæum, scrotum, testis, or penis	1	.....	.....	1	.....	.....	.....	2	3
Rupture of urethra	.....	.....	.....	.....	.....	.....	.....	1	1
Laceration of the urethra	.....	1	1	.....	.....	.....	.....	.....	1
Fracture and dislocation of pelvis	.....	1	.....	1	.....	.....	.....	.....	1
Contusion of testicle	.....	1	.....	1	.....	.....	.....	1	2
Contusion of upper extremities	.....	6	4	2	.....	.....	.....	52	58
Sprain of the shoulder	1	1	2	.....	.....	.....	.....	14	16
Sprain of the elbow	.....	1	.....	1	.....	.....	.....	3	4
Sprain of the wrist	.....	.....	.....	.....	.....	.....	.....	16	16
Sprain of the fingers	.....	.....	.....	.....	.....	.....	.....	2	2
Wound of the upper extremities	.....	44	34	9	.....	.....	1	127	171
Fracture of the clavicle	.....	3	1	1	1	.....	.....	1	4
Fracture of the humerus	.....	2	1	1	.....	.....	.....	.....	2
Fracture of the radius	.....	1	.....	1	.....	.....	.....	1	2
Fracture of the ulna	.....	2	.....	2	.....	.....	.....	2	4
Fracture of both bones of forearm	1	2	2	1	.....	.....	.....	.....	3

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Fracture of carpus, metacarpus, and phalanges	.....	2	2	.....	.....	....	.....	4	6
Dislocation of the humerus	.....	1	1	.....	.....	....	.....	2	3
Dislocation of the phalanges of fingers	.....	1	1	.....	.....	....	.....	.....	1
Contusion of the lower extremities	.....	22	16	6	.....	....	.....	54	76
Sprain of the knee	.....	6	2	4	.....	....	.....	15	21
Sprain of the ankle	.....	7	3	2	.....	....	2	12	19
Wound of the lower extremities	.....	17	14	3	.....	....	.....	34	51
Wound of joint, lower extremities	.....	1	.....	1	.....	....	.....	.....	1
Fracture of femur	.....	2	1	.....	.....	....	1	.....	2
Fracture of patella	.....	1	.....	1	.....	....	.....	1	2
Fracture of tibia	.....	2	.....	1	.....	....	1	.....	2
Fracture of fibula	.....	2	2	.....	.....	....	.....	1	3
Fracture of tibia and fibula	.....	2	.....	.....	.....	1	1	.....	2
Fracture of metatarsus	.....	1	.....	1	.....	....	.....	.....	1

GULF.

TOTAL CASES	58	1,265	800	387	21	44	71	5,331	6,654
General Diseases	21	549	356	159	8	19	28	2,207	2,777
Cowpox	.....	1	1	.....	.....	....	.....	12	13
Measles	.....	1	1	.....	.....	....	.....	.....	1
Rubella	1	.....	1	.....	.....	....	.....	1	2
Dengue	.....	.....	.....	.....	.....	....	.....		9
Influenza	.....	23	20	2	1	....	.....	74	97
Whooping cough	.....	.....	.....	.....	.....	....	.....	1	1
Diphtheria	.....	1	.....	.....	.....	....	1	.....	1
Cerebrospinal fever	.....	1	1	.....	.....	....	.....	.....	1
Simple continued fever	.....	9	9	.....	.....	....	.....	.....	9
Enteric fever	1	6	6	.....	.....	1	.....	2	9
Choleraic diarrhœa	.....	1	1	.....	.....	....	.....	4	5
Dysentery	.....	20	17	3	.....	....	.....	34	54
Beri-beri	.....	3	3	.....	.....	....	.....	.....	3
Malarial fever:									
Intermittent	1	155	140	6	.....	3	7	519	675
Remittent	3	54	50	4	1	1	1	43	100
Erysipelas	.....	2	2	.....	.....	....	.....	3	5
Tubercle	3	27	.....	11	3	12	4	40	70
Syphilis:									
Primary	.....	4	.....	3	.....	....	1	31	35
Secondary	5	80	.....	76	1	....	8	233	318
Gonorrhœa	.....	36	17	15	.....	....	4	534	570
Diseases dependent on animal parasites	.....	.....	.....	.....	.....	....	.....	1	1
Tænia salium	.....	.....	.....	.....	.....	....	.....	6	6
Ascaris lumbricoides	.....	.....	.....	.....	.....	....	.....	1	1
Phthirius inguinalis	.....	.....	.....	.....	.....	....	.....	6	6
Sarcoptes scabiei	.....	.....	.....	.....	.....	....	.....	7	7
Diseases dependent on vegetable parasites:									
Trichophyton tonsurans	.....	.....	.....	.....	.....	....	.....	18	18
Microsporon furfur	.....	.....	.....	.....	.....	....	.....	1	1
Effects of vegetable poisons	.....	1	1	.....	.....	....	.....	5	6
Lead colic	.....	2	2	.....	.....	....	.....	1	3

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases—Continued.									
Effects of the presence of foreign bodies	.....	.....	.....	.....	.....	....	.....	12	12
Effects of heat	.....	4	4	.....	.....	....	.....	2	6
Effects of cold	.....	.....	.....	.....	.....	....	.....	2	2
Starvation	.....	1	1	.....	.....	....	.....	1	2
Alcoholism	1	14	12	3	.....	....	.....	10	25
Rheumatic fever	1	11	12	.....	.....	....	.....	9	21
Rheumatism	4	82	53	31	1	....	1	478	564
New growth:									
Nonmalignant	1	2	.....	2	1	....	.....	25	28
Malignant	.....	5	2	.....	.....	2	1	.....	5
Anæmia	.....	.....	.....	.....	.....	....	.....	2	2
Diabetes mellitus	.....	1	.....	1	.....	....	.....	8	9
Debility	.....	2	.....	2	.....	....	.....	72	74
Local Diseases	**32**	**510**	**305**	**172**	**11**	**21**	**33**	**2,679**	**3,221**
DISEASES OF THE NERVOUS SYSTEM	4	33	18	10	1	....	8	172	209
Of the nerves:									
Inflammation	1	1	2	.....	.....	....	.....	1	3
Neuritis	.....	1	1	.....	.....	....	.....	1	2
Multiple neuritis	.....	2	1	1	.....	....	.....	4	6
Of the spinal cord and membranes—Membranes:									
Inflammation of dura mater	.....	.....	.....	.....	.....	....	.....	1	1
Of the spinal cord and membranes—Cord:									
Hæmorrhage	2	.....	2	.....	.....	....	.....	.....	2
Degeneration of posterior columns	.....	1	.....	.....	.....	....	1	.....	1
Of the brain and its membranes—Membranes:									
Inflammation of dura mater	.....	1	.....	.....	.....	....	1	1	2
Inflammation of pia mater and arachnoid	1	.....	.....	.....	.....	....	1	.....	1
Of the brain and its membranes—Brain:									
Inflammation	.....	1	.....	.....	.....	....	1	.....	1
Hæmorrhage	.....	2	.....	1	.....	....	1	.....	2
Hyperæmia	.....	.....	.....	.....	.....	....	.....	2	2
Functional nervous disorders, with other diseases of undetermined nature:									
Apoplexy	.....	1	.....	.....	.....	....	1	2	3
Paralysis—									
Paraplegia	.....	2	1	1	.....	....	.....	3	5
Hemiplegia	.....	1	.....	1	.....	....	.....	1	2
Monoplegia	.....	1	.....	1	.....	....	.....	4	5
Local paralysis	.....	.....	.....	.....	.....	....	.....	2	2
Incomplete paralysis	.....	1	.....	1	.....	....	.....	.....	1
Paralysis agitans	.....	.....	.....	.....	.....	....	.....	1	1
Chorea	.....	.....	.....	.....	.....	....	.....	1	1
Spasm	.....	.....	.....	.....	.....	....	.....	6	6
Epilepsy	.....	4	.....	3	.....	....	1	7	11
Vertigo	.....	.....	.....	.....	.....	....	.....	9	9
Headache	.....	.....	.....	.....	.....	....	.....	13	13
Megrim	.....	3	1	.....	1	....	1	16	19
Anæsthesia	.....	.....	.....	.....	.....	....	.....	2	2
Neuralgia	.....	11	10	1	.....	....	.....	95	106

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
MENTAL DISEASES	1	2	1	1	.....	....	1	4	7
Mania	1	.....	.....	.....	.....	....	1	.....	1
Melancholia	.....	1	.....	1	.....	....	.....	2	3
Delusional insanity	.....	1	1	.....	.....	....	.....	2	3
DISEASES OF THE EYE	2	10	6	6	.....	....	.....	61	73
Conjunctivitis	1	5	4	2	.....	....	.....	48	54
Keratitis	.....	1	.....	1	.....	....	.....	2	3
Ulceration of cornea	.....	.....	.....	.....	.....	....	.....	1	1
Opacity of cornea	.....	.....	.....	.....	.....	....	.....	1	1
Iritis	1	2	2	1	.....	....	.....	.....	3
Lenticular cataract	.....	1	.....	1	.....	....	.....	5	6
Amblyopia	.....	1	.....	1	.....	....	.....	.....	1
Blepharitis	.....	.....	.....	.....	.....	....	.....	1	1
Sty	.....	.....	.....	.....	.....	....	.....	2	2
Abscess of eyelid	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE EAR	.....	1	.....	1	.....	....	.....	43	44
Inflammation of the external meatus—									
Acute	.....	.....	.....	.....	.....	....	.....	2	2
Abscess	.....	.....	.....	.....	.....	....	.....	1	1
Accumulation of wax or epidermis	.....	.....	.....	.....	.....	....	.....	22	22
Inflammation of the middle ear—									
Nonsuppurative	.....	.....	.....	.....	.....	....	.....	10	10
Suppurative	.....	1	.....	1	.....	....	.....	7	8
Tinnitus	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE NOSE	.....	1	.....	.....	.....	....	1	38	39
Inflammation of soft parts	.....	.....	.....	.....	.....	....	.....	28	28
Imflammation of framework—necrosis	.....	1	.....	.....	.....	....	1	.....	1
Diseases of septum—abscess	.....	.....	.....	.....	.....	....	.....	1	1
Epistaxis	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the accessory sinuses	.....	.....	.....	.....	.....	....	.....	2	2
Inflammatiol. of the naso-pharynx	.....	.....	.....	.....	.....	....	.....	6	6
DISEASES OF THE CIRCULATORY SYSTEM	1	27	2	15	.....	7	4	58	86
Valvular disease—									
Aortic	.....	4	.....	3	.....	....	1	8	12
Mitral	.....	17	.....	9	.....	5	3	16	33
Degeneration of heart—fatty	.....	1	.....	1	.....	....	.....	.....	1
Hypertrophy of heart	.....	1	.....	.....	.....	1	.....	1	2
Disordered action of the heart	.....	4	2	2	.....	....	.....	27	31
Degeneration of arteries	.....	.....	.....	.....	.....	....	.....	1	1
Arterio-capillary fibrosis	1	.....	.....	.....	.....	1	.....	.....	1
Dilatation of arteries	.....	.....	.....	.....	.....	....	.....	2	2
Aneurism of arteries	.....	.....	.....	.....	.....	....	.....	1	1
Varix	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE RESPIRATORY SYSTEM	2	106	72	27	.....	5	4	504	612
Inflammation of mucous membrane of larynx—catarrhal	.....	1	1	.....	.....	....	.....	5	6
Bronchitis—									
Catarrhal, acute	2	48	41	8	.....	1	.....	411	461
Catarrhal, chronic	.....	18	2	13	.....	....	3	51	69
Spasmodic asthma	.....	2	2	.....	.....	....	.....	12	14
Hemorrhage of lung	.....	.....	.....	.....	.....	....	.....	2	2
Pneumonia	.....	25	16	4	.....	4	1	9	34
Abscess of lung	.....	1	1	.....	.....	....	.....	.....	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Pleurisy—									
Acute	.....	6	6	.....	.....	....	.....	7	13
Chronic	.....	4	2	2	.....	....	.....	7	11
Empyema	.....	1	1	.....	.....	....	.....	.....	1
DISEASES OF THE DIGESTIVE SYSTEM	9	97	65	32	3	3	3	916	1,022
Inflammation of the lips	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the mouth	.....	.....	.....	.....	.....	....	.....	4	4
Ulceration of the mouth	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the dental pulp	.....	.....	.....	.....	.....	....	.....	1	1
Caries of dentine and cementum	.....	.....	.....	.....	.....	....	.....	55	55
Necrosis of dentine and cementum	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of dental periosteum	.....	.....	.....	.....	.....	....	.....	2	2
Abscess of dental periosteum	.....	.....	.....	.....	.....	....	.....	7	7
Inflammation of gums and alveoli	.....	.....	.....	.....	.....	....	.....	3	3
Suppuration of the gums and alveoli	.....	.....	.....	.....	.....	....	.....	2	2
Ulceration of gums and alveoli	.....	.....	.....	.....	.....	....	.....	1	1
Toothache	.....	.....	.....	.....	.....	....	.....	18	18
Ulceration of the tongue	.....	.....	.....	.....	.....	....	.....	1	1
Sore throat	.....	4	3	1	.....	....	.....	17	21
Inflammation of tonsils—									
Follicular	.....	6	4	2	.....	....	.....	32	38
Suppuration	.....	1	.....	1	.....	....	.....	1	2
Hypertrophy of tonsils	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of salivary glands	.....	.....	.....	.....	.....	....	.....	1	1
Salivation	.....	2	2	.....	.....	....	.....	1	3
Inflammation of the pharnyx—									
Catarrhal	.....	1	1	.....	.....	....	.....	12	13
Follicular	.....	.....	.....	.....	.....	....	.....	4	4
Inflammation of stomach—catarrhal	1	14	11	4	.....	....	.....	29	44
Indigestion	1	3	2	2	.....	....	.....	173	177
Vomiting	.....	.....	.....	.....	.....	....	.....	1	1
Heartburn	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the intestines—									
Typhlitis	.....	2	.....	1	.....	1	.....	4	6
Colitis	.....	4	2	1	.....	....	1	3	7
Catarrhal	3	12	13	2	.....	....	.....	28	43
Ulceration of the intestines	.....	.....	.....	.....	.....	....	.....	4	4
Fecal accumulation	.....	3	3	.....	.....	....	.....	1	4
Hernia	1	4	.....	3	2	....	.....	104	109
Affections of hernial sacs—inflammation	.....	1	.....	1	.....	....	.....	.....	1
Obstruction of the intestines	.....	1	.....	.....	.....	1	.....	.....	1
Intestinal dyspepsia	.....	2	.....	1	.....	....	1	.....	2
Constipation	.....	3	3	.....	.....	....	.....	144	147
Colic	.....	2	2	.....	.....	....	.....	19	21
Diarrhea	.....	9	8	1	.....	...	.....	118	127
Inflammation of the rectum	.....	.....	.....	.....	.....	....	.....	1	1
Ulceration of the rectum	.....	1	1	.....	.....	....	.....	1	2
Abscess	.....	.....	.....	.....	.....	....	.....	1	1
Fissure of the anus	.....	.....	.....	.....	.....	....	.....	1	1
Fistula in ano	.....	2	1	.....	.....	....	1	4	6
Prolapse of the rectum	.....	1	.....	1	.....	....	.....	.....	1
Piles—									
Internal	1	3	2	2	.....	....	.....	14	18
External	.....	1	.....	1	.....	....	.....	40	41
Mixed	.....	2	.....	2	.....	....	.....	8	10

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Pruritus ani	.....	.....	.....	.....	.....	....	.....	5	5
Inflammation of the liver—									
Acute	.....	.....	.....	.....	.....	....	.....	1	1
Acute abscess	.....	1	.....	.....	.....	1	.....	.....	1
Chronic	1	4	.....	4	1	....	.....	2	7
Hyperæmia of the liver	.....	8	7	1	.....	....	.....	42	50
Jaundice	1	.....	.....	.....	1	....	.....	.....	1
DISEASES OF THE LYMPHATIC SYSTEM	4	37	26	11	3	....	1	58	99
Hypertrophy of the spleen	.....	.....	.....	.....	.....	....	.....	1	1
Hypertrophy of lymph glands	.....	1	.....	.....	1	....	.....	1	2
Inflammation of lymph glands	1	27	17	9	1	....	1	44	72
Suppuration of lymph glands	3	9	9	2	1	....	.....	12	24
DISEASES OF THE URINARY SYSTEM	.....	20	5	7	.....	6	2	65	85
Acute nephritis	.....	1	.....	1	.....	....	.....	.....	1
Bright's disease	.....	12	.....	5	.....	6	1	12	24
Congestion of kidney	.....	.....	.....	.....	.....	....	.....	1	1
Calculus in kidney	.....	.....	.....	.....	.....	....	.....	1	1
Suppression of urine	.....	.....	.....	.....	.....	....	.....	1	1
Lithuria	.....	.....	.....	.....	.....	....	.....	5	5
Phosphaturia	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of bladder—									
Acute	.....	4	4	.....	.....	....	.....	11	15
Subacute	.....	.....	.....	.....	.....	....	.....	1	1
Chronic	.....	3	1	1	.....	....	1	22	25
Irritability of bladder	.....	.....	.....	.....	.....	....	.....	7	7
Retention of urine	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE GENERATIVE SYSTEM	5	107	56	48	3	....	5	296	408
Urethritis	.....	.....	.....	.....	.....	....	.....	2	2
Gleet	.....	.....	.....	.....	.....	....	.....	4	4
Stricture of urethra—									
Organic	2	23	10	13	.....	....	2	62	87
Spasmodic	.....	1	1	.....	.....	....	.....	.....	1
Urethral fistula	.....	1	.....	1	.....	....	.....	.....	1
Inflammation of the prostate—acute	.....	1	.....	1	.....	....	.....	1	2
Hypertrophy of the prostate	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the vesiculæ seminalis	.....	.....	.....	.....	.....	....	.....	2	2
Posthitis	.....	.....	.....	.....	.....	....	.....	2	2
Phimosis	.....	2	2	.....	.....	....	.....	2	4
Paraphimosis	.....	1	1	.....	.....	....	.....	2	3
Inflammation of glans penis	.....	1	.....	1	.....	....	.....	1	2
Abscess of penis	.....	.....	.....	.....	.....	....	.....	1	1
Ulcer of penis	.....	4	.....	4	.....	....	.....	97	101
Soft chancre	3	50	26	24	1	....	2	61	114
Priapism	.....	.....	.....	.....	.....	....	.....	1	1
Sloughing of the scrotum	.....	1	1	.....	.....	....	.....	.....	1
Varicocele	.....	.....	.....	.....	.....	....	.....	9	9
Hydrocele of tunica vaginalis	.....	1	1	.....	.....	....	.....	4	5
Inflammation of the testicle—									
Acute orchitis	.....	16	10	3	2	....	1	15	31
Chronic orchitis	.....	1	.....	.....	.....	....	.....	5	6
Epididymitis	.....	4	4	.....	.....	....	.....	7	11
Spermatorrhœa	.....	.....	.....	.....	.....	....	.....	9	9
Impotence	.....	.....	.....	.....	.....	....	.....	7	7
Leucorrhœa	.....	.....	.....	.....	.....	....	.....	1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE ORGANS OF LOCOMOTION.	2	12	10	3	.....	....	1	80	94
Inflammation of the bones—periostitis.	.....	1	1	.....	.....	....	.....	2	3
Caries	.....	1	1	.....	.....	....	.....	3	4
Necrosis	1	1	1	1	.....	....	.....	1	3
Ununited fracture or false joint	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of joints, synovitis—									
Acute	.....	2	2	.....	.....	....	.....	6	8
Chronic	1	4	3	1	.....	....	1	2	7
Ankylosis	.....	.....	.....	.....	.....	....	.....	1	1
Dislocation of articular cartilage	.....	.....	.....	.....	.....	....	.....	1	1
Idiopathic muscular atrophy	.....	.....	.....	.....	.....	....	.....	1	1
Myalgia	.....	1	1	.....	.....	....	.....	52	53
Inflammation of tendons	.....	1	1	1	.....	....	.....	2	3
Inflammation of bursæ	.....	.....	.....	.....	.....	....	.....	6	6
Bursal cyst	.....	1	1	.....	.....	....	.....	2	3
DISEASES OF THE CONNECTIVE TISSUE	.....	17	12	4	.....	....	1	71	88
Inflammation	.....	5	4	1	.....	....	.....	29	34
Abscess	.....	11	7	3	.....	....	1	39	50
Œdema	.....	1	1	.....	.....	....	.....	3	4
DISEASES OF THE SKIN	2	40	32	7	1	....	2	313	355
Erythema	.....	.....	.....	.....	.....	....	.....	2	2
Urticaria	.....	.....	.....	.....	.....	....	.....	6	6
Prickly heat	.....	.....	.....	.....	.....	....	.....	1	1
Eczema	.....	.....	.....	.....	.....	....	.....	60	60
Impetigo	.....	1	1	.....	.....	....	.....	7	8
Lichen	.....	.....	.....	.....	.....	....	.....	1	1
Herpes	.....	1	1	.....	.....	....	.....	12	13
Zona	.....	1	1	.....	.....	....	.....	5	6
Acne	.....	.....	.....	.....	.....	....	.....	2	2
Sycosis	.....	.....	.....	.....	.....	....	.....	1	1
Melasma	.....	.....	.....	.....	.....	....	.....	1	1
Alopecia	.....	.....	.....	.....	.....	....	.....	2	2
Chilblain	.....	.....	.....	.....	.....	....	.....	18	18
Frostbite	.....	.....	.....	.....	.....	....	.....	25	25
Ulcer	1	22	19	3	.....	....	1	92	115
Boil	1	5	4	2	.....	....	.....	36	42
Carbuncle	.....	1	1	.....	.....	....	.....	5	6
Whitlow	.....	3	2	1	.....	....	.....	17	20
Onychia	.....	1	.....	1	.....	....	.....	5	6
Corn	.....	.....	.....	.....	.....	....	.....	2	2
Ainhum	.....	1	1	.....	.....	....	.....	3	4
Lupus	.....	1	.....	.....	.....	....	1	.....	1
Wen	.....	3	2	.....	1	....	.....	4	7
Hyperidrosis	.....	.....	.....	.....	.....	....	.....	2	2
Pruritus	.....	.....	.....	.....	.....	....	.....	4	4
Injuries	**5**	**206**	**139**	**56**	**2**	**4**	**10**	**445**	**656**
GENERAL INJURIES	1	12	5	3	1	2	2	23	36
Burns and scalds	.....	7	3	3	.....	1	.....	20	27
Heatstroke	.....	3	1	.....	.....	....	2	1	4
Sunstroke	.....	.....	.....	.....	.....	....	.....	1	1
Multiple injury	1	2	1	.....	1	1	.....	1	4
LOCAL INJURIES	4	194	134	53	1	2	8	422	620
Strain of muscles	.....	2	2	.....	.....	....	.....	3	5
Strain of tendons	.....	.....	.....	.....	.....	....	.....	1	1
Abrasion of skin	.....	3	3	.....	.....	....	.....	6	9

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Contusion of scalp	.....	1	1	.....	.....	....	.....	1	2
Scalp wound	.....	9	4	5	.....	....	.....	20	29
Fracture of vault of the skull	.....	1	1	.....	.....	....	.....	.....	1
Contusion of face	.....	3	2	1	.....	....	.....	2	5
Wound of face and mouth	.....	6	6	.....	.....	....	.....	8	14
Contusion of the eyeball	.....	2	1	1	.....	....	.....	7	9
Contusion of the eyelid	.....	1	1	.....	.....	....	.....	1	2
Wound of eyelid	.....	.....	.....	.....	.....	....	.....	1	1
Wound of conjunctiva	.....	.....	.....	.....	.....	....	.....	2	2
Foreign bodies in the conjunctiva or cornea	.....	.....	.....	.....	.....	....	.....	6	6
Contusion of soft parts of neck	.....	.....	.....	.....	.....	....	.....	1	1
Wound of neck	.....	1	1	.....	.....	....	.....	.....	1
Foreign body in the air passages	.....	.....	.....	.....	.....	....	.....	1	15
Contusion of the chest	.....	5	4	1	.....	....	.....	25	30
Dislocation of costal cartilages	.....	.....	.....	.....	.....	....	.....	1	1
Fracture of the ribs	.....	8	3	5	.....	....	.....	7	15
Wound of parietes of chest	.....	2	2	.....	.....	....	.....	1	3
Penetrating wound of pleura or lung	.....	2	2	.....	.....	....	.....	.....	2
Contusion of back	.....	7	6	1	.....	....	.....	13	20
Sprain of back	.....	4	3	1	.....	....	.....	45	49
Wound of back	.....	2	1	1	.....	....	.....	.....	2
Fracture of spine, with displacement	.....	1	.....	.....	.....	1	.....	.....	1
Contusion of abdomen	.....	.....	.....	.....	.....	....	.....	1	1
Wound of parietes of abdomen	.....	4	3	1	.....	....	.....	1	5
Wound of the male urethra, perinæum, scrotum, testis, or penis	.....	1	.....	1	.....	....	.....	2	3
Foreign body in the rectum	.....	.....	.....	.....	.....	....	.....	1	1
Contusion of upper extremities	1	11	10	2	.....	....	.....	22	34
Sprain of the shoulder	.....	.....	.....	.....	.....	....	.....	17	17
Sprain of the elbow	.....	1	1	.....	.....	....	.....	4	5
Sprain of the wrist	.....	1	1	.....	.....	....	.....	15	16
Sprain of the fingers	.....	.....	.....	.....	.....	....	.....	3	3
Wound of the upper extremities	1	28	14	12	1	1	1	83	112
Fracture of the clavicle	.....	.....	.....	.....	.....	....	.....	1	1
Fracture of the radius	.....	3	1	2	.....	....	.....	1	4
Fracture of both bones of forearm	.....	2	1	.....	.....	....	1	5	7
Fracture of carpus, metacarpus, and phalanges	.....	6	4	2	.....	....	.....	6	12
Dislocation of the clavicle	.....	1	1	.....	.....	....	.....	.....	1
Dislocation of the humerus	.....	1	1	.....	.....	....	.....	.....	1
Dislocation of the ulna	.....	1	1	.....	.....	....	.....	.....	1
Dislocation of the radius and ulna	.....	1	.....	1	.....	....	.....	.....	1
Dislocation of the phalanges of fingers	.....	.....	.....	.....	.....	....	.....	1	1
Contusion of lower extremities	.....	36	29	6	.....	....	1	34	70
Sprain of the hip	.....	.....	.....	.....	.....	....	.....	7	7
Sprain of the knee	.....	1	.....	1	.....	....	.....	17	18
Sprain of the ankle	.....	1	1	.....	.....	....	.....	16	17
Sprain of the foot	.....	.....	.....	.....	.....	....	.....	1	1
Wound of the lower extremities	.....	21	12	8	.....	....	1	31	52
Wound of joint, lower extremities	.....	2	.....	1	.....	....	1	.....	2
Fracture of femur	1	2	1	.....	.....	....	2	.....	3
Fracture of tibia	.....	2	2	.....	.....	....	.....	1	3
Fracture of fibula	1	3	4	.....	.....	....	.....	.....	4
Fracture of tibia and fibula	.....	2	2	.....	.....	....	.....	.....	2
Fracture of tarsus	.....	1	.....	.....	.....	....	1	.....	1
Fracture of phalanges of toes	.....	1	1	.....	.....	....	.....	.....	1
Dislocation of the foot	.....	1	1	.....	.....	....	.....	.....	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE OHIO.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
TOTAL CASES	52	1,005	611	353	14	29	50	3,525	4,582
General Diseases	32	472	277	186	3	12	26	1,660	2,164
Measles	.....	12	11	.....	.....	....	1	.....	12
Influenza	.....	46	39	7	.....	....	.....	127	173
Mumps	.....	1	1	.....	.....	....	.....	1	2
Simple continued fever	.....	.....	.....	.....	.....	....	.....	1	1
Enteric fever	1	17	7	8	.....	2	1	.....	18
Typho-malarial fever	1	.....	.....	1	.....	....	.....	.....	1
Choleraic diarrhœa	.....	1	1	.....	.....	....	.....	5	6
Dysentery	1	15	11	3	.....	1	1	24	40
Malarial fever:									
Intermittent	5	121	114	10	1	...	1	318	444
Remittent	1	30	17	13	.....	....	1	8	39
Erysipelas	.....	2	.....	2	.....	....	.....	2	4
Tubercle	7	31	.....	23	2	7	6	29	67
Syphilis:									
Primary	.....	9	2	6	.....	....	1	17	26
Secondary	6	63	2	60	.....	1	6	293	362
Gonorrhœa	1	21	15	7	.....	....	.....	329	351
Diseases dependent on animal parasites:									
Tænia solium	.....	3	2	1	.....	....	.....	7	10
Tænia mediocanellata	.....	.....	.....	.....	.....	....	.....	2	2
Phthirius inguinalis	.....	.....	.....	.....	.....	....	.....	2	2
Sarcoptes scabiei	.....	1	1	.....	.....	....	.....	3	4
Diseases dependent on vegetable parasites:									
Trichophyton tonsurans	.....	.....	.....	.....	.....	....	.....	3	3
Effects of vegetable poisons	.....	.....	.....	.....	.....	....	.....	6	6
Effects of lead colic	.....	1	1	.....	.....	....	.....	.....	1
Effects of the presence of foreign bodies	.....	.....	.....	.....	.....	....	.....	1	1
Effects of cold	.....	1	1	.....	.....	....	.....	.....	1
Alcoholism	.....	13	9	3	.....	....	1	6	19
Delirium tremens	.....	1	1	.....	.....	....	.....	.....	1
Rheumatic fever	1	30	14	17	.....	....	.....	2	33
Rheumatism	5	41	21	19	.....	....	6	325	371
Osteo arthritis	.....	1	1	.....	.....	....	.....	1	2
New growth:									
Nonmalignant	.....	2	1	1	.....	....	.....	11	13
Malignant	1	1	2	.....	.....	....	.....	.....	2
Anæmia	.....	3	2	.....	.....	....	1	7	10
Diabetus mellitus	1	.....	.....	1	.....	....	.....	3	4
Diabetus insipidus	.....	.....	.....	.....	.....	....	.....	2	2
Debility	.....	5	1	4	.....	....	.....	125	130
Old age	1	.....	.....	.....	.....	1	.....	.....	1
Local Diseases	16	376	233	117	8	17	17	1,659	2,051
DISEASES OF THE NERVOUS SYSTEM	3	18	4	8	2	2	5	88	109
Of the spinal cord and membranes—									
Cord:									
Inflammation	.....	.....	.....	.....	.....	....	.....	1	1
Degeneration—									
Of posterior columns	3	5	.....	3	2	....	3	9	17
Of lateral and posterior columns	.....	.....	.....	.....	.....	....	.....	2	2
Functional nervous disorders with other diseases of undetermined nature:									
Apoplexy	.....	1	.....	.....	.....	1	.....	.....	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE OHIO—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE NERVOUS SYSTEM—Continued.									
Functional nervous disorders with other diseases of undetermined nature—Continued.									
Paralysis—									
Hemiplegia	.....	1	.....	.....	.....	1	.....	.....	1
Local paralysis	.....	1	1	.....	.....	.....	.....	1	2
Incomplete paralysis	.....	1	.....	.....	.....	.....	1	2	3
Spasm	.....	1	.....	1	.....	.....	.....	1	2
Torticollis	.....	.....	.....	.....	.....	.....	.....	1	1
Epilepsy	.....	1	.....	1	.....	.....	.....	1	2
Headache	.....	1	.....	1	.....	.....	.....	2	3
Hyperæsthesia	.....	.....	.....	.....	.....	.....	.....	1	1
Neuralgia	.....	3	2	1	.....	.....	.....	64	67
Nervous weakness	.....	3	1	1	.....	.....	1	3	6
DISEASES OF THE EYE	.....	15	10	5	.....	.....	.....	40	55
Conjunctivitis	.....	9	8	1	.....	.....	.....	32	41
Chronic hyperæmia of conjunctiva	.....	.....	.....	.....	.....	.....	.....	1	1
Keratitis	.....	2	.....	2	.....	.....	.....	1	3
Iritis	.....	3	1	2	.....	.....	.....	1	4
Shrunken eyeball	.....	1	1	.....	.....	.....	.....	.....	1
Ametropia	.....	.....	.....	.....	.....	.....	.....	1	1
Blepharitis	.....	.....	.....	.....	.....	.....	.....	2	2
Sty	.....	.....	.....	.....	.....	.....	.....	2	2
DISEASES OF THE EAR	.....	2	1	1	.....	.....	.....	19	21
Inflammation of the external meatus—									
Acute	.....	.....	.....	.....	.....	.....	.....	1	1
Abscess	.....	.....	.....	.....	.....	.....	.....	1	1
Accumulation of wax or epidermis	.....	.....	.....	.....	.....	.....	.....	5	5
Inflammation of the middle ear—									
Nonsuppurative	.....	.....	.....	.....	.....	.....	.....	6	6
Suppurative	.....	2	1	1	.....	.....	.....	6	8
DISEASES OF THE NOSE	.....	.....	.....	.....	.....	.....	.....	39	39
Inflammation of soft parts	.....	.....	.....	.....	.....	.....	.....	21	21
Inflammation of the naso-pharynx	.....	.....	.....	.....	.....	.....	.....	18	18
DISEASES OF THE CIRCULATORY SYSTEM	1	21	2	15	.....	5	.....	25	47
Pericarditis	.....	2	1	1	.....	.....	.....	.....	2
Valvular disease—									
Aortic	.....	5	1	3	.....	1	.....	.....	5
Mitral	1	9	.....	8	.....	2	.....	15	25
Syncope	.....	.....	.....	.....	.....	.....	.....	1	1
Disordered action of the heart	.....	.....	.....	.....	.....	.....	.....	5	5
Aneurysm of arteries	.....	4	.....	2	.....	2	.....	1	5
Varix	.....	1	.....	1	.....	.....	.....	3	4
DISEASES OF THE RESPIRATORY SYSTEM	1	63	38	20	.....	5	1	322	386
Hay fever	.....	.....	.....	.....	.....	.....	.....	1	1
Inflammation of mucous membrane of larynx—catarrhal	.....	.....	.....	.....	.....	.....	.....	6	6
Bronchitis—									
Catarrhal, acute	.....	18	16	1	.....	1	.....	264	282
Catarrhal, chronic	.....	7	1	6	.....	.....	.....	36	43
Spasmodic asthma	1	3	.....	4	.....	.....	.....	8	12
Pneumonia	.....	26	18	3	.....	4	1	2	28
Chronic interstitial inflammation	.....	4	.....	4	.....	.....	.....	.....	4

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE OHIO—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Pleurisy—									
Acute	.....	4	3	1	.....	....	.....	3	7
Chronic	.....	.....	.....	.....	.....	....	.....	2	2
Empyema	.....	1	.....	1	.....	....	.....	.....	1
DISEASES OF THE DIGESTIVE SYSTEM	1	98	70	21	2	1	5	622	721
Inflammation of the mouth	.....	.....	.....	.....	.....	....	.....	9	9
Caries of dentine and cementum	.....	.....	.....	.....	.....	....	.....	12	12
Inflammation of gums and alveoli	.....	.....	.....	.....	.....	....	.....	2	2
Ulceration of gums and alveoli	.....	.....	.....	.....	.....	....	.....	2	2
Toothache	.....	.....	.....	.....	.....	....	.....	1	1
Ulceration of the tongue	.....	.....	.....	.....	.....	....	.....	1	1
Sore throat	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of tonsils—									
Follicular	.....	6	6	.....	.....	....	.....	14	20
Suppuration	.....	1	1	.....	.....	....	.....	1	2
Hypertrophy of tonsils	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the pharynx—									
Catarrhal	.....	2	2	.....	.....	....	.....	3	5
Follicular	.....	2	2	.....	.....	....	.....	20	22
Inflammation of the stomach—catarrhal	.....	8	6	1	.....	....	1	17	25
Hæmorrhage of the stomach	.....	1	1	.....	.....	....	.....	.....	1
Indigestion	.....	1	1	.....	.....	....	.....	221	222
Pyrosis	.....	.....	.....	.....	.....	....	.....	2	2
Gastralgia	.....	.....	.....	.....	.....	....	.....	10	10
Inflammation of the intestines—									
Enteritis	.....	1	1	.....	.....	....	.....	.....	1
Colitis	.....	1	1	.....	.....	....	.....	.....	1
Catarrhal	.....	18	14	3	1	....	.....	29	47
Fæcal accummulation	.....	.....	.....	.....	.....	....	.....	2	2
Hernia	1	7	5	3	.....	....	.....	66	74
Obstruction of the intestines	.....	1	1	.....	.....	....	.....	.....	1
Constipation	.....	2	2	.....	.....	....	.....	74	76
Colic	.....	2	2	.....	.....	....	.....	1	3
Diarrhœa	.....	24	17	4	.....	....	3	66	90
Enteralgia	.....	.....	.....	.....	.....	....	.....	3	3
Ulceration of the rectum	.....	3	1	2	.....	....	.....	.....	3
Abscess	.....	.....	.....	.....	.....	....	.....	1	1
Fissure of the anus	.....	.....	.....	.....	.....	....	.....	1	1
Fistula in ano	.....	4	1	1	1	....	1	3	7
Prolapse of the anus	.....	1	.....	1	.....	....	.....	.....	1
Piles—									
Internal	.....	3	1	2	.....	....	.....	8	11
External	.....	3	2	1	.....	....	.....	19	22
Mixed	.....	1	1	.....	.....	....	.....	2	3
Inflammation of the liver—									
Acute	.....	.....	.....	.....	.....	....	.....	14	14
Chronic	.....	2	.....	1	.....	1	.....	1	3
Hyperæmia of the liver	.....	2	2	.....	.....	....	.....	7	9
Atrophy of the liver	.....	.....	.....	.....	.....	....	.....	4	4
Jaundice	.....	1	.....	1	.....	....	.....	2	3
Inflammation of hepatic ducts and gall bladder	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the peritonæum	.....	1	.....	1	.....	....	.....	.....	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE OHIO—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE LYMPHATIC SYSTEM	.....	26	22	4	.....	....	.....	33	95
Inflammation of lymphatics	.....	.....	.....	.....	.....	....	.....	1	1
Suppuration of lymph glands	.....	13	12	1	.....	....	.....	23	36
Lymph fistula	.....	13	10	3	.....	....	.....	9	22
DISEASES OF THE THYROID BODY	.....	1	.....	.....	1	....	.....	1	2
Goitre	.....	1	.....	.....	1	....	.....	1	2
DISEASES OF THE URINARY SYSTEM	1	14	4	7	.....	2	2	60	75
Bright's disease	1	4	.....	3	.....	2	.....	17	22
Hæmaturia	.....	.....	.....	.....	.....	....	.....	1	1
Albuminuria	.....	.....	.....	.....	.....	....	.....	4	4
Lithuria	.....	.....	.....	.....	.....	....	.....	6	6
Inflammation of bladder—									
Acute	.....	5	2	3	.....	....	.....	26	31
Chronic	.....	4	2	1	.....	....	1	3	7
Irritability of bladder	.....	.....	.....	.....	.....	....	.....	2	2
Retention of urine	.....	1	.....	.....	.....	....	1	.....	1
Incontinence of urine	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE GENERATIVE SYSTEM	2	59	39	18	.....	2	2	189	250
Gleet	.....	.....	.....	.....	.....	....	.....	19	19
Stricture of urethra—									
Organic	.....	18	9	6	.....	1	2	32	50
Spasmodic	.....	.....	.....	.....	.....	....	.....	1	1
Paraphimosis	.....	1	.....	1	.....	....	.....	.....	1
Inflammation of glans penis	.....	.....	.....	.....	.....	....	.....	2	2
Abscess of penis	.....	.....	.....	.....	.....	....	.....	1	1
Ulcer of penis	2	17	13	6	.....	....	.....	92	111
Œdema of the penis	.....	.....	.....	.....	.....	....	.....	1	1
Soft chancre	.....	7	6	1	.....	....	.....	11	18
Varicocele	.....	.....	.....	.....	.....	....	.....	8	8
Hydrocele of tunica vaginalis	.....	1	1	.....	.....	....	.....	4	5
Inflammation of the testicle—									
Acute orchitis	.....	9	8	1	.....	....	.....	7	16
Chronic orchitis	.....	.....	.....	.....	.....	....	.....	2	2
Epididymitis	2	1	1	.....	.....	....	.....	2	4
Impotence	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the fallopian tube	.....	2	1	1	.....	....	.....	1	3
Inflammation of the uterus	.....	1	.....	1	.....	....	.....	3	4
Ulcer of the vulva	.....	.....	.....	.....	.....	....	.....	1	1
Ectopic gestation	.....	1	.....	.....	.....	1	.....	.....	1
DISEASES OF THE ORGANS OF LOCOMOTION	2	18	8	7	3	....	2	61	81
Necrosis	1	1	1	.....	.....	....	1	.....	2
Ununited fracture or false joint	.....	1	.....	.....	1	....	.....	1	2
Inflammation of joints, synovitis—									
Acute	.....	4	3	1	.....	....	.....	9	13
Chronic	1	2	.....	2	1	....	.....	2	5
Anterior curvature of spine	.....	4	.....	2	1	....	1	3	7
Inflammation of muscles	.....	.....	.....	.....	.....	....	.....	1	1
Suppuration of muscles	.....	1	.....	1	.....	....	.....	.....	1
Myalgia	.....	5	4	1	.....	....	.....	40	45
Inflammation of sheaths of tendons	.....	.....	.....	.....	.....	....	.....	3	3
Inflammation of bursæ	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE CONNECTIVE TISSUE	.....	12	12	.....	.....	....	.....	12	24
Inflammation	.....	3	3	.....	.....	....	.....	4	7
Abscess	.....	9	9	.....	.....	....	.....	8	17

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE OHIO—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE SKIN	5	29	23	11	.....	....	.....	148	182
Erythema	.....	.....	.....	.....	.....	....	.....	6	6
Urticaria	.....	.....	.....	.....	.....	....	.....	7	7
Eczema	.....	4	2	2	.....	....	.....	47	51
Impetigo	.....	.....	.....	.....	.....	....	.....	1	1
Prurigo	.....	.....	.....	.....	.....	....	.....	2	2
Psoriasis	.....	.....	.....	.....	.....	....	.....	2	2
Herpes	.....	2	1	1	.....	....	.....	8	10
Zona	.....	.....	.....	.....	.....	....	.....	2	2
Dermatitis herpetiformis	.....	1	1	.....	.....	....	.....	6	7
Sycosis	.....	.....	.....	.....	.....	....	.....	2	2
Chilblain	.....	1	1	.....	.....	....	.....	.....	1
Frostbite	.....	4	3	1	.....	....	.....	.....	4
Ulcer	4	14	11	7	.....	....	.....	27	45
Boil	.....	1	1	.....	.....	....	.....	24	25
Carbuncle	1	1	2	.....	.....	....	.....	2	4
Whitlow	.....	1	1	.....	.....	....	.....	7	8
Corn	.....	.....	.....	.....	.....	....	.....	4	4
Hyperidrosis	.....	.....	.....	.....	.....	....	.....	1	1
Injuries	**4**	**157**	**101**	**50**	**3**	....	**7**	**206**	**367**
GENERAL INJURIES	1	5	4	2	.....	....	.....	9	15
Burns and scalds	1	2	2	1	.....	....	.....	9	12
Sunstroke	.....	1	.....	1	.....	....	.....	.....	1
Multiple injury	.....	2	2	.....	.....	....	.....	.....	2
LOCAL INJURIES	3	150	95	48	3	....	7	197	350
Wound of veins	.....	1	1	.....	.....	....	.....	4	5
Contusion of muscles	.....	2	2	.....	.....	....	.....	.....	2
Strain of muscles	.....	3	3	.....	.....	....	.....	9	12
Strain of tendons	.....	1	1	.....	.....	....	.....	.....	1
Abrasion of skin	.....	1	1	.....	.....	....	.....	.....	1
Wound of skin	.....	.....	.....	.....	.....	....	.....	2	2
Contusion of scalp	.....	.....	.....	.....	.....	....	.....	2	2
Scalp wound	.....	2	1	1	.....	....	.....	10	12
Effect of irritants	.....	.....	.....	.....	.....	....	.....	1	1
Fracture of the vault of the skull	.....	1	1	.....	.....	....	.....	.....	1
Contusion of face	.....	1	.....	.....	1	....	.....	5	6
Wound of face and mouth	.....	5	3	2	.....	....	.....	3	8
Fracture of the lower jaw	.....	2	1	.....	1	....	.....	.....	2
Contusion of the eyelid	.....	.....	.....	.....	.....	....	.....	1	1
Wound of eyelid	.....	1	.....	.....	.....	....	1	3	4
Contusion of the eyeball	.....	1	1	.....	.....	....	.....	2	3
Foreign bodies in the conjunctiva or cornea	.....	.....	.....	.....	.....	....	.....	8	8
Contusion of pinna	.....	.....	.....	.....	.....	....	.....	1	1
Wound of pinna	.....	1	1	.....	.....	....	.....	1	2
Wound of neck	.....	.....	.....	.....	.....	....	.....	1	1
Foreign body in the food passages	.....	.....	.....	.....	.....	....	.....	1	1
Compression of chest	.....	.....	.....	.....	.....	....	.....	1	1
Contusion of the chest	.....	2	2	.....	.....	....	.....	3	5
Dislocation of costal cartilages	.....	1	1	.....	.....	....	.....	.....	1
Fracture of the ribs	1	1	2	.....	.....	....	.....	2	4
Wound of parietes of chest	.....	1	1	.....	.....	....	.....	.....	1
Penetrating wound of pleura or lung	.....	1	1	.....	.....	....	.....	.....	1
Gunshot wound of chest	.....	1	.....	.....	.....	....	1	.....	1
Contusion of back	.....	4	4	.....	.....	....	.....	3	7
Sprain of back	.....	8	7	1	.....	....	.....	1	9

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE OHIO—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Wound of back	.....	1	1	.....	.....	...	.....	1	2
Contusion of abdomen	.....	2	2	.....	.....	...	.....	.....	2
Wound of parietes of abdomen	.....	1	1	.....	.....	...	.....	.....	1
Contusion of testicle	.....	.....	.....	.....	.....	...	.....	1	1
Contusion of upper extremities	.....	14	8	5	.....	...	1	24	38
Sprain of the shoulder	.....	.....	.....	.....	.....	...	.....	2	2
Sprain of the elbow	.....	.....	.....	.....	.....	...	.....	3	3
Sprain of the wrist	.....	.....	.....	.....	.....	...	.....	6	6
Wound of the upper extremities	.....	19	12	5	.....	...	2	38	57
Fracture of the clavicle	.....	.....	.....	.....	.....	...	.....	1	1
Fracture of the humerus	.....	1	1	.....	.....	...	.....	.....	1
Fracture of the radius	.....	.....	.....	.....	.....	...	.....	1	1
Fracture of the ulna	.....	2	.....	2	.....	...	.....	3	5
Fracture of carpus, metacarpus, and phalanges	.....	3	• 2	1	.....	...	.....	8	11
Dislocation of the phalanges of thumb	.....	.....	.....	.....	.....	...	.....	1	1
Contusion of the lower extremities	.....	17	11	6	.....	...	.....	16	33
Sprain of the knee	.....	5	2	3	.....	...	.....	4	9
Sprain of the ankle	2	16	11	7	.....	...	.....	13	31
Sprain of the foot	.....	1	1	.....	.....	...	.....	.....	1
Internal derangement of joints	.....	1	.....	1	.....	...	.....	.....	1
Wound of the lower extremities	.....	14	6	7	.....	...	1	10	24
Fracture of tibia	.....	1	.....	.....	1	...	.....	.....	1
Fracture of fibula	.....	3	2	.....	.....	...	1	.....	3
Fracture of tibia and fibula	.....	3	.....	3	.....	...	.....	.....	3
Fracture of metatarsus	.....	3	1	2	.....	...	.....	.....	3
Fracture of phalanges of toes	.....	1	.....	1	.....	...	.....	1	2
Dislocation of the foot	.....	1	.....	1	.....	...	.....	.....	1
AMPUTATIONS	.....	2	2	.....	.....	...	.....	.....	2
Amputation of leg	.....	2	2	.....	.....	...	.....	.....	2

THE MISSISSIPPI.

TOTAL CASES	57	1,032	549	425	31	32	52	2,878	3,967
General Diseases	26	544	267	243	12	16	32	1,663	2,233
Cowpox	.....	.....	.....	.....	.....	...	.....	3	3
Measles	.....	1	1	.....	.....	...	.....	.....	1
Rubella	.....	1	1	.....	.....	...	.....	.....	1
Influenza	.....	19	17	2	.....	...	.....	74	93
Whooping cough	.....	1	.....	1	.....	...	.....	.....	1
Mumps	.....	1	1	.....	.....	...	.....	1	2
Simple continued fever	.....	2	2	.....	.....	...	.....	.....	2
Enteric fever	.....	10	7	.....	.....	1	2	.....	10
Dysentery	.....	15	8	5	.....	2	.....	29	44
Malarial fever:									
Intermittent	3	150	136	9	2	1	5	423	576
Remittent	1	38	32	4	.....	1	2	41	80
Erysipelas	.....	3	2	.....	.....	...	1	.....	3
Septicæmia	.....	1	.....	.....	.....	...	1	.....	1
Tubercle	3	82	.....	57	6	7	15	60	145
Syphilis:									
Primary	1	13	.....	14	.....	...	.....	41	55
Secondary	10	78	.....	84	.....	1	3	444	532

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases—Continued.									
Gonorrhœa	.....	40	14	23	2	....	1	227	267
Diseases dependent on animal parasites	.....	1	1	.....	.....	....	.....	2	3
Diseases dependent on vegetable parasites	.....	.....	.....	.....	.....	....	.....	2	2
Effects of vegetable poisons	.....	2	.....	1	.....	1	.....	19	21
Effects of the presence of foreign bodies	.....	.....	.....	.....	.....	....	.....	2	2
Alcoholism	.....	17	9	7	1	....	.....	9	26
Rheumatic fever	1	9	6	4	.....	....	.....	10	20
Rheumatism	4	51	29	23	1	....	2	229	284
Cyst	.....	.....	.....	.....	.....	....	.....	1	1
New growth:									
Nonmalignant	.....	.....	.....	.....	.....	....	.....	7	7
Malignant	.....	4	.....	3	.....	1	.....	7	11
Anæmia	1	2	.....	3	.....	....	.....	16	19
Diabetes mellitus	.....	.....	.....	.....	.....	....	.....	3	3
Debility	2	2	1	3	.....	....	.....	13	17
Old age	.....	1	.....	.....	.....	1	.....	.....	1
Local Diseases	**25**	**317**	**161**	**143**	**15**	**13**	**10**	**1,000**	**1,342**
DISEASES OF THE NERVOUS SYSTEM	1	11	2	7	1	1	1	47	59
Of the spinal cord and membranes—									
Cord:									
Degeneration—									
Of lateral columns	.....	1	.....	.....	.....	....	1	.....	1
Of posterior columns	1	.....	.....	1	.....	....	.....	.....	1
Of the brain and its membranes—									
Membranes:									
Hæmorrhage	.....	1	.....	.....	.....	1	.....	.....	1
Of the brain and its membranes—									
Brain:									
Inflammation	.....	1	.....	1	.....	....	.....	.....	1
Hyperæmia	.....	.....	.....	.....	.....	....	.....	1	1
Functional nervous disorders, with other diseases of undetermined nature:									
Local paralysis	.....	1	.....	1	.....	....	.....	.....	1
Incomplete paralysis	.....	.....	.....	.....	.....	....	.....	1	1
Epilepsy	.....	1	.....	1	.....	....	.....	.....	1
Megrim	.....	1	.....	.....	1	....	.....	2	3
Neuralgia	.....	4	2	2	.....	....	.....	42	46
Nervous weakness	.....	1	.....	1	.....	....	.....	1	2
MENTAL DISEASES	.....	.....	.....	.....	.....	....	.....	2	2
Mania	.....	.....	.....	.....	.....	....	.....	1	1
Melancholia	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE EYE	2	2	1	3	.....	....	.....	19	23
Conjunctivitis	.....	1	1	.....	.....	....	.....	16	17
Iritis	.....	1	.....	1	.....	....	.....	3	4
Atrophy of retina	1	.....	.....	1	.....	....	.....	.....	1
Lenticular cataract	1	.....	.....	1	.....	....	.....	.....	1
DISEASES OF THE EAR	1	2	2	1	.....	....	.....	7	10
Accumulation of wax or epidermis	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the middle ear—									
Nonsuppurative	.....	1	1	.....	.....	....	.....	2	3
Suppurative	1	.....	.....	1	.....	....	.....	2	3
Ulceration of membrana tympani	.....	1	1	.....	.....	....	.....	.....	1
Deafness	.....	.....	.....	.....	.....	....	.....	1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE NOSE	.....	.....	.....	.....	.....	.....	.....	21	21
Inflammation of soft parts	.....	.....	.....	.....	.....	.....	.....	20	20
Inflammation of the naso-pharynx	.....	.....	.....	.....	.....	.....	.....	1	1
DISEASES OF THE CIRCULATORY SYSTEM	.....	22	.....	16	.....	3	3	26	48
Valvular disease—									
Aortic	.....	.....	.....	.....	.....	.....	.....	4	4
Mitral	.....	16	.....	10	.....	3	3	16	32
Degeneration of heart—fatty	.....	1	.....	1	.....	.....	.....	2	3
Angina pectoris	.....	1	.....	1	.....	.....	.....	.....	1
Disordered action of the heart	.....	.....	.....	.....	.....	.....	.....	2	2
Aneurysm of arteries	.....	2	.....	2	.....	.....	.....	1	3
Raynaud's disease	.....	1	.....	1	.....	.....	.....	.....	1
Varix	.....	1	.....	1	.....	.....	.....	1	2
DISEASES OF THE RESPIRATORY SYSTEM	2	46	24	17	2	5	.....	149	197
Inflammation of mucous membrane of larynx—catarrhal	.....	1	.....	.....	.....	1	.....	4	5
Tracheitis	.....	.....	.....	.....	.....	.....	.....	1	1
Bronchitis—									
Catarrhal, acute	2	17	13	5	1	.....	.....	115	134
Catarrhal, chronic	.....	4	1	3	.....	.....	.....	15	19
Spasmodic asthma	.....	2	.....	2	.....	.....	.....	10	12
Congestion of lung	.....	.....	.....	.....	.....	.....	.....	1	1
Pneumonia	.....	14	9	1	.....	4	.....	2	16
Broncho-pneumonia	.....	1	.....	1	.....	.....	.....	.....	1
Pleurisy—									
Acute	.....	4	1	2	1	.....	.....	1	5
Chronic	.....	2	.....	2	.....	.....	.....	.....	2
Empyema	.....	1	.....	1	.....	.....	.....	.....	1
DISEASES OF THE DIGESTIVE SYSTEM	8	71	45	24	5	3	2	400	479
Inflammation of the mouth	.....	.....	.....	.....	.....	.....	.....	2	2
Ulceration of the mouth	.....	.....	.....	.....	.....	.....	.....	3	3
Caries of dentine and cementum	.....	.....	.....	.....	.....	.....	.....	13	13
Inflammation of dental periosteum	.....	1	1	.....	.....	.....	.....	2	3
Inflammation of gums and alveoli	.....	.....	.....	.....	.....	.....	.....	1	1
Ulceration of gums and alveoli	.....	.....	.....	.....	.....	.....	.....	1	1
Toothache	.....	.....	.....	.....	.....	.....	.....	1	1
Ulceration of the tongue	.....	.....	.....	.....	.....	.....	.....	1	1
Sore throat	.....	1	1	.....	.....	.....	.....	10	11
Inflammation of tonsils—									
Follicular	.....	3	2	1	.....	.....	.....	9	12
Suppuration	.....	1	1	.....	.....	.....	.....	1	2
Elongated uvula	.....	.....	.....	.....	.....	.....	.....	2	2
Salivation	.....	.....	.....	.....	.....	.....	.....	3	3
Inflammation of the pharynx—									
Catarrhal	.....	.....	.....	.....	.....	.....	.....	5	5
Follicular	.....	.....	.....	.....	.....	.....	.....	2	2
Dysphagia	.....	1	.....	1	.....	.....	.....	.....	1
Inflammation of the stomach—catarrhal	1	8	6	2	.....	1	.....	15	24
Dilatation of the stomach	.....	2	.....	1	1	.....	.....	.....	2
Indigestion	.....	11	9	2	.....	.....	.....	38	49
Nausea	.....	.....	.....	.....	.....	.....	.....	1	1
Inflammation of the intestines—									
Enteritis	2	.....	1	1	.....	.....	.....	2	4
Typhlitis	.....	.....	.....	.....	.....	.....	.....	2	2
Colitis	.....	2	1	1	.....	.....	.....	1	3
Catarrhal	2	4	5	1	.....	.....	.....	14	20

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Hernia	1	1	.....	1	1	....	.....	55	57
Constipation	.....	2	1	.....	.....	....	1	120	122
Colic	.....	.....	.....	.....	.....	....	.....	3	3
Diarrhœa	1	9	7	3	.....	....	.....	53	63
Inflammation of the rectum	.....	1	1	.....	.....	....	.....	2	3
Periproctitis—abscess	.....	1	1	.....	.....	....	.....	.....	1
Fissure of the anus	.....	.....	.....	.....	.....	....	.....	2	2
Fistula in ano	.....	5	1	2	2	....	.....	3	8
Piles—									
Internal	.....	3	1	1	1	....	.....	9	12
External	.....	3	.....	3	.....	....	.....	9	12
Mixed	.....	2	1	.....	.....	1	.....	.....	2
Pruritus ani	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the liver—chronic	.....	3	.....	2	.....	....	1	2	5
Hyperæmia of the liver	1	.....	.....	1	.....	....	.....	1	2
Degenerations of the liver—fatty	.....	.....	.....	.....	.....	....	.....	1	1
Hypertrophy of the liver	.....	1	.....	1	.....	....	.....	.....	1
Jaundice	.....	5	5	.....	.....	....	.....	5	10
Inflammation of hepatic ducts and gall bladder	.....	.....	.....	.....	.....	....	.....	4	4
Calculi	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the peritonæum	.....	1	.....	.....	.....	1	.....	.....	1
DISEASES OF THE LYMPHATIC SYSTEM	2	20	17	5	.....	....	.....	25	47
Hypertrophy of lymph glands	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of lymphatics	.....	1	.....	1	.....	....	.....	.....	1
Inflammation of lymph glands	1	7	6	2	.....	....	.....	12	20
Suppuration of lymph glands	1	12	11	2	.....	....	.....	12	25
DISEASES OF THE URINARY SYSTEM	4	7	1	7	1	1	1	30	41
Acute nephritis	.....	1	.....	1	.....	....	.....	.....	1
Bright's disease	2	4	.....	4	1	1	.....	9	15
Congestion of kidney	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of bladder—									
Acute	.....	1	.....	1	.....	....	.....	8	9
Subacute	.....	.....	.....	.....	.....	....	.....	1	1
Chronic	2	1	1	1	.....	....	1	4	7
Irritability of bladder	.....	.....	.....	.....	.....	....	.....	4	4
Retention of urine	.....	.....	.....	.....	.....	....	.....	1	1
Incontinence of urine	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE GENERATIVE SYSTEM	.....	80	40	34	3	....	3	152	232
Urethritis	.....	.....	.....	.....	.....	....	.....	10	10
Stricture of urethra—organic	.....	13	4	8	1	....	.....	14	27
Urethral fistula	.....	1	1	.....	.....	....	.....	.....	1
Hypertrophy of the prostate	.....	1	.....	.....	.....	....	1	.....	1
Phimosis	.....	3	2	1	.....	....	.....	1	4
Paraphimosis	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the penis	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of glans penis	.....	1	1	.....	.....	....	.....	.....	1
Ulcer of penis	.....	52	28	22	2	....	.....	84	136
Gangrene of penis	.....	1	1	.....	.....	....	.....	.....	1
Œdema of penis	.....	.....	.....	.....	.....	....	.....	1	1
Soft chancre	.....	4	2	.....	.....	....	2	9	13
Pruritus of the scrotum	.....	.....	.....	.....	.....	....	.....	2	2
Varicocele	.....	1	.....	1	.....	....	.....	3	4
Hydrocele of tunica vaginalis	.....	.....	.....	.....	.....	....	.....	1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Inflammation of the testicle—									
Acute orchitis	.....	2	1	1	.....	....	.....	13	15
Chronic orchitis	.....	1	.....	1	.....	....	.....	1	2
Spermatorrhœa	.....	.....	.....	.....	.....	....	.....	1	1
Impotence	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the uterus	.....	.....	.....	.....	.....	....	.....	4	4
Atrophy of the uterus	.....	.....	.....	.....	.....	....	.....	3	3
Dysmenorrhœa	.....	.....	.....	.....	.....	....	.....	1	1
Leucorrhœa	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE ORGANS OF LOCOMOTION.	1	11	2	9	1	....	.....	24	36
Inflammation of the bones—periostritis	.....	.....	.....	.....	.....	....	.....	3	3
Caries	.....	.....	.....	.....	.....	....	.....	1	1
Necrosis	.....	.....	.....	.....	.....	....	.....	4	4
Inflammation of joints, synovitis—									
Acute	.....	3	1	2	.....	....	.....	2	5
Chronic	.....	2	.....	1	1	....	.....	1	3
Ankylosis	.....	1	.....	1	.....	....	.....	.....	1
Dislocation of articular cartilage	.....	.....	.....	.....	.....	....	.....	1	1
Posterior curvature of spine	1	.....	.....	1	.....	....	.....	.....	1
Lateral curvature of spine	.....	1	.....	1	.....	....	.....	.....	1
Myalgia	.....	3	1	2	.....	....	.....	10	13
Contraction of tendons	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of bursæ	.....	1	.....	1	.....	....	.....	1	2
DISEASES OF THE CONNECTIVE TISSUE	.....	20	12	7	1	....	.....	29	49
Inflammation	.....	3	1	2	.....	....	.....	4	7
Abscess	.....	17	11	5	1	....	.....	22	39
Gangrene	.....	.....	.....	.....	.....	....	.....	2	2
Œdema	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE SKIN	4	25	15	13	1	....	.....	69	98
Urticaria	.....	.....	.....	.....	.....	....	.....	5	5
Prickly heat	.....	.....	.....	.....	.....	....	.....	1	1
Eczema	.....	1	.....	1	.....	....	.....	14	15
Prurigro	.....	.....	.....	.....	.....	....	.....	1	1
Pityriasis rubra	.....	.....	.....	.....	.....	....	.....	1	1
Herpes	.....	.....	.....	.....	.....	....	.....	14	14
Pemphigus	.....	.....	.....	.....	.....	....	.....	1	1
Dermatitis herpetiformis	1	.....	1	.....	.....	....	.....	.....	1
Acne	.....	.....	.....	.....	.....	....	.....	1	1
Chilblain	.....	.....	.....	.....	.....	....	.....	2	2
Frostbite	.....	6	3	3	.....	....	.....	1	7
Ulcer	3	8	3	7	1	....	.....	10	21
Boil	.....	3	3	1	.....	....	.....	6	9
Carbuncle	.....	4	3	.....	.....	....	.....	3	7
Whitlow	.....	2	1	1	.....	....	.....	7	9
Onychia	.....	.....	.....	.....	.....	....	.....	1	1
Wen	.....	1	1	.....	.....	....	.....	.....	1
Pruritus	.....	.....	.....	.....	.....	....	.....	1	1
Injuries	**6**	**171**	**121**	**39**	**4**	**3**	**10**	**215**	**392**
GENERAL INJURIES	.....	14	11	2	.....	1	.....	15	29
Burns and scalds	.....	4	3	.....	.....	1	.....	13	17
Heatstroke	.....	6	4	2	.....	....	.....	1	7
Sunstroke	.....	4	4	.....	.....	....	.....	1	5

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES	6	157	110	37	4	2	10	200	363
Strain of muscles	.....	.....	.....	.....	.....	...	.....	4	4
Contusion of scalp	.....	.....	.....	.....	.....	...	.....	8	8
Scalp wound	.....	5	3	2	.....	...	.....	6	11
Fracture of the base of the skull	.....	1	1	.....	.....	...	.....	1	2
Wound of the skull	.....	.....	.....	.....	.....	...	.....	1	1
Concussion of brain	1	2	1	2	.....	...	.....	.....	3
Contusion of face	.....	2	2	.....	.....	...	.....	4	6
Wound of face and mouth	.....	2	2	.....	.....	...	.....	5	7
Fracture of facial bones	.....	3	1	1	.....	1	.....	.....	3
Foreign bodies in the conjunctiva or cornea	.....	.....	.....	.....	.....	...	.....	4	4
Rupture of membrana tympani	.....	1	.....	1	.....	...	.....	.....	1
Foreign body in external meatus	.....	.....	.....	.....	.....	...	.....	1	1
Contusion of neck	.....	.....	.....	.....	.....	...	.....	1	1
Wound of neck	.....	1	.....	1	.....	...	.....	.....	1
Foreign body in the air passages	.....	.....	.....	.....	.....	...	.....	1	1
Contusion of the chest	1	4	5	.....	.....	...	.....	5	10
Fracture of the ribs	.....	4	4	.....	.....	...	.....	3	7
Wound of parietes of chest	.....	2	2	.....	.....	...	.....	2	4
Penetrating wound of pleura or lung	.....	2	2	.....	.....	...	.....	.....	2
Contusion of back	.....	3	2	.....	.....	...	1	4	7
Sprain of back	.....	9	6	2	.....	...	1	20	29
Wound of back	.....	2	1	1	.....	...	.....	1	3
Concussion of cord	.....	1	.....	1	.....	...	.....	.....	1
Contusion of abdomen	.....	1	1	.....	.....	...	.....	.....	1
Wound of parietes of abdomen	.....	4	4	.....	.....	...	.....	3	7
Contusion of the pelvis	.....	1	.....	1	.....	...	.....	.....	1
Wound of the male urethra, perinæum, scrotum, testis, or penis	.....	1	.....	.....	.....	...	1	.....	1
Contusion of testicle	.....	1	1	.....	.....	...	.....	.....	1
Contusion of upper extremities	.....	7	5	2	.....	...	.....	14	21
Sprain of the shoulder	.....	.....	.....	.....	.....	...	.....	1	1
Sprain of the elbow	.....	1	.....	1	.....	...	.....	2	3
Sprain of the wrist	.....	1	1	.....	.....	...	.....	8	9
Wound of the upper extremities	1	13	11	2	1	...	.....	40	54
Fracture of the clavicle	.....	1	.....	1	.....	...	.....	2	3
Fracture of the humerus	.....	1	1	.....	.....	...	.....	.....	1
Fracture of the radius	.....	1	1	.....	.....	...	.....	.....	1
Fracture of the ulna	.....	1	1	.....	.....	...	.....	.....	1
Fracture of carpus, metacarpus, and phalanges	.....	2	.....	2	.....	...	.....	2	4
Dislocation of the humerus	.....	3	1	1	.....	...	1	.....	3
Contusion of the lower extremities	.....	21	16	3	.....	...	2	20	41
Sprain of the knee	.....	4	3	.....	1	...	.....	4	8
Sprain of the ankle	.....	9	8	1	.....	...	.....	14	23
Sprain of the foot	1	5	4	2	.....	...	.....	4	10
Wound of the lower extremities	1	22	16	6	1	...	.....	14	37
Fracture of femur	1	2	1	2	.....	...	.....	.....	3
Fracture of patella	.....	1	.....	1	.....	...	.....	.....	1
Fracture of tibia	.....	2	1	.....	.....	...	1	.....	2
Fracture of fibula	.....	3	1	1	.....	...	1	.....	3
Fracture of tibia and fibula	.....	2	.....	.....	.....	...	2	.....	2
Dislocation of the fibula	.....	2	1	.....	1	...	.....	1	3
Dislocation of the foot	.....	1	.....	.....	.....	1	.....	.....	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE GREAT LAKES.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
TOTAL CASES	146	1,984	1,287	600	42	61	140	8,831	10,961
General Diseases	54	810	506	270	16	31	41	3,807	4,671
Chicken pox	.....	1	1	.....	.....	.....	.....	.....	1
Measles	.....	9	8	.....	1	.....	.....	3	12
Scarlet fever	.....	1	1	.....	.....	.....	.....	.....	1
Dengue	.....	.....	.....	.....	.....	.....	.....	116	116
Influenza	.....	57	54	3	.....	.....	.....	.....	57
Mumps	.....	4	3	.....	.....	.....	1	6	10
Diphtheria	.....	1	1	.....	.....	.....	.....	.....	1
Simple continued fever	.....	13	11	2	.....	.....	.....	7	20
Enteric fever	8	90	73	10	.....	10	5	13	111
Typho-malarial fever	.....	.....	.....	.....	.....	.....	.....	1	1
Choleraic diarrhœa	.....	4	4	.....	.....	.....	.....	6	10
Epidemic diarrhœa	.....	1	.....	1	.....	.....	.....	23	24
Dysentery	1	16	13	4	.....	.....	.....	13	30
Malarial fever:									
Intermittent	2	57	54	2	.....	1	2	108	167
Remittent	1	27	23	2	1	.....	2	22	50
Erysipelas	.....	4	2	1	.....	.....	1	2	6
Pyæmia	.....	1	.....	.....	.....	.....	1	.....	1
Septicæmia	.....	1	1	.....	.....	.....	.....	1	2
Tubercle	15	63	7	41	6	17	7	138	216
Syphilis:									
Primary	3	16	5	14	.....	.....	.....	94	113
Secondary	5	78	10	67	2	.....	4	974	1,057
Gonorrhœa	1	64	39	21	1	.....	4	1,219	1,284
Diseases dependent on animal parasites:									
Tænia solium	1	7	7	.....	.....	.....	1	9	17
Ascaris lumbricoides	.....	1	1	.....	.....	.....	.....	.....	1
Pediculis capitas	.....	.....	.....	.....	.....	.....	.....	2	2
Pediculis vestimenti	.....	.....	.....	.....	.....	.....	.....	1	1
Phthirius inguinalis	.....	.....	.....	.....	.....	.....	.....	4	4
Acanthia lectularia	.....	.....	.....	.....	.....	.....	.....	2	2
Sarcoptes scabiei	.....	.....	.....	.....	.....	.....	.....	15	15
Diseases dependent on vegetable parasites:									
Trichophyton tonsurans	.....	1	1	.....	.....	.....	.....	18	19
Effects of vegetable poisons	.....	.....	.....	.....	.....	.....	.....	4	4
Effects of inorganic poisons	.....	.....	.....	.....	.....	.....	.....	3	3
Effects of the presence of foreign bodies	.....	1	1	.....	.....	.....	.....	6	7
Effects of mechanical injuries	.....	.....	.....	.....	.....	.....	.....	1	1
Effects of heat	.....	.....	.....	.....	.....	.....	.....	9	9
Alcoholism	.....	36	30	5	1	.....	.....	35	71
Delirium tremens	.....	6	5	1	.....	.....	.....	.....	6
Rheumatic fever	4	31	18	16	.....	.....	1	4	39
Rheumatism	11	189	112	74	4	1	9	716	916
Gout	.....	.....	.....	.....	.....	.....	.....	1	1
Osteo arthritis	1	.....	.....	1	.....	.....	.....	.....	1
Cyst	.....	3	1	2	.....	.....	.....	6	9
New growth:									
Nonmalignant	.....	4	3	.....	.....	.....	1	13	17
Malignant	.....	4	2	1	.....	1	.....	2	6
Anæmia	.....	.....	.....	.....	.....	.....	.....	2	2
Diabetes mellitus	1	.....	.....	.....	.....	1	.....	10	11
Diabetes insipidus	.....	.....	.....	.....	.....	.....	.....	3	3
Congenital malformations:									
Phimosis	.....	5	3	1	.....	.....	1	.....	5
Hypospadiæ fissure of the urethra	.....	.....	.....	.....	.....	.....	.....	1	1
Elongation of the pupuce	.....	.....	.....	.....	.....	.....	.....	1	1
Malposition of testicle	.....	1	1	.....	.....	.....	.....	.....	1
Debility	.....	13	11	1	.....	.....	1	193	206

TABLE VII.--TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases	**61**	**781**	**492**	**232**	**23**	**24**	**71**	**4,323**	**5,165**
DISEASES OF THE NERVOUS SYSTEM	13	46	25	19	2	3	10	232	291
Of the nerves:									
Inflammation	.....	1	1	.....	.....	....	.....	.....	1
Neuritis	.....	.....	.....	.....	.....	....	.....	14	14
Of the spinal cord and membranes—									
Cord:									
Hæmorrhage	.....	2	1	1	.....	....	.....	.....	2
Degeneration of posterior columns	5	4	.....	2	1	2	4	3	12
Of the brain and its membranes—									
Brain:									
Hyperæmia	.....	.....	.....	.....	.....	....	.....	2	2
Anæmia	.....	.....	.....	.....	.....	....	.....	1	1
Functional nervous disorders, with other diseases of undetermined nature:									
Apoplexy	1	.....	.....	.....	.....	....	1	.....	1
Paralysis—									
Hemiplegia	3	5	1	2	.....	1	4	.....	8
Local paralysis	2	1	2	.....	.....	....	1	5	8
Spasm	.....	.....	.....	.....	.....	....	.....	4	4
Torticollis	.....	.....	.....	.....	.....	....	.....	2	2
Epilepsy	1	4	.....	4	1	....	.....	8	13
Vertigo	1	1	.....	2	.....	....	.....	2	4
Headache	.....	1	.....	1	.....	....	.....	17	18
Megrim	.....	.....	.....	.....	.....	....	.....	12	12
Anæsthesia	.....	.....	.....	.....	.....	....	.....	1	1
Neuralgia	.....	26	19	7	.....	....	.....	115	141
Hysteria	.....	.....	.....	.....	.....	....	.....	1	1
Nervous weakness	.....	1	1	.....	.....	....	.....	45	46
MENTAL DISEASES	2	4	.....	5	.....	1	.....	21	27
Melancholia	.....	2	.....	2	.....	....	.....	16	18
Dementia	2	1	.....	3	.....	....	.....	5	8
General paralysis of the insane	.....	1	.....	.....	.....	1	.....	.....	1
DISEASES OF THE EYE	3	26	19	7	2	....	1	95	124
Conjunctivitis	1	7	5	3	.....	....	.....	71	79
Ecchymosis of conjunctiva	.....	.....	.....	.....	.....	....	.....	1	1
Keratitis	.....	4	3	1	.....	....	.....	3	7
Ulceration of cornea	.....	2	.....	1	.....	....	1	.....	2
Opacity of cornea	1	.....	.....	1	.....	....	.....	2	3
Iritis	1	7	7	1	.....	....	.....	2	10
Choroiditis	.....	.....	.....	.....	.....	....	.....	1	1
Atrophy and degeneration of optic nerve or papilla	.....	2	.....	.....	2	....	.....	3	5
Hemorrhage of the retina	.....	.....	.....	.....	.....	....	.....	1	1
Lenticular cataract	.....	.....	.....	.....	.....	....	.....	4	4
Capsular cataract	.....	1	1	.....	.....	....	.....	.....	1
Ametropia	.....	.....	.....	.....	.....	....	.....	1	1
Squint	.....	1	1	.....	.....	....	.....	1	2
Blepharitis	.....	1	1	.....	.....	....	.....	1	2
Sty	.....	1	1	.....	.....	....	.....	2	3
Ecchymosis of eyelid	.....	.....	.....	.....	.....	....	.....	1	1
Blepharospasm	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE EAR	.....	4	1	2	.....	....	1	63	67
Inflammation of the external meatus—									
Acute	.....	.....	.....	.....	.....	....	.....	9	9
Abscess	.....	.....	.....	.....	.....	....	.....	2	2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE EAR—Continued.									
Accumulation of wax or epidermis	.....	.....	.....	.....	.....	....	.....	32	32
Inflammation of the middle ear—									
Nonsuppurative	.....	.....	.....	.....	.....	....	.....	7	7
Suppurative	.....	4	1	2	.....	....	1	7	11
Perforation of membrana tympani	.....	.....	.....	.....	.....	....	.....	6	6
DISEASES OF THE NOSE	.....	1	.....	.....	1	....	.....	86	87
Inflammation of soft parts	.....	1	.....	.....	1	....	.....	78	79
Inflammation of frame work—Necrosis	.....	.....	.....	.....	.....	....	.....	2	2
Epistaxis	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the naso-pharynx	.....	.....	.....	.....	.....	....	.....	4	4
DISEASES OF THE CIRCULATORY SYSTEM	6	47	8	28	1	5	11	178	231
Pericarditis	.....	1	.....	1	.....	....	.....	3	4
Endocarditis	.....	2	.....	.....	.....	2	.....	.....	2
Valvular disease—									
Aortic	.....	6	.....	5	.....	1	.....	21	27
Mitral	3	13	.....	8	.....	2	6	84	100
Degeneration of heart—Fatty	.....	1	.....	1	.....	....	.....	.....	1
Hypertrophy of heart	.....	2	.....	2	.....	....	.....	3	5
Dilatation of heart	.....	1	.....	1	.....	....	.....	2	3
Angina pectoris	.....	.....	.....	.....	.....	....	.....	2	2
Disordered action of the heart	.....	2	.....	2	.....	....	.....	28	30
Endarteritis	1	2	.....	1	.....	....	2	.....	3
Degeneration of arteries	.....	1	.....	1	.....	....	.....	14	15
Aneurysm of arteries	2	5	1	3	1	....	2	4	11
Phlebitis	.....	3	1	1	.....	....	1	2	5
Varix	.....	8	6	2	.....	....	.....	14	22
Dilatation of capillaries	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE RESPIRATORY SYSTEM	4	145	101	33	6	4	5	950	1,099
Hay fever	.....	3	1	1	.....	1	.....	2	5
Inflammation of mucous membrane of larynx—Catarrhal	.....	1	.....	1	.....	....	.....	9	10
Bronchitis—									
Catarrhal, acute	1	70	60	11	.....	....	.....	842	913
Catarrhal, chronic	.....	12	5	7	.....	....	.....	47	59
Spasmodic asthma	.....	8	3	2	2	....	1	15	23
Hæmorrhage of lung	.....	.....	.....	.....	.....	....	.....	2	2
Pneumonia	.....	28	19	2	2	3	2	3	31
Chronic interstitial inflammation	.....	1	.....	.....	.....	....	1	.....	1
Phthisis—Acute	.....	4	.....	3	1	....	.....	2	6
Emphysema	.....	2	.....	2	.....	....	.....	.....	2
Pleurisy—									
Acute	3	15	13	3	1	....	1	19	37
Chronic	.....	.....	.....	.....	.....	....	.....	7	7
Empyema	.....	1	.....	1	.....	....	.....	2	3
DISEASES OF THE DIGESTIVE SYSTEM	12	188	136	35	5	6	18	1,252	1,452
Inflammation of the lips	.....	1	1	.....	.....	....	.....	1	2
Ulceration of the lips	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the mouth	.....	.....	.....	.....	.....	....	.....	6	6
Ulceration of the mouth	.....	.....	.....	.....	.....	....	.....	8	8
Caries of dentine and cementum	.....	.....	.....	.....	.....	....	.....	16	16
Necrosis of dentine and cementum	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of dental periosteum	.....	.....	.....	.....	.....	....	.....	2	2
Abscess of dental periosteum	.....	1	1	.....	.....	....	.....	12	13
Suppuration of the gums	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of gums and alveoli	.....	.....	.....	.....	.....	....	.....	2	2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Toothache	.....	.....	.....	.....	.....	....	.....	4	4
Ulceration of the tongue	.....	.....	.....	.....	.....	....	.....	1	1
Sore throat	.....	1	1	.....	.....	....	.....	15	16
Inflammation of tonsils—									
Follicular	.....	12	12	.....	.....	....	.....	48	60
Suppuration	.....	4	3	1	.....	....	.....	1	5
Hypertrophy of tonsils	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of salivary glands	.....	2	2	.....	.....	....	.....	3	5
Inflammation of the pharynx—									
Catarrhal	.....	3	3	.....	.....	....	.....	50	53
Follicular	.....	.....	.....	.....	.....	....	.....	9	9
Post-pharyngeal abscess	.....	1	.....	1	.....	....	.....	.....	1
Inflammation of the stomach—catarrhal	3	24	17	7	1	....	2	78	115
Ulceration of the stomach—superficial	.....	2	.....	1	1	....	.....	5	7
Hæmatemesis	.....	1	1	.....	.....	....	.....	.....	1
Indigestion	.....	3	1	2	.....	....	.....	304	307
Pyrosis	.....	.....	.....	.....	.....	....	.....	3	3
Gastralgia	.....	.....	.....	.....	.....	....	.....	3	3
Inflammation of the intestines—									
Enteritis	.....	4	2	.....	.....	....	2	2	6
Typhlitis	2	10	10	1	.....	1	.....	1	13
Colitis	.....	2	1	1	.....	....	.....	7	9
Catarrhal	.....	2	2	.....	.....	....	.....	3	5
Ulceration of the intestines	.....	.....	.....	.....	.....	....	.....	2	2
Hæmorrhage of the intestines	.....	.....	.....	.....	.....	....	.....	1	1
Fæcal accumulation	.....	4	4	.....	.....	....	.....	.....	4
Hernia	3	21	15	2	1	1	5	115	139
Internal strangulation of the intestines	.....	1	.....	.....	.....	1	.....	1	2
Stricture of the intestines	.....	2	1	1	.....	....	.....	2	4
Constipation	.....	3	3	.....	.....	....	.....	215	218
Colic	.....	4	3	.....	.....	....	1	10	14
Diarrhœa	2	28	23	4	.....	....	3	161	191
Enteralgia	.....	.....	.....	.....	.....	....	.....	4	4
Inflammation of the rectum	.....	.....	.....	.....	.....	....	.....	1	1
Ulceration of the rectum	1	2	.....	3	.....	....	.....	3	6
Periproctitis—abscess	.....	2	1	1	.....	....	.....	3	5
Fissure of the anus	.....	1	.....	1	.....	....	.....	4	5
Fistula in ano	.....	11	8	3	.....	....	.....	12	23
Prolapse of the anus	.....	1	1	.....	.....	....	.....	.....	4
Piles—									
Internal	.....	5	3	1	1	....	.....	13	18
External	.....	4	3	.....	.....	....	1	39	43
Mixed	.....	1	1	.....	.....	....	.....	2	3
Pruritus ani	.....	.....	.....	.....	.....	....	.....	6	6
Inflammation of the liver—									
Acute	.....	2	2	.....	.....	....	.....	3	5
Abscess	.....	1	.....	.....	.....	1	.....	.....	1
Chronic	.....	5	2	.....	1	1	1	3	8
Hyperæmia of the liver	.....	1	1	.....	.....	....	.....	39	40
Hypertrophy of the liver	.....	.....	.....	.....	.....	....	.....	2	2
Jaundice	1	9	6	1	.....	....	3	10	20
Inflammation of hepatic ducts and gall bladder	.....	4	1	3	.....	....	.....	8	12
Calculi	.....	.....	.....	.....	.....	....	.....	4	4
Inflammation of the peritonæum	.....	2	1	.....	.....	1	.....	1	3
Dropsy	.....	1	.....	1	.....	....	.....	.....	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE LYMPHATIC SYSTEM	4	47	34	9	2	....	6	87	138
Hypertrophy of the spleen	.....	.....	.....	.....	.....	....	.....	2	2
Hypertrophy of lymph glands	.....	.....	.....	.....	.....	....	.....	3	3
Inflammation of lymphatics	.....	2	.....	2	.....	....	.....	.....	2
Inflammation of lymph glands	2	19	15	3	2	....	1	62	83
Suppuration of lymph glands	2	26	19	4	.....	....	5	20	48
DISEASES OF THE THYROID BODY	.....	1	.....	.....	1	....	.....	3	4
Inflammation	.....	1	.....	.....	1	....	.....	.....	1
Hypertrophy	.....	.....	.....	.....	.....	....	.....	1	1
Goitre	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE URINARY SYSTEM	6	34	14	17	1	4	4	144	184
Acute nephritis	.....	1	.....	.....	.....	1	.....	6	7
Bright's disease	3	15	1	11	1	3	2	14	32
Abscess—									
Of kidney	.....	.....	.....	.....	.....	....	.....	1	1
Perinephritic	1	.....	.....	1	.....	....	.....	1	2
Pyelitis	.....	2	1	1	.....	....	.....	.....	2
Congestion of kidney	1	.....	1	.....	.....	....	.....	.....	1
Calculus in kidney	.....	1	1	.....	.....	....	.....	.....	1
Movable kidney	1	.....	.....	.....	.....	....	1	.....	1
Calculus in ureter	.....	1	.....	1	.....	....	.....	1	2
Chyluria	.....	1	.....	.....	.....	....	1	1	2
Albuminuria	.....	.....	.....	.....	.....	....	.....	2	2
Phosphaturia	.....	.....	.....	.....	.....	....	.....	8	8
Inflammation of bladder—									
Acute	.....	9	8	1	.....	....	.....	61	70
Subacute	.....	1	1	.....	.....	....	.....	1	2
Chronic	.....	3	1	2	.....	....	.....	21	24
Irritability of bladder	.....	.....	.....	.....	.....	....	.....	18	18
Retention of urine	.....	.....	.....	.....	.....	....	.....	1	1
Incontinence of urine	.....	.....	.....	.....	.....	....	.....	8	8
DISEASES OF THE GENERATIVE SYSTEM	4	91	65	21	.....	1	8	518	613
Urethritis	.....	.....	.....	.....	.....	....	.....	22	22
Gleet	.....	.....	.....	.....	.....	....	.....	36	36
Abscess of the urethra	.....	.....	.....	.....	.....	....	.....	2	2
Hæmorrhage of the urethra	.....	.....	.....	.....	.....	....	.....	1	1
Stricture of urethra—									
Organic	1	27	15	11	.....	....	2	106	134
Spasmodic	.....	.....	.....	.....	.....	....	.....	7	7
Urethral fistula	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the prostate—chronic	1	.....	.....	.....	.....	1	.....	.....	1
Prostatorrhœa	.....	.....	.....	.....	.....	....	.....	1	1
Abscess of the prostate	.....	.....	.....	.....	.....	....	.....	1	1
Hypertrophy of the prepuce	.....	.....	.....	.....	.....	....	.....	1	1
Phimosis	.....	3	3	.....	.....	....	.....	2	5
Paraphimosis	1	.....	.....	1	.....	....	.....	.....	1
Inflammation of glans penis	.....	1	1	.....	.....	....	.....	9	10
Ulcer of penis	.....	4	1	2	.....	....	1	113	117
Œdema of penis	.....	1	1	1	.....	....	.....	.....	1
Soft chancre	.....	2	.....	1	.....	....	1	49	51
Œdema of the scrotum	.....	1	1	.....	.....	....	.....	1	2
Hydrocele of the spermatic cord	.....	.....	.....	.....	.....	....	.....	2	2
Varicocele	.....	13	13	.....	.....	....	.....	.....	.....
Inflammation of tunica vaginalis	.....	.....	.....	.....	.....	....	.....	36	49
Hydrocele of tunica vaginalis	.....	1	1	.....	.....	....	.....	21	22

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Inflammation of the testicle—									
Acute orchitis	1	17	15	2	.....	....	1	19	37
Chronic orchitis	.....	4	2	1	.....	....	1	15	19
Epididymitis	.....	5	5	.....	.....	....	.....	19	24
Atrophy of the testicle	.....	.....	.....	.....	.....	....	.....	4	4
Spermatorrhœa	.....	.....	.....	.....	.....	....	.....	22	22
Impotence	.....	.....	.....	.....	.....	....	.....	4	4
Inflammation of the ovary	.....	2	2	.....	.....	....	.....	1	3
Prolapse	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the uterus	.....	8	4	3	.....	....	1	3	11
Anteversion	.....	.....	.....	.....	.....	....	.....	1	1
Retroversion	.....	1	.....	.....	.....	....	1	1	2
Inflammation of the vagina	.....	.....	.....	.....	.....	....	.....	5	5
Dysmenorrhœa	.....	.....	.....	.....	.....	....	.....	1	1
Menorrhagia	.....	.....	.....	.....	.....	....	.....	2	2
Leucorrhœa	.....	.....	.....	.....	.....	....	.....	4	4
Abortion	.....	1	1	.....	.....	....	.....	.....	1
Inflammation of the mammary gland	.....	.....	.....	.....	.....	....	.....	3	3
Inflammation of the male breast	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE ORGANS OF LOCOMOTION	.....	47	20	20	1	....	6	127	174
Inflammation of the bones—									
Osteitis	.....	3	.....	3	.....	....	.....	.....	3
Periostitis	.....	5	3	2	.....	....	.....	10	15
Chronic abscess of bones	.....	.....	.....	.....	.....	....	.....	1	1
Caries	.....	5	3	1	.....	....	1	1	6
Necrosis	.....	5	3	1	.....	....	1	3	8
Ununited fracture or false joint	.....	2	1	1	.....	....	.....	.....	2
Inflammation of joints—									
Synovitis, acute	.....	8	4	3	.....	....	1	11	19
Synovitis, chronic	.....	3	.....	3	.....	....	.....	1	4
Suppuration	.....	1	.....	1	.....	....	.....	.....	1
Ankylosis	.....	2	1	.....	1	....	.....	10	12
Loose body in joint	.....	.....	.....	.....	.....	....	.....	1	1
Psoas, lumbar, and other abscesses	.....	1	.....	.....	.....	....	1	.....	1
Inflammation of muscles	.....	.....	.....	.....	.....	....	.....	1	1
Suppuration of muscles	.....	1	.....	1	.....	....	.....	2	3
Atrophy of the muscles	.....	.....	.....	.....	.....	....	.....	1	1
Myalgia	.....	8	2	4	.....	....	2	72	80
Inflammation of tendons	.....	.....	.....	.....	.....	....	.....	4	4
Ganglion	.....	1	1	.....	.....	....	.....	1	2
Inflammation of bursæ	.....	2	2	.....	.....	....	.....	7	9
Flat foot	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE CONNECTIVE TISSUE	1	33	20	14	.....	....	.....	69	103
Inflammation	.....	10	4	6	.....	....	.....	28	38
Abscess	1	21	16	6	.....	....	.....	37	59
Gangrene	.....	.....	.....	.....	.....	....	.....	1	1
Œdema	.....	2	.....	2	.....	....	.....	3	5
DISEASES OF THE SKIN	6	67	49	22	1	....	1	498	571
Erythema	.....	1	.....	1	.....	....	.....	15	16
Urticaria	.....	.....	.....	.....	.....	....	.....	10	10
Prickly heat	.....	.....	.....	.....	.....	....	.....	6	6
Eczema	.....	4	3	1	.....	....	.....	105	109
Pityriasis rubra	.....	.....	.....	.....	.....	....	.....	4	4
Psoriasis	.....	.....	.....	.....	.....	....	.....	28	28

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE SKIN—Continued.									
Herpes	.....	.....	.....	.....	.....	...	.....	16	16
Zona	.....	.....	.....	.....	.....	...	.....	5	5
Dermatitis herpetiformis	.....	1	1	.....	.....	...	.....	4	5
Acne	.....	.....	.....	.....	.....	...	.....	33	33
Gutta rosea	.....	.....	.....	.....	.....	...	.....	5	5
Sycosis	.....	.....	.....	.....	.....	...	.....	17	17
Chloasma	.....	.....	.....	.....	.....	...	.....	4	4
Alopecia	.....	.....	.....	.....	.....	...	.....	3	3
Frostbite	.....	2	.....	2	.....	...	.....	8	10
Ulcer	2	26	19	9	.....	...	.....	94	122
Cicatrices	.....	1	1	.....	.....	...	.....	1	2
Boil	.....	10	10	.....	.....	...	.....	78	88
Carbuncle	1	8	4	4	.....	...	1	17	26
Whitlow	1	7	6	2	.....	...	.....	8	16
Onychia	1	2	2	.....	1	...	.....	10	13
Corn	.....	.....	.....	.....	.....	...	.....	3	3
Pruritus	.....	.....	.....	.....	.....	...	.....	11	11
Lupus	.....	3	3	.....	.....	...	.....	3	6
Wen	1	2	.....	3	.....	...	.....	8	11
Adenoma sebaceum	.....	.....	.....	.....	.....	...	.....	1	1
Rhinoscleroma	.....	.....	.....	.....	.....	...	.....	1	1
Injuries	**31**	**393**	**289**	**98**	**3**	**6**	**28**	**701**	**1,125**
GENERAL INJURIES	6	30	20	12	.....	1	3	37	73
Burns and scalds	5	28	17	12	.....	1	3	35	68
Heatstroke	.....	2	2	.....	.....	...	.....	.....	2
Multiple injury	1	.....	1	.....	.....	...	.....	2	3
LOCAL INJURIES	25	362	268	86	3	5	25	663	1,050
Contusion of nerves	.....	.....	.....	.....	.....	...	.....	1	1
Contusion of muscles	.....	.....	.....	.....	.....	...	.....	4	4
Strain of muscles	.....	3	1	2	.....	...	.....	19	22
Rupture of muscles	.....	1	.....	1	.....	...	.....	.....	1
Contusion of skin	.....	1	1	.....	.....	...	.....	1	2
Abrasion of skin	.....	.....	.....	.....	.....	...	.....	1	1
Wound of skin	.....	1	1	.....	.....	...	.....	2	3
Burn of skin	.....	.....	.....	.....	.....	...	.....	4	4
Abrasion of mucous membrane	.....	.....	.....	.....	.....	...	.....	1	1
Wound of mucous membrane	.....	.....	.....	.....	.....	...	.....	2	2
Contusion of scalp	.....	1	1	.....	.....	...	.....	.....	1
Scalp wound	.....	15	8	7	.....	...	.....	28	43
Contusion of skull	.....	1	.....	.....	1	...	.....	1	2
Fracture of the vault of the skull	.....	1	.....	.....	.....	...	1	.....	1
Fracture of the base of the skull	.....	3	.....	.....	.....	2	1	.....	3
Concussion of brain	.....	1	1	.....	.....	...	.....	1	2
Contusion of face	.....	7	5	1	.....	...	1	.....	7
Wound of face and mouth	2	9	9	2	.....	...	.....	19	30
Fracture of facial bones	2	2	3	1	.....	...	.....	1	5
Contusion of the eyelid	.....	.....	.....	.....	.....	...	.....	3	3
Wound of conjunctiva	.....	1	.....	.....	.....	...	1	1	2
Foreign bodies in the conjunctiva or cornea	.....	2	2	.....	.....	...	.....	28	30
Wound of the eyeball	.....	2	1	.....	.....	...	1	.....	2
Wound of pinna	.....	1	.....	1	.....	...	.....	1	2
Wound of neck	.....	.....	.....	.....	.....	...	.....	3	3
Foreign body in the food passages	.....	.....	.....	.....	.....	...	.....	1	1
Contusion of the chest	.....	10	7	2	.....	...	1	24	34

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Dislocation of costal cartilages	.....	1	1	.....	.....	....	.....	.....	1
Fracture of the ribs	.....	12	10	2	.....	....	.....	5	17
Wound of parietes of chest	.....	3	3	.....	.....	....	.....	.....	3
Penetrating wound of pleura or lung	.....	1	1	.....	.....	....	.....	.....	1
Contusion of back	.....	15	10	4	.....	....	1	25	40
Sprain of back	.....	8	5	1	.....	....	2	37	45
Wound of back	.....	1	1	.....	.....	....	.....	1	2
Fracture of spine	.....	.....	.....	.....	.....	....	.....	1	1
Dislocation of spine	.....	1	.....	1	.....	....	.....	.....	1
Concussion of cord	.....	1	.....	1	.....	....	.....	.....	1
Contusion of abdomen	.....	2	2	.....	.....	....	.....	2	4
Wound of parietes of abdomen	.....	1	.....	1	.....	....	.....	.....	1
Contusion of the pelvis	.....	1	1	.....	.....	....	.....	.....	1
Wound of the male urethra, perinæum, scrotum, testis, or penis	.....	2	.....	1	.....	....	1	2	4
Foreign body in the bladder	.....	1	.....	1	.....	....	.....	.....	1
Contusion of testicle	.....	.....	.....	.....	.....	....	.....	1	1
Contusion of upper extremities	1	22	16	5	.....	....	2	69	92
Sprain of the shoulder	.....	1	1	.....	.....	....	.....	4	5
Sprain of the elbow	.....	.....	.....	.....	.....	....	.....	2	2
Sprain of the wrist	.....	4	4	.....	.....	....	.....	16	20
Sprain of hand	.....	.....	.....	.....	.....	....	.....	1	1
Sprain of thumb	.....	.....	.....	.....	.....	....	.....	6	6
Wound of the upper extremities	2	39	26	11	.....	1	3	162	203
Wound of joint, upper extremities	.....	1	1	.....	.....	....	.....	5	6
Fracture of the clavicle	1	3	3	1	.....	....	.....	1	5
Fracture of the scapula	.....	.....	.....	.....	.....	....	.....	1	1
Fracture of the humerus	.....	8	2	5	1	....	.....	1	9
Fracture of the radius	2	10	6	4	.....	....	2	5	17
Fracture of the ulna	.....	4	3	.....	.....	....	1	1	5
Fracture of both bones of forearm	1	2	3	.....	.....	....	.....	3	6
Fracture of carpus, metacarpus, and phalanges	1	4	3	2	.....	....	.....	4	9
Dislocation of the clavicle	.....	1	1	.....	.....	....	.....	1	2
Dislocation of the scapula	.....	.....	.....	.....	.....	....	.....	2	2
Dislocation of the humerus	1	10	7	4	.....	....	.....	.....	11
Dislocation of the radius and ulna	.....	2	2	.....	.....	....	.....	.....	2
Dislocation of the phalanges of thumb	.....	.....	.....	.....	.....	....	.....	1	1
Contusion of the lower extremities	3	50	43	7	.....	....	3	58	111
Sprain of the hip	.....	1	1	.....	.....	....	.....	.....	1
Sprain of the knee	.....	1	1	.....	.....	....	.....	9	10
Sprain of the ankle	.....	30	22	7	1	....	.....	31	61
Sprain of the foot	.....	1	1	.....	.....	....	.....	1	2
Wound of the lower extremities	3	27	23	4	.....	1	2	49	79
Wound of joint, lower extremities	.....	3	3	.....	.....	....	.....	4	7
Fracture of femur	3	4	5	1	.....	1	.....	1	8
Fracture of tibia	.....	4	4	.....	.....	....	.....	1	5
Fracture of fibula	.....	6	3	3	.....	....	.....	.....	6
Fracture of tibia and fibula	3	6	5	2	.....	....	2	.....	9
Fracture of phalanges of toes	.....	5	4	1	.....	....	.....	.....	5
Dislocation of the fibula with fracture of fibula	.....	1	1	.....	.....	....	.....	4	5
AMPUTATIONS	.....	1	1	.....	.....	....	.....	1	2
Amputation of fingers	.....	1	1	.....	.....	....	.....	1	2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE PACIFIC.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
TOTAL CASES	**108**	**1,302**	**768**	**430**	**38**	**62**	**112**	**4,104**	**5,514**
General Diseases	**33**	**414**	**211**	**166**	**18**	**25**	**27**	**1,559**	**2,006**
Measles	.....	6	6	.....	.....	....	.....	1	7
Influenza	.....	7	7	.....	.....	....	.....	25	32
Diphtheria	.....	1	1	.....	.....	....	.....	.....	1
Simple continued fever	.....	.....	.....	.....	.....	....	.....	7	7
Enteric fever	2	9	8	.....	.....	3	.....	1	12
Dysentery	.....	12	7	2	.....	1	2	1	13
Malarial fever:									
Intermittent	.....	38	31	6	1	....	.....	78	116
Remittent	1	6	7	.....	.....	....	.....	9	16
Erysipelas	.....	5	5	.....	.....	....	.....	.....	5
Tubercle	4	45	.....	23	4	15	7	37	86
Leprosy	1	.....	.....	.....	.....	....	1	.....	1
Syphilis:									
Primary	5	12	.....	15	1	....	1	14	31
Secondary	4	40	.....	48	1	2	1	321	373
Gonorrhœa	.....	54	33	16	2	....	3	601	655
Diseases dependent on animal parasites	.....	2	2	.....	.....	....	.....	12	14
Diseases dependent on vegetable parasites	.....	.....	.....	.....	.....	....	.....	5	5
Effects of vegetable poisons	.....	.....	.....	.....	.....	....	.....	2	2
Effects of the presence of foreign bodies	.....	.....	.....	.....	.....	....	.....	3	3
Effects of heat	.....	1	1	.....	.....	....	.....	.....	1
Effects of cold	.....	2	1	1	.....	....	.....	8	10
Scurvy	.....	.....	.....	.....	.....	....	.....	1	1
Alcoholism	.....	13	9	2	1	1	.....	22	35
Delirium tremens	.....	1	.....	.....	.....	1	.....	.....	1
Rheumatic fever	3	28	19	11	1	....	.....	3	34
Rheumatism	10	107	65	39	3	1	9	366	483
Gout	.....	.....	.....	.....	.....	....	.....	3	3
Osteoarthritis	1	.....	.....	.....	.....	....	1	.....	1
Cyst	.....	2	2	.....	.....	....	.....	1	3
New growth:									
Nonmalignant	.....	3	2	.....	1	....	.....	11	14
Maglignant	1	6	1	.....	3	1	2	.....	7
Anæmia	.....	.....	.....	.....	.....	....	.....	5	5
Hodgkin's disease	.....	1	1	.....	.....	....	.....	.....	1
Diabetes mellitus	.....	1	.....	1	.....	....	.....	3	4
Debility	1	4	3	2	.....	....	.....	19	24
Local Diseases	**57**	**600**	**359**	**194**	**16**	**31**	**57**	**1,975**	**2,632**
DISEASES OF THE NERVOUS SYSTEM	14	37	16	17	2	6	10	108	159
Of the nerves:									
Inflammation	1	1	1	1	.....	....	.....	.....	2
Of the spinal cord and membranes—Cord:									
Degeneration—									
Of lateral columns	2	.....	.....	.....	.....	....	2	.....	2
Of posterior columns	2	.....	.....	.....	.....	....	2	.....	2
Of the brain and its membranes—Brain:									
Inflammation	.....	2	.....	.....	.....	2	.....	.....	2
Hemmorrhage	.....	3	1	.....	.....	....	2	.....	3
Hyperæmia	.....	1	.....	1	.....	....	.....	.....	1
Functional nervous disorders, with other diseases of undetermined nature:									
Paralysis—									
Hemiplegia	3	1	.....	2	.....	2	.....	2	6
Local paralysis	1	3	.....	3	.....	1	.....	17	21

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE NERVOUS SYSTEM—Continued.									
Functional nervous disorders, with other diseases of undetermined nature—Continued.									
Incomplete paralysis	.....	3	.....	2	.....	....	1	2	5
Paralysis from acute disease	.....	1	1	.....	.....	....	.....	.....	1
Epilepsy	2	2	.....	2	1	1	.....	.....	4
Vertigo	1	2	1	.....	1	....	1	.....	3
Headache	.....	.....	.....	.....	.....	....	.....	8	8
Megrim	.....	.....	.....	.....	.....	....	.....	4	4
Neuralgia	2	18	12	6	.....	....	2	75	95
MENTAL DISEASES	.....	1	.....	1	.....	....	.....	3	4
Melancholia	.....	.....	.....	.....	.....	....	.....	3	3
Delusional insanity	.....	1	.....	1	.....	....	.....	.....	1
DISEASES OF THE EYE	1	8	2	6	.....	....	1	41	50
Conjuntivitis	.....	4	2	2	.....	....	.....	34	38
Ulceration of cornea	.....	1	.....	1	.....	....	.....	1	2
Iritis	.....	.....	.....	.....	.....	....	.....	3	3
Atrophy and degeneration of optic nerve or papila	1	.....	.....	.....	.....	....	1	.....	1
Retinitis	.....	1	.....	1	.....	....	.....	1	2
Lenticular cataract	.....	2	.....	2	.....	....	.....	.....	2
Epiphora	.....	.....	.....	.....	.....	....	.....	1	1
Sty	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE EAR	.....	3	1	1	1	....	.....	23	26
Inflammation of the external meatus—									
Acute	.....	.....	.....	.....	.....	....	.....	1	1
Abscess	.....	.....	.....	.....	.....	....	.....	1	1
Accumulation of wax or epidermis	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the middle ear—									
Nonsuppurative	.....	1	.....	1	.....	....	.....	3	4
Suppurative	.....	1	.....	.....	1	....	.....	6	7
Perforation of membrana tympani	.....	1	1	.....	.....	....	.....	9	10
Deafness	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE NOSE	.....	.....	.....	.....	.....	....	.....	21	21
Inflammation of soft parts	.....	.....	.....	.....	.....	....	.....	18	18
Epistaxis	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the accessory sinuses	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the naso-pharynx	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE CIRCULATORY SYSTEM	5	31	2	19	.....	6	9	42	78
Endocarditis	.....	1	.....	1	.....	....	.....	.....	1
Valvular disease—									
Aortic	.....	5	.....	3	.....	1	1	10	15
Mitral	3	15	.....	12	.....	3	3	15	33
Dilatation of heart	.....	.....	.....	.....	.....	....	.....	1	1
Angina pectoris	.....	1	.....	1	.....	....	.....	.....	1
Disordered action of the heart	.....	.....	.....	.....	.....	....	.....	10	10
Aneurysm of arteries	1	3	.....	.....	.....	2	2	.....	4
Embolism	1	.....	1	.....	.....	....	.....	.....	1
Phlebitis	.....	1	.....	1	.....	....	.....	.....	1
Varix	.....	5	1	1	.....	....	3	6	11

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM	11	117	74	39	2	7	6	415	543
Inflammation of mucous membrane of larynx—Catarrhal	.....	3	.....	3	.....	.....	.....	5	8
Bronchitis—									
Catarrhal, acute	5	62	48	16	.....	3	.....	266	333
Catarrhal, chronic	1	13	2	7	1	....	4	107	121
Spasmodic asthma	2	1	2	1	.....	....	.....	18	21
Congestion of lung	.....	2	.....	2	.....	....	.....	.....	2
Hemorrhage of lung	.....	3	2	1	.....	....	.....	1	4
Pneumonia	.....	10	4	1	.....	4	1	1	11
Phthisis—Chronic	.....	1	.....	1	.....	....	.....	.....	1
Pleurisy—									
Acute	.....	20	14	5	1	....	.....	16	36
Chronic	.....	1	.....	1	.....	....	.....	1	2
Empyema	3	.....	2	.....	.....	....	1	.....	3
Hydrothorax	.....	1	.....	1	.....	....	.....	.....	1
DISEASES OF THE DIGESTIVE SYSTEM	6	153	110	29	5	7	8	537	696
Ulceration of the lips	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the mouth	.....	.....	.....	.....	.....	....	.....	3	3
Ulceration of the mouth	.....	.....	.....	.....	.....	....	.....	5	5
Caries of dentine and cementum	.....	.....	.....	.....	.....	....	.....	22	22
Abscess of dental periosteum	.....	3	3	.....	.....	....	.....	3	6
Ulceration of gums and alveoli	.....	.....	.....	.....	.....	....	.....	2	2
Toothache	.....	.....	.....	.....	.....	....	.....	6	6
Inflammation of the tongue	.....	2	.....	1	1	....	.....	2	4
Ulceration of the tongue	.....	.....	.....	.....	.....	....	.....	1	1
Sore throat	.....	4	3	1	.....	....	.....	18	22
Inflammation of tonsils—									
Follicular	.....	5	4	1	.....	....	.....	23	28
Suppuration	1	10	11	.....	.....	....	.....	6	17
Hypertrophy of tonsils	.....	.....	.....	.....	.....	....	.....	1	1
Salivation	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the pharynx—									
Catarrhal	.....	1	1	.....	.....	....	.....	18	19
Follicular	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the stomach—catarrhal	.....	39	29	8	1	....	1	90	129
Perforation of the stomach	.....	1	.....	.....	.....	1	.....	.....	1
Indigestion	.....	7	5	2	.....	....	.....	123	130
Vomiting	.....	.....	.....	.....	.....	....	.....	1	1
Gastralgia	.....	.....	.....	.....	.....	....	.....	1	1
Loss of appetite	.....	.....	.....	.....	.....	....	.....	2	2
Inflammation of the intestines—									
Typhlitis	1	8	5	1	.....	2	1	.....	9
Colitis	.....	1	1	.....	.....	....	.....	10	11
Catarrhal	.....	10	6	4	.....	....	.....	2	12
Fistula of the intestines	.....	1	1	.....	.....	....	.....	1	2
Fæcal accumulation	.....	2	2	.....	.....	....	.....	3	5
Tympanitis	1	.....	1	.....	.....	....	.....	.....	1
Hernia	1	30	21	2	3	1	4	65	96
Obstruction of the intestines	.....	1	1	.....	.....	....	.....	.....	1
Constipation	.....	1	.....	1	.....	....	.....	36	33
Colic	.....	1	1	.....	.....	....	.....	2	7
Diarrhœa	.....	1	1	.....	.....	....	.....	43	44
Periproctitis—abscess	.....	1	1	.....	.....	....	.....	.....	1
Fissure of the anus	.....	.....	.....	.....	.....	....	.....	3	3
Fistula in ano	.....	7	4	2	.....	....	1	.....	7

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Piles—									
Internal	.....	2	2	.....	.....	....	.....	8	10
External	.....	3	2	1	.....	....	.....	8	11
Mixed	.....	3	2	1	.....	....	.....	6	9
Pruritus ani	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the liver—									
Acute	.....	1	1	.....	.....	....	.....	.....	1
Abscess	.....	1	1	.....	.....	....	.....	.....	1
Chronic	2	2	.....	1	.....	2	1	4	8
Hyperæmia of the liver	.....	3	1	2	.....	....	.....	7	10
Jaundice	.....	1	.....	1	.....	....	.....	5	6
Dropsy	.....	1	.....	.....	.....	1	.....	2	3
DISEASES OF THE LYMPHATIC SYSTEM	1	17	13	3	.....	....	2	28	46
Inflammation of lymph glands	.....	11	9	1	.....	....	1	27	38
Suppuration of lymph glands	1	6	4	2	.....	....	1	1	8
DISEASES OF THE URINARY SYSTEM	1	34	7	20	.....	5	3	70	105
Acute nephritis	.....	6	2	3	.....	1	.....	.....	6
Bright's disease	.....	16	.....	11	.....	3	2	12	28
Calculus in kidney	.....	1	.....	1	.....	....	.....	.....	1
Hæmaturia	.....	.....	.....	.....	.....	....	.....	1	1
Lithuria	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of bladder—									
Acute	1	7	4	2	.....	1	1	34	42
Subacute	.....	.....	.....	.....	.....	....	.....	3	3
Chronic	.....	4	1	3	.....	....	.....	18	22
Irritability of bladder	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE GENERATIVE SYSTEM	1	75	47	22	2	....	5	217	293
Urethritis	.....	.....	.....	.....	.....	....	.....	4	4
Gleet	.....	.....	.....	.....	.....	....	.....	2	2
Stricture of urethra—									
Organic	.....	20	12	5	1	....	2	48	68
Traumatic	.....	1	1	.....	.....	....	.....	2	3
Spasmodic	.....	1	1	.....	.....	....	.....	.....	1
Hypertrophy of the prostate	.....	1	.....	1	.....	....	.....	.....	1
Phimosis	.....	7	6	.....	.....	....	1	.....	7
Paraphimosis	.....	1	.....	1	.....	....	.....	1	2
nflammation of glans penis	.....	.....	.....	.....	.....	....	.....	3	3
Ulcer of penis	.....	12	6	6	.....	....	.....	82	94
Soft chancre	.....	7	4	3	.....	....	.....	21	28
Inflammation of the scrotum	.....	.....	.....	.....	.....	....	.....	1	1
Varicocele	.....	4	1	2	.....	....	1	4	8
Hydrocele of tunica vaginalis	.....	2	2	.....	.....	....	.....	1	3
Inflammation of the testicle—									
Acute orchitis	.....	12	9	1	1	....	1	13	25
Chronic orchitis	.....	.....	.....	.....	.....	....	.....	3	3
Epididymitis	1	5	4	2	.....	....	.....	15	21
Spermatorrhœa	.....	1	.....	1	.....	....	.....	15	16
Dysmenorrhœa	.....	1	1	.....	.....	....	.....	.....	1
Leucorrhœa	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE ORGANS OF LOCOMOTION	4	36	23	12	2	....	3	72	112
Inflammation of the bones—									
Osteitis	.....	2	2	.....	.....	....	.....	1	3
Caries	.....	8	5	2	.....	....	1	.....	8

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE ORGANS OF LOCOMOTION—Continued.									
Inflammation of bones—Continued.									
Necrosis	.....	8	4	4	.....	....	.....	4	12
Inflammation of joints, synovitis—									
Acute	1	5	3	3	.....	....	.....	4	10
Chronic	.....	1	.....	1	.....	....	.....	2	3
Senile degeneration of cartilage	2	.....	.....	1	.....	....	1	.....	2
Ankylosis	.....	3	.....	.....	2	....	1	.....	3
Loose body in joint	.....	2	2	.....	.....	....	.....	.....	2
Posterior curvature of spine	1	.....	.....	1	.....	....	.....	.....	1
Myalgia	.....	5	5	.....	.....	....	.....	49	54
Inflammation of tendons	.....	.....	.....	.....	.....	....	.....	1	1
Ganglion	.....	1	1	.....	.....	....	.....	1	2
Inflammation of bursæ	.....	.....	.....	.....	.....	....	.....	9	9
Abscess of bursæ	.....	1	1	.....	.....	....	.....	.....	1
Flat foot	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE CONNECTIVE TISSUE	4	36	29	6	1	....	4	89	129
Inflammation	1	8	6	1	.....	....	2	22	31
Abscess	3	28	23	5	1	....	2	67	98
DISEASES OF THE SKIN	9	52	35	19	1	....	6	309	370
Erythema	.....	.....	.....	.....	.....	....	.....	5	5
Urticaria	.....	.....	.....	.....	.....	....	.....	22	22
Eczema	1	7	3	5	.....	....	.....	79	87
Intertrigo	.....	.....	.....	.....	.....	....	.....	4	4
Impetigo	.....	.....	.....	.....	.....	....	.....	1	1
Prurigro	.....	.....	.....	.....	.....	....	.....	6	6
Psoriasis	.....	1	.....	.....	.....	....	1	4	5
Herpes	.....	.....	.....	.....	.....	....	.....	9	9
Zona	.....	1	1	.....	.....	....	.....	4	5
Pemphigus	.....	.....	.....	.....	.....	....	.....	1	1
Acne	.....	.....	.....	.....	.....	....	.....	7	7
Sycosis	.....	.....	.....	.....	.....	....	.....	4	4
Chilblain	.....	.....	.....	.....	.....	....	.....	1	1
Frostbite	2	.....	1	1	.....	....	.....	.....	2
Ulcer	5	24	17	8	1	....	3	75	104
Cicatrices	.....	1	.....	.....	.....	....	1	1	2
Boil	.....	13	8	5	.....	....	.....	48	61
Carbuncle	.....	2	1	.....	.....	....	1	3	5
Whitlow	.....	.....	.....	.....	.....	....	.....	15	15
Onychia	1	.....	1	.....	.....	....	.....	7	8
Corn	.....	.....	.....	.....	.....	....	.....	6	6
Cheloid	.....	.....	.....	.....	.....	....	.....	1	1
Wen	.....	3	3	.....	.....	....	.....	4	7
Pruritus	.....	.....	.....	.....	.....	....	.....	2	2
Injuries	**18**	**288**	**198**	**70**	**4**	**6**	**28**	**570**	**876**
GENERAL INJURIES	.....	18	12	3	.....	2	1	22	40
Burns and scalds	.....	15	12	2	.....	....	1	19	34
Heatsroke	.....	.....	.....	.....	.....	....	.....	1	1
Effects of cold	.....	.....	.....	.....	.....	....	.....	1	1
Multiple injury	.....	2	.....	1	.....	1	.....	.....	2
Suffocation from coal gas	.....	1	.....	.....	.....	1	.....	1	2
LOCAL INJURIES	18	270	186	67	4	4	27	548	836
Rupture of veins	.....	2	2	.....	.....	....	.....	.....	2
Strain of muscles	.....	1	1	.....	.....	....	.....	7	8

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Wound of tendons	.....	1	.....	1	.....	....	.....	.....	1
Contusion of scalp	.....	1	1	.....	.....	....	.....	2	3
Scalp wound	.....	8	5	3	.....	....	.....	14	22
Contusion of skull	.....	2	2	.....	.....	....	.....	.....	2
Fracture of the vault of the skull	.....	2	1	1	.....	....	.....	.....	2
Wound of the skull	.....	1	.....	.....	.....	1	.....	.....	1
Concussion of brain	.....	.....	.....	.....	.....	....	.....	1	1
Contusion of face	.....	4	2	2	.....	....	.....	8	12
Wound of face and mouth	.....	5	5	.....	.....	....	.....	18	23
Fracture of facial bones	.....	5	.....	4	.....	....	1	1	6
Wound of eyelid	.....	1	.....	1	.....	....	.....	2	3
Contusion of the eyeball with rupture of sclerotic	.....	1	1	.....	.....	....	.....	.....	1
Injury of eye from hot lime	1	.....	.....	1	.....	....	.....	.....	1
Foreign bodies in the conjunctiva or cornea	.....	.....	.....	.....	.....	....	.....	3	3
Wound of pinna	.....	.....	.....	.....	.....	....	.....	2	2
Foreign body in external meatus	.....	.....	.....	.....	.....	....	.....	1	1
Contusion of the chest	.....	5	4	1	.....	....	.....	23	28
Fracture of the ribs	4	12	11	3	.....	....	2	3	19
Fracture of the sternum	.....	1	.....	.....	.....	1	.....	.....	1
Gunshot wound of chest	.....	1	.....	1	.....	....	.....	.....	1
Contusion of back	.....	13	8	3	1	....	1	19	32
Sprain of back	.....	4	1	1	.....	....	2	13	17
Fracture of spine	.....	1	.....	.....	.....	1	.....	.....	1
Contusion of abdomen	.....	4	4	.....	.....	....	.....	1	5
Wound of parietes of abdomen	.....	2	1	.....	.....	....	1	3	5
Contusion of the pelvis	.....	1	1	.....	.....	....	.....	.....	1
Contusion of the male urethra, perinæum, scrotum, or penis	.....	.....	.....	.....	.....	....	.....	1	1
Wound of the male urethra, perinæum, scrotum, testis, or penis	.....	1	1	.....	.....	....	.....	.....	1
Contusion of testicle	.....	2	2	.....	.....	....	.....	1	3
Contusion of upper extremities	.....	11	4	6	1	....	.....	56	67
Sprain of the shoulder	.....	2	1	1	.....	....	.....	5	7
Sprain of the wrist	.....	.....	.....	.....	.....	....	.....	11	11
Sprain of thumb	.....	.....	.....	.....	.....	....	.....	3	3
Wound of the upper extremities	1	33	25	5	.....	....	4	166	200
Fracture of the clavicle	.....	2	2	.....	.....	....	.....	.....	2
Fracture of the scapula	.....	1	1	.....	.....	....	.....	.....	1
Fracture of the humerus	.....	4	3	1	.....	....	.....	.....	4
Fracture of the radius	.....	1	.....	1	.....	....	.....	1	2
Fracture of the ulna	.....	1	.....	1	.....	....	.....	.....	1
Fracture of both bones of forearm	1	1	1	1	.....	....	.....	.....	2
Fracture of carpus, metacarpus, and phalanges	.....	.....	.....	.....	.....	....	.....	8	8
Dislocation of the clavicle	.....	1	1	.....	.....	....	.....	2	3
Dislocation of the humerus	.....	6	4	1	1	....	.....	2	8
Dislocation of the phalanges of thumb	.....	.....	.....	.....	.....	....	.....	2	2
Dislocation of the phalanges of fingers	.....	1	.....	1	.....	....	.....	.....	1
Contusion of the lower extremities	2	37	27	10	1	....	1	67	106
Sprain of the hip	.....	2	2	.....	.....	....	.....	2	4
Sprain of the knee	.....	5	4	.....	.....	....	1	11	16
Sprain of the ankle	3	22	16	3	.....	....	6	24	49
Sprain of the foot	.....	1	.....	1	.....	....	.....	3	4
Internal derangement of joints	.....	1	1	.....	.....	....	.....	1	2
Wound of the lower extremities	.....	26	20	5	.....	....	1	56	82
Fracture of femur	2	6	4	1	.....	....	3	1	9

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Fracture of patella	.....	3	.....	2	.....	....	1	.....	3
Fracture of tibia	1	2	2	.....	.....	....	1	.....	3
Fracture of fibula	1	7	8	.....	.....	....	.....	1	9
Fracture of tibia and fibula	2	10	5	4	.....	1	2	.....	12
Fracture of metatarsus	.....	2	1	1	.....	....	.....	2	4
Fracture of phalanges of toes	.....	.....	.....	.....	.....	....	.....	1	1
Dislocation of the foot, with fracture of the tibia and fibula	.....	1	1	.....	.....	....	.....	.....	1
QUARANTINE.									
TOTAL CASES	.....	81	48	23	.....	4	6	92	173
General Diseases	.....	75	48	17	.....	4	6	48	123
Smallpox	.....	14	13	.....	.....	1	.....	.....	14
Influenza	.....	1	1	.....	.....	....	.....	.....	1
Mumps	.....	3	3	.....	.....	....	.....	.....	3
Enteric fever	.....	4	2	2	.....	....	.....	.....	4
Typho-malarial fever	.....	1	1	.....	.....	....	.....	.....	1
Dysentery	.....	3	1	1	.....	1	.....	1	4
Yellow fever	.....	2	.....	.....	.....	....	2	.....	2
Beri beri	.....	10	6	4	.....	....	.....	9	19
Malarial fever:									
Intermittent	.....	21	14	7	.....	....	.....	10	31
Remittent	.....	13	7	1	.....	1	4	7	20
Tubercle	.....	1	.....	.....	.....	1	.....	.....	1
Syphilis—Secondary	.....	.....	.....	.....	.....	....	.....	3	3
Gonorrhea	.....	1	.....	1	.....	....	.....	2	3
Diseases dependent on animal parasites	.....	.....	.....	.....	.....	....	.....	1	1
Diseases dependent on vegetable parasites	.....	.....	.....	.....	.....	....	.....	1	1
Rheumatic fever	.....	.....	.....	.....	.....	....	.....	1	1
Rheumatism	.....	.....	.....	.....	.....	....	.....	10	10
Cyst	.....	.....	.....	.....	.....	....	.....	1	1
Debility	.....	1	.....	1	.....	....	.....	2	3
Local Diseases	.....	6	.....	6	.....	....	.....	39	45
DISEASES OF THE NERVOUS SYSTEM	.....	.....	.....	.....	.....	....	.....	2	2
Neuralgia	.....	.....	.....	.....	.....	....	.....	2	2
DISEASES OF THE EYE	.....	.....	.....	.....	.....	....	.....	3	3
Conjunctivitis	.....	.....	.....	.....	.....	....	.....	3	3
DISEASES OF THE EAR	.....	.....	.....	.....	.....	....	.....	1	1
Inflammation of the external meatus—Abscess	.....	.....	.....	.....	.....	....	.....	1	1
DISEASES OF THE CIRCULATORY SYSTEM	.....	1	.....	1	.....	....	.....	.....	1
Pericarditis	.....	1	.....	1	.....	....	.....	.....	1
DISEASES OF THE RESPIRATORY SYSTEM	.....	2	.....	2	.....	....	.....	3	5
Inflammation of mucous membrane of larynx—Catarrhal	.....	.....	.....	.....	.....	....	.....	1	1
Bronchitis—Catarrhal, acute	.....	.....	.....	.....	.....	....	.....	1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1897—Continued.

QUARANTINE—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at the close of the year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Pneumonia	.....	1	.....	1	.....	...	.....	.....	1
Phthisis—Acute	.....	1	.....	1	.....	...	.....	1	2
DISEASES OF THE DIGESTIVE SYSTEM	.....	2	.....	2	.....	...	.....	22	24
Caries of dentine and cementum	.....	.....	.....	.....	.....	...	.....	2	2
Sore throat	.....	.....	.....	.....	.....	...	.....	1	1
Inflammation of the pharynx—Catarrhal	.....	.....	.....	.....	.....	...	.....	1	1
Inflammation of the stomach—Catarrhal	.....	1	.....	1	.....	...	.....	1	2
Indigestion	.....	1	.....	1	.....	...	.....	3	4
Inflammation of the intestines—Catarrhal	.....	.....	.....	.....	.....	...	.....	1	1
Constipation	.....	.....	.....	.....	.....	...	.....	1	1
Colic	.....	.....	.....	.....	.....	...	.....	2	2
Diarrhea	.....	.....	.....	.....	.....	...	.....	7	7
Piles—									
Internal	.....	.....	.....	.....	.....	...	.....	1	1
External	.....	.....	.....	.....	.....	...	.....	1	1
Perforation of hepatic ducts and gall bladder	.....	.....	.....	.....	.....	...	.....	1	1
DISEASES OF THE LYMPHATIC SYSTEM	.....	1	.....	1	.....	...	.....	.....	1
Inflammation of lymph glands	.....	1	.....	1	.....	...	.....	.....	1
DISEASES OF THE URINARY SYSTEM	.....	.....	.....	.....	.....	...	.....	1	1
Bright's disease	.....	.....	.....	.....	.....	...	.....	1	1
DISEASES OF THE GENERATIVE SYSTEM	.....	.....	.....	.....	.....	...	.....	3	3
Urethritis	.....	.....	.....	.....	.....	...	.....	1	1
Ulcer of penis	.....	.....	.....	.....	.....	...	.....	2	2
DISEASES OF THE ORGANS OF LOCOMOTION	.....	.....	.....	.....	.....	...	.....	1	1
Inflammation of bursæ	.....	.....	.....	.....	.....	...	.....	1	1
DISEASES OF THE CONNECTIVE TISSUE	.....	.....	.....	.....	.....	...	.....	1	1
Abscess	.....	.....	.....	.....	.....	...	.....	1	1
DISEASES OF THE SKIN	.....	.....	.....	.....	.....	...	.....	2	2
Eczema	.....	.....	.....	.....	.....	...	.....	1	1
Herpes	.....	.....	.....	.....	.....	...	.....	1	1
Injuries	.....	.....	.....	.....	.....	...	.....	5	5
GENERAL INJURIES	.....	.....	.....	.....	.....	...	.....	1	1
Multiple injury	.....	.....	.....	.....	.....	...	.....	1	1
LOCAL INJURIES	.....	.....	.....	.....	.....	...	.....	4	4
Sprain of the wrist	.....	.....	.....	.....	.....	...	.....	1	1
Dislocation of the humerus	.....	.....	.....	.....	.....	...	.....	1	1
Sprain of the hip	.....	.....	.....	.....	.....	...	.....	2	2

TABLE VIII.—TABULAR STATEMENT, BY DISTRICTS, OF CAUSES OF MORTALITY AMONG PATIENTS OF THE SERVICE DURING THE YEAR ENDED JUNE 30, 1897.

Causes of death.	Total.	Districts.								
		North Atlantic.	Middle Atlantic.	South Atlantic.	The Gulf.	The Ohio.	The Mississippi.	The Great Lakes.	The Pacific.	Quarantine stations.
Total Deaths from all Causes	**396**	**42**	**72**	**50**	**44**	**29**	**32**	**61**	**62**	**4**
FROM DISEASES	371	40	70	48	40	29	29	55	56	4
FROM INJURIES	25	2	2	2	4	.....	3	6	6	.....
General Diseases	**194**	**16**	**45**	**26**	**19**	**12**	**16**	**33**	**23**	**4**
Smallpox	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Enteric fever	27	4	3	3	1	2	1	10	3	.....
Choleraic diarrhea	1	.....	.....	1	.....	.....	.....	.....	.....	.....
Dysentery	6	.....	.....	1	.....	1	2	.....	1	1
Beri-beri	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Malarial fever:										
Intermittent	7	.....	1	1	3	.....	1	1	.....	.....
Remittent	4	1	.....	.....	1	.....	1	.....	.....	1
Erysipelas	1	.....	.....	1	.....	.....	.....	.....	.....	.....
Tubercle	120	10	33	18	12	7	7	17	15	1
Syphilis—Secondary	6	.....	1	1	.....	1	1	2	.....	.....
Effects of vegetable poisons	1	.....	.....	.....	.....	.....	1	.....	.....	.....
Alcoholism	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Delirium tremens	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Rheumatism	5	1	2	.....	.....	.....	.....	1	1	.....
New growth—Malignant	8	.....	3	.....	2	.....	1	1	1	.....
Anæmia	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Old age	3	.....	.....	.....	.....	1	1	1	.....	.....
Local Diseases	**177**	**24**	**25**	**22**	**21**	**17**	**13**	**22**	**33**	.....
DISEASES OF THE NERVOUS SYSTEM	22	6	1	3	.....	2	1	1	8	.....
Degeneration of posterior columns	3	1	.....	.....	.....	.....	.....	.....	2	.....
Of the brain and its membranes—										
Inflammation of the dura mater	2	2	.....	.....	.....	.....	.....	.....	.....	.....
Hemorrhage	5	3	.....	1	.....	.....	1	.....	.....	.....
Hyperæmia	3	.....	.....	1	.....	.....	.....	.....	2	.....
Atrophy	1	.....	.....	.....	.....	1	.....	.....	.....	.....
Functional nervous disorders—										
Hemiplegia	5	.....	.....	1	.....	1	.....	1	2	.....
Local paralysis	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Incomplete paralysis	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Epilepsy	1	.....	.....	.....	.....	.....	.....	.....	1	.....
MENTAL DISEASES	2	.....	1	.....	.....	.....	.....	1	.....	.....
Mania	1	.....	1	.....	.....	.....	.....	.....	.....	.....
General paralysis of the insane	1	.....	.....	.....	.....	.....	.....	1	.....	.....
DISEASES OF THE CIRCULATORY SYSTEM	39	7	3	3	7	5	3	5	6	.....
Endocarditis	2	.....	.....	.....	.....	.....	.....	2	.....	.....
Valvular disease—										
Aortic	6	2	.....	1	.....	1	.....	1	1	.....
Mitral	22	3	3	1	5	2	3	2	3	.....
Degeneration of heart—Fatty	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Hypertrophy of heart	1	.....	.....	.....	1	.....	.....	.....	.....	.....
Arterio-capillary fibrosis	1	.....	.....	.....	1	.....	.....	.....	.....	.....
Aneurism of the arteries	5	1	.....	.....	.....	2	.....	.....	2	.....
Embolism	1	.....	.....	1	.....	.....	.....	.....	.....	.....
DISEASES OF THE RESPIRATORY SYSTEM	41	3	5	7	5	5	5	4	7	.....
Hay fever	1	.....	.....	.....	.....	.....	.....	1	.....	.....
Inflammation mucous membrane—Larynx:										
Catarrhal	1	.....	.....	.....	.....	.....	1	.....	.....	.....
Ulcerative	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Bronchitis—Catarrhal, acute	7	1	1	.....	1	1	.....	.....	3	.....
Asthma—Spasmodic	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Pneumonia	29	1	3	6	4	4	4	3	4	.....
Chronic intestinal inflammation	1	.....	.....	1	.....	.....	.....	.....	.....	.....
DISEASES OF THE DIGESTIVE SYSTEM	36	2	10	4	3	1	3	6	7	.....
Inflammation of the stomach—Catarrhal	3	.....	2	.....	.....	.....	1	.....	.....	.....
Ulceration of the stomach—Perforating	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Hemorrhage of the stomach	1	.....	1	.....	.....	.....	.....	.....	.....	.....

TABLE VIII.—TABULAR STATEMENT, BY DISTRICTS, OF CAUSES OF MORTALITY AMONG PATIENTS OF THE SERVICE, ETC.—Continued.

Causes of death.	Total.	Districts.								
		North Atlantic.	Middle Atlantic.	South Atlantic.	The Gulf.	The Ohio.	The Mississippi.	The Great Lakes.	The Pacific.	Quarantine stations.
Local Diseases—Continued.										
DISEASES OF THE DIGESTIVE SYSTEM—Continued.										
Inflammation of the intestines—Typhlitis	5	.....	.....	1	1	.....	.....	1	2	.....
Hernia	4	.....	1	1	.....	.....	.....	1	1	.....
Internal strangulation of the intestines	1	.....	.....	.....	.....	.....	.....	1	.....	.....
Obstruction of the intestines	1	.....	.....	.....	1	.....	.....	.....	.....	.....
Diarrhea	1	.....	.....	1	.....	.....	.....	.....	.....	.....
Ulceration of the rectum	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Inflammation of the liver—										
Acute	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Suppurative	1	.....	.....	.....	1	.....	.....	.....	.....	.....
Abscess	1	.....	.....	.....	.....	.....	.....	1	.....	.....
Chronic	8	1	2	.....	.....	1	1	1	2	.....
Jaundice	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Inflammation of the peritoneum	3	.....	1	.....	.....	.....	1	1	.....	.....
Dropsy	3	.....	1	1	.....	.....	.....	.....	1	.....
DISEASES OF THE URINARY SYSTEM	28	4	2	4	6	2	1	4	5	.....
Acute nephritis	3	1	.....	.....	.....	.....	.....	1	1	.....
Bright's disease	22	1	2	4	6	2	1	3	3	.....
Lithuria	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Inflammation of bladder—										
Acute	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Chronic	1	1	.....	.....	.....	.....	.....	.....	.....	.....
DISEASES OF THE GENERATIVE SYSTEM	4	.....	1	.....	.....	2	.....	1	.....	.....
Stricture of the urethra, chronic	2	.....	1	.....	.....	1	.....	.....	.....	.....
Inflammation of the prostate, chronic	1	.....	.....	.....	.....	.....	.....	1	.....	.....
Ectopic gestation	1	.....	.....	.....	.....	1	.....	.....	.....	.....
DISEASES OF THE ORGANS OF LOCOMOTION	3	2	1	.....	.....	.....	.....	.....	.....	.....
Psoas, lumbar, and other abscesses	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Myalgia	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Contraction of tendons	1	1	.....	.....	.....	.....	.....	.....	.....	.....
DISEASES OF THE CONNECTIVE TISSUES	1	.....	.....	1	.....	.....	.....	.....	.....	.....
Abscesses	1	.....	.....	1	.....	.....	.....	.....	.....	.....
DISEASES OF THE SKIN	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Pemphigus	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Injuries	25	2	2	2	4	.....	3	6	6	.....
GENERAL INJURIES	8	.....	1	1	2	.....	1	1	2	.....
Burns and scalds	3	.....	.....	.....	1	.....	1	1	.....	.....
Multiple injury	4	.....	1	1	1	.....	.....	.....	1	.....
Suffocation	1	.....	.....	.....	.....	.....	.....	.....	1	.....
LOCAL INJURIES	17	2	1	1	2	.....	2	5	4	.....
Scalp wound	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Fracture of the base of the skull	3	1	.....	.....	.....	.....	.....	2	.....	.....
Wound of the skull	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Wound of face and mouth	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Fracture of facial bones	1	.....	.....	.....	.....	.....	1	.....	.....	.....
Fracture of the sternum	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Fracture of the spine	2	.....	.....	.....	1	.....	.....	.....	1	.....
Dislocation of the foot	1	.....	.....	.....	.....	.....	1	.....	.....	.....
Wound of the upper extremities	2	.....	.....	.....	1	.....	.....	1	.....	.....
Wound of the lower extremities	2	.....	.....	.....	.....	.....	.....	2	.....	.....
Fracture of tibia and fibula	2	.....	.....	1	.....	.....	.....	.....	1	.....

TABLE IX.—SURGICAL OPERATIONS, FISCAL YEAR 1897.

Operations.	Number of cases.	Remarks.
Total Number of Operations	**1,121**	
REMOVAL OF TUMORS	40	
For carcinoma	2	Excision; unsuccessful, 2.
For carcinoma of stomach	1	Gastrotomy (Witzel's method, death).
For wen	6	Excision.
For cyst	10	Do.
For polypus	1	Do.
For hæmatoma	2	Incision.
For sarcoma	2	Parenchymatous injection, 1; excision, 1.
For papillomata	4	Suprapubic cystotomy, 1; excision, 2.
For lipoma	4	Excision.
For fibroma	3	Do.
For fibro-lipoma	3	Do.
For angioma	1	Do.
For epithelioma	1	Do.
REMOVAL OF FOREIGN BODIES	2	
In neck	1	Bullet.
In foot	1	Piece of wood.
OPENING OF ABSCESSES	72	
For abscess of connective tissue of hand	6	Incision.
For abscess of connective tissue of knee	5	Do.
For abscess of tonsil	1	Do.
For whitlow	4	Do.
For ischio-rectal abscess	4	Incision, unsuccessful.
For abscess of scrotum	1	Incision.
For abscess of rectum	4	Do.
For abscess of thigh	2	Do.
For abscess of leg	3	Do.
For abscess of perineum	5	Do.
For abscess of arm	6	Do.
For abscess of liver	3	Incision; exploratory aspiration, unsuccessful.
For abscess of buttock	3	Incision.
For abscess of neck	8	Do.
For abscess of axilla	2	Do.
For abscess of antrum of Highmore	1	Do.
For abscess of hand	1	Do.
For abscess of scalp	1	Do.
For abscess of breast	1	Do.
For abscess of groin	9	Do.
For peritoneal abscess	1	Do.
For abscess of testicle and scrotum	1	Castration.
OPERATIONS ON THE NERVES	2	
For neuritis of seventh nerve	1	Curettment of mastoid; unsuccessful.
For paralysis musculo-spiral nerve	1	Divided nerve sutured; unsuccessful.
OPERATIONS ON THE EYE	22	
For chalazion	2	Excision.
For foreign body	3	Removal.
For pterygium	7	Excision.
For panophthalmitis	1	Eye removed; success partial.
For glaucoma	1	Iridectomy.
For opacity of cornea	1	Artificial pupil.
For cataract	1	Removal of lens.
For old injury of eyeball	1	Enucleation of eye.
For rupture of eyeball	1	Do.
For iritis	1	Paracentesis anterior chamber.
For hypopyon	2	Evacuation of pus.
For ptosis	1	Excision of skin.
OPERATIONS ON THE NOSE	2	
For new growth	1	Removal.
For compound fracture nasal bone	1	Reduction and suture.
OPERATIONS ON THE HEAD AND MOUTH	13	
For elongated uvula	1	Excision.
For lupus	1	Do.
For stab wound of head	1	Sutured.
For wound of scalp	1	Do.
For fracture of frontal bone	1	Fragments removed.
For ranula	1	Incision.
For inflammation of mastoid cells	5	Perforation of cells; unsuccessful, 1.
For salivary fistula	1	Plastic operation.
For compounded pressed fracture of skull	1	Removal of portion of bone.

TABLE IX.—SURGICAL OPERATIONS, FISCAL YEAR 1897—Continued.

Operations.	Number of cases.	Remarks.
OPERATIONS ON THE ARTERIES	6	
For ligation of femoral artery	1	
For hæmorrhage	1	Transfusion.
For aneurism of femoral artery	1	Artery tied above and below; unsuccessful.
For aneurism of popliteal artery	1	Compression unsuccessful and femoral ligated.
For thrombus of femoral artery	1	Ligation external iliac.
For dissecting aneurism radial artery	1	Artery ligated and clots turned out.
OPERATIONS ON THE VEINS	33	
For varix	32	Excision of veins (Schade's operation, 17); unsuccessful, 1.
For rupture of vein	1	Ligation.
OPERATIONS ON THE THORAX AND RESPIRATORY ORGANS	21	
For acute pleurisy	13	Paracentesis.
For penetrating wound of lung and abdomen	1	Colon and diaphragm sutured, incised lung packed with gauze.
For empyema	6	Removal of portion of ribs; paracentesis, 3.
For tracheotomy wound	1	Wound closed.
OPERATIONS ON SKIN AND CONNECTIVE TISSUE	16	
For cellulitis of forearm and hand	2	Multiple incision.
For incised wound of arm	1	Sutured.
For lacerated wound of leg	1	Do.
For gunshot wound:		
Of arm	2	Bullet removed.
Of finger	1	Do.
Of leg	3	Do.
For furuncle	1	Incised.
For carbuncle	3	Incised and curetted.
For sinus	1	Curetted.
For cicatrix	1	Incised.
OPERATIONS ON THE ORGANS OF DIGESTION	179	
Hæmorrhoids:		
Internal	20	Ligation and excision; unsuccessful.
External	8	Clamp and cautery; ligation, 4.
For fistula in ano	51	Incision; unsuccessful, 2.
For hernia:		
Inguinal, oblique	73	Andrews, 7; Kochers, 3; McBurney, 1; Bassini, 46; Molifer Halsted, 8; Halsted, 7; Vaughan, 1; unsuccessful, 1; death, 1.
Inguinal, strangulated	1	Death.
Ventral	1	Abdominal section; death.
Omental	1	Incision and reduction.
For appendicitis	18	Abdominal section; death, 2.
For prolapse of anus	1	Clamp and cautery.
For stricture of rectum	3	Posterior proctotomy, dilatation, 2; death, 1.
For ulcer of rectum	1	Dilatation of sphincter.
For strangulation of intestines	1	Abdominal section; death.
OPERATIONS ON THE ABDOMEN AND PELVIS	39	
For ascitis	34	Paracentesis.
For wound of abdomen with protrusion of intestines.	1	Laparotomy.
For stab wound of abdomen	2	Do.
For gunshot wound of abdomen	1	Laparotomy with removal of bullet.
For tubercular peritonitis	1	Abdomen opened and irrigated; unsuccessful.
OPERATIONS ON THE LYMPHATIC ORGANS	193	
Inflammation of lymph glands of—		
Groin	38	Excision (injected with iodoform).
Axilla	1	Excision.
Neck	6	Excision; unsuccessful, 1.
Suppuration of lymph glands of—		
Groin	135	Excision; curetted, 52; injected with iodoform, 51.
Axilla	4	Incised and curetted.
Neck	9	Incision and drainage; unsuccessful, 1; injected with iodoform, 2; excision, 2.

TABLE IX.—SURGICAL OPERATIONS, FISCAL YEAR 1897—Continued.

Operations.	Number of cases.	Remarks.
OPERATIONS ON THE URINARY ORGANS	102	
For organic stricture—		
Internal urethrotomy	42	Death from septicæmia, 1.
External urethrotomy	15	Unsuccessful, 1.
For gradual dilatation	36	
For divulsion	2	
For urinary fistula	3	Plastic operation; curetted, 1; unsuccessful, 1.
For hæmatoma	1	Exploratory nephrotomy.
For pyonephrosis	1	Incision and drainage.
For chronic cystitis	2	Suprapubic cystotomy.
OPERATIONS ON THE ORGANS OF GENERATION	164	
For varicocele	18	Ligation and excision.
For phimosis	83	Circumcision; incised, 9.
For paraphimosis	11	Circumcision, 5; incision.
For hydrocele	22	Excision of sac, testicle removed, aspiration, 7; unsuccessful, 1.
For tubercular testicles	5	Castration.
For redundant scrotum	1	Excision of portion of scrotum.
For inflammation of uterus (catarrhal)	5	Cavity curetted.
For ulcer of penis	7	Circumcision; excision, 2.
For abortion	1	Uterus curetted.
For epididymitis (tubercular)	2	Excision of cord of testicle and scrotum; removal of testicle, 1.
For syphilitic testicle	2	Castration.
For enlarged prostate	2	Testicle removed.
For orchitis	2	Castration; puncture of tissue.
For hypospadias	1	Plastic operation; unsuccessful.
For chronic suppurative salpingitis	1	Laparotomy.
For ectopic gestation	1	Laparotomy; death.
OPERATIONS ON THE BONES	89	
For fracture of—		
Inferior maxillary	7	Wired, 2; unsuccessful, 1.
Clavicle	2	Splints applied.
Humerus	1	Do.
Humerus (compound comminuted)	2	Splints applied, 1; ends of bone freshened and wired, 1.
Finger	2	Splints applied.
Femur	5	Splints applied, 1; refractured and splints applied, 1.
Femur (compound)	1	Splints applied.
Bones of leg (ununited)	3	Freshened and wired; unsuccessful, 2.
Tibia (compound)	3	Splints applied.
Tibia and fibula	2	Do.
Tibia and fibula (compound comminuted)	2	Do.
For periostitis	2	Periostiotomy—curetted.
For necrosis of—		
Temporal bone	1	Removal of sequestrum.
Inferior maxillary	5	Sequestra removed.
Radius	2	Scraped; unsuccessful, 1.
Zygoma	1	Partial removal of bone.
Ribs	1	Bone curetted.
Bones of hand	3	Excision of bone.
Finger	1	Dead bone removed.
Astragulus	2	Do.
Tibia	2	Do.
Bones of foot	3	Incised and curetted; unsuccessful, 1.
For caries	11	Curetted.
For astronyelitis	1	Do.
For tuberculosis of scapula	1	Resection of scapula.
For depressed sternum	1	Removal of typhoid cartilage.
For gunshot wound of femur	4	Bullet removed.
For dislocation—		
Metacarpal bone	2	Reduced.
Of head of radius	1	Do.
Metatarsal bone	1	Do.
OPERATIONS ON THE JOINTS	27	
For fibrous anchylosis—		
Elbow joint	1	Forcible breaking of ankylosis.
Kneejoint	3	Forcible breaking of tenatomy, 1.
For inflammation of metatarsal phalangeal joint of great toe	1	Incised and drained.
For suppuration of—		
Kneejoint	1	Incised irrigation and drainage.
Ankle joint	1	Incised and drainage.

TABLE IX.—SURGICAL OPERATIONS, FISCAL YEAR 1897—Continued.

Operations.	Number of cases.	Remarks.
OPERATIONS ON THE JOINTS—Continued.		
For effusion in kneejoint	1	Aspiration.
For inflamed bursa of patella	5	Incised, aspirated, 3; unsuccessful, 1.
For suppuration of bursa of knee	2	Sac dissected out.
For synovitis of kneejoint	7	Aspirated.
For gunshot wound of elbow	1	Ligature brachial artery.
For bony ankylosis of hip	1	Excision of portion of femur unsuccessful.
For loose body in kneejoint	3	Removed.
For dislocation of—		
Clavicle	1	Reduction.
Humerus	12	Do.
Finger	1	Do.
OPERATIONS ON TENDONS ANA FASCIA	2	
For ganglion	1	Excision.
For contraction	1	Incision.
AMPUTATIONS	56	
Of forearm	3	Gangrene; death, 1.
Of thumb	5	
Of fingers	32	
Of hip joint	2	Death.
Of leg (middle of thigh)	2	Death, 1.
Of leg (below knee)	8	Do.
Of leg (compound dislocation of foot)	1	Do.
Of tarsal bones	2	(Lisfranes, 1.)
Of foot (tubercular)	1	Symus; unsuccessful.
REAMPUTATION	2	
Of finger	1	
Of forearm	1	
EXCISION	4	
Gunshot fracture of elbow joint	2	Partial, 1; unsuccessful, 1.
Heads of metatarsal bones	2	
OPERATIONS ON THE SKIN AND CONNECTIVE TISSUE	39	
For ulcer	14	Skin grafted; curetted, 6.
For lacerated wound	4	Sutured.
For incised wound	6	Do.
For poisoned wound of hand	13	Incised.
For onychia	2	Removal of nail.

TABLE X.—RATIO OF DEATHS FROM SPECIFIC CAUSES.

Deaths from—	Per 100 from all causes.	Deaths from—	Per 100 from all causes.
General diseases	48.99	Diseases of the digestive system	9.09
Diseases of the nervous system	5.56	Diseases of the urinary system	7.07
Diseases of the circulatory system	9.85	Injuries	6.31
Diseases of the respiratory system	10.35	From all other causes	2.78

TABLE XI.—RATIO OF DEATHS IN EACH DISTRICT.

Districts.	Per 100 patients treated in hospital.	Districts.	Per 100 patients treated in hospital.
North Atlantic	2.95	The Mississippi	2.93
Middle Atlantic	3.75	The Great Lakes	2.86
South Atlantic	2.83	The Pacific	4.40
The Gulf	3.33	The quarantine stations	4.94
The Ohio	2.74		

TABLE XII.—COMPARATIVE EXHIBIT—MORTALITY PER 100 PATIENTS TREATED IN HOSPITAL, BY DISTRICTS, 1888–1897.

Districts.	General average.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.
North Atlantic	2.81	3.53	3.25	2.65	2.50	2.62	2.46	2.36	3.09	2.73	2.95
Middle Atlantic	4.09	4.80	3.92	4.66	3.77	3.44	3.69	4.17	4.56	4.12	3.75
South Atlantic	3.23	2.54	3.55	3.64	2.56	2.71	3.37	4.00	3.56	3.55	2.83
The Gulf	3.16	2.78	3.08	3.40	3.88	3.63	3.29	2.38	2.98	2.90	3.33
The Ohio	2.66	2.01	3.52	2.26	2.54	1.53	3.01	2.51	3.23	3.24	2.74
The Mississippi	3.47	4.78	3.52	3.04	3.67	3.37	3.64	3.99	2.53	3.20	2.93
The Great Lakes	2.80	2.83	2.93	2.63	2.44	4.11	2.76	2.61	2.54	2.26	2.86
The Pacific	4.23	4.45	4.22	4.42	4.43	3.83	3.73	3.76	4.38	4.70	4.40
The quarantine stations	4.85	.....	.....	.....	.....	.....	.....	.....	.....	4.76	4.94

TABLE XIII.—COMPARATIVE EXHIBIT—RATIO OF DEATHS FROM SPECIFIC CAUSES, 1888–1897.

Deaths from—	General average.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.
General diseases	47.74	46.58	45.47	50.20	52.66	43.42	47.70	47.70	43.94	50.70	48.99
Diseases of the—											
Nervous system	5.17	6.84	5.69	4.06	3.69	6.05	4.81	5.58	4.81	4.65	5.56
Circulatory system	8.95	10.04	7.58	5.81	9.84	9.60	8.99	5.58	10.76	11.39	9.85
Respiratory system	15.11	14.96	17.26	19.10	15.16	15.85	13.38	16.51	16.24	12.23	10.35
Digestive system	7.70	8.97	7.37	6.30	5.33	7.30	7.11	8.48	10.53	6.51	9.09
Urinary system	5.27	5.34	4.63	4.67	4.71	4.80	6.48	5.35	6.17	3.49	7.07
Injuries	6.20	4.50	8.00	5.81	5.33	7.72	8.99	5.58	3.43	6.28	6.31
From all other causes	3.86	2.77	4.00	3.65	3.28	5.26	2.54	5.57	4.12	4.65	2.78

TABLE XIV.—COMPARATIVE EXHIBIT—AVERAGE DURATION OF TREATMENT IN HOSPITAL IN EACH DISTRICT, 1888–1897.

Districts.	General average.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.
North Atlantic	27.83	26.76	30.05	29.21	29.68	24.37	24.12	26.14	29.97	31.07	26.93
Middle Atlantic	27.91	26.99	26.92	26.32	26.81	26.87	26.29	24.60	34.21	29.68	30.39
South Atlantic	27.73	26.53	27.91	28.27	26.19	26.26	29.23	29.48	29.80	26.83	26.80
The Gulf	22.56	23.24	24.55	23.21	21.07	21.97	22.33	22.13	22.46	22.24	22.41
The Ohio	23.64	21.62	22.52	24.52	24.92	23.81	23.37	22.80	25.18	25.43	22.20
The Mississippi	21.19	21.23	22.60	20.88	22.61	20.59	19.84	21.51	22.92	20.74	19.00
The Great Lakes	28.01	26.72	29.69	30.82	27.09	27.82	27.07	28.32	28.34	28.25	26.27
The Pacific	36.39	29.96	31.12	33.68	32.68	36.92	40.27	43.57	40.66	38.81	36.20
The quarantine stations	13.89	.....	.....	.....	.....	.....	.....	.....	19.97	10.00	11.69

TABLE XV.—NATIONALITIES OF PATIENTS TREATED IN UNITED STATES MARINE HOSPITALS DURING THE FISCAL YEAR ENDED JUNE 30, 1897.

Countries.	Number.	Countries.	Number.
TOTAL	**12,154**	Ireland	520
		Italy	57
Africa	3	Japan	22
Australia	62	Mexico	17
Austria	100	New Zealand	15
Azore Islands	9	Norway	450
Bavaria	20	Peru	20
Belgium	43	Poland	30
Brazil	10	Portugal	25
Canada	240	Prince Edward Island	18
Chile	8	Russia	84
China	6	Scandinavia	5
Denmark	233	Scotland	181
England	241	Spain	50
Finland	125	Sweden	540
France	75	Switzerland	20
Germany	460	United States of America	8,121
Greece	25	United States of Colombia	15
Holland	35	Wales	8
Hungary	9	West Indies	167
Iceland	7	Unknown	70
India	8		

PUBLIC HEALTH SERVICE.

PUBLIC HEALTH SERVICE.

CHOLERA.

CHOLERA IN 1897.

There is but little of importance to report in regard to this disease in Europe and Asia, and although it exists at most of the points noted in my last annual report, yet the number of cases has gradually diminished to a point where it has ceased to be a menace. The survey of the situation in my last annual report of 1896 closed with November of that year. Cholera was then existing in Russia, India, China, and Japan. It still exists in the last three named countries.

In Russia the great epidemic of 1893, which claimed its victims by thousands, has passed into history, and the gradual decline of it noted in my last annual report has come to a final termination, and no cases are now reported from that Empire.

In India the usual annual visitation, productive of the usual mortality, has occurred. In the Bombay presidency 1,107 deaths, and in the Calcutta district 2,367 deaths, have been reported. In the latter section, from March 6 to May 29, 1897, inclusive, a period of twelve weeks, there were 1,310 deaths.

In Madras 149 deaths have been reported, making a total of 3,623 in the Indian Empire.

In China 1 death has been reported at Hongkong, and at the Straits Settlements (Singapore) 19 deaths have occurred, in both instances probably imported from adjoining points previously infected.

In Ceylon there were 119 deaths in the settlement of Colombo, the chief town, mostly occurring during the winter months of November, December, and January.

In Japan during the past summer (1897) there was a reappearance of cholera in sixteen different places, but it gained but little headway, only 68 deaths having been reported.

The steamship *Nubia* brought some cases to Plymouth, England, in January, 1897, on her trip from Calcutta, the disease breaking out among the troops returning home. There were 7 deaths en route and 8 cases more under treatment.

Following is a table, prepared in the division of sanitary reports and statistics, showing the prevalence of cholera in all countries as reported to the Bureau:

Cholera, as reported to the Supervising Surgeon-General United States Marine-Hospital Service, November 1, 1896, to November 1, 1897.

[Reports received from United States consuls through the Department of State and from other sources.]

Places.	Date.	Cases.	Deaths.	Remarks.
India:				
Bombay	Dec. 8–Dec. 15		1	
	Dec. 22–Dec. 29		1	
	Mar. 23–Mar. 30		1	
	Mar. 31–June 29		68	
	July 1–Aug. 3		386	
	Aug. 4–Aug. 31		509	
	Sept. 1–Sept. 21		109	
	Sept. 28–Oct. 5		32	
Calcutta	Nov. 1–Jan. 30		275	
	Jan. 31–Feb. 27		311	
	Feb. 28–Mar. 6		125	
	Mar. 6–May 29		1,310	
	May 30–June 26		176	
	June 27–July 31		118	
	Aug. 1–Aug. 28		22	
	Aug. 29–Sept. 25		30	
China:				
Hongkong	Sept. 4–Sept. 11		1	
Madras	Nov. 1–Nov. 27		14	
	Nov. 28–Dec. 4		1	
	Dec. 12–Dec. 25		6	
	Dec. 26–Jan. 29		22	
	Jan. 30–Feb. 26		13	
	Feb. 27–Mar. 5		2	
	Mar. 6–Mar. 19		1	
	Mar. 20–Mar. 26		2	
	May 29–June 25		4	
	June 26–July 30		12	
	July 31–Aug. 27		28	
	Aug. 28–Sept. 24		54	
Singapore	Nov. 1–Nov. 30		12	
	Dec. 1–Dec. 31		5	
	June 1–June 30		1	
	Aug. 1–Aug. 31		1	
Ceylon:				
Colombo	Nov. 28–Jan. 23		114	
	Jan. 23–Jan. 30	1	1	
	July 3–July 17	4	4	
England:				
Plymouth	Jan. 9		4	On steamship Nubia. No cases in city.
Japan:				
Chiba Ken	July 20–Aug. 3	4	3	
Fukuoka Ken	June 28–Aug. 3	6	4	
Hiogo Ken	June 28–July 6	1	1	
Kanagawa Ken	July 7–Aug. 3	13	9	
	Sept. 23–Sept. 30	1	1	
Kioto Fu	July 16–Aug. 3	2	1	
Okinawa	July 30–Aug. 3	1	1	
Osaka	May 1–July 6	13	2	
Osaka and Hiogo	July 16–July 25	2	2	
	Aug. 1–Sept. 4	5	8	
Oyama Ken	June 28–July 6	1	.....	
Saitama	July 16–July 25	1	1	
Shiga Ken	July 20–Aug. 3	1	1	
Tochigi Ken	July 20–Aug. 3	1	1	
	Nov. 1–Dec. 3	79	13	
Tokyo Tu	Dec. 4–Dec. 29	8	7	
	Dec. 30–Jan. 18	3	3	
	June 28–Aug. 3	28	10	
	Sept. 3–Sept. 30	18	7	
Yamanashi Ken	July 7–July 15	1	.....	
Yamaguchi Ken	July 20–Aug. 3	1	1	
Yokohama	Dec. 4–Dec. 29	4	3	
	Dec. 30–Jan. 18	2	2	

SMALLPOX.

Smallpox is reported as having appeared in 16 States, covering 29 localities, during the period between November 1, 1896, and November 1, 1897. In the year previous it appeared in 22 States and 74 localities. It has appeared in two States not noted in the preceding year, Georgia and New Mexico, and disappeared from Arizona, Arkansas, Kansas, Kentucky, Maryland, New Jersey, Texas, Wisconsin, and West Virginia, where cases of it occurred in 1896.

In Alabama 200 cases have been reported, with 2 deaths, the epidemic being principally in Birmingham and Montgomery.

In Florida, which has the next largest record, there have been 67 cases reported, all in Pensacola and Escambia County, in which that city is situated.

In Tennessee there have been 33 cases altogether, in the city of Memphis.

In the remaining thirteen States there have been 93 cases, with a slight mortality, making a grand total of 393 cases and 33 deaths throughout the United States the past twelve months.

The principal locality affected was the city of Birmingham, Ala., and the Marine-Hospital Bureau was called upon to send an expert to express a definite opinion as to the nature of the disease, doubt concerning which had been expressed on account of the low rate of mortality. An officer of the Service was therefore detailed for this purpose, and rendered efficient aid to the authorities.

Following is a table prepared in the division of sanitary report and statistics, showing the prevalence of smallpox in the limits of the United States as reported to the bureau:

Smallpox in the United States, as reported to the Supervising Surgeon-General United States Marine-Hospital Service, November 1, 1896, to November 1, 1897.

Places.	Date.	Cases.	Deaths.	Remarks.
Alabama:				
Bessemer	Sept. 26–Oct. 2	1		
Birmingham and adjacent country.	May 8–Aug. 12	96	1	
	Aug. 21–Oct. 16	68		5 cases varioloid.
Brockton	Aug. 29	1		
Mobile	Dec. 28–Jan. 26	2		
	Mar. 28	1		
	Apr. 17	1		
	May 21	1		
	May 31	1		
Montgomery	Aug. 7–Aug. 13	28		
Union Springs	Mar. 21		1	

Smallpox in the United States, etc.—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Connecticut:				
New Haven	Feb. 17	1		
Florida:				
Pensacola	Nov. 20–27	5		
	Jan. 19–Feb. 20	13		
	Feb. 28–Mar. 10	14		12 varioloid.
	Mar. 27–Apr. 3	3		Varioloid.
	Apr. 10–May 1	10		Do.
	May 2–May 22	7		Do.
	May 29–June 5	2		Do.
	July 4–July 10			1 case varioloid.
Escambia County (not including Pensacola).	Dec. 2–Jan. 19	18		
Georgia:				
Atlanta	Oct. 12–Oct. 23	19		
Illinois:				
Chicago	Mar. 25			Smallpox reported; brought from Mexico.
	Mar. 27–Apr. 3		1	
	Apr. 10–Apr. 17	2		
	May 8–May 15		1	
Indiana:				
Greenwood	Feb. 12	1		
Louisiana:				
New Orleans	Sept. 8	1		Varioloid.
	Oct. 23	1		
Massachusetts:				
Boston	May 1–May 8	4		
	May 22–May 29	1		
Cambridge	June 6–June 26	3		Varioloid; 1 smallpox.
Gloucester	June 19–June 26	1	2	
New Bedford	Apr. 10–Apr. 17	1		
Michigan:				
Bay City	Oct. 27	3		
Blissfield Township	Mar. 27–Apr. 10			Smallpox reported.
	Apr. 17–May 1			Do.
Missouri:				
St. Louis	Apr. 29	2		
	May 1–May 22	2	3	
New Mexico:				
Albuquerque	Sept. 19	1		
New York:				
Brooklyn	Apr. 24–June 26	5	2	
	June 27–July 24	2	1	
New York	Mar. 1–Mar. 31		2	Do.
	Apr. 17–May 15		10	
	June 13–June 19		3	
	July 4–July 24		3	
Ohio:				
Toledo	Apr. 1–May 31	14	2	
	June 1–June 30	4	1	
Pennsylvania:				
Drifton	Apr. 6	1		
McKeesport	Oct. 16–Oct. 23	1		
Tennessee:				
Memphis	Nov. 7	1		
	Apr. 1–June 26	21		
	July 4–July 17	3		
	Aug. 15–Aug. 21	1		
	Oct. 14–Oct. 23	8		
Washington:				
Tacoma	Feb. 6	1		
Olympia	Mar. 1	1		

PLAGUE.

The bubonic plague in the Eastern Hemisphere offers a new problem for the health authorities of this country to consider. It is a menace to our western shores—a constantly increasing menace by reason of the rapid increase of commerce between Asiatic ports and our ports on the Pacific coast.

From the reports of consular agents abroad it appears that the chief seat of this epidemic at present is India. The presidency and city of Bombay has the record for the greatest number of deaths "officially reported," but from advices received at the Bureau the number of deaths reported does not represent the exact mortality from this disease. On the contrary, the estimated number of deaths for the period covered by these reports (December 1, 1896, to October 5, 1897) reaches a total of 10,650 deaths. The official returns show 7,602 deaths to March 12, 1897.

Calcutta has been practically free from its visitation, but Karachi is on record for 214 deaths to date of last report.

In Arabia there have been 23 deaths, and 1 case en route from a British steamer developed at Suezin, Egypt.

In China the greatest mortality has been at Macao, where 154 deaths from the bubonic plague have been reported. The difficulty of obtaining any reliable statistics from the Chinese Empire is so great that only "estimates" can be formed as to the ravages of the disease except in the English and treaty seaports. A "plague epidemic" is reported at Amoy, and a similar statement is made in respect to Swato, while in Hongkong but 6 cases occurred during the seven months ending July 17 of this year.

In Japan (island of Formosa) many cases are reported, but the mortality is not given with any degree of accuracy.

In consequence of this condition of affairs, and desiring to have more accurate information upon this important subject, I detailed, with your approval, P. A. Surg. Stephen D. Brooks to visit China and Japan during the spring and summer months of 1897, and the results of his inspections, which appear in a report elsewhere printed, are such that it is clearly evident that the most careful watch must be kept upon this Asiatic menace to the health of our country.

The necessity for accurate as well as full reports of the existence of this dreaded disease is clearly shown in a number of the separate reports made by Passed Assistant Surgeon Brooks, and which have been printed in the public health reports. In Amoy the port physician, employed by the foreign merchants, is stated to have "frankly

confessed that he did not consider it his duty in that capacity (sanitary inspector) to hunt up any plague cases in Chinatown."

Special quarantine regulations were issued with reference to this disease and cabled to the United States consul at Bombay, January 18, 1897, by the Secretary of State on your request. One vessel infected with plague was received and properly treated at the United States quarantine station at San Francisco in July, 1897.

An officer of the service was detailed by the President as technical delegate to the International Sanitary Conference, held in Venice in February and March, 1897, with special reference to preventive measures concerning this disease. Reports of the proceedings of this conference have been published in the public health reports.

Following is a table prepared in the division of sanitary reports and statistics, showing the prevalence of the bubonic plague in all countries as reported to the Bureau:

PLAGUE.

Places.	Date.	Cases.	Deaths.	Remarks.
Arabia:				
Jeddah	June 10	16	23	
Egypt:				
Suez	Mar. 31	.....	.....	One case of plague on British steamship Dilwara from Bombay.
India:				
Bombay(a)	Dec. 1–Dec. 22	.....	694	This is the number of deaths officially reported. The United States consul estimates the number of deaths for the same period at 2,763.
	Feb. 23–Mar. 9	.....	1,282	Estimated deaths for this same period, 2,265.
	Mar. 9–Mar. 30	.....	1,431	Estimated deaths for this same period, 2,730.
	Mar. 31–June 1	.....	1,681	Estimated deaths from Mar. 31 to Apr. 20, 2,892.
	June 2–June 29	.....	90	
	July 1–Aug. 3	.....	52	
	Aug. 4–Aug. 31	.....	65	
	Sept. 1–Sept. 21	.....	95	
	Sept. 28–Oct. 5	.....	44	
Calcutta	Feb. 6–Feb. 13	.....	1	
Karachi	Jan. 11	.....	.....	Plague epidemic; 220 cases, 214 deaths to date.
China:				
Amoy	June 30	.....	.....	Plague epidemic reported.
Hongkong	Dec. 13–Dec. 29	.....	.....	A few cases.
	May 21–May 29	4	2	
	June 6–June 12	.....	1	
	June 26–July 17	.....	3	
Macao	Apr. 1–May 31	.....	154	
	June 1–June 3	43	.....	
	June 1	.....	.....	Plague epidemic reported.
Swato	May 4	.....	.....	Epidemic of plague reported.
Japan:				
Formosa	Nov. 6–Nov. 30	53	37	
	Dec. 4–Dec. 29	.....	15	
	Jan. 19–Jan. 27	3	.....	
	Feb. 23–Mar. 12	3	.....	
	Mar. 13–Mar. 23	4	.....	
	Mar. 24–Mar. 31	3	.....	
	Apr. 1–Apr. 20	64	54	
	Apr. 20–May 20	268	.....	
	May 31–June 27	144	.....	
	June 28–July 25	25	.....	
Kanagawa Ken	July 7–Aug. 3	3	2	
Nagasaki Ken	June 9–June 27	3	3	
Taihoku	Apr. 20–Apr. 27	3	.....	
Russia:				
St. Petersburg	Apr. 10–Apr. 17	.....	1	
Theodosia	Mar. 31	.....	.....	One case of plague on British steamship Baldwin.

a Official returns show 9,118 cases and 7,602 deaths to March 12.

The Bubonic Plague.

AN ADDRESS DELIVERED BEFORE THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA, MARCH 31, 1897.

By Walter Wyman, *Surgeon-General Marine-Hospital Service.*

The plague, known also as the bubonic plague, Levantine, Oriental, and black plague, and black death, is a disease which has ravaged from time to time the several countries of Africa, Asia, and Europe almost from time immemorial. The literature on the subject is appalling in extent, a mere enumeration of titles with authors covering 40 pages, royal quarto size, of the Index Catalogue of the Library of the Surgeon-General's Office, United States Army, and a score or more of the columns of the Index Medicus, published since the issue of the Index Catalogue in 1889.

Manetho, an Egyptian historian, who lived at the beginning of the third century B. C., described pestilences supposed to have been the plague as having occurred in the reign of the most ancient Egyptian kings. It prevailed in Athens 431–429 B. C., and reappeared in eighteen months after the last-named date. Thucydides has described it, and had the disease, and Hippocrates noted it. It is said that Athens lost more than one-third of its population by the epidemic.

According to Rufus of Ephesus, plague prevailed in Lybia in the third century B. C., and its home was considered to be in northern Africa. The great plague reported by Livy, who died 221 B. C., is said to have destroyed a million of persons in Africa, but it is not mentioned that it passed into Europe. Plague is also alluded to in the Bible, Zachariah xiv, 18, as peculiarly Egyptian, of which country this disease has been a great scourge.

In the Christian era it is not until the sixth century that we find bubonic plague in Europe. In 542 it spread over Egypt, and passed to Constantinople, where it carried off 10,000 persons in one day, and in the same century appeared in Italy, and extended also along the northern coast of Africa. It prevailed in England in the seventh century.

In the fourteenth century it was introduced from the East, and prevailed throughout Armenia, Asia Minor, Egypt, northern Africa, and nearly the whole of Europe. Hecker calculates that one-fourth the population of Europe, or 25,000,000 persons, died in all of the epidemics in the fourteenth century. It was in this century that the first measures were taken to check the spread of the plague, Venice appointing in 1348 three guardians of the public health for this purpose.

In the fifteenth century it recurred frequently in nearly all parts of Europe, in one year, 1466, the mortality reaching 40,000. The first quarantine establishment was founded in this century, namely, at Venice in 1403, on a small island adjoining the city.

The sixteenth century was not more free from plague than the fifteenth. In 1572 50,000 died at Lyons. In 1576 Venice lost 70,000.

In the seventeenth century it still prevailed in Europe, though less widely than in the middle ages. In 1656 one of the most destructive of all recorded epidemics raged in Naples. It is said to have carried off 300,000 in a period of five months. The great plague of London was in 1664 and 1665. The total number of deaths in 1665, according to the bills of mortality, was 68,596 in an estimated population of 460,000, out of whom two-thirds are supposed to have fled to escape contagion.

In the eighteenth century it prevailed extensively in Europe, the most notable epidemics being in Marseilles (1720), when from 40,000 to 60,000 persons were carried off. In 1721 it appeared in Toulon and spread over Provence, and out of a population of 250,000 persons 87,659 are said to have died. Sicily was visited in 1743, namely, at Messina, where the mortality was between 40,000 and 50,000. In 1771 it broke out in Moscow, and more than 50,000 persons, nearly one-quarter of the population, were carried off.

The nineteenth century has been marked by a recession of the plague toward the East, although in 1815 it appeared on the eastern coast of Italy, confined to a small district—its last appearance in that country. An isolated epidemic appeared in Greece in 1828. It appeared in Egypt between 1833 and 1845, the last year witnessing the last plague epidemic observed in that country, and marking its great eastward recession.

There was an epidemic of extreme severity in Cairo, 1835, during which there died a number of the inhabitants equal to the whole adult male population.

In 1840, Dalmatia; in 1841, Constantinople, and in 1843 and 1844, the eastern part of Egypt, were its western boundaries.

THE PLAGUE IN THE LATTER PART OF THE NINETEENTH CENTURY—THE "PLAGUE BELT."

Since 1850 the western limit of the plague is the Canary Islands, 1852, while its eastern limit is the island of Formosa, off the coast of China, where it now prevails.

Since 1850 the disease has oscillated, now east and now west, between the Red Sea and the Pacific, in China, India, Arabia, Persia, Mesopotamia, Russia, Caspian Sea, Afghanistan, Tripoli. There have been since 1850 but nineteen years when it has not been recorded in one or the other of these countries. The last outbreak of plague on European soil was in 1878 and 1879, on the banks of the Volga.

As to the "plague belt," it may be said that since 1850 the disease has never traveled further north than Astrakan, about 45° north, although within the present century it has visited Moscow, Norway, and Sweden, and latitudes as far as 60° north. During the nineteenth century the belt of the plague according to Cantlie may be roughly described as the basin of the Mediterranean and the strip of country in Asia from Turkey to China, running parallel to that sea; but the Mediterranean part of the belt has disappeared almost wholly within the present generation.

Formerly it was asserted that plague never appeared east of the Indus in India; nevertheless it has been observed during the present century in more than one distinct center in India. Of late years, since 1871, it has been heard from, particularly in China.

It should be remarked in this connection that according to Lowson the history of the disease in the far east is, with the exception of Rocher's Papers, a perfect blank. Chinese history makes no reference to any epidemic which has left a permanent record.

THE PRESENT EPIDEMIC.

The present epidemic in Bombay is generally believed to have been introduced from Hongkong. There was a violent epidemic in Hongkong in 1894, and an exacerbation of it in the same city in 1896. It was brought to Hongkong in 1894 from Canton, distant only eight hours by steamer, and is supposed to have been introduced into Canton in 1894 by way of Thibet from northern India.

A telegram from Bombay dated March 11 states that the total number of cases of bubonic plague in that city up to date is 9,032, and 7,546 deaths have resulted. In the whole presidency to date there have been 14,856 cases of the plague reported, and 12,204 deaths have been recorded. According to the United States consul only about one-half of the total number of deaths have probably been recorded.

The Bombay presidency or governorship of British India is bounded west by the Arabian Sea and inclosed elsewhere by Beloochistan, the Punjab, Rajpootana, Indore, the Central Provinces, Berar, the Nizam's country, Madras, and Mysore. Area, including Sinde, 190,512 square miles. The governorship is divided into 24 administrative districts. Population, 18,826,820.

OUR MODERN KNOWLEDGE OF PLAGUE.

This disease furnishes a striking illustration of the scientific advance of modern medicine. It was not until 1894 that positive knowledge of its true nature became

known. Now, its cause, method of propagation, and the means to prevent its spread are matters of scientific certainty. True, investigation is still necessary to make this knowledge complete, but enough is known to warrant the foregoing statement. All through the centuries, before and during the Christian era, down to 1894, the subject has been enveloped in darkness, and there has been the same groping after facts, the same unsuccessful search for the true cause, the same struggle in ignorance against its ravages, on the part of physicians, sanitarians, and public officials, as has marked the history of that other great epidemic disease, cholera, now likewise robbed of its terror by science.

One has but to reflect upon the vast amount of research, thought, and labor involved in the preparation of that mass of literature previously referred to, and to the misery, disaster, and death of which it is the exponent, in order to appreciate the value of the great discovery of 1894. It is to the immortal Pasteur and his contemporary, Koch, in their establishment of bacteriology as a science, that credit is due for the possibility of this discovery; and to a Japanese physician, Dr. Kitasato, a student in the laboratory of Koch, we are indebted for the discovery itself.

When, in 1894, the plague was epidemic in Hongkong, hundreds dying daily, great apprehension existed on the part of Japan, and accordingly Drs. Kitasato and Aoyama, with assistants, were commissioned by the Japanese Government to visit Hongkong and there study the disease, the former to make bacteriological investigation, and the latter to report upon its clinical and pathological characteristics. The report of Kitasato announcing the discovery of the plague bacillus was published under the auspices of the University of Tokio, July 7, 1894, and may be found in full in the Annual Report of the Marine-Hospital Service for 1894. Other investigators during the same year were, on the part of the English, Drs. Lowson and Cantlie; on the part of the French Government, Dr. Yersin; of the German Government, Dr. Wilm; and the United States was represented in these investigations by Dr. Arnold of the Navy, to whom we are indebted for the cultures which form the basis of the experiments now being conducted in three laboratories in the United States.

Plague, or malignant polyadenitis, as it has been termed by Cantlie, has been defined as an acute febrile disease, of an intensly fatal nature, characterized by inflammation of the lymphatic glands, marked cerebral and vascular disturbances, and by the presence of a specific bacillus. Although one gland alone may be clinically apparent, most, if not all, of the lymphatic glands are found to be enlarged at the post-mortem examinations. It is practically a septicæmia.

In from three to six days after exposure the disease makes its appearance in the individual. The period of incubation in some instances may reach nine days. The patient complains of high fever, a swelling of one or more of the lymphatic glands, and has delirium early in the attack, though seldom violent. The fever persists at least a week, and convalescence thereafter is slow. In fatal cases, death usually occurs at the height of the disease, between the second and eighth day, frequently within forty-eight hours. If life is prolonged for five or six days the prognosis is better. The glands most commonly affected are those of the thigh and groin, next of the axilla, and sometimes those in the neck. The swollen gland quickly attains the size of a hen's egg, and, unless death intervenes, after five or six days the gland softens and is filled with pus, which may be evacuated. In many cases of the severer type the bubo has not time to form, and then there are hemorrhages from the mucous membranes and beneath the skin—hemorrhagic extravasations—the so-called petechial spots. It is probably this phenomenon, giving a dark appearance to portions of the skin, which has given the name of "black death" to the disease. Large buboes may form in a few hours after a time when a person has felt in the best of health; and, on the other hand, patients die of the disease without the appearance of a single affected gland, although the post-mortem examination shows the glands to be slightly swollen and their substance contains the plague bacillus.

According to Wilm, death is generally caused by paralysis of the heart; in other cases it is from brain complications—meningitis, cerebritis, and hemorrhage.

The death rate varies in different epidemics, and is estimated at from 50 to 90 per cent. It varies, however, apparently according to nationalities. From the official reports of the epidemic in Hongkong in 1894 the following table shows the death rate of the several nationalities named: Chinese, 93.4 per cent; Indians, 77; Japanese, 60; Eurasians, 100; Europeans, 18.2. The small relative percentage of deaths among Europeans is attributed to the European blood and stamina and to the early treatment and confidence in the European medical attendant.

THE PLAGUE BACILLUS.

The cause of the disease is a bacillus somewhat resembling that of chicken cholera, a small short rod, with rounded ends of the nonspore-bearing variety, characterized by its property of extremely rapid multiplication and the facility with which it enters the human organism. It is found in large numbers in the pus from the buboes, occasionally in the interior organs, in grave cases in the blood and in the feces. It is also found in the dust of infected houses and in the soil. While so virulent, its resisting power to chemical disinfectants is feeble, succumbing shortly in a 1 per cent solution of carbolic acid, or of lime water. It dies in four days if kept at a dry heat of 60° C., or 140° F., or in half an hour if subjected to a temperature of 80° C., 176° F.; and in a few minutes if subjected to a heat of 100° C., 212° F. As demonstrated in the hygienic laboratory of the Marine-Hospital Service, it is easily destroyed by all of the ordinary disinfectants. On the other hand, it develops easily in many culture-media at the ordinary temperature, 18° to 22° C., or 64.4° to 71.6° F.

The length of its life when exposed to favorable conditions outside of the human body is as yet undetermined. This has an important bearing upon the quarantine measures necessary to be enforced, particularly with regard to merchandise from an infected port.

An interesting suggestion as to the cause of the prevalence of this disease in India and China is offered by Dr. Charles W. Dabney, jr., Assistant Secretary of Agriculture, to the effect that it may be because the people of India are so badly fed, and fed only on rice and other grains which contain very little protein. As compared with wheat, oats, indian corn, and rye, rice—by the protein standard—is the poorest food of them all. Additional credence may be given to this theory from the fact that plague so often accompanies famine. Other conditions are known to favor it, such as overcrowding and filth; but in cities and localities where these two elements are present, while the disease has raged violently it has been made in time to disappear; while in India, where these conditions prevail, with faulty nutrition added, the disease is persistent. Following is the letter of Dr. Dabney containing the suggestions mentioned:

WASHINGTON, D. C., *February 3, 1897.*

DEAR SIR: In pursuance of our conversation of Monday evening, I take pleasure in handing you herewith some suggestions which have come to me with regard to the reasons for the persistence of the bubonic plague in certain oriental countries. The density of the population, which in certain portions of Bombay approximates 1,000 to the acre; the filthy habits of the people; the heat of the tropical climate; the absence of pure water; the crowded and badly managed cemeteries; and the utter ignorance of all sanitary laws, doubtless combine to give rise to conditions which would favor diseases of this sort.

But why is it that this disease is continuously present in certain oriental countries and does not persist in occidental countries, even among people who are equally filthy and crowded together fully as densely as those in China and India? If it is density of population and filth that alone keep the disease going, why do we not have it all the time in Egypt or Africa, in Italy, in Spain, and even in the West Indies and South America? The population in certain tenement districts in New York City is almost as dense as in the section of Bombay referred to, though dis-

tributed more in altitude, perhaps, through the great tenement houses. I can testify that the negroes in our Southern cities are certainly filthy enough to make it possible there, if that were all that is required for the disease.

I have asked myself, therefore, what other condition exists in the East that does not exist among these other peoples?

It is well known that the poorer classes in India live largely upon grains, chiefly rice and pulse, with very little meat or fish. Many classes among them are vegetarians. There is a want of accurate dietaries, but from the report of Cornish (Nature of the Food of the Inhabitants of the Madras Presidency) and from the unpublished statements of Professor Atwater, said to have been compiled from the reports of intelligent and careful missionaries, it is evident that under normal conditions the Indian peasantry are among the poorest-fed people in the world. They are not at all delicate in their diet, but gladly consume any kind of vegetable food, and will even eat decaying fruits and tainted meat or fish.

Calculations based upon data supplied from these sources show that the food of the Indian peasant does not afford, on the average, more than 1,200 to 1,400 calories per man per day. We know that 2,000 calories is considered the lowest upon which a grown person can maintain comfortable existence, while 3,000 calories is the amount usually allotted for a man at ordinary work. We have nothing equaling the poverty of the Indian's dietary except that of the poorest Russian laborers, existing chiefly on buckwheat and animal fat, yielding only 1,600 calories.

Similarly the reported dietary of the poor Malays, among whom the plague plays great havoc, is said to have consisted for their whole lives of nothing but rice and fruit, yielding not exceeding 2,000 calories. The Indian peasant, in fact, appears to be always in a condition verging on famine, so that he would be a ready victim of disease of any kind.

These facts seem to suggest that one reason, at least, why the plague persists in the East is that the people are so badly fed, and fed only on rice and other grains, which contain very little protein. We know that, compared with wheat, oats, indian corn, and rye, rice, by the protein standard, is the poorest food of them all.

Respectfully, yours,

CHAS. W. DABNEY, Jr.

HOW IS THE DISEASE CONTRACTED?

The methods by which the bacilli enter the human body are three in number—by inoculation (through an external wound or abrasion), by respiration, and by introduction into the stomach. The Japanese investigator, Aoyama, contracted the disease by inoculation incurred during a post-mortem, and one of his assistants died of the disease contracted in the same manner. According to Lowson, skin to skin infection is impossible, unless the one to be infected has some wound, and the infector's skin has been soiled by fæces, blood, or the contents of buboes. The individual may contract the disease by inhaling the dust from infected houses which contain the germ; furthermore, by imbibing infected fluids or eating infected food.

It may be contracted, therefore, through one or more of the above-mentioned channels, by prolonged and intimate contact with the plague stricken, as in the case of a nurse carrying a child ill with the disease; also by the handling of fomites—clothing, bedding, and other infected materials—and by eating with soiled or unwashed hands. Infection from bodies found in the street, in houses, or awaiting burial, may take place if the clothes have been soiled by discharges. Cantlie says: "Bulard says sleeping in the dead man's shirt proves nothing further than that the plague-infected garment did not generate the poison of an intensity sufficient to infect. The poison grew every moment more dilute; but a nurse carrying a child throwing off contagion continuously is an exposure of a different stamp." According to Lowson, the poison is not given off in the ordinary respiration of a patient suffering with the disease; and sputem and saliva from an infected person have given negative results in the only case of which Lowson was able to make investigation upon this point.

HOW DOES IT SPREAD IN HOUSES AND IN LOCALITIES?

The conditions favoring plague are similar to those favoring typhus fever, namely, crowd poisoning, bad ventilation and drainage, impure water supply, famine or imperfect nourishment, and inattention to sanitary requirements. It is probable of this disease, as of yellow fever, that human habitations and the ground may become so thoroughly infected as to establish endemicity. The bacillus may infect food and water, though how long it will retain its virility in water is as yet undetermined. Clothing and other personal effects, bedding, etc., may be infected through the discharges. The bacillus is not killed by drying, as is the case with the cholera bacillus, and may be carried in the dust arising through the cleansing of dwelling houses which plague patients have occupied.

A very important element in the spread of plague in houses and localities are rats and other animals. It has been found that rats, mice, snakes, beetles, bugs, flies, dogs, and jackals are infected during an epidemic. It is significant that the purely herbivorous animals—horses, oxen, sheep, goats, and rabbits—are exempt. Rats die in large numbers, and generally this phenomenon is observed in advance of the appearance of the plague among human beings. The cause of their infection is still a subject of discussion. The soil becomes infected, and a very common belief in oriental countries is that the rat contracts the disease from miasmatic emanations from the soil, but this has never been scientifically demonstrated and is probably incorrect. The fact that mortality among rats precedes an outbreak of plague among human beings is explained by Lowson by the fact that rats have their snouts about an inch above the floors of houses and are more liable to inspire plague-infected dust than are human beings.

TREATMENT AND PREVENTION OF SPREAD.

Modern science, in its development of the serum therapy of disease, appears to have found an efficacious remedy in the treatment of this disease, which hitherto has maintained an average mortality of 90 per cent. A French physician, Yersin, was the first to use the serum from an immunized horse upon cases of a severe type. At Amoy, in 1896, he treated 23 cases of plague in this manner, all of whom recovered excepting two, whose cases were desperate from the outset, and upon whom treatment was not begun until the fifth day of the disease. The method in this treatment is similar to that of the antitoxin treatment of diphtheria, the efficacy of which is now thoroughly established.

In the prevention of the spread of the disease in a given house, all hygienic measures are necessary, such as proper sewerage, purity of water supply, isolation of the sick, disinfection of clothing and bedding, of the evacuations, and disinfection of the room; all unnecessary contact with the sick to be avoided, great care to be exercised with regard to food and drink, and, according to Kitasato, after recovery the patient to be kept in isolation for at least one month. It is believed that we have a valuable aid in disinfection of rooms and houses in formaldehyd gas, which has now been established as a reliable agent, superseding sulphur, and which can be used without injury to metals or fabrics. Experiments with this gas as a disinfectant have been carefully made within the last year in the laboratory of the Marine Hospital Service, and the results published in the public health reports issued by the Bureau. A formalin lamp for the generation of formaldehyd gas, suitable for practical use in dwellings, has been invented and successfully tested.

The advice of Kitasato that the patient should be kept isolated one month after apparent recovery is significant. Like precautions are necessary with regard to other contagious diseases, and too little attention has heretofore been paid to this very necessary precaution against the spread of contagious disease. For example, patients apparently recovered from cholera may carry within the intestinal tract the germs of the disease a variable time, possibly fourteen days. Patients who have

apparently recovered from diphtheria may still be found to have the diphtheria bacillus present in the throat for many days after recovery.

As a means of preventing the spread of the disease mention should not be omitted of the efforts of Haffkine, who has prepared and is now using in India a prophylactic lymph—in other words, a vaccination—against the disease, which recent reports indicate is successful. Over 1,000 natives and leading Europeans have already been inoculated in Bombay.

The means to be adopted when the disease becomes epidemic in a city consist, first, of a house-to-house inspection. In Bombay the government has undertaken the inspection of 30,000 houses.

There should be prohibition of the use of dwellings unfit for habitation, and abatement of overcrowding should be required. Buildings and premises, if infected or suspected, should be vacated for cleansing and disinfecting. The sick should be removed to hospitals or treated in their own homes, and the well who have been exposed should be removed to refuge camps. Infected bedding, clothing, etc., should be destroyed. It is the opinion of some English writers that when plague has been thoroughly fixed and established in a given city its speedy eradication is impossible. However this may be, it is a fact that the subsidence of the plague seems to depend upon the abatement of its virulence in the due course of its evolution, and it is generally conceded that a period of seven months is necessary for the subsidence of an epidemic.

HOW DOES IT SPREAD FROM ONE COUNTRY TO ANOTHER, AND WHAT PREVENTIVE MEASURES SHOULD BE ADOPTED?

From the foregoing lines it may be readily understood how the malady may be transmitted from one country to another by travel and commerce, either overland or by sea. As with cholera, the chief element connected with its spread from India to other portions of Asia and into Europe and Africa are the religious pilgramages. Pilgrams from infected districts visit the shrines, which are also visited by people from noninfected districts, who carry back with them the germs of the disease.

With a view to preventing the spread of the plague from India into Europe, an international sanitary conference has been called by the Italian Government, at the instance of the Austro-Hungarian Government, which assembled at Venice, February 9, 1897, and adjourned sine die about March 7. The representatives from the United States were Consul-General Wallace S. Jones and P. A. Surg. H. D. Geddings, United States Marine-Hospital Service, technical delegate. The direct interest that the United States has in the prevention of the spread of the disease into Europe may be seen from a consideration of the dangers which would threaten this country, provided the disease should become epidemic in certain European seaports, especially those from which large numbers of emigrants embark for the United States. For example, there is a large emigration from Naples, and the vessels which bring immigrants from Naples have Marseilles as their port of original departure. Thus, the infection of either port would be a matter of serious concern, and it should be remembered that Marseilles is the great entrepôt on the Mediterranean of commerce from the Orient.

There are two features of this disease which are matters for serious consideration, so far as the United States is concerned: One is the fact that while the period of incubation of the ordinary plague, the violent form of the disease, is from three to six days, there is said to be another form called the ambulant, or walking form, or pestis minor, in which the symptoms are mild, the patients not being confined to bed. They may be afflicted for a period of from ten to thirty days before the symptoms have developed which call attention to the disease, and it may then develop into the violent form. The other feature is the prolonged and still uncertain length of life, under favorable circumstances, of the plague bacillus. This has an important bearing upon the possibility of conveyance by merchandise. Personal effects are easily

disinfected, but certain classes of merchandise are so difficult and expensive to disinfect as to render the measure impracticable. Generally speaking, it is now considered that new merchandise plays a comparatively small rôle in the conveyance of contagious diseases, yet when suspected it must be disinfected or forbidden entry until a time has elapsed covering the natural life of the bacillus.

PLAGUE CONVEYANCE BY MERCHANDISE.

Following is an extract from the London Lancet of March 13, 1897, upon this subject:

"A special commission was appointed by the French Academy of Medicine in 1846, and made report upon the danger of the importation of the plague infection through merchandise from infected ports.

"The delivery (of the commission of 1846) was as follows:

"'There is no proof that merchandise can transport plague outside of the epidemic foci,' and the arguments upon which this conclusion was based were: (Translation.) 'In 1835 epidemic plague prevailed at Alexandria among the employees of all grades living in the warehouses of the Egyptian Government. A great quantity of bales of cotton, handled daily by laborers, were shipped to all the great ports of Europe from January to June—that is to say, during the period of the epidemic—without a single case of plague resulting. In 1835, 31,709 bales were carried to England, 33,812 to Marseilles, 424 to Leghorn, 150 to Holland, 32,263 to Trieste, 32 to various ports. These cotton bales, we repeat, did not convey plague to anyone, although no precaution was taken to disinfect them. They were compressed before being put on board, and were then piled in as small a space as possible. The hatches were closed, and the vessel left Alexandria. Of the 16 English vessels loaded with cotton which left Alexandria from the beginning of January to the end of June, 8 had plague on board, but the cotton loaded in these vessels was not more dangerous than that of noninfected vessels. We close, gentlemen, what we had to say with regard to the transmissibility of plague by directing your attention to a fact of great importance, which is positively and officially recognized. Since 1720 not one of the porters employed at the lazaretto of Marseilles in loading and handling merchandise has contracted plague.'

"Sir John Simon brought this report to the attention of the privy council in England in 1875, and thus concluded his report:

"'Under these circumstances, I evidently have no facts which would justify me in stating it to be necessary for the public safety that wool or other merchandise from Eastern places infected with plague should be excluded from this country.'"

Notwithstanding the opinion of Sir John Simon, as above quoted, our knowledge of the long life of the bacillus under favorable circumstances throws doubt upon the conclusions reached by him. The danger to the United States, however, from merchandise is minimized by the very small amount of direct trade, and the fact that, as reported by the United States consul, exports have almost ceased from Bombay. A circular letter has been sent by the Marine-Hospital Bureau to all the boards of trade in the United States to inquire as to the expected arrival of any vessels from Bombay and Calcutta, and the replies have all indicated that there are no such arrivals expected.

Although the quarantine regulations of the Treasury Department contained provisions relating to the plague, it was deemed expedient to make the following special regulations, which were cabled to Bombay January 18:

"QUARANTINE REGULATIONS TO BE OBSERVED AT FOREIGN PORTS AND AT SEA.

"ART. IX. At all foreign ports and places infected, or suspected of being infected, with plague, the United States Quarantine Regulations, Treasury Department, 1894, relating to cholera, shall be observed with regard to vessels and cargoes bound to the United States. Passengers and crews of said vessels who have been exposed to

the infection, or are liable to convey the disease, shall be detained a period of not less than fifteen days from the last possible exposure to infection, under the same regulations as those relating to cholera.

"QUARANTINE REGULATIONS TO BE OBSERVED AT PORTS AND ON THE FRONTIERS OF THE UNITED STATES.

"ART. XIII. The regulations heretofore promulgated with regard to cholera shall be observed with regard to vessels, cargo, passengers, and crews infected, or suspected of being infected, with plague, but persons who have been exposed to the infection, or are liable to convey the disease, shall be detained for a period of not less than fifteen days from the last possible exposure to infection."

The system of quarantine adopted by the United States is deemed sufficient to meet any emergencies. The law and regulations relate to foreign as well as to domestic ports, and require every vessel leaving a foreign port for the United States to have a bill of health, signed by the consul, certifying that all the requirements have been complied with. The regulations for foreign ports are such as to insure the sanitary condition of the vessel, its cargo, and passengers before sailing.

In addition to the above, there is a complete and uniform system of quarantine for domestic ports. These are explicit with regard to inspection before entry, removal and treatment of the sick with contagious disease, the isolation of those who have been exposed to contagion, the disinfection of the vessel and any articles of cargo that may be infected, and, finally, with regard to vessels bringing immigrants, a notification to be sent to the proper State health authorities of the expected arrival within their jurisdiction of immigrants who have arrived on the infected vessel, even though all precautionary measures necessary at quarantine have been taken.

The Government is well equipped with quarantine stations for the disinfection of infected vessels, and has besides several large stations where immigrants can be detained in barracks under observation, as at the Delaware Breakwater, at the mouth of Delaware Bay, and Fishermans Island (entrance of Chesapeake Bay), on the Atlantic coast, and Angel Island, San Francisco Bay, and Diamond Point, Washington, on the Pacific.

In conclusion, it may be said that it seems impossible that the plague should ever again ravage the earth as in previous centuries.

Modern quarantine is effective to a degree. Though old-fashioned and absurd as administered by some of the European countries and imperfectly executed in others, it nevertheless has proven, and will continue to prove, a powerful shield against this Asiatic invasion. Even should the disease spread to certain European countries, modern sanitation of cities, the knowledge of disinfectants and improved disinfecting appliances, and modern knowledge of the disease itself would doubtless enable it to be confined within reasonable limits.

NOTE.—Since the above was written the following report of experiments on the viability of the plague bacillus has been published by S. L. Rappoport, St. Petersburg. The material used was allowed to soak in bouillon cultures of bacillus pestis in a dark closet for twenty-four hours, then exposed for successive days to all the sunlight obtainable, or to dry heat.

Temperature and time required to kill.

Material.	20° C. (68° F.).	36° C. (96.8° F.).	60° C. (140° F.).	80° C. (176° F.).
Silk thread	19–24 days	13 days	75 minutes	15 minutes.
Note paper	10–17 days	5 days	30 minutes	15 minutes.
Filter paper	10–24 days	7 days	45 minutes	15 minutes.
Linen thread	9–13 days	4 days	30 minutes	15 minutes.
Woolen thread	13–23 days	5 days	60 minutes	15 minutes.

BERIBERI.

On April 6, 1897, there appeared a number of cases of beriberi on the Norwegian bark *Axel*, which arrived at the Gulf Quarantine Station in the early part of that month. Previous instances of the occurrence of this disease on board vessels sailing from Pensacola and other ports on the Gulf coast led me to institute an inquiry concerning the origin and prevalence of this disease in that region. I directed the medical officer in command of the Gulf Quarantine Station to investigate the matter and his report is subjoined, from which it will be seen that only isolated cases could be traced here and there, and that no spread of the disease need be apprehended.

INQUIRY CONCERNING BERIBERI AT SOUTHERN PORTS IN THE UNITED STATES.

By P. A. Surg. A. C. Smith.

Office of Medical Officer in Command, M. H. S.,
Gulf Quarantine Station, June 12, 1897.

Sir: As directed in Bureau letter (Q. D.) of April 6, 1897, I have the honor to report upon such investigations as I have been able to make concerning the occurrence of beriberi in ports on this coast and on vessels sailing from such ports.

I regret that these investigations are very incomplete and that no definite conclusion can be reached from them. On account of being confined so closely at the quarantine station, I have not been able to make many personal inquiries, and the press of other work has prevented my devoting much time to correspondence on the subject. I sent a letter of inquiry to medical officers of the Marine-Hospital Service stationed on the Gulf coast and to many health officers of the same region. Copies of the letter and replies received are given herewith.

I have not been able to learn of a single case of beriberi appearing in any actual resident of the Gulf coast of the United States. It has been seen with considerable frequency, within a few months past, on vessels entering Ship Island Harbor from tropical American ports. The reports of the disease or something simulating it having appeared last year on several vessels on the voyage out from Gulf ports are well founded and definite, but the origin of the disease in these cases is entirely obscure.

The Norwegian bark *Axel*, referred to in my letter of April 1, 1897, arrived at this port from Buenos Ayres August 24, 1896, with all well on board and the sanitary history good. The port of departure previous to Buenos Ayres was Leith, Scotland. After taking a cargo of pitch-pine lumber the vessel left Ship Island October 7, 1896. Before leaving the master was ailing for some days with an affection which was supposed to be rheumatic. The affection grew steadily worse at sea, œdema extending over the body, and the patient died at Montevideo, before reaching the end of the voyage, the vessel being bound for Buenos Ayres again. The next person to suffer after the captain was taken sick when the vessel was four weeks out. Later every-

one on board was more or less affected with beriberi, the last case appearing in a very mild form after the vessel reached Buenos Ayres.

My information in this case was received from the officers and crew of the vessel on her return to Ship Island in April of this year. I was informed that beriberi had never been seen on the vessel before, and that the master, while suffering from the disease, had asserted that he had been in command of her ten years without ever seeing a case on board.

No cargo was brought on the voyage from Buenos Ayres to Ship Island in 1896, but the ballast was of earth and was noted, on the inspection of the vessel, as not clean. It had the appearance of being taken from some excavation on shore. I can not learn much of the supplies of food and water taken on at Ship Island. The crew thought the water was not good, but the water usually furnished here is artesian and is considered excellent. No fault was found with the food. It is customary with vessels of this kind to depend a good deal upon canned meats and other canned foods, and these supplies are usually bought in quantities, in the cheapest market, and kept for months or even years.

When the *Axel* arrived in August, 1896, there was a vessel lying in the harbor, the Norwegian bark *Golden Sunset*, which had put into Ship Island in distress on account of the crew being disabled with beriberi on the voyage from Campeche to Havre. The vessel was disinfected at this station, and afterwards lay apart from the other vessels in the harbor. The sickest members of the crew were taken to the marine hospital at Mobile, and others only slightly affected remained on board. I believed communication had taken place between this vessel and the *Axel*, but was afterwards told by members of the crew of the *Axel* that this was a mistake, and that no such communication had taken place.

The Swedish bark *Monarch*, on her arrival at this port April 13, 1897, gave a history similar to that of the *Axel*. On the previous voyage, this vessel arrived at Ship Island July 10, 1896, from Port Natal, with all well on board and sanitary history good. The port of departure previous to Port Natal was Gefle, Sweden. No cargo was brought to Ship Island, and the ballast was stone and sand of clean appearance. The vessel loaded with pine lumber and set sail August 20, 1896. Beriberi appeared when the vessel was sixty or seventy days from Ship Island, bound for Delagoa Bay, and later affected all the officers and crew but 4, there being 16 men on board. One case was fatal, but the man was thought to have been in bad health before the attack. Seven men were put in hospital at Port Natal, before reaching Delagoa Bay, the master being among them, and the diagnosis of beriberi was made there, but whether beriberi was the diagnosis in all the cases I do not know; the crew list showed several to have been paid off on account of being sick with beriberi and one on account of dysentery.

The water for this voyage and a large part of the food were got at Biloxi and were thought to be good. The master only found fault with some fresh potatoes, which were watery and rotted quickly. A supply of canned goods, however, had been on board the vessel a length of time.

I have been told that beriberi appeared on a number of vessels sailing from Gulf ports in the summer or fall of 1896, but I can not get definite accounts of such occurrences, with the exception of the information regarding the Norwegian bark *Febrella* given by Dr. Alexander Grant, of the Escambia County, Fla., board of health, in the letter hereto appended. The mate of the *Axel* said that while he was in a hospital at Buenos Ayres with the disease there were sailors there with the same sickness, which had attacked them on the voyage from Gulf ports, and he understood that one vessel, to which part of these men belonged, sailed from Mobile and another from Pensacola. He could not give the names of the vessels nor any other evidence to confirm his belief.

I am strongly of the opinion expressed by Surg. R. D. Murray, that whatever the primary cause of the disease may be, zymotic or other, it is more largely influenced by the diet of the sea, or by some other factor of life aboard ship, than by any other

contributory cause. It is a remarkable fact that it has made its appearance on shipboard since tinned meats and other tinned foods came into extensive use for victualing ships.

I have suspected that the disease which we see on shipboard on this coast may be only a spurious beriberi, perhaps a form of chronic metallic poisoning, or ptomaine poisoning, from the use of foods which have been kept a very long time put up in tin cans.

If it is a zymotic disease I am unable to trace the origin of such outbreaks of it as those on the *Axel* and the *Monarch*, here given.

The treatment of the cases seen here has had good results in most cases, and is comparatively easy unless the patient is old or otherwise in bad health, or unless the cachexia is severe. The œdematous form has predominated, and in many the evidence of neuritis has been very slight. I have not found any evidence of a lesion of either the kidneys or the heart in the cases which I have examined. The urine is commonly somewhat concentrated and quite acid and free from albumin, and I have not found sugar, although Surg. R. D. Murray reports a case in which there was diabetes mellitus. If the disease extends to the chest the breathing is oppressed and the heart's action rapid.

The vegetable diuretics have a good effect upon the œdema, and may be combined with digitalis or strophanthus with advantage. Strychnine, combined with the tincture of chloride of iron, I have found very useful. Complete rest and good food are essential. I have not yet undertaken the prolonged treatment of a case in which the multiple neuritis was the main feature.

The letter of inquiry and answers received are appended.

Very respectfully, yours,

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.

The SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

[Inclosures.]

CIRCULAR LETTER.

GULF QUARANTINE STATION, *May 7, 1897.*

DEAR DOCTOR: I am trying to investigate the cause of reported cases of beriberi occurring on vessels sailing out of ports of the United States on the Gulf of Mexico. There is reason to believe the reports of this disease having appeared on a number of vessels sailing from this coast during last summer, and I want to ask you to give me all the information you have or can obtain of its ever having been seen at your port, either on shore or on vessels in the harbor.

Please also give me any details you can obtain in regard to its having occurred on any vessel in the voyage from your port, together with your opinion as to its possible causes.

Very truly, yours,

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.

REPLIES TO CIRCULAR LETTER.

UNITED STATES MARINE HOSPITAL,
New Orleans, La., May 20, 1897.

DEAR DOCTOR: Referring to your letter of the 7th instant concerning beriberi on vessels sailing out of ports on the Gulf of Mexico last summer and requesting information regarding cases, if any, observed at this port, etc., I would say that it does not appear from the records of this hospital from 1873 to the present that any cases have been received. The house surgeons of Charity Hospital and Touro

Infirmary have informed me that no cases have ever been treated at those institutions. Indeed, I have been unable to ascertain that any physician has ever seen a case, except Dr. Wilkinson, the quarantine officer at the Mississippi River quarantine station, who stated a few days ago that he saw a case, I think in 1893, at quarantine. My experience with the disease is limited to several cases treated at the San Francisco and Boston marine hospitals a few years ago, but the clinical records in the cases presented no data of special importance not already recorded by different recent observers. The best and fullest report I have seen from a pathological standpoint on this interesting affection is in the Annual Report of the Service for 1892 by Rounseville Wildeman, our United States consul at Singapore.

Very respectfully, yours,

HENRY W. SAWTELLE,
Surgeon, M. H. S.

P. A. Surg. A. C. SMITH,
Gulf Quarantine, Miss.

BILOXI, MISS., *May 14, 1897.*

DEAR DOCTOR: Yours of 7th instant to hand, making inquiries about cases of beriberi. After making inquiries about it, two cases were brought ashore for treatment—one, mate of Norwegian bark *Matilda*, December 27, 1896; the other, steward of Norwegian bark *Prince Regent*, April 12, 1897. I heard of some cases being sent to Mobile hospital from Ship Island from Norwegian vessels, but I have not heard of any cases on English vessels. I treated both the above cases with success. I have not heard of any beriberi occurring on any vessels after they left this port; if any occurred it must have been on Norwegians. I can not form any idea as to the cause, but should any more cases come under my observation I will let you know all particulars.

Very truly, yours,

JAMES J. LEMON,
President of Board of Health.

P. A. Surg. A. C. SMITH,
Gulf Quarantine.

ESCAMBIA COUNTY BOARD OF HEALTH,
Pensacola, Fla., May 13, 1897.

SIR: Replying to your favor of 7th instant as to beriberi in Gulf ports, I beg to say that from inquiries made no cases of beriberi have occurred here. The Norwegian bark *Febrella*, on her return trip from Rio Janeiro April 14, has a bill of health that one man died from beriberi on her trip from this place to Rio Janeiro.

We know nothing further about it.

Very respectfully,

ALEX. GRANT,
Secretary and Treasurer.

P. A. Surg. A. C. SMITH,
Gulf Quarantine.

UNITED STATES MARINE HOSPITAL,
Port of Mobile, May 10, 1897.

DEAR DOCTOR: Your circular letter of May 7, relating to beriberi at this port, etc., is at hand. In reply I have to state that the sole cases of the disease ever recognized here or in Mobile were the four cases sent from Ship Island last summer from the Norwegian bark *Golden Sunset*. Several invitations were given to Mobile physicians to inspect the cases, but only one doctor called. As (I think) I wrote you the *Golden Sunset* left Cardiff for Pernambuco, where she filled one tank with river water and put enough river water in the other to fill it also, mixing with original

Cardiff water. At the time I thought the disorders came from the water. One of the men thought them caused by the dust of the mahogany taken in at Campeachy. The vessel lay offshore from Campeachy about six weeks loading. Three or four of the men sickened there and were given aconite and potass. iod. by Dr. M. Ramos. He subsequently gave a clear description of the symptoms to me, concluding that the cases were of rheumatism. But at the time the four patients were admitted here the Norwegian bark *Themis* arrived in New York with six or eight men affected in a similar manner. The *Themis* had precisely the route of the *Golden Sunset*—Cardiff to Pernambuco and Campeachy for wood. In fact, water was taken at Pernambuco. I wrote to Dr. A. H. Doty, suggesting beriberi, but he replied that the cases were only of malnutrition, giving no symptoms. When I told this to the most intelligent of my patients (the one who was speechless and helpless when he left you) he was reminded that the *Golden Sunset* and *Themis* were revictualed at Cardiff with supplies from old vessels which were to be broken up, said provisions having been to sea three to four years. Thus my theory of Pernambuco water poisoning got a shock. But the cases had in varying amounts all the symptoms of beriberi. The men all practically recovered; three went to sea; one (Torkildsen, the paralyzed one), went home using crutches. All had clubby feet, serous effusions in different parts of the body. One had slight ascites and diabetes mellitus; he remained two hundred and five days, when he shipped on an American vessel. Dr. Ramos knows nothing of the prevalence, either in Campeachy or on vessels that load there. The above comprises all I know of the disease in the Mexican Gulf. Dr. T. S. Scales called to-day and stated that he never heard of a case till I told him of those last summer. The matter of causation of the illness of the *Golden Sunset* men is not final with me, for the effect of spoiled canned meat looks more plausible as a cause than Amazon or any other river water. In time I will ask Dr. Fowler, but expect nothing from him.

Yours, respectfully,

R. D. MURRAY.

P. A. Surg. A. C. SMITH,
Gulf Quarantine.

OFFICE OF QUARANTINE BOARD OF MOBILE BAY,
Mobile, Ala., May 10, 1897.

DEAR DOCTOR: I have to acknowledge the receipt of your communication of 7th instant, and to say that, with the exception of the cases from a vessel at Ship Island, treated in marine hospital here by Surgeon Murray, I have never heard of beriberi at Mobile, either on vessels or ashore. Experience of all the physicians here that I have interviewed on the subject corresponds with my own, and I have never heard of the disease making its appearance on board vessels subsequent to their departure from Mobile.

I am, most respectfully, etc.,

T. S. SCALES.

P. A. Surg. A. C. SMITH,
Gulf Quarantine.

BERIBERI AT SOUTH ATLANTIC QUARANTINE STATION.

Report of A. A. Surg. E. F. GEDDINGS.

MARCH 31, 1897.

SIR: I have to report that the first mate of the Norwegian bark *Rosenberg*, from Rio de Janeiro for Savannah, Ga., is suffering from beriberi. Upon the arrival of the vessel the symptoms were not well marked, but since then have developed sufficiently to establish the diagnosis. His condition at present is not serious. He has

been removed from the vessel to the wharf, where he is receiving medical attention. The vessel's sanitary history is not good, and she will be detained for disinfection. Should the Bureau not direct otherwise, the mate will be placed aboard when the vessel leaves for Savannah, provided, of course, if his condition warrants removal. There are at this writing no signs of any further outbreak.

Bespectfully, yours,

E. F. GEDDINGS,
Acting Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

BERIBERI AT BRUNSWICK, GA.

BRUNSWICK QUARANTINE, *May 22, 1897.*

SIR: The British barkentine *Athena*, thirty-eight days from Rio de Janeiro, arrived at this station on the 16th instant with three cases of beriberi on board. Those affected were the captain, the first mate, and second mate. They were all critically ill. The captain and second mate are recovering. The first mate is better, but his recovery is doubtful. There was no evidence of any infection of yellow fever other than the vessel was from an infected port. The vessel has been disinfected and is being held for observation. The five days' detention subsequent to disinfection will expire on the 24th instant.

Respectfully, yours,

R. E. L. BENFORD,
Sanitary Inspector, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

LEPROSY.

A full report of the proceedings of the International Leprosy Conference, held at Berlin October 11 to 16, 1897, by P. A. Surg. J. J. Kinyoun, detailed to attend the conference, is printed in the first portion of this report. Nineteen countries were represented.

The report of the conference gives a somewhat imperfect statement of the number of cases of leprosy in the different countries of the world, there being, approximately, 130,000 in India; 20,000 in Japan; 2,500 in Hawaii; 1,200 in Russia; 700 in Calcutta; 250 in the United States. Twenty-one other countries are included in the statistical table.

The cause of the disease is declared to be the bacillus lepræ, and known to the scientific world for twenty-five years. It is now acknowledged to be a slowly contagious disease, but not hereditary; and it is concluded that isolation is the best means of preventing its spread.

In view of the fact that our knowledge of the prevalence of the disease in the United States is fragmentary and unsatisfactory, although it is positively known that the number afflicted is not inconsiderable, I have to recommend that a definite knowledge as to its prevalence and the sanitary measures adopted by State and municipal authorities be obtained through investigation by the Marine-Hospital Service; the result of this investigation to be made known to Congress, with such recommendations as may be deemed proper concerning the establishment of a national leper sanitarium. It is proposed to pay the necessary expenses of the investigation from the epidemic fund. A bill to effect this purpose has been prepared, and will be introduced in Congress at its next session.

YELLOW FEVER.

The appearance of this disease within the limits of the United States during the summer and fall of 1897 will be adverted to in another place. Its continued appearance elsewhere on the Western Hemisphere, where alone it is allowed to have its habitat, requires a rehearsal of the same story from year to year with but few changes.

The island of Cuba, which lies at our doors, still remains the constant menace to the health of our Southern States. The normal state of unhealthiness of its principal seaport, Havana, is of course augmented at present by the presence of so many unacclimated troops from abroad who are engaged in suppressing the rebellion. The sickness and mortality among these soldiers can not be accurately ascertained, as their statistical reports are not obtainable. There have been (November 1, 1896, to November 1, 1897) 1,605 deaths in Havana alone, more than the entire number of cases which occurred during the present epidemic in the city of New Orleans, and upon a basis of mortality of 12 per cent, which is a very low one, this would represent about 12,000 cases. In two months (November 1–December 31, 1896) there were 1,472 cases reported. In Santiago there have been 385 deaths; in Matanzas 175 deaths; in Cienfuegos 129 deaths, and in Regla 130 deaths. In other places there have been reported to the Bureau a total of 232 deaths, making a grand total of 2,656 deaths in the island of Cuba, which based upon the mortality rate above mentioned gives a probable minimum of 20,000 cases; and this, it is to be remembered, is only from those points where our consuls reside, and where communication with the world is possible at the present time.

In Brazil the epidemic reported during the last year appears to be abating. In the city of Rio de Janeiro only 158 deaths have been reported, as against 3,107 the year previous; but it has appeared in Para, a point not noted the previous year, and 125 deaths have occurred in that city. Santos is apparently free from it, as no cases are reported.

In Mexico there have been only 4 deaths reported from Vera Cruz and 9 from Mazatlan, certainly a good record from places heretofore unpleasantly associated with large statistics in respect to yellow fever.

On the Isthmus of Panama the city of that name has been visited by an epidemic this spring and summer, and 110 deaths have been reported.

Other countries in South America or the West Indies where cases or deaths have been reported are Ecuador, Haiti, Guadeloupe, Jamaica, Peru, Nicaragua, and Salvador.

Following is a table, prepared in the division of sanitary reports and statistics, showing the prevalence of yellow fever in all countries, as reported to the Bureau from November 1, 1896, to November 1, 1897:

YELLOW FEVER.

Places.	Date.	Cases.	Deaths.	Remarks.
Brazil:				
Bahia	May 13–May 19	5	3	
Pará	Dec. 12–Jan. 30	.....	32	
	Jan. 31–Feb. 27	.....	20	
	Feb. 27–Mar. 6	.....	9	
	Mar. 13–Mar. 20	.....	3	
	Apr. 3–Apr. 10	.....	3	
	May 30–June 5	.....	4	
	June 20–July 3	.....	7	
	July 4–July 31	.....	11	
	Aug. 1–Aug. 28	.....	16	
	Sept. 5–Sept. 25	.....	12	
	Oct. 2–Oct. 9	.....	5	
Rio de Janeiro	Nov. 1–Dec. 26	.....	14	
	Dec. 26–Jan. 30	.....	28	
	Jan. 31–Feb. 6	12	5	
	Feb. 13–Feb. 20	21	6	
	Feb. 20–Mar. 6	.....	16	
	Mar. 7–May 29	174	78	
	May 30–July 3	10	7	
	July 4–July 31	3	2	
	Aug. 8–Aug. 28	2	1	
	Aug. 29–Sept. 11	1	1	
Santos	Aug. 1–Aug. 7	1	.....	
Cuba:[1]				
Cardenas	Dec. 25–Jan 30	84	8	
	Jan. 31–Feb. 27	38	1	
	Apr. 17–June 26	46	9	
	June 27–July 31	7	3	
	Aug. 1–Aug. 28	.....	11	
	Sept. 5–Oct. 23	.....	10	
Cienfuegos	Nov. 1–Dec. 27	.....	19	
	Dec. 28–Jan. 17	.....	2	
	Apr. 4–Apr. 11	.....	1	
	May 17–May 23	.....	1	
	June 20–July 25	.....	30	
	July 26–Aug. 1	.....	16	
	Aug. 2–Aug. 29	.....	33	
	Aug. 30–Oct. 24	.....	27	
Havana	Nov. 1–Dec. 31	1,472	554	
	Jan. 1–Jan. 28	400	141	
	Jan. 28–Feb. 25	117	44	
	Feb. 25–Mar. 25	130	38	
	Mar. 25–Apr. 29	342	85	
	Apr. 30–July 1	750	279	
	July 2–July 29	.....	192	
	July 3–Aug. 5	.....	28	
	Aug. 6–Sept. 2	.....	108	
	Sept. 3–Sept. 30	.....	67	
	Oct. 1–Oct. 28	.....	66	
	Nov. 1–Nov. 30	.....	4	
Manzanillo	Apr. 1–Apr. 15	.....	1	
	May 15–May 31	.....	1	
	June 1–June 15	.....	1	
	July 2–July 31	.....	6	
	Aug. 1–Aug 31	.....	7	
	Oct. 1–Oct. 15	.....	3	
Matanzas	Nov. 1–Dec. 23	.....	57	
	Dec. 23–Jan. 27	.....	19	
	Jan. 27–Feb. 24	.....	4	
	Feb. 25–Mar. 31	.....	2	
	Apr. 1–June 30	9	24	
	July 1–July 28	.....	17	
	July 29–Aug. 4	.....	4	
	Aug. 5–Sept. 29	.....	39	
	Sept. 30–Oct. 20	.....	8	

[1] February 28, 1897, 300 cases of yellow fever were reported among the sick soldiers on the island.

YELLOW FEVER—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Cuba—Continued.				
Regla	Sept. 1–Sept. 30	.....	104	
	Oct. 1–Oct. 14	.....	30	
Santiago	Nov. 1–Dec. 26	.....	56	
	Dec. 26–Jan. 30	.....	16	
	Jan. 16–Jan. 30	.....	5	
	Jan. 30–Feb. 27	.....	6	
	Feb. 27–Mar. 27	.....	3	
	May 2–July 3	54	64	140 cases in military hospital.
	July 4–July 31	.....	82	
	Aug. 1–Aug. 28	.....	56	
	Aug. 29–Oct. 2	.....	74	
	Oct. 3–Oct. 23	.....	23	
Sagua la Grande	Nov. 1–Dec. 26	705	86	
	Dec. 26–Jan. 9	65	6	
	Jan. 9–Jan. 30	110	12	
	Jan. 31–Feb. 27	35	7	
	Feb. 27–Mar. 27	54	17	
	Mar. 28–June 26	304	.....	Number of deaths not given.
	June 27–July 31	185	9	
	Aug. 1–Aug. 28	130	11	
	Aug. 29–Sept. 25	180	13	
	Sept. 26–Oct. 2	30	4	
	Oct. 3–Oct. 23	102	6	
Ecuador:				
Guayaquil	Dec. 18–Jan. 10	.....	9	
Haiti:				
Port au Prince	Nov. 4	.....	.....	Yellow fever reported.
	Dec. 1–Dec. 7	.....	2	
	Dec. 14	.....	.....	Yellow fever epidemic.
	Mar. 1–Mar. 8	.....	3	
Guadeloupe:				
Basse Terre	Jan. 5	1	.....	
Jamaica:				
Kingston	July 17–July 31	2	1	
	Aug. 1–Oct. 16	55	25	
Manchester	Aug. 1–Oct. 16	8	2	
Port Antonio	Aug. 1–Oct. 16	4	4	
St. Elizabeth	Aug. 1–Oct. 16	1	1	
Mexico:				
Mazatlan	Sept. 26–Oct. 2	.....	9	
Vera Cruz	June 28	.....	.....	Yellow fever reported.
	June 25–July 1	.....	2	
	June 29	.....	2	
	Oct. 1–Oct. 7	[1] 3	.....	
Nicaragua:				
Corinto	Sept. 6	.....	.....	Do.
Leon	Sept. 6	.....	.....	Do.
Managua	Sept. 6	.....	.....	Do.
Peru:				
Callao	June 10–June 17	.....	2	In harbor on steamship Santiago, from Panama.
San Salvador	July 1–July 31	38	11	
	Aug. 1–Aug. 31	54	16	
	Sept. 1–Sept. 30	34	12	
United States of Colombia:				
Bocas del Toro	Aug. 22	.....	.....	1 case yellow fever.
Panama	Apr. 14	20	17	
	June 25	91	62	Estimated.
	June 23–July 3	12	7	
	July 4–Aug. 3	33	15	
	Aug. 4–Aug. 13	4	2	
	Sept. 13–Oct. 3	2	2	
Colon	May 12–May 25	.....	5	
	Aug. 4–Aug. 14	.....	1	

[1] On steamship Uto.

SPECIAL MEASURES TO PROTECT THE UNITED STATES FROM YELLOW FEVER IN 1897.

On account of the close proximity of Florida to the island of Cuba, and the danger caused by irregular tariff and illicit communication carried on by smugglers, two officers of the Marine-Hospital Service were detailed for duty, one upon the east and the other upon the west coast of Florida, to inspect quarantine and inspection stations and to take special precautions regarding the landing of smugglers or others upon unfrequented portions of the coast. These officers were assisted in the performance of their duties by collectors of customs, officers of the Revenue-Cutter Service, and by special agents of the Treasury Department.

Correspondence relating to these measures follows. It should also be mentioned that inspections were made of all the quarantines of the South Atlantic and Gulf coasts.

OUTLINE OF MEASURES TO PROTECT FLORIDA COAST.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., June 17, 1897.

SIR: As will be seen by the public health reports published weekly by this Bureau, smallpox and yellow fever—particularly the latter—have been unusually prevalent in Cuba for a number of months past, and it is incumbent upon the Department, therefore, during the summer and fall months, when the danger of introduction of yellow fever is greatest, to take every precaution necessary to prevent the lodgment of yellow fever in the United States. Special precautions of this nature have been taken in each of the last three or four years, similar in character but not in detail to those about to be proposed. The danger of yellow fever reaching any of the regular ports on vessels connected with regular traffic is met by the quarantine regulations provided by the Treasury Department and by the several quarantine inspection and complete disinfecting stations. The greater danger is in connection with irregular traffic, illicit communication, such as is carried on by smugglers, and, in the event of any disturbance in the present relations between the United States and Cuba, in landings being effected on the Florida coast by irregular bodies of men from that island. I deem it therefore necessary that the Bureau for the next three or four months should be in a position to know as quickly as possible of any threatened danger from these sources, and it is proposed to detail two regular officers of the Marine-Hospital Service for duty, one upon the east coast of Florida, the other upon the west coast, who will be required to inspect the quarantine and inspection stations, keep thoroughly informed upon all matters affecting the public health, promptly notify the Bureau thereof, and, in emergency, to employ such temporary assistance as may be absolutely required without waiting previous approval. The expense of this service will be chargeable to the epidemic fund.

It is proposed, in addition and in accordance with previous practice, to inspect the quarantines on the Gulf, Atlantic, and Pacific coasts during the season.

Referring again to the inspectors on the coast of Florida, it will add greatly to their efficiency if the revenue cutters may be made available to assist them in reaching out-of-the-way places which have to be inspected, and in transporting them from place to place on the coast from time to time as may be required.

I would therefore suggest that the officers of the revenue cutters plying along the coast of Florida, as well as those on the coast of Alabama and Mississippi, be directed to render such aid of this character as may be practicable.

It is proposed to detail P. A. Surg. J. B. Stoner for duty on the east coast of Florida, and P. A. Surg. A. H. Glennan for duty on the west coast.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

The SECRETARY OF THE TREASURY.

REQUEST FOR AID OF SPECIAL AGENTS OF THE TREASURY DEPARTMENT.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., June 21, 1897.

SIR: Respectfully referring to the great danger of yellow fever reaching the east and west coasts of Florida from Cuba by means of irregular traffic and illicit communication, such as is carried on by smugglers and fishing craft, and the detail of medical officers of this Service to patrol these coasts, I have the honor to request that the supervising special agent of the Treasury Department be directed to communicate with his agents, instructing them to aid said officers in every way possible in ferreting out such vessels, with a view to giving greater protection from infectious diseases, and that he furnish this office with a list of such agents, so that the same may be given to the officers of this Service making inspection.

In order that he may be advised in the matter, I have to say that P. A. Surg. A. H. Glennan is ordered to patrol the west coast of Florida, and P. A. Surg. J. B. Stoner the east coast of Florida.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

The SECRETARY OF THE TREASURY.

INSTRUCTIONS TO SPECIAL AGENTS.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., June 25, 1897.

SIR: I inclose herewith copy of a letter, dated the 21st instant, from the Supervising Surgeon-General of the Marine-Hospital Service, wherein he calls attention to the danger of the introduction of yellow fever on the Florida coasts, through the irregular traffic, or illicit communication, such as is carried on by smugglers and fishing craft.

You are instructed to communicate immediately with the officials of the Marine-Hospital Service who have been assigned to patrol the coasts of Florida, and to render to such officers all possible assistance in their efforts to protect the public health. You are also directed to require from the special officers acting under your direction such action as may be necessary in the direction herein indicated. P. A. Surg. A. H. Glennan and J. B. Stoner have been instructed to patrol the west and and east coasts of Florida, respectively.

Respectfully, yours,

W. B. HOWELL, *Assistant Secretary.*

Mr. JOHN W. LINCK,
Special Agent, Tampa, Fla.

INSTRUCTIONS TO OFFICERS COMMANDING REVENUE CUTTERS.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., July 21, 1897.

SIR: In the course of your cruising you are directed to cover the coast from Anclote Key to Boca Grande as frequently as possible, reaching Key West for pay and provisions once each month only.

You will be particular to board all craft fallen in with on the coast referred to, but before boarding you will ascertain by hailing whence the vessels were last from. Should you find that any of them are from ports on the island of Cuba or other infected places, you will cause all such vessels to proceed to the Tampa Bay quarantine station, with instructions to report there to the medical officer in charge for examination, disinfection, or such disposition as said medical officer will make of them.

You are directed, if you find it practicable to do so with the force of officers and men on board the *Forward*, to send boats into such waters as can not be reached by the cutter for the performance of boarding duty and to carry out these orders.

Respectfully, yours,

W. B. HOWELL, *Assistant Secretary.*

COMMANDING OFFICER U. S. S. FORWARD,
Port Tampa, Fla.

Similar letters were addressed to the commanding officers of the other cutters on the Gulf and South Atlantic coasts.

INSTRUCTIONS TO OFFICERS M. H. S. SPECIALLY DETAILED.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., June 22, 1897.

SIR: Having inspected Cape Charles quarantine in accordance with official orders of June 14, you will rejoin your station, and as soon thereafter as possible proceed to the west coast of Florida for the purpose of making inspection of the quarantine stations upon the west coast of Florida from and including Apalachicola (Carrabelle) to and including Tortugas and Key West, in accordance with Article XI, page 31, of the United States Quarantine Regulations.

While making these inspections, you will be diligent in obtaining any information showing that the quarantine regulations have either been violated or evaded, and you are hereby authorized to take such reasonable measures as are necessary to obtain this information.

Attention is called to the reported arrival on the west coast of Florida of persons from Cuba who have been surreptitiously brought to the coast by smuggling and other vessels evading the quarantine restraints.

A request will be made for the cooperation of the special agents of the Treasury Department on duty in the territory assigned to you.

You are directed to keep the Bureau frequently and accurately informed of your address and of the work accomplished, and will transmit a report each week.

Whenever practicable you will wire the Bureau of your arrival and departure from each place, and on departure the date of expected arrival at the succeeding place.

The masters of the revenue cutters on the coast will be informed of this detail, and request will be made to have them instructed to assist, so far as may be possible consistent with their other duties.

It is suggested that among the first places visited should be Sarasota Keys and neighborhood, and Anclote Keys.

For information concerning the stations about to be visited, you are referred to the report of inspections in the annual report for 1896.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

P. A. Surg. A. H. GLENNAN,
U. S. Marine-Hospital Service, Washington, D. C.

A letter of similar import was addressed to P. A. Surg. J. B. Stoner, detailed for duty on the east coast of Florida.

CIRCULAR LETTER TO UNITED STATES CONSULS.

In view of the dangers apprehended at the beginning of the quarantine season, the following letter was addressed to all consuls and consular agents in the West Indies and on the Spanish Main, requesting full information to be given on the bills of health and supplemental bills of health furnished vessels leaving for the United States, and requesting also prompt notification of the outbreak of infectious or contagious diseases:

[Circular letter.]

PREVALENCE OF YELLOW FEVER AND NECESSITY OF PROMPT AND FULL REPORTS.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., July 27, 1897.

SIR: Owing to the prevalence of yellow fever and smallpox in Cuba, Martinique, Porto Rico, Haiti, Colon, and other ports having communication with the United States, I have to call your special attention to the quarantine laws and regulations of the United States, and request that full information be given in the bills of health and supplemental bills of health furnished to vessels leaving your port for the United States.

I have also to request that you will keep this Bureau fully informed of the sanitary condition of your port, and promptly send notification of the outbreak of contagious or infectious disease.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

NATIONAL QUARANTINE ADMINISTRATION (FOREIGN).

SANITARY INSPECTORS.

During the fiscal year two sanitary inspectors of the Marine-Hospital Service were in constant service at the port of Havana. One sanitary inspector was maintained throughout the year at Santiago de Cuba, one at Panama, one at Rio de Janeiro, and one at Yokohama, Japan.

Special inspectors also visited Havana, Vera Cruz, Honolulu, and the several large commercial ports of China and Japan. Reports from all these are herewith submitted:

INSPECTION OF ASIATIC PORTS BY AN OFFICER OF THE MARINE-HOSPITAL SERVICE.

LETTER OF DETAIL AND INSTRUCTIONS.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., March 30, 1897.

P. A. Surg. S. D. BROOKS,
United States Marine-Hospital Service, Port Townsend, Wash.

SIR: You are hereby detailed to proceed without delay to the principal ports of Japan and China for the purpose of informing the Bureau upon the prevalence of epidemic or contagious diseases, the commercial relations which said ports have with the United States, the precautions which are now being taken to prevent the

extension of the disease to the United States, and to make such recommendations as may seem to be necessary. This detail is made because of frequently recurring epidemics of smallpox, cholera, and plague in the far East, and the increase of transportation facilities between oriental ports and ports of the United States. Heretofore the Bureau has relied largely upon the disinfection of the baggage of immigrants at the quarantine stations of the United States, but the law of February 15, 1893, requires that vessels, their cargo, passengers, and crew must be free from danger of carrying disease before leaving the foreign port when bound for the United States, and with a view to a more definite policy in the enforcement of the law full and accurate reports are necessary.

You are informed that the Bureau has a sanitary inspector, Dr. Stuart Eldridge, at Yokohama, and is about to authorize the appointment of a sanitary inspector at Hongkong. These inspectors are appointed on the recommendation of the United States consul, and are not authorized to sign the bills of health, but are to furnish the United States consul with such information as will enable him to sign them.

The sanitary inspector at Yokohama is also the representative of the Hawaiian Republic, and it is likely that the one to be appointed at Hongkong will also be the one who is the representative of the Hawaiian Republic at that port. Their relations to this Government, however, are to be considered as though they had no official connection with the Hawaiian Government.

A special copy of the regulations, with all the recent amendments and additions, will be mailed to you to-morrow, and your attention is called to the Annual Report of the Service for 1896, and to the chapter therein devoted to the subject of "National Quarantine Administration, Foreign." You are directed to familiarize yourself with these volumes.

You will proceed first to Yokohama, and the limit point of your inspection will be Hongkong, or, if need be, Canton; and on return you will visit Honolulu. Should it be more convenient, Honolulu may be visited on the outward trip. The names of the ports to be visited by you are not specified, for the reason that this must be left to your judgment upon information to be derived after reaching Japan.

At each port visited you will make a special report, written upon one side only of the sheet, and ready, so far as may be, for publication in the annual report. You are authorized, where practicable, to employ a typewriter for this purpose, but it is believed that before leaving a port the report concerning it should be finished and transmitted. A general report will be made upon the completion of the tour. Special note should be made, and statistics given, of the commerce of each port with the United States, either direct or indirect.

With regard to the enforcement of the quarantine regulations, you are informed that at present it is the opinion of the Bureau that sanitary inspectors are not needed at other than the ports of Yokohama and Hongkong, where provision of this character has been made. The Bureau does not contemplate the employment of inspectors at every consulate. You are informed that at many European ports, where disinfection of baggage and detention of immigrants is a matter of only occasional occurrence, the United States consuls themselves make arrangements with local physicians for overseeing the work required and giving certificates, the expense of the service being borne by the steamship companies. You will make a special report upon the inspection service at Yokohama.

You will keep the Bureau informed of your movements, reporting your departure and arrival at each place, and transmit, as frequently as possible, your contemplated itinerary.

All mail sent from this office will be addressed to the care of the several United States consulates.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Approved.

LYMAN J. GAGE, *Secretary.*

General Report of Inspection of Asiatic Ports.

Office of Medical Officer in Command, M. H. S.,
Port Townsend, Wash., October 20, 1897.

Sir: Your order of March 30, 1897 (P. H. B.), directed me "to proceed without delay to the principal ports of Japan and China for the purpose of informing the Bureau upon the prevalence of epidemic or contagious diseases, the commercial relations which said ports have with the United States, the precautions which are now being taken to prevent the extension of disease to the United States, and to make such recommendations as may seem to be necessary."

Yokohama.—I sailed for Yokohama at once. A widespread epidemic of smallpox had been prevailing through Japan for twelve months preceding, but had nearly subsided. My attention was given at first mainly to the inspection of vessels bound for the United States, and I visited on day of sailing passenger steamships of different lines and sailing vessels bound for Pacific coast ports. I found that the inspection service was carefully carried out, but that processes of disinfection did not conform to the methods prescribed by the quarantine regulations. A visit was made to the Japanese quarantine station, then occupied only by a keeper. No inspection of ships was carried out by Japan at this time.

Hongkong.—I next sailed for Hongkong. On the way the ship touched at Kobe and Nagasaki, Japan, and Shanghai, China. Smallpox was still prevailing at the Japanese ports visited. No steerage passengers were allowed to embark at these ports, and no rags or other dangerous articles were being shipped to the United States. At Shanghai no epidemic was prevailing.

In Hongkong a few cases of smallpox in hospital were seen, marking the end of a small epidemic which had run several months. A case of bubonic plague with fatal termination also came under personal observation at the isolation hospital, the fourth case in that city the present year. From latest reports a few cases more were discovered, but the summer has passed without an epidemic.

Canton and Macao.—The cities of Canton and Macao were also visited from here. Lines of steamers make daily trips each way from one to the other of these three cities and bring to Hongkong much of its fresh food supplies and many Chinese passengers. Bubonic plague prevailed in Macao at this time, but no medical inspection of the steamers from Macao was made, although this was carried out for vessels from Swatow and Amoy because of epidemics of plague reported in those cities. Steamships for the United States occasionally touch at Macao after leaving Hongkong, and I know nothing to prevent Chinese steerage passengers embarking there. The United States consular service has no officer residing in that city.

From Hongkong I started on my return trip north and visited several cities on the Chinese coast. A short stop was made at Swatow, where plague had been currently reported, but no evidence of any cases could be found then.

Amoy.—At the next point, Amoy, a serious epidemic of plague was prevailing, the third in as many successive years. There was no hospital for the sick and it was with difficulty that a foreigner could gain access to cases, but through the aid of Chinese students of an American physician, Dr. J. A. Otte, I saw 7 cases at their homes. At several other houses I was refused admission. These were all acute cases and all had glandular enlargements. I append brief notes on these cases.

Case No. 1.—Woman; second day of sickness; pulse weak; temperature 103° F.; femoral enlargement. A member of same family had died the previous day after one day's sickness.

No. 2.—Woman; near the close of pregnancy; first day of sickness; bubo small, inguinal, painful to touch.

No. 3.—Man; second day of sickness; active delirium earlier, comatose at my visit; pulse barely perceptible. His bubo, inguinal, had been blistered as a part of treatment.

No. 4.—Woman; almost recovered; cervical enlargement, which had been very painful.

No. 5.—Woman; sick only a few hours; temperature, 103.5° F.; pulse full, rapid; cervical enlargement, just beginning.

Nos. 6 and 7.—Mother and adult son; both nearly well. The woman may have been an instance of local infection through a wound. She had severe itching over trunk and scratched one hip until raw. Later she became sick and had a femoral enlargement on the same side. The son had, at time of my visit, marked polyadenitis, inguinal, axillary, cervical. A Chinese medical student related that one of the enlargements increased in a short time (a half hour stated) from a barely palpable mass to one an inch in diameter. In this house several dead rats were found just before the sickness. A house close by was pointed out to me in which 10 persons had recently died after short illnesses.

It was reported in the daily press in other Chinese cities and in Japan that plague was prevailing in Amoy, but as to its extent the health authorities in the different cities had no official information.

Foochow.—In regard to Foochow, the next port visited, there were reports in other cities that plague was prevailing more severely than in 1895 or 1896, and that the number of deaths would be counted in tens of thousands, yet on reaching this city, near the end of June, I could not find one case, and no other disease was epidemic at this time. The region about Foochow is the limit on the north to which bubonic plague has spread since its start on the coast of China in 1894.

At an out-patient clinic in this city, conducted by the port physician, Dr. T. Rennie, at his hospital for Chinese, I saw two cases, pronounced incipient leprosy, in which the only evidence to the eye was two or three discolored patches on lower part of trunk and thighs. There were only slight subjective symptoms and the men appeared in good health, and I thought how easily such cases could pass any quarantine inspection unless all emigrants were stripped. And the diagnoses could not well be doubted, because of the physician's long experience and the necessity for his deciding such points almost daily.

Shanghai is the next city nothward which has direct foreign trade. Here I found no epidemic. Cholera has attracted rather more attention here. All foreign residents talk freely of its annual recurrence, but insist that it is of a different sort from that in India, and it seems reasonable to them, because of the small mortality among their own numbers and the absence of statistics among the Chinese.

Chefoo and Tientsin, still farther north, were next visited. The latter, a large city itself, has been brought within a few hours of Pekin recently by the opening of a railroad. Whenever cholera prevails in Shanghai it seems also to be found in these cities.

Shanghai.—I was obliged to return to Shanghai in order to cross to Japan, and while waiting for the ship for Japan I found that a few cases of cholera had been reported to the municipal health officer, and that bacteriological examination had failed to disclose comma bacilli. The health office in this city is now fully prepared to make examinations in all such cases, and hopes to determine the mooted question whether Asiatic cholera is endemic and whether there is danger of infection from the sporadic cases which so closely resemble the epidemic form clinically.

At this same time I found that two physicians of this city had made investigation of cholera there and had published their results in 1889.[1] The following quotation is of interest:

"Shanghai is situated in mid-China, on an alluvial flat several thousand square miles in extent. The city stands 10 miles from the mouth of a branch of the Yangtze River, with a neighborhood so flat that a large part of it is on, or even below the level to which the highest spring tides rise. The country is cut up in all direc-

[1] An Enquiry into the Causation of Asiatic Cholera, by Neil Macleod, M. D., and Walter J. Milles, F. R. C. S.

tions by creeks and artificial waterways, which are used for purposes of communication and irrigation. The ground water level is rarely so much as 10 feet below the surface, and is influenced by the tides much more than by the rainfall. The tides rise and fall from 10 to 15 feet. The water of the river at Shanghai is fresh, being partly that of the Yangtze, which is forced back at each flow of the ocean tide. Where the Shanghai River falls into the Yangtze the latter is about 30 miles wide, and reaches the sea some 70 miles away.

"Cholera makes its appearance in Shanghai every summer with startling regularity. Before the end of July it is rarely met with, by the end of August it is well marked, in September it is in full swing, not quite so virulent in October, and in the beginning of November an occasional case may be heard of, after which it disappears entirely till the following summer. For twenty years this has gone on with unfailing regularity under the observation of medical men now resident, and for how long previously no one can estimate.

"In the month of June the weather is damp and hot, in July and August it is dry and hot. September is like June for heat, damp, muggy weather prevailing. October is cool, and in the end of that month hoar frost is seen in the morning. So far as temperature of the air is concerned, we enjoy tropical heat for nearly a couple of months before the disease breaks out; it is most virulent in the damp, hot September, and does not disappear until after the hoar frosty mornings are experienced.

"The remarkable regularity of the time of outbreak, period of duration, and time of cessation, so far as I am aware, has no parallel on record. The country around Shanghai as to position at the mouth of a river, soil, and water distribution, is strikingly like that of the deltas of the Ganges and Nile. In each there is the alluvial deposit rich in organic matter, and the high ground water level, yet in the Ganges delta the disease is prevalent all the year round; at the mouth of the Yang-tsze it occurs with the regularity of a crop at the same season yearly, in the delta of the Nile it occurs only occasionally. The two latter regions have at least weekly communication with India. Some cause or combination of causes are prevalent all the year round at the mouth of the Ganges; at one season every year, viz, late summer and autumn at the mouth of the Yang-tsze; and at the same season but not every year at the mouth of the Nile. The explanation of the different way in which the disease prevails in these three regions, in many ways so like each other, may be found in the different combination of two causes, viz, the presence of the poison and the temperature of the soil. At the mouth of the Ganges cholera is never absent, the poison is therefore always present. * * * At the mouth of the Yang-tsze, either the poison is endemic or it is introduced shortly before the time that cholera breaks out each year, in which case it is curious that it should always be at the same time, there being no means of communication with a cholera-infected country opened up specially at that time, communication with India being weekly. Here the climate admits of a greater range in the soil temperature than at the mouth of the Ganges, there being great extremes of both heat and cold. The soil heats more slowly than the air, hence perhaps the determining cause for the spread of the disease in the late summer and autumn. * * * The regularity of the outbreak at Shanghai points to an endemic poison, the irregularity at the mouth of the Nile to the occasional introduction of the poison. * * *

"The second part of the investigation, the occurrence of the organism in relation to the disease, was tested in 44 cases, of which 30 were fatal, but 6 only could be examined after death, a number being Chinamen, whose dead bodies may not be examined except under pains and penalties of a severe kind. In 40 cases the comma bacillus was found."

This account is of value not only for the clear picture it gives of local conditions, but as embodying the results of the only series of investigations which I was able to find had been carried out in the Chinese cities I visited, in all of which cholera is frequently reported, and in all of which it is not difficult to find practitioners ready to foster the idea that these cases are devoid of any danger to the community.

I make no special reference to smallpox in the Chinese cities, because this has been fully considered in the individual reports.

Japan.—On returning to Japan I visited Nagasaki, Kobe, Hiogo, Osaka, Yokohama, and Tokyo, obtained various information and statistics from the health offices in those cities, and inspected the quarantine plants in Nagasaki and Hiogo, and the steam plant for disinfection of rags at Kobe.

The condition in Japan is very different from that in China. Statistics are available in Japan, and the outbreak of any epidemic is speedily known. The central sanitary bureau is in communication with the local offices all over the Empire. Sanitary improvements are being carried out. The quarantine establishments at Nagasaki, Hiogo, and Yokohama are well provided, and inspections of vessels were carried out at these ports this year during June, July, and August, or presumably until it was understood that plague had ceased in China and Formosa. The prevention of the entrance of plague cases into Japan the present year in two instances by means of these quarantine stations is evidence of their usefulness.

The failure to find comma bacilli in cases reported as cholera this year throughout Japan, though somewhat negative in character in view of recent epidemics of that disease, is yet encouraging.

The Government is now furnishing vaccine of good quality, and universal vaccination is compulsory. Careless methods of vaccination, an inferior grade of vaccine, as well as failure to carry out the law during recent years, all contributed to the spread of smallpox the past year. In spite of this widespread epidemic, however, it is a fact that the majority of the cases of that disease which have developed on the passenger steamships for the United States have been in the persons of Chinese passengers and Chinamen in the crew, whose exposure can be undoubtedly traced to China, not Japan. It is largely due to the careful inspection at Yokohama and the absence of emigation from Kobe that cases from Japan have not been brought over.

On the return voyage to this country I stopped at Honolulu, as instructed. The most important considerations here were the quarantine establishment and usages, the methods of dealing with infectious diseases in the community, and the leper settlement, which are detailed in the special report.

The voyage was continued to San Francisco, and I returned to my station September 27.

Your instructions to me refer to the frequently recurring epidemics of smallpox, cholera, and plague in Asia, and the increase of transportation facilities with the United States, and to the law of February 15, 1893, requiring that vessels, their cargo, passengers, and crew, must be free from danger of carrying disease before leaving the foreign port.

The statistics and other information, forwarded from the various ports I visited, furnish convincing evidence of the extent to which infectious diseases prevail in Japan and China.

The increase of transportation facilities is plainly shown by the figures given, and rumors are current for further increase of passenger service.

RÉSUMÉ AND RECOMMENDATIONS.

By way of résumé and suggestion for the further protection of the United States I have the honor to submit the following:

Smallpox is always present in the various cities of China and passes unheeded by the different communities, and the same statement applies as well to leprosy. Cholera is reported every summer in these same cities, and every few years becomes a serious epidemic. Plague has prevailed in several coast cities with greater or less severity the past four years.

In Japan the Government is devoting much energy to the quarantine establishments and to the suppression of infectious diseases. These efforts may prove success-

ful in the future and serve as a great protection against the transmission of disease to the United States, but that the danger has not been imaginary is seen by the statement made elsewhere respecting Kobe, that either cholera or smallpox had been epidemic during five of the past six years.

Leprosy is not infrequent in Japan and is uncontrolled, and dysentery is so prevalent at certain seasons as to awaken great alarm.

Medical inspection is a necessity at all points of emigration, and inspection alone is not sufficient. Personal clothing must be rendered free from danger of carrying disease. Of the quarantinable diseases, smallpox is the only one that has recently been brought to our Pacific coast ports. Since it is never known in China that an individual or his clothing has not been exposed to this disease, disinfection of all effects should be carried out, and this should apply to the crew (Asiatic) as well as to the steerage passengers. The individuals should all be bathed and inspected at this time.

In my inspections of passenger steamships I have found the steerage almost invariably well cared for and well ventilated, while the forecastle is usually the reverse, very dirty and foul smelling.

In spite of statements frequently made that all movables are taken out of the forecastle and a thorough cleaning given at the end of each voyage, I could not convince myself, often, that these parts were ever made mechanically clean. The crews are quite largely Chinese, and must necessarily have liberty ashore, and often are discharged in Hongkong. I recommend, therefore, that the sanitary inspector assure himself previous to day of departure that the vessel is in all parts mechanically clean, as directed in the quarantine regulations, and that he be given authority to require the same disinfection of all the Asiatics in the crew and their effects as of steerage passengers.

Leprosy should be added to the diseases which inspectors must exclude from ships bound for the United States, whether among passengers or crew.

No mention has been made in the separate reports of parasitic skin affections since they are not among the diseases declared quarantinable, but the desirability of excluding these is well recognized, and inspectors should be authorized to prevent the embarkation of emigrants so affected.

At Hongkong an excellent steam-disinfecting chamber is ready for use, and opportunities for bathing and for caring for articles injured by steam can be easily added. A sanitary inspector should have direct supervision of this work, and should inspect and vaccinate all emigrants before embarkation. He should also have charge of similar precautions for the neighboring port of Macao, if the ship proceeds to that port.

In Japan (all ports) these precautions can be limited to times of known epidemic, with the exception of vaccination, which I would advise at all times. Inspection and vaccination should be carried out on shore immediately before embarkation.

At Kobe, Japan, the disinfecting plant for rags should be made suitable to use for emigrants also. Bathing facilities can be easily added, and whether the plant is used for emigrants or not a change should be made in this establishment by the erection of a partition across the warehouse to separate the entrances to the steam chambers from the exits. If emigration increases at this port a sanitary inspector is needed here, and I would suggest that the disinfection of rags be carried out at all times under medical inspection, so that the certificate of the United States consul may become of greater value.

At Yokohama a plant for disinfecting with steam or formaldehyde and bathing facilities should be installed at once and used for all emigrants in times of epidemic.

The inspection at Yokohama of the Chinese emigrants and the crews on all vessels from China bound for this country must continue to be of great advantage to the United States.

Coolies boarding passenger ships to stow cargo should be first inspected by a

sanitary inspector or a physician selected by the United States consul. This should be done in Chinese ports at all times and in Japanese ports in time of epidemic.

I do not feel that it is wise at this time to recommend a detention of emigrants on shore under medical inspection during epidemics. The law permits the stopping of all emigration, and this would be the only efficacious means of preventing the spread of disease when the danger becomes too great.

Reference has been made in the separate reports to the work of United States consuls in preventing the shipments of lily bulbs and wool to this country during epidemics of infectious diseases, in compliance with the United States quarantine laws and regulations. Shipments of bulbs from Amoy, China, have increased greatly within a few years. They are, as a rule, packed in clay which has been fertilized with human excrement. On this account such shipments must be looked upon with suspicion and should be prohibited during epidemics.

Careful supervision is needed to see that the quarantine regulations regarding shipments of wool, hair, bristles, and feathers are not suffered to become a dead letter. The tendency is in the direction of too great leniency.

Very respectfully,

S. D. BROOKS,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

SPECIAL REPORTS OF INSPECTIONS OF PORTS IN CHINA, JAPAN, AND HAWAII, BY P. A. SURG. S. D. BROOKS.

REPORT ON HONGKONG.

HONGKONG, *June 14, 1897.*

PREVALENCE OF EPIDEMIC OR CONTAGIOUS DISEASES.

It can not be said that an epidemic of any disease exists here at this date.

Plague.—Watch for a recurrence of bubonic plague this year seems to have been carefully kept up, but the zeal of officials has been rewarded fortunately by the finding of only four cases, one each on May 21, 23, 25, and June 5. All were Chinese and all died at the isolation hospital. The opinion is generally held among medical men that an epidemic is far less likely to start here after the onset of very hot weather. But the medical reports of the Chinese imperial maritime customs for the year ended September 30, 1895, forty-ninth and fiftieth issues, state that at Mengtsz in Yunnan, the home of the plague for the past thirty-five years, the epidemic for that year (1895) did not begin until the latter part of July, and was one of extraordinary virulence, the number of victims reaching three times the usual figure.

The first official record of the occurrence of plague in Hongkong is in May, 1894. The opinion has been expressed that some cases must have existed in April, but that they can only have been few in number would appear from the April death rate of 21.54 per 1,000, the average death rate in that month, from 1887 to 1894 inclusive, being 19.86, while in May, 1894, the rate jumped to 61.36. The deaths from plague in 1894, by months, were as follows:

May	534
June	1,688
July	262
August	62
September	4
October	2
Total	2,552

The total number of cases in that year was 2,724. From October, 1894, no case was recorded until April, 1895.

Cases and deaths from plague in 1895 and 1896.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1895.													
Cases	.....	.....	.....	3	2	13	2	4	3	.....	5	12	44
Deaths	.....	.....	.....	1	4	12	3	4	2	.....	5	5	36
1896.													
Cases	49	125	168	316	344	113	52	25	9	2	1	.....	1,204
Deaths	45	111	174	273	292	130	43	12	7	3	.....	1	1,091

Dr. Jemes A. Lowson (The Epidemic of Bubonic Plague in 1894, Hongkong) states: "The mortality statistics can not be depended on in this colony as far as the proper registration of cause of death is concerned, but the number of deaths given by the registrar-general may be looked on as not far wide of the mark."

PLAGUE IN PARTS OF CHINA CONNECTED BY TRADE WITH HONGKONG.

(1) *Mengtsz.*—The following is abstracted from the report[1] of Dr. J. L. Michoud:

"This city lies in the southern part of the province of Yunnan, in a plain 20 by 12 miles in size, and 4,500 feet above sea. Mountains from 2,000 to 5,000 feet high encircle; Yunnan presents, in fact, a vast network of mountains 6,000 to 10,000 feet high. The climate is not very hot. One-fifth of the huge plain of Mengtsz is covered with graves. The cemetery touches the western edge of the city. A wall encircles the city. The houses are usually one story, and overcrowded. In March and April of each year the latrines (cesspools) of the houses are emptied. The contents remain outside for weeks until sold to farmers for fertilizing the rice fields. The rice planting and oppressive heat and rains begin in May. At this time plague usually shows itself, and always in the quarter near the cemetery. The disease is at its height in June, begins to subside in July and ceases with October. The greatest intensity is in the hottest month, June. With an increase in the rainfall, plague lessens. Immunity of individuals after one attack is well recognized. The epidemic in 1893 was not called particularly severe, yet out of the 10,000 to 12,000 inhabitants, 1,000 died."

(2) *Pakhoi.*[1]—"Bubonic plague, known locally as li-tzŭ-chêng, though falsely rumored to have been present during the spring of most years since 1884, is now, at the date on which this report ends, after an absence of ten years, making its appearance in Pakhoi. Endemic as the disease is to this part of China, the outbreak on the present occasion has its orign in the filthy state of the town, from want of rain, of which we have had, I may say, none since last September. Only a few cases have been reported; some of these were brought to the Church Missionary Society Hospital in a moribund state, hopelessly beyond medical aid. The disease so far can not be called epidemic, for it is only those living in the most loathsome parts of the town who contract it, and beyond these localities it has not extended."

(3) *Canton.*[1]—"The terrible outbreak of bubonic plague has been the event of this year. The first notice of the outbreak appeared in a native newspaper, dated March 14, 1894. In May the plague was at its worst. I have it on good authority that during the third, fourth, fifth, and sixth Chinese months 90,000 coffins were sold; probably only 75 per cent were for plague cases. By the end of July the pestilence had in a great part disappeared simultaneously from here and Hongkong. This coincidence is remarkable, for in Hongkong the most vigorous sanitary precautions were taken and enforced, whereas here no means whatever appear to have been used to check its spread and progress."

In the same report another writer on the plague in Canton observes: "In Hong-

[1] China. Imperial Maritime Customs. Medical reports for the year ended September 30, 1894, forty-seventh and forty-eighth issues, p. 19.

kong improved house accommodations and Hygienic arrangements may in the future prevent the plague attaining the same serious dimensions as in the severe outbreak of 1894; but what of the Chinese cities, where overcrowding, insanitary arrangements and filth provide the conditions so necessary for its propagation?

"History repeats itself. The disease may remain comparatively quiescent for a few years, but will surely again be called into activity under the same fostering conditions as preceded the present outbreak. It is impossible to give any correct estimate of the mortality, as no official records of burials are kept. Comparing the estimates from various sources, we believe the mortality from the beginning of the epidemic to the middle of June (the date of writing) to have been about 40,000, in a population of about 1,500,000.

"Canton[1] was again visited by the bubonic plague in 1896. During 1895 the disease was not seen, and there were very few, if any, cases. The epidemic of 1896 was not so violent as that of 1894, but it ran its course in the same way, beginning in the early spring and ending in midsummer. In the absence of any statistics, any estimate of the number of deaths is mere guesswork, and where a fatal disease is prevailing there is sure to be exaggeration."

John G. Kerr, M. D., LL. D., president of the Medical Missionary Society's Hospital at Canton, informed me that reports had been received from mission schools in the country around Canton this year indicating the existence of plague in many villages, but he could not speak definitely of any cases in Canton.

(*4*) *Macao.*—The official figures[2] for plague in 1895 in this Portuguese colony show a mortality of 67 in April, 448 in May, 66 in June, and 4 in July.

"It is worthy of note[3] that in 1894 Macao enjoyed complete immunity from the plague, while it was raging intensely in Hongkong and Canton, and that in 1895, when there were a few sporadic cases of an endemic form in Hongkong and Canton, Macao was invaded by the plague in all its intensity."

In 1896 there were a few sporadic cases in Macao. The colonial surgeon, J. Gomes da Silva, gave me a verbal account of the cases of plague the present year. The first case occurred in the convent in March. Others followed in the same building, principally among children; altogether, 22 cases, 13 deaths. In April, 37 cases were reported in the city; in May, 117; June 1, 15 cases; June 2, 15; June 3, 13. Only rarely is any report from Macao obtainable in Hongkong.

Smallpox.—A number of cases of smallpox occur every year in Hongkong. The mortality for the past six years, 1891 to 1896, has been respectively 16, 44, 51, 18, 8, and 12. A small epidemic took place the past winter, and isolated cases are being found up to date of writing. From October, 1896, to June 9, 1897, 292 cases were reported. The mortality for the first four months of 1897 has been, by months, 25, 43, 67, and 33. On June 2, 7 cases were still under treatment in the smallpox hospital, and the dead bodies of 3 were discovered by the police a few days later. In times of any epidemic it is by no means uncommon to find bodies, perhaps of beggars, who have crawled into a secluded spot and died.

In Canton, Dr. Kerr, of the Missionary Hospital, states epidemics of smallpox occur every five to seven years, and cases are not rare every year. No one can pass through the streets of Canton and not be struck by the large number of faces scarred by smallpox. The medical reports of the Chinese imperial maritime customs abound with repetitions of the same testimony from various Chinese cities.

Cholera.—Sporadic cases of cholera are reported here every summer, but an epidemic is almost unknown. Some cases are taken direct from ships from the south (Singapore, etc.), or are traced to such ships, and all others are regarded as nonspecific, noninfectious.

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[1] Report of the Medical Missionary Society in China for the year 1896.

[2] A Epidemia de Peste Bubonica em Macau. J. Gomes da Silva, Chefe do Serviço de Sande. 1895.

[3] China. Imperial Maritime Customs. Medical reports for year ended September 30, 1895, forty-ninth and fiftieth issues.

Mortality reports for cholera, choleraic diarrhea, and simple diarrhea show the following:

	1891.	1892.	1893.	1894.	1895.	1896.
Cholera	2	0	0	1	4	22
Choleraic diarrhea	0	1	3	2	14	20
Diarrhea	333	238	308	317	287	268

A few cases are recorded as cholera nostras every year, and a few as "vomiting and purging." Dr. Kerr, of Canton, has experienced two epidemics only during his more than forty years in that city.

Dysentery.—Mortality reports are alone available, and the deaths for a few years past are as follows:

1891	148
1892	69
1893	116
1894	92
1895	109
1896	86
1897	12

Beriberi.—The statistics of deaths are as follows:

1892	137
1893	130
1894	80
1895	144
1896	142

This disease is never considered epidemic here, and the cases are generally imported from the islands south of China, but the practice in the Hongkong hospitals is to avoid placing this disease in a ward containing surgical cases, since several instances are known of transfer of the disease to a patient with an open wound.

Leprosy.—It is generally acknowledged that leprosy exists in this city, but no official investigation has ever been made and no segregation attempted. Cases are at times tranferred to Chinese territory by the police and the authorities of the Tung-Wa (native) hospital. A leper colony exists outside of Macao and another near Canton, but in these cases there is no real isolation. Many children of leprous parents continue to reside in the colony, though exhibiting no signs of the disease, and the lepers roam about the country at will to such an extent that I was avised that the early morning was the only time I could see the real size of the colony.

Phthisis is reported to be very prevalent among the Chinese. Deaths are recorded as follows:

1892	593
1893	594
1894	556
1895	547
1896	614

But this, doubtless, falls short of the truth. The uncertain term, "lung disease," heads a large list as well.

Typhus fever is credited with only 2 deaths in the past five years.

Enteric fever has not, in recent years, entered very largely into the list of diseases at Hongkong. The recorded mortality is as follows:

1893	5
1894	6
1895	15
1896	14

Thirty-seven cases of this disease were reported in 1896. Investigation has not disclosed any special source of infection.

Measles and diphtheria do not occur in any extensive epidemics.

COMMERCIAL RELATIONS WITH THE UNITED STATES.

Hongkong is the port of embarkation of nearly all the Chinese steerage passengers bound for the United States, and is also a depot of supplies for the United States in Chinese goods, and vice versa. Whether emigrants or merchandise, all are largely in transit through this port.

Five steamship lines carry steerage passengers to the United States: One to San Francisco, the Occidental and Oriental, and Pacific Mail companies (combined); one to Tacoma, the Northern Pacific Company; one to Seattle, the Nippon Yusen Kaisha; one to Portland, Oreg., the Oregon Railway and Navigation Company; and one indirectly, by way of Vancouver, British Columbia, the Canadian Pacific Company.

By the San Francisco line there were 41 ships leaving Hongkong in 1896. The Canadian Pacific Company has a ship every twenty-one days, or a total of 18 ships during 1896. The Northern Pacific Company has 4 ships making regular trips, leaving here once in twenty-one days, and 5 extra ships are chartered mainly to carry tea. The Nippon Yusen Kaisha, of Tokyo, Japan, has only begun to run from Hongkong within the past four months. Its schedule is 1 ship a month. The Oregon Railway and Navigation Company has no regular schedule and makes only a few trips a year.

From the harbor master's report it is seen that, in 1895 80 vessels entered at Hongkong from the United States and 15 from British Columbia, and 73 cleared for the United States and 14 for British Columbia. In 1896, 91 entered from the United States and 18 from the whole of Canada, and 107 cleared for the United States and 19 for Canada.

The harbor master has also furnished me with the following list of emigrants for America and their destinations:

	1892.	1893.	1894.	1895.	1896.
To Portland, Oreg.	12	.....	.....	.....	.....
To Tacoma	246	976	245	118	427
To San Francisco	3,588	5,450	3,585	3,359	4,324
Total for United States direct	3,846	6,426	3,830	3,477	4,751
To Vancouver	1,027	4,094	2,168	2,964	4,196
To Victoria	3,437	1,222	799	750	860
Total for British Columbia	4,464	5,316	2,967	3,714	5,056

It can not be assumed that all of those landing at Vancouver and Victoria come into the United States, but in the absence of definite figures it seems safe to estimate that two-thirds of the number do. The last ship of the Nippon Yusen Kaisha, which sailed June 10, 1897, carried 3 Chinese steerage passengers.

From the Review of the World's Commerce, 1894-95, Washington, D. C., it is learned that for the fiscal year 1893-94 the exports of the United States to Hongkong amounted (in round numbers) to $4,200,000 (gold) and the imports to $890,000. In 1880 the imports were valued at $2,400,000. Through the kindness of Consul William E. Hunt I am informed that the imports from Hongkong amounted in 1895 (fiscal year) to $2,589,545, and in 1896 to $2,835,595. These are the only obtainable figures. Hongkong is a free port and has no custom-house, therefore no statistics of the commerce are to be obtained from local official authorities. Tea, silk, mattings, and Chinese clothing and food are the most important items sent from Hongkong. No rags are ever shipped. When we consider the length of the voyage to the United States it seems highly improbable that any article of new merchandise can be suspected of carrying infection, but this subject will be referred to again. Very few

sailing vessels leave here for Pacific ports of the United States. These would ordinarily be in ballast, and the ballast taken from this port is all hard rock. Some sailing vessels leave for New York with cargo. In 1895, 2 vessels cleared for the United States in ballast, and 6 in 1896.

PRECAUTIONS TO PREVENT EXTENSION OF DISEASE TO THE UNITED STATES.

The sanitary board and its officers have made strenuous efforts to free the colony from plague and other diseases, but this is only a part of what is absolutely essential to protect the United States. It is said that most of the Chinese who go to America are Cantonese; that is, speak the Canton dialect, and come from that city and the country surrounding. But they ship through a Chinese agent, and in all probability come to Hongkong only in time to embark. No means exist for ascertaining with any certainty where they have been living, and this fact would be of no importance when we consider how little is known in Hongkong as to the prevalence of epidemic diseases in the Canton district. The port physician, by virtue of his official position, examines the crew and steerage passengers of all ships on board on day of sailing, and certifies "that they are free from any bodily or mental disease which is likely to render them unfit to proceed or to endanger the health or safety of other persons about to proceed in such vessel."

The Pacific Mail Steamship Company has obtained a steam disinfecting chamber, and I witnessed the first work done with it, viz, the disinfection, June 8, of the baggage of Chinese steerage passengers for Honolulu by the steamship *City of Peking*. The apparatus worked well, and the clothing was taken from the chamber practically dry and uninjured. All unpacking and repacking was done by Chinese employees of the steamship company, and a certain amount of supervision was exercised by the sanitary inspector for Hawaii (the port physician), whose plan was to visit the place occasionally and see how the work was progressing. No passenger or other persons were present during my inspection. The baggage was held in the same warehouse until the time for transporting it to the ship, and no owner had access to it until it was placed on board. No provision had at that time been made for disinfecting the containers, or articles which would be injured by steam, or the clothing worn by these passengers. At the inspection on shipboard greater attention was given to the Hawaiian passengers. They were partially stripped, examined for glandular enlargements, and an attempt made to detect rise of temperature by the touch. Where increase of bodily temperature was suspected the clinical thermometer was used, and in several instances passage was refused when fever was thus verified.

The consular officer can obtain the certificate of the port physician, previously described, to guide him, and he is provided with an official statement of cases and deaths (in the colony) of the diseases mentioned on the United States bill of health. But this statement often refers to a period which ended ten days or two weeks previous to the date of sailing, whereas the Hawaiian inspector from his official connection with the colony fills in these facts to the day of sailing.

REPORT ON SWATOW.

SWATOW, CHINA, *June 16, 1897.*

This is a city of about 50,000 inhabitants, and lies halfway between Hongkong and Amoy, 150 miles from either. The surrounding district in which the same dialect prevails contains some 5,000,000 people.

Plague appeared here first in 1895, when there were approximately 10 to 12 cases a day for at least three months, and returned in 1896, but only to the extent of 5 or 6 cases a day for a few months. No cases are known to have occurred in the city this year. But in a neighboring town of 20,000 people, 5 miles distant, it is estimated

that 3,000 to 4,000 deaths have occurred this year, and in another town of the same size, 20 miles away, probably 5,000 deaths, while in a third town, 5 miles from the one last referred to, it is reported that plague has just made a start for the first time.

Smallpox occurs every winter or spring in all Chinese towns to a variable extent, and Swatow is no exception. It is by no means uncommon for cases to develop among the officers as well as the crew of local steamships. Many children are attacked. The opinion prevails that the disease is usually mild. Inoculation is probably little practiced now. Vaccination is quite general, and a sufficient supply of good vaccine, at a price within the reach of the poor, would be readily taken advantage of. As it is, the material used is often worthless.

Two severe epidemics of cholera within the past eighteen years (the latter about 1883) have made havoc in this city. In both instances it was believed to have been imported. Sporadic cases are seen often at the close of summer, but whether due to the comma bacillus or not is not determined.

Leprosy is very commonly seen, but estimates are impossible. No isolation is practiced until the cases appear very severe, when they are compelled to live in huts on the edge of town.

Typhus fever is not known.

Enteric fever is prevalent, but the Chinese are largely protected by abstention from drinking unboiled water.

Beriberi was originally imported from the South ten years or more ago, but now seems endemic and many cases occur. The manner of its occurrence at times fosters the belief that the contagion becomes fixed in a given building. Not long ago 7 cases developed in a missionary school for Chinese girls of only 40 members. Change of location effected a cure, except in the case of one, who suffered a second attack on returning to the school and died.

The Chinese in Hongkong come in largest proportion from the vicinity of Canton, but a large element is from Swatow. No direct emigration from Swatow to the United States has taken place, nor is there any direct trade. Large numbers emigrate to Singapore and neighboring ports. In recent years a sailing vessel in the foreign trade is almost unknown at Swatow. Many food stuffs are exported coastwise. Feathers are collected here, cleaned, compressed, and exported to Germany. As stated previously, Hongkong has at present an inspection service of all vessels from Swatow. Every immigrant is carefully examined and compelled to return if there is a suspicion of the plague or even if a rise of temperature is discovered. Similarly, at Swatow, every emigrant is examined to save the ship from possible detention at Hongkong.[1]

REPORT ON AMOY.

AMOY, CHINA, *June 19, 1897.*

Plague reached this port in 1895 and was very severe; returned with less severity in 1896, and again made its appearance in April or earlier the present year. No accurate estimates can be made. One opinion places the mortality at 10,000 in 1895 and 5,000 in 1896. The population of the city is about 250,000. All foreign residents live on the island of Kulangsu. Three cases of plague are known this year among the Chinese on this island. Many Chinese have taken refuge there recently. Ships anchor in the bay between the island and the mainland where the city proper lies. The business offices and warehouses (godowns) of foreigners are in the city on the water front. Last year there were deaths among Chinese living in these warehouses, and many dead rats were seen, but fewer this year. Immense quantities of firecrack-

[1] Information above noted was mostly obtained from Alexander Lyall, M. D., in charge of the English Presbyterian Mission Hospital, whose position and long experience render his opinions most trustworthy.

ers are being burned by Chinese in infected districts as one means of stopping the plague. It is reported that the mandarin has ordered many food shops closed in these districts, and from personal observation it is a fact that all shops are closed and business suspended in at least one section. From fairly reliable information it can be stated that at this date there are at least 50 cases of plague a day in the city, and that many surrounding towns and villages are equally infected.

Cholera is seen in sporadic cases every year. Two serious epidemics have occurred in the city within the past nine years, and small epidemics in the surrounding country are believed to be frequent. Diagnosis is made on the usual group of symptoms alone.

Smallpox is frequently seen; no winter passes without its presence. More cases are observed among children. Vaccination is most imperfectly practiced. Condensed milk is known to have been used by native vaccinators. As elsewhere the Chinese have no fear of smallpox and convalescents are often seen on the narrow streets.

Typhus fever is met with infrequently.

Enteric fever is not spoken of as the cause of much sickness, yet in the entire absence of opportunities for necropsies and with severe attacks of malarial fever occurring on all sides, it is not at all improbable that enteric fever often fails of recognition.

Few cases of diphtheria come under observation.

A small number of cases of beriberi are reported. A series of cases occurring in a school was noted here not long since similar to that mentioned under Swatow.

Syphilis is very prevalent in the city, but not common in country districts.

The principal exports are tea, bulbs, rock sugar (for candies and for use of Chinese), dates, dried litchis (fruit), images, and curios, but the great bulk consists of tea and bulbs, both of which items are on the increase. Yearly exports are valued at $4,000,000 (gold), more than three fourths of which is Formosa tea. This is usually "fired" and packed in Formosa. A few years ago not over 500 tons of bulbs were exported; now over 2,000 tons annually. These bulbs are partly packed in mud, a fact to be remembered in connection with the universal use of human excrement as a fertilizer. All bulbs come from a single district, Changchow, 50 miles up the river above Amoy.

Imports from the United States amount to about $150,000 (gold), nearly all of which is kerosene from New York. Flour, articles of tin, iron, copper, and machinery come indirectly by coast steamships from Shanghai or Hongkong. Kerosene alone shows much increase.

Emigration to the United States is practically nonexistent. No statistics on this subject are available in the office of the United States consul, and the direct steamship lines declare no steerage passengers are taken here. Many emigrants go south to Singapore, the Straits Settlements, and Hongkong.

Medical inspection of emigrants is made to avoid detention at destination.

The port physician takes his title from being the medical adviser for all the foreign residents, including the officers of the Chinese customs service. His interests are so closely allied with the shipping interests that it often becomes a hard task for him to declare any disease epidemic, as has been illustrated in previous years and at the present time. Proofs of the existence of plague can not have been difficult to obtain for several weeks past, yet not until the date of writing this has an epidemic been acknowledged to the United States consul for his guidance in preparing ships' bills of health.

Formosa.—The only steamship line between Formosa and the continent starts from Hongkong, touches at Swatow and Amoy, and then crosses to Tamsui, Formosa, and a trip is made every four or five days. Most of the Formosa tea for the United States is landed at Amoy, where it is sometimes again treated for exportation, or often repacked.

The fact is undisputed that plague exists now in Formosa, but to what extent is

unknown and probably could not be ascertained with any certainty in the present unsettled condition of affairs in the island following the recent change of rule from China to Japan.

FOOCHOW.

FOOCHOW, CHINA, *June 25, 1897.*

Plague prevailed here quite severely in 1895 and 1896, but no estimate has ever been made of the mortality or number of cases. As stated by Consul Hixen in his letter in the annual report for 1896, a serious epidemic undoubtedly occurred in both the above years and there is every reason to believe that it was the same disease (plague) which was present in other Asiatic cities at the same time. Reports of cases this year are easy to obtain and some may be true, but every sudden death is attributed by the Chinese now to plague. It was impossible to find any physician who had definite knowledge of cases of plague this year, and the port physician gave assurance that he had recently made an inquiry into the number of coffins sold in the city and found it not indicative of a large death rate. The coffin makers are united in a guild and pay a fixed sum into the guild treasury for every coffin sold. These figures are accessible under certain circumstances. The general observation, also, by foreign residents, especially by the missionaries, of whom there are nearly 100 from the United States, several graduates in medicine, tends to the same opinion, for all unite in stating that a far smaller number of funeral processions are seen or heard this year. Ground for burial is hard to find within short distances. One favorite place, perhaps for centuries, has been the hill on which the foreign community lives and which is yet one vast cemetery, and many funerals of necessity come in this direction from the native city. The missionaries have hospitals in the native city and the port physician sees some 14,000 Chinese patients annually at the hospital under his charge. Regarding the surrounding country only one report reaches me, that the town of Hing-hua, 50 miles to the south, has much plague now.

Cholera is diagnosed here only by the well-known symptoms, and is reported quite prevalent every year.

The same story is rehearsed for smallpox as reported for other Chinese cities. The people fear measles far more. Convalescents are often seen on the streets. The clothing of those who die is always used by relatives or is sold. Yet vaccination is quite general, though often poorly carried out. A practitioner here confirmed, as an eyewitness, the use of condensed milk in place of vaccine.

Typhus fever is little seen.

Enteric fever causes practically all the deaths in the foreign community, and is undoubtedly prevalent among Chinese. Measles is quite common, often severe. Diphtheria little seen.

Beriberi less prevalent than farther south.

Many cases of leprosy are seen. There are leper settlements for those most disabled on the borders of the city, but no effective isolation.

The population of Foochow is variously estimated at 600,000 to 1,600,000, but the smaller figure would appear the most reliable. It lies on the River Min, nearly 30 miles from the ocean, and vessels of deep draft are obliged to anchor 10 miles below the city.

In 1892, 13 vessels (steamships) cleared for the United States—12 for New York, 1 for Tacoma; in 1893 there were 7 (steamships)—4 for New York, 3 for Tacoma; in 1894, 12 (steamships)—10 for New York, 2 for Tacoma; in 1895, 16 (steamships)—12 for New York, 4 for Tacoma; in 1896, 19 (steamships)—10 for New York, 8 for Tacoma, 1 for Portland, Oreg. Three sailing vessels entered from the United States during the past three years. The Northern Pacific Steamship Company (for Tacoma) is thus the only line making any practice of calling at this port en route to Pacific coast ports of the United States, and this not regularly and only during the tea season—June to December.

There is no emigration from here to the United States.

The only exports to the United States are tea and curios. According to invoices certified at the United States consulate, the total export of tea for the season of 1894–95 was 8,960,924 pounds; for 1895–96, 9,392,765 pounds; for 1896–97, 9,011,264 pounds. The tea trade from China has greatly diminished in recent years, as Ceylon tea has proved superior. But an experiment with machinery instead of hand work has been tried on a small scale in the Foochow district with such success that a large plant is to be set up. The tea is brought from a point 20 miles above the city on the river, where it is prepared for the market. A part of it at least is again handled in the city and repacked. Of course, all has to be carried by boat down the river to the steamship anchorage.

The curios are usually very dirty. They come from pawnshops, and often consist of articles of clothing which may have changed hands several times.

A shipment of rags to New York was made two years ago, but it was attended with such financial loss that the experiment is not likely to be repeated. This shipment was fumigated here.

Recently feathers have been collected here for exportation, but none have been sent to the United States. The shipper has a modern steam-cleaning apparatus, it is said.

A sailing vessel was in port at the time of my visit which had just discharged her cargo of kerosene from New York.

If ballast is needed for vessels clearing from here it is reported that rock is used.

REPORT ON SHANGHAI.

SHANGHAI, CHINA, *July 6, 1897.*

Plague has never appeared at this port, nor in the section of China surrounding and including the tributary district of the Yangtze River, navigable for 1,000 miles.

Smallpox is present a part at least of every year.[1]

"The regular appearance of smallpox in Shanghai during the winter months has been variously explained, but there can be no doubt the practice of inoculation among the Chinese is chiefly and often solely to blame. When I first directed attention to this in two memoranda I pointed out 'that in those years when other influences were sufficient of themselves to originate smallpox, inoculation, by multiplying foci of infection, favored the spread of the disease, while in those years when such influences were insufficient to originate an epidemic, inoculation took their place in determining one,' and although the substitution of vaccination for inoculation has made considerable progress among the natives since this was written, it has still not done so sufficiently to alter the position materially."

A portion of a proclamation issued by the Taotai, or chief local native official, is also quoted as showing clearly the Chinese feeling toward vaccination and inoculation:

"And you are hereby to know that vaccination is both economical and safe, and those who wish to be vaccinated are at liberty to go either to the Temple Gardens Hospital or to the foreign institution in the Settlements, and the use of the native system of inoculation is peremptorily forbidden within the Settlements, *as it is baneful to foreigners.*"

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[1] Health officer's Report, Shanghai, 1895

The following table gives the number of deaths from smallpox, so far as it was possible to be ascertained:

	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Foreign	7	2	1	4	3	5	11	9	7	19
Native	76	54	29	79	223	78	184	125	138	316

Cholera.—The following extract from the report of the health officer for 1895 summarizes the views of the medical profession here clearly:

"After three years of complete or nearly complete immunity, Shanghai was last summer again visited by cholera. Situated as Shanghai is, in the center of a large native population under no sanitary control whatever, and in constant communication with the outside world both by sea and land, it must be rarely possible to say anything with certainty regarding the origin of zymotic disease. On the present occasion, those who believe in the introduction of cholera from without may point to the fact that the disease was known to be more or less prevalent over a wide area both in China and Japan before it made its appearance in Shanghai. Those who regard cholera as endemic—that is, those who believe the cholera germ to be constantly present in the water or soil of the district in which Shanghai is situated, its development, multiplication, and dissemination depending on conditions peculiar to the season or to the people themselves—may reasonably defend their opinion by declaring that it is impossible to regard disease as otherwise than endemic which has made its appearance every summer for seventeen successive summers, 1875 to 1891, inclusive, and which can not be said positively to have been unrepresented during the three years which followed, the years which I have just referred to as years of 'complete, or nearly complete, immunity.' The truth probably rests with those who hold neither of these views exclusively, for while endemic influence may be a reasonable explanation of a regular recurrence of cholera in successive years, it is equally reasonable to suppose that a reappearance of the disease after a lapse of time, such as the outbreak last year, was independent of local cause and due solely to an imported contagium."

In the foreign community 256 deaths from cholera have occurred during the past twenty-four years. During the past three years the following is the total number of deaths recorded from cholera:

	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Foreign	605	232	5	5	0	20	10
Native					7	908	8

Of the 20 foreigners who died in 1895, 9 were nonresidents and sailors, and of the 10 in 1896, 7 were nonresidents and 6 were sailors.

Dengue was present as an extensive epidemic during September and October, 1896. It attacked foreigners and natives alike, whole families in some instances suffering at one time. But it was not serious and no death occurred among foreigners.

Enteric fever prevails, but no figures are available, except that 13 deaths occurred among foreigners in 1895 and 1896.

Leprosy is less common here than in the more southern ports of China. No colony exists in this vicinity.

Dysentery never prevails in epidemic form.

Beriberi is not infrequently seen, but does not appear in recent mortality lists.

About six months ago the ships of the Pacific Mail and Occidental and Oriental Steamship companies began to call here on the voyage from Hongkong to San Francisco. Previously passengers and goods from here were transferred to these ships in

Japan. The Northern Pacific steamships for Tacoma call here; also the Canadian Pacific for Vancouver, British Columbia, and very rarely a steamship for Portland, Oreg. Many ships leave here for New York via Suez Canal, and the steamships among these touch also at many other ports in Asia and Europe. From the records in the consul-general's office I find that in the fiscal year 1894–95 6 sailing vessels and 19 steamships left here for New York and 8 sailing vessels and 12 steamships for Pacific coast ports of the United States. Of the latter, 5 sailing vessels were for Puget Sound ports, 9 of the steamships left for Tacoma, and 2 for Portland, Oreg. In the fiscal year 1895-96 there were 21 steamships and 5 sailing vessels for New York and 14 steamships and 25 sailing vessels for Pacific coast ports of the United States. Of the latter, 12 steamships were for Tacoma and 2 for Portland, Oreg., and 13 sailing vessels were for Port Townsend, Wash., 5 for San Francisco, and 1 each for several other ports. In the fiscal year 1896–97 there were 22 steamships and 9 sailing vessels for New York and 47 steamships and 30 sailing vessels for Pacific coast ports. Of the latter, 33 steamships were for San Francisco, 12 for Tacoma, and 2 for Portland, Oreg., and 11 sailing vessels for Port Townsend and 5 for San Francisco. The number of sailing vessels for Canadian ports could not be ascertained.

All the steamship lines unite in the statement that no Chinese steerage passengers are carried from this port, and the records at the consulate show only a few steerage passengers, and most of these were said to be returning sailors. In fact, the consul-general assures me he has not passed upon the papers of over three or four Chinese during his term of about three years. The general hospital has a steam disinfecting plant, and the sanitary board offer to disinfect any articles from houses where there has been infectious disease, so it seems quite possible that the personal effects of steerage passengers could be made safe at the same place.

The principal exports from Shanghai to the United States are bristles, feathers, furs, hides, crude musk, silk, straw braid, tea, and wool; and of these, bristles, furs, and musk are comparatively small items. Silk and tea make up three-fourths of the total value. The total value has not increased, but has remained nearly the same during the past five years. The value of the cowhides is fifteen times what it was five years ago. Straw braids have nearly doubled in that time. Crude musk has also greatly increased during the fiscal year 1896–97. The hides are said to be all arsenic cured. It is said at the consulate that a very large proportion of the wool, raw silk, and tea are shipped by way of Suez to New York.

These various articles are collected from all over China, as Shanghai is a great distributing and collecting depot. Many large cities are tributary to Shanghai in the line of foreign trade—for instance, Hankow, with a population of 800,000; Kiukiang, 55,000; Soochow, 500,000; Ningpo, 255,000; Hangchow, 700,000; Wenchow, 80,000; Wuhu, 78,000; Chinkiang, 140,000; Chunking, 110,000. These figures are all taken from the moderate estimates made by the Chinese customs.

Nearly all the sailing vessels for the Pacific coast ports go in ballast. This ballast is mud from the river banks just below the city. Sand or rock ballast is expensive, and has to be brought from a distance.

Shanghai is located on a small branch of the Yang-tse-kiang River, the Woosung, 12 miles from its mouth. Vessels of deep draft are obliged to anchor at the mouth of the Woosung, 20 miles from the ocean, but the majority of steamships and all sailing vessels come to the city and usually to dock.

The population of Shanghai is about 450,000, including over 6,000 foreigners. The old native city contains 100,000 Chinese. The remainder live in what is known as the Concessions—French, British, and American. While these concessions are self-governing, yet their control over the Chinese within their bounds is very limited and does not admit of the sanitary restrictions necessary for the common safety. No case of infectious disease can be isolated.

All regulations with reference to the shipping emanate from the Chinese customs service (under foreign management). On June 2, 1897, the Formosan ports Macao and Amoy were declared infected with plague, and a medical inspection of all ves-

sels from these ports was instituted. Such vessels, if able to come to the city, are stopped 2 miles below the lower limit of the harbor and inspected by a medical officer. If plague should be found on the ship she is to be disinfected and detained in quarantine, and passengers and crew separated into small groups and held. The municipality has a small isolation station for foreigners and for Chinese near this inspection ground, but it is very uncertain whether Chinese would willingly leave any vessel for such a place, and the city has no power to enforce it. No disinfection plant exists. In case a vessel from the above-infected ports, with plague aboard, has to anchor at the mouth of the Woosung River, inspection is made there if she does not carry a surgeon, while, if she does, his certificate that all precautions necessary to prevent the spread of the contagion have been carried out is sufficient to enable passengers and baggage to be transferred to a tender and brought up the river as far as the inspection ground, when the medical officer would decide what it was necessary to do. In case a vessel anchoring below has no sickness, no inspection is made until the tender comes up to the inspecting ground, and the statement of captain or surgeon that no sickness exists on the ship is accepted. In the absence of a regular quarantine station, the judgment of the inspecting officer is to determine what is best at many times.

The above procedure is what is now carried out in the case of steamships for San Francisco, Tacoma, or Vancouver, in case they have touched at Macao or Amoy for cargo.

It is customary for ships to employ a physician to look after the health of all on board, and he visits the ship occasionally, at times every day, whether there is sickness on board or not. If such a ship sails for the United States, this physician is authorized by the consul-general to charge the ship a fee of 5 taels ($3.45 gold) for his certificate regarding the sanitary condition of ship and health of crew, and the health of this city. The health officer sends him a weekly list of deaths from infectious diseases. It is very probable, however, that at times no real inspection is made, and reliance is placed on the fact that he has not been summoned to attend any sickness on board, or the captain assures him all are well. In the case of the steamships which can not come up to the city, a written statement of the condition of the ship and all on board, by the ship's surgeon, is furnished a local physician, who in turn certifies to the consul-general. The steamship company pays the same fee in this case. These certificates are filed at the consulate.

REPORT ON TIENTSIN.

TIENTSIN, *July 17, 1897.*

No epidemic is now prevailing.

Plague has never visited this portion of China.

Cholera exists here and in Peking and the surrounding country, probably, every summer. The heat becomes intense, but the period of this intensity is shorter than farther south. Cases of severe diarrhœa are just beginning to occur now, and soon after it is usual to find deaths in three to fifty hours following an attack, characterized by purging and vomiting, cramps, and collapse.

Such attacks are rare in the foreign population.

Physicians on the spot are bound to differ in opinion when asked if an epidemic exists, according to their theories as to the origin and their opportunities for realizing the extent of the disease. The occurrence of these choleraic cases is usually limited to a few weeks of the hottest weather and ceases abruptly.

A laborer becomes overheated at his work and fills his stomach with cucumber or watermelon. Is it strange that he is seized with cramps and the other accompanying symptoms? These are the oft-repeated expressions heard from those physicians who deny the existence of Asiatic cholera in China.

An incident was described to me as it occurred at a mining camp in China. Five or six deaths a day from a choleraic disease were occurring. The narrator, who was the medical attendant, induced the management to stop the importation of all

watermelons, and the deaths ceased at once. Cessation of hot weather was not coincident. This was to him a sure proof that the disease was not Asiatic cholera. Others, on the other hand, who have abundant opportunities to see disease among the Chinese, unite in the belief that the rice-water stools, cramps, algid, shrunken condition, and the many deaths could not be present unless the disease were true cholera.

Special epidemics are mentioned as occurring in this part of China in 1886, 1888, 1892, and 1895. An epidemic is often noticed in Chefoo and Tientsin first, later in Pekin, so it is thought there may be an introduction from the south. No estimate of cases or deaths is possible, but testimony is strong that at such times the number of funerals is greatly increased, and that cases and deaths are frequently seen on the streets.

The accounts respecting smallpox are the same as already noted, and repetition is unnecessary. The disease is everywhere prevalent and frequently noticed on the streets. Vaccination and inoculation both are practiced.

Enteric fever is probably quite common, though not often seen among the Chinese by foreign physicians.

Typhus fever is rare in Tientsin, but would appear to be more common in Pekin from the testimony of Dr. J. J. Matignon, médecin aide-major de 1e classe de l'armée, Attaché à la Légation de la République Française en Chine, in an elaborate description in the fifty-first issue of the medical reports of the Chinese imperial maritime customs for the half year ending March 31, 1896.

Beri-beri seems unknown here in the north. Measles are quite prevalent. Diphtheria is often seen in intensely severe type.

Tientsin is situated on the Peiho River, some 60 miles from its mouth, and has 950,000 inhabitants (estimated by imperial maritime customs, China), of whom possibly 800 are foreigners.

Until this season ships have been able to reach the city, but all are now obliged to anchor at T'angku, about 50 miles below Tientsin. The only railway in China affords communication, but all cargo is transported by lighters on the river. It is not probable that any attempt will be made to increase the depth of the river.

Ice closes all communication with this port, except overland, during three months every winter.

In 1893 the direct trade with America was limited to 2 sailing vessels, 1 from Port Townsend, 1 from Vancouver, British Columbia, bringing lumber, returning in ballast (always mud from here); in 1894 there was no direct trade; in 1895, 2 sailing vessels, 1 from San Francisco, 1 from Vancouver, British Columbia, with lumber, returning in ballast; in 1896, 7 sailing vessels from British Columbia ports, with lumber, 3 clearing in ballast for ports of the United States, 2 for Japanese ports, thence without doubt to the United States; in 1897 (to date), 3 sailing vessels from the United States, with lumber, 1 returning to Astoria, Oreg., in ballast, 2 still in port, and the steamship *Pelican* has made two trips from the United States with lumber, clearing with cargoes of wool for Tacoma, Wash.

There are several lines of steamers running between Shanghai and Tientsin, and, as a rule, at least one ship sails from each port daily. The Nippon Yusen Kaisha of Tokio has a steamer sailing direct from Tientsin to Nagasaki and Kobe, Japan, once a month.

The lumber trade from America is likely to increase to supply the needs of the railroad.

All the exports for the United States, with the above exception, are transshipped at Shanghai. These goods are invoiced partly with the consul at Tientsin and partly with the consul-general at Shanghai.

Wool (sheep, goat, camel) constitutes three-fourths of the total value invoiced at Tientsin. Other articles in the order of importance are straw braid, bristles, skins and furs, curios (porcelain and embroideries), intestines, feathers. The wool comes from distant parts of China often and is at times two years on the way, by carts,

over dusty roads. Of course it is impossible to learn the condition as to epidemic disease of any of the country passed through. The wool is all handled at this port. No sickness among the workmen is traceable to this wool. The skins are all arsenic cured. Intestines are packed in salt. Bristles are all handled and tied in bunches. Feathers are not steam cleansed.

These facts were all learned through the United States consul, who also estimates that 90 per cent of all goods for the United States go via Suez, are transshipped in Shanghai, and in part again in England.

In the summer of 1895 the United States consul declared the port cholera infected and refused to give shippers his usual certificate, which reads as follows:

"I, ——— ———, consul of the United States of America at Tientsin, China, do hereby certify that there is not, to my knowledge and belief, any epidemic of cholera, plague, or any other contagious or infectious disease prevalent at this port or in my consular district." * * * (See inclosure.)

The suggestion was at the same time sent to the consul-general at Shanghai that large amounts of Tientsin goods might come to him for invoice.

It is only when an epidemic has become widespread that this certificate has been withheld, with the result of stopping for the time the shipment of prohibited goods (wool) to the United States. No notice has ever been taken of the existence of smallpox.

No Chinese have ever emigrated to the United States from this district, but quite recently a small number of laborers have been sent from Newchwang, a short distance farther north, to Honolulu.

[Inclosure No 1.]

UNITED STATES CONSULATE,
Tientsin, China, January 1, 1897.

Comparative totals of exports for 1894, 1895, and 1896.

[Digest of the Invoice Book for 1896.]

Description of goods.	1896.				Total, 1896.	Total, 1895.	Total, 1894.
	First quarter.	Second quarter.	Third quarter.	Fourth quarter.			
Bristles	6,327.58	31,392.87	14,013.63	8,928.21	60,662.29	29,533.60	9,438.57
Carpets (camel wool)	.....	.....	.....	.....	.....	441.27	129.20
Curios, porcelain, and embroideries	3,215.30	125.00	.....	13,760.53	17,100.83	33,530.96	13,485.18
Feathers	881.57	3,442.80	2,216.66	1,259.36	7,800.39	2,546.72	.....
Horse hair	.....	.....	.....	.....	.....	2,473.36	.....
Intestines	5,375.00	1,219.69	1,202.72	7,007.04	14,804.45	4,767.05	.....
Miscellaneous	786.66	1,276.12	.....	.....	2,062.78	553.22	5,599.05
Skins and furs	2,359.65	11,076.19	5,097.35	6,716.24	25,249.43	229,432.40	105,714.00
Straw braid	982.38	41,972.14	17,504.16	88,391.88	148,850.56	332,169.20	234,356.94
Wool:							
Sheep	1,850.21	162,137.91	154,196.88	603,738.81	921,923.81	1,183,464.18	1,376,982.64
Goat	.....	.....	.....	.....	.....	.....	1,361.10
Camel	.....	14,725.00	.....	.....	14,725.00	.....	4,734.02
Total, Tientsin taels	21,778.35	267,367.72	194,231.40	729,802.07	1,213,179.54	1,818,881.96	1,751,800.70
Total United States gold at Government exchange	16,747.55	206,675.25	151,500.49	560,487.99	935,411.28	1,337,939.59	1,326,067.31

Bales, 18,250, at an average of, say, piculs 3.511 per bale, equal piculs 64,075.

With the compliments of the season and with wishes for increased prosperity during the year 1897,

——— ———, *United States Consul.*

To the MERCHANTS OF TIENTSIN.

[Inclosure No. 2.]

UNITED STATES CONSULATE, TIENTSIN.

I, ——— ———, consul of the United States of America at Tientsin, China, do hereby certify that there is not, to my knowledge and belief, any epidemic of cholera, plague, or any other contagious or infectious disease prevalent at this port or in my consular district.

This certificate is made to accompany a shipment of ——— ———, in transit from Tientsin for ———, U. S. A., per ——— from Shanghai, made by ——— ———, of Tientsin, and consigned by them to ——— ———, as declared in consular invoice No. ——, certified at this consulate on the —— day of ———, 189—.

Fee received: 50.

In witness whereof I have hereto set my hand and affixed my official seal this —— day of ———, in the year 189—.

———— ————,
United States Consul.

REPORT ON CHEFOO.

CHEFOO, *July 19, 1897.*

This port has a population of 35,000, and is frequented in summer by many foreigners from Pekin, Tientsin, and Shanghai, as a seashore resort. It has been subject to epidemics of cholera occasionally, the last time in 1895. The present port physician has made limited investigations, and has demonstrated the existence of comma bacilli in certain cases.

Smallpox, I am assured, holds its sway here as elsewhere in China.

From the United States consul it is learned that no direct trade now exists with the United States, though in the past a few ships laden with kerosene have entered. Exports to the United States and imports therefrom are all transshipped at Shanghai. Most of the steamers plying between Shanghai and Tientsin touch here each way, and a bimonthly connection by steam with Nagasaki and Kobe, Japan, is also maintained. Chefoo is closed to navigation by ice for three months each year.

The exports for the United States, which are invoiced here, consist of straw braid, silk (raw), pongees, and wool, in the order of their importance, and amounted, roughly, in 1895, to $120,000 and in 1896 to $86,000.

REPORT ON NAGASAKI.

NAGASAKI, *Japan, July 26, 1897.*

The health department of this city has furnished me the following table of cases of disease reported by physicians in this ken or district, which has a population of 800,000 (the city alone 75,000 to 100,000):

	1893.		1894.	1895.	1896.	1897 (to July 20).	
	District.	City.				District.	City.
Cholera	9	184	4	1,748	8	4	.....
Smallpox	1,162	.....	1,917	87	33	1,327	285
Diphtheria	29	.....	24	29	106	122	33
Enteric fever	325	.....	261	437	263	86	14
Typhus fever	1	.....	.....	.....	.....	2	.....
Dysentery	5,452	.....	2,298	562	351	44	2

Cholera is reported every year, but only occasionally does it assume epidemic form and only at such times are bacteriological examinations made. Opinion

inclines to the belief that the disease has always been imported from China in such years.

In spite of general vaccination smallpox is present every year. Undoubtedly the vaccine has been of inferior quality and the work carelessly performed. Practically no isolation of cases exists. The epidemic of the past year in Japan began here later than farther north, and continues after it has become extinct in most other sections. Ten cases and 2 deaths are reported within the city in the period July 9 to 20.

Enteric fever will necessarily continue endemic through the practice of enriching the fields with human excrement. The water supply in the city is piped from surrounding hills and passes through sand filter beds before distribution.

No cases of recurrent fever are known to have occurred in this district during the epidemic which prevailed in Japan in 1896.

The ships of the Pacific Mail and Occidental and Oriental companies, from Hongkong to America, touch at this port once in nine days, and those of the Canadian Pacific Company once in twenty-one days—in both instances mainly to coal. The Nippon Yusen Kaisha has a local line from Shanghai to Yokohama which touches here and affords connection to Yokohama with its line from Hongkong to Seattle, Wash. Besides these in the last five years there have been 4 to 10 steamships a year from New York via Suez and various ports, and a few sailing vessels with kerosene oil from Philadelphia or New York, but scarcely one vessel to or from Pacific coast ports of the United States. Four steamships a month from Formosa make their first landing here.

The principal exports to the United States are tea, matting, curios, skins, shells, paper, and rice, and the amount is materially increasing. No rags or wool are exported. Rock is always used for ballast from here.

No emigrants have ever embarked here for the United States.

At the entrance to the landlocked bay and 2 miles below the anchorage grounds (there are no docks), the Japanese Government has for many years had a quarantine station. The hospital buildings are located at one side. There are waiting rooms for different classes of passengers, bath rooms, dormitories, and two small steam disinfecting chambers. A laboratory and fine microscope are a part of the outfit. Everything is clean, buildings are conveniently arranged, but on account of neighboring steep hills the space occupied is too contracted. No arrangements exist for disinfecting cargo. A steam launch is provided for boarding. At present all vessels from Formosa and from ports on the coast of China as far north as Shanghai are boarded and inspected. In the case of the ship on which I arrived the work seemed to be carefully done.

Early in June of this year the steamship *Fukuoka Maru* arrived from Formosa with one case of plague among the steerage passengers. The ship carried nearly 400 passengers. A few days later two other cases developed, and all three died. The passengers and crew were carried ashore 100 at a time and bathed and their effects disinfected by steam. The ship's apartments were scrubbed with carbolic solution. The ship and all on board were detained a week after the development of the last case. No further outbreak on this ship has been reported. Cultures of the plague bacilli were made from these cases, but all had been removed elsewhere before my visit. A slide was shown under the microscope containing plague bacilli said to have been obtained from this source.

More recently a case of smallpox was discovered on the American ship *Joseph B. Thomas* on the eve of her departure for the United States and after the bill of health had been delivered. The ship went to quarantine, and after removal of the sick man was disinfected and proceeded on her voyage. No further precautions for the safety of the United States have, to my knowledge, been taken at this port.

REPORT ON KOBE.

KOBE, JAPAN, *August 3, 1897.*

The following figures were obtained directly from the Government statistics. Kobe ken has a population of 1,641,943; Kobe (city) and Hiogo have 182,625.

List of cases of diseases reported in Kobe ken.

	1892.	1893.	1894.	1895.	1896.	1897 (to July 1).
Cholera	63	28	35	3,603	54	1
Smallpox	748	2,435	101	8	a 2,348	b 1,865
Diphtheria	239	303	233	289	336	190
Enteric fever	1,076	1,659	1,447	1,369	1,817	300
Typhus	47	99	31	58	40	0
Dysentery	4,279	17,016	8,163	1,873	2,206	19
Scarlatina	.....	.....	.....	.....	.....	6

a City, 2,030. b City, 589.

During the month of July, 1 case of smallpox has been reported in Kobe-Hiogo and 3 cases in the ken.

List of cases reported in the city of Osaka, population about 460,000.

	1892.	1893.	1894.	1895.	1896.	1897 (to July 1).
Cholera	120	46	73	7,195	119	17
Smallpox	1,525	5,241	467	24	1,127	6,924
Diphtheria	259	300	245	375	373	456
Enteric fever	892	1,114	1,509	820	638	184
Typhus	13	27	13	2	5	0
Dysentery	1,694	24,504	6,198	1,370	1,302	50

List of deaths from above diseases in the city of Osaka.

	1892.	1893.	1894.	1895.	1896.	1897 (to July 1).
Cholera	78	29	37	5,564	69	5
Smallpox	611	2,034	169	4	330	3,061
Diphtheria	190	170	130	239	131	144
Enteric fever	295	325	404	257	174	42
Typhus	3	11	2	0	2	0
Dysentery	259	5,973	1,760	375	390	7

The United States consul declared Kobe infected with smallpox May 2, 1896, and pronounced it free from the same May 29, 1897; and Osaka was declared infected from May 17, 1896, to May 30, 1897.

Kobe-Hiogo and Osaka have been visited by many epidemics in the past, and the above statistics show that either cholera or smallpox has been epidemic during five out of the past six years. The causes are the same as mentioned elsewhere, absence of proper sanitation, vaccination, and isolation of cases. Osaka has a fairly good city water supply, but Kobe and Hiogo have only wells, or springs on the hillsides. There are no sewers except for surface water. All human fæces and urine are collected and used on the fields.

The regular lines of steamships for America which touch at Kobe are the same as already given for Hongkong: The Pacific Mail and Occidental and Oriental companies for San Francisco once in nine days, the Canadian Pacific Company for Vancouver, British Columbia, every twenty-one days, the Northern Pacific Company monthly (and as many more, with cargo only, at irregular intervals) for Tacoma, the Nippon Yusen Kaisha monthly for Seattle, and certain others at irregular intervals for New York.

The following list of vessels clearing from this port for the United States was compiled from the records in the office of the United States consul:

	1891-92.	1892-93.	1893-94.	1894-95.	1895-96.	1896-97.
For New York:						
Sail	2	10	15	15	18	11
Steam	31	23	18	21	23	23
For Pacific coast ports:						
Sail	5	3	7	7	9	20
Steam	5	16	49	47	61	94

Add to this the ships of the Canadian Pacific Line for Vancouver, at least 17 in the last year, and we find a total of 131 ships for Pacific coast ports in the fiscal year 1896-97, as compared with only 10 in 1891-92. Yet the number for New York via Suez has increased little in the same period.

From the Japanese customs reports, I find for Kobe the following values of exports to and imports from the United States, given in yen (worth about 50 cents gold):

Year.	Exports.	Imports.
1893	5,964,000	3,256,000
1894	7,061,000	5,622,000
1895	9,685,000	4,563,000
1896	7,437,000	8,495,000

The principal articles of export to the United States in order of valuation are matting, tea, rice, camphor, carpets and rugs, porcelains, curios (articles of lacquer and metal, beads, etc.), paper, brushes, straw braid, bamboo ware, vegetable wax, cotton rags, manganese, antimony, silk, oranges, wool, lily bulbs, etc. According to Japanese statistics the shipments of rags to the United States in 1895 and 1896 were not one-third of the amounts in 1893 and 1894. Shipments of lily bulbs are increasing somewhat. No shipments are being made at present, so I was unable personally to investigate the chances of infection by reason of the soil used in packing. But the correspondence from the office of the consul-general of Japan, quoted in the Annual Report for 1896, and in particular the statements of Sanitary Inspector Eldridge, at Yokohama, in that report, make it clear that careful supervision of such shipments are wise. The wool is mostly from Australia, but partly from China. Rock or sand is used as ballast from this port.

Very few emigrants for the United States have embarked here during the recent epidemic of smallpox. This was largely due to the action of the steamship companies in declining to accept any. Two days ago (August 1) the steamship *Coptic* took 17 for San Francisco. These had all been vaccinated before embarking and their clothing had been fumigated with sulphur. The fumigation building was made sufficiently tight, but trunks and baskets were simply opened and contents loosened, not removed, and bundles of bedding were not unfolded. The surgeon of this ship stated that he always fumigated bedding and personal effects (not in trunks) with sulphur in the steerage after leaving port. The United States consul has required that this vaccination and fumigation and the inspection of vessels shall be made by some reputable physician. He furnishes a certificate to the consul and the fee for his services is paid by the ship. In 1893, 145 steerage passengers left here; in 1894, 160; in 1895, none; in 1896, 148. It is stated that most of the Japanese emigrants come from districts west of here, which would make this their nearest port for embarkation, but that, owing to epidemics and the preference of steamship companies to take them at Yokohama, the larger number have taken passage at the last-named port.

During the past epidemic of smallpox, a further precaution has been taken here by the Canadian Pacific Company. All coolies who are to go aboard the ship to load cargo are given a medical inspection and a pass, then go aboard a lighter, and are towed out to the ship's anchorage.

All rags for shipment to the United States have been for some years past disinfected by steam. The plant consists of two brick steam chambers, each about 25 feet long, 12 feet wide, and 12 feet high, with arched roof, cemented on the inside, and with an opening at each end. These are situated in the center of a large warehouse. Within the chambers are steam pipes, one set perforated and one not. Work was going on at the time of my visit. The baled rags are brought into the warehouse on one side and are taken out rebaled at an entrance on another street. The bales are opened, the rags placed loosely in bamboo baskets of open construction, and the baskets then laid on wire racks within the chamber. The baskets are not over 6 inches deep and the rags were not heaped up in them. The racks are arranged in the chamber on either side of a central aisle, about 8 inches apart, from the floor to a height of 6½ feet. This leaves a large free space in the middle of chamber and several feet above the highest rack, undoubtedly conforming to the regulation that 50 per cent at least of the space must be free. After closing a chamber it is heated to 239° F., then steam is turned into the interior through the perforated pipes for fifteen minutes, and dry heat alone for fifteen minutes after this. The rags come out dry. At the beginning of the work here the chamber was heated to 260° F., but it was found that this destroyed the fiber of the cloth. Steam presses are located close to the end from which the rags are taken, where they are again baled. The owner of this plant certifies to the United States consul that a given invoice of rags has been disinfected by the method just described, and from this the consul makes out his "Certificate of the disinfection of merchandise," Form No. 156. It has been suggested that the effects of emigrants might be disinfected at this same plant. The warehouse was looked over with this in view and a plan suggested by which bathrooms might be erected beside the steam chambers. In this way the personal clothing could be disinfected (with the contents of trunks, etc.) and be received by the individual at opposite end soon after emerging from his bath. From the exit to the bay is a walk of not over two minutes. If arrangements could be made to have an officer of the Japanese customs make his inspection of emigrants here, then emigrants and their baggage could be at once placed on lighters and conveyed to their ships, avoiding danger of further contamination.

The sanitary inspector of the Hawaiian Republic, in behalf of that Government, has detained emigrants for Honolulu under observation during the incubation period of the disease, and the same could be as easily carried out for the United States.

The Japanese quarantine station is located in Hiogo, at a convenient point on the bay where all ships pass, about 2 miles before they reach their anchorage. As stated under Nagasaki, all ships from Formosa and from ports on the coast of China as far north as Shanghai are now subject to inspection.

The ship on which I took passage anchored off quarantine at 9 p. m., and was very soon boarded by the officers, six of whom at once proceeded to inspect, under electric light, the crew, steerage passengers, and the ship in general. There were about 225 Chinese in the steerage. An hour was consumed in this work. The station is provided with two steam launches for boarding. A steamship is anchored off the station on which the officers live, and which is available for any emergency which may appear. There is no dock at the station for receiving ships, nor special appliances for disinfecting cargo or ships. The arrangements on shore are excellent in the main—a waiting room, from which runs a covered passageway with side passageways leading to different buildings, for female cabin passengers, for male cabin passengers and ships' officers, for second-class passengers and crew, and for coolies. The general plan for all these is the same, but the accommodations are

much better for cabin passengers and ships' officers than for the others. In all cases the personal clothing is to be removed and taken to the steam chamber. The individual then passes to the bath, and on emerging at the other side receives a clean garment from the station and awaits the return of his own clothing. The building for female cabin passengers contained five bathrooms, waiting rooms on either side, rooms for undressing and for dressing, and toilet rooms. The building for male cabin passengers and for officers contained ten bathrooms. In the remaining buildings the bath tubs were large and designed for several individuals at once. All baths were provided with hot and cold water. A short distance from these buildings are the detention houses—one for cabin passengers, four for remaining passengers and crew, and one for any cases of sickness (nonquarantinable). The house for cabin passengers could hardly accommodate more than 25, the four others about 250, the hospitals (nonquarantine) 60. There are two steam disinfecting chambers of brick, lined with a shell of iron, each about 10 feet long, oval, 5½ by 3½ feet in two diameters, open at either end. A car on rails and bearing wooden racks is provided for clothing, etc. Articles injured by steam and containers in general are disinfected with carbolic-acid solution converted into a spray by a jet of steam, after the plan of the steam atomizers used in sick rooms. An administration building, boiler house, and houses for attendants complete the list, with the exception of the hospital for infectious diseases on the water front, a half mile distant. All the buildings are light frame, suitable only for mild weather, and not provided with means for heating.

REPORT ON YOKOHAMA.

YOKOHAMA, *August 25, 1897.*

The central sanitary bureau at Tokyo furnished me the following table of cases and deaths from infectious diseases in Japan for the five years 1892–1896 and for the first six months of 1897:

	1892.		1893.		1894.		1895.		1896.		1897 (one-half year).	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera	874	497	633	364	546	314	55,144	40,154	1,481	908	57	28
Smallpox	33,779	8,409	41,898	11,582	12,418	3,342	1,287	268	10,704	3,388	40,049	11,615
Typhus fever	281	62	228	56	139	33	186	49	92	28	34	12
Typhoid fever	35,636	8,529	34,069	8,183	36,667	8,054	37,015	8,401	42,505	9,174	9,457	2,068
Dysentery	70,842	16,844	167,305	41,282	155,140	38,094	52,711	12,959	85,876	22,356	1,055	186
Diphtheria	4,359	2,531	5,726	3,205	5,308	2,903	6,100	3,025	8,613	3,296	7,073	2,494
Pest	.....	.....	.....	.....	.....	.....	.....	.....	195	122	579	.....

The cases of pest occurred in Formosa.

In Yokohama the local office of the sanitary bureau prepared for me similar tables for that city and the including district, Kanagawa Ken.

YOKOHAMA.

	1892.		1893.		1894.		1895.		1896.		1897 (half year).		1897, July 1 to Aug. 9, cases.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	
Cholera	2	2	12	7	5	1	177	138	27	24	1	1	.....
Smallpox	663	264	14	2	15	2	6	.....	34	7	428	119	.....
Typhus fever	2	.....	.....	.....	.....	.....	1	.....	.....	.....	1	1	.....
Typhoid fever	127	35	157	37	141	26	137	23	178	42	26	6	3
Dysentery	33	10	31	4	44	6	29	7	131	22	16	1	29
Diphtheria	34	22	39	26	49	34	77	41	150	53	101	31	1
Recurrent fever	.....	.....	.....	.....	.....	.....	.....	.....	63	1	.....	.....	.....

KANAGAWA KEN (EXCLUDING YOKOHAMA).

Cholera	31	16	14	8	3	2	657	444	30	24	2	1	.....
Smallpox	2,048	535	101	27	114	8	4	.....	99	11	.....	346	.....
Typhus fever	15	4	1	1	4	3	2	1	.....	.....	.....	.....	.....
Typhoid fever	986	202	535	107	702	157	730	134	757	147	113	28	44
Dysentery	34	8	520	104	535	128	212	42	1,268	254	26	7	518
Diphtheria	84	61	78	52	56	39	64	46	139	72	167	80	10
Recurrent fever	.....	.....	.....	.....	.....	.....	.....	.....	34	4	.....	.....	.....

Yokohama is a city of 180,000 inhabitants. Its water supply is piped from a river in the hills, 20 miles away. The system includes settling basins and sand filter beds, and analyses have shown it a safe water. The amount is insufficient at certain seasons, but increased facilities are promised. The sewer system (intended for drainage only) is ample in the foreign settlement, but insufficient in some sections. In a few houses water-closets are connected with sewers.

All ships for the United States anchor in the artificial harbor formed by a breakwater. A strong tide appears to flush this harbor well, but is not sufficient to cleanse the several canals extending through the city. The ballast provided for ships is compact earth from the suburbs, brought down the canals to the harbor. No sweepings or other refuse from the city are ever used.

At the time of my arrival in Yokohama, in May, an epidemic of smallpox was declining, and at the present date only a few isolated cases remain in the Empire. Yokohama and the surrounding district were less severely visited than many sections. Tokyo was pronounced infected December 17, 1896, and Yokohama January 15, 1897, and both were declared free June 12. The proximity of Tokyo, 20 miles distant, with its 1,800,000 inhabitants, is a constant source of infection to Yokohama.

Vaccination[1] was introduced into Japan in 1849, and within a few years became generally known, but its use was restricted until the overthrow of the feudal system. A national vaccination bureau was organized in 1871, but human lymph was still largely used. In 1876 universal vaccination was ordered and a fine provided for its neglect, and in 1885 the law stipulated that every new-born child should be vaccinated, and subsequently every five years revaccinated, and when one fails to do so he shall be fined. Not until 1892 was the use of human lymph abolished by law. State vaccine farms have existed for years and private farms have been permitted, but the Government wished all to be under one control, and in 1896 abolished all private institutions.

Before the end of May, 1897, cases of cholera were beginning to be reported in Japan. The director of the central sanitary bureau, Dr. S. Goto, was at that time strong in his belief that Japan would be practically free from cholera this year. He felt that the work of disinfection had been carried out so thoroughly since the epi-

[1] Abstracted from the Report of the Centennial Celebration of Jenner's Discovery of Vaccination, held in Tokyo, May 14, 1896.

demic of 1895 that there would be no recurrence. It was understood that a bacteriological examination would be made in each case reported. The preceding table for all Japan shows that 57 cases were reported as cholera in the first six months of this year, with 28 deaths, but in August Dr. Goto assured me the bacteriological examination had been negative in every case, and that he regarded all the diagnoses as incorrect. The law imposing a fine for failure to report a case of the stated infectious diseases may partially account for these errors, practitioners preferring to err rather than to risk conviction for failure to report. From what I have learned of the state of medical education in Japan, I would hazard the opinion that the cholera spirilla would certainly have been found in some of these cases had they been Asiatic cholera.

On the other hand, it would seem as if cholera had been epidemic in Japan since 1877, as brought out in the following table, previously reported by Sanitary Inspector Eldridge. The first epidemic of cholera known in Japan occurred in 1822, and the second in 1858–1860. No statistics are available until the next appearance, in 1877, since which time the following figures are recorded for the whole country:

Year.	Cases.	Deaths.	Death rate per 100.	Year.	Cases.	Deaths.	Death rate per 100.
1877	13,816	8,027	58.09	1887	1,228	654	53.25
1878	902	275	30.48	1888	811	460	56.72
1879	162,639	105,786	65.28	1889	751	431	57.39
1880	1,580	618	39.71	1890	46,019	35,227	76.55
1881	9,389	6,237	66.42	1891	11,142	7,760	69.64
1882	51,631	33,784	69.30	1892	874	497	56.86
1883	969	434	44.78	1893	633	364	57.50
1884	900	414	46	1894	546	314	57.50
1885	13,772	9,310	67.61	1895	55,144	40,154	72.81
1886	155,923	108,409	69.53	1896	1,471	904	51.45

The population of Japan is now about 43,000,000.

Each extensive epidemic of cholera has started at some port, usually Nagasaki, Kobe, or Yokohama, and frequently this disease has been brought by ship from China. The belief of the sanitary bureau is that no endemic center exists in Japan, but that cholera has always been imported.

Typhus fever does not occur in Japan except in isolated cases.

The figures for typhoid fever indicate that it prevails extensively through the whole country.

The ravages of dysentery have become alarming every year. It seems to have been endemic in certain localities, and the area has slowly increased. One thousand and fifty-five cases were officially reported from the whole country for the first half of this year, but during July and August this number has been greatly increased, and the total number to August 15 was reported in the daily press as 15,565. Measures for prevention and disinfection have been undertaken, but have accomplished little. At date of writing I learn that the director of the central sanitary bureau and other physicians have gone to the districts most severely affected to make investigations. I am unable to present any report relative to a scientific investigation of the disease, or opinion as to the communicability or period of incubation.

Recurrent fever occurred as an epidemic from May to December, 1896, and the disease was temporarily placed on the list of those to be reported, but the statistics are very meager and the figures for the Empire were not furnished me.

No statistics exist relative to leprosy. The Government puts its faith in its very limited communicability, and has never taken any action toward segregating the victims. It is said that various hot springs, especially those of Kusatsu, are much frequented by lepers, and the success of the treatment at Kusatsu has made these springs noted.

Beriberi has never been made subject for statistics. It is known to exist quite extensively, but is less fatal than in more tropical countries. Its occurrence in the

army and navy has been greatly decreased within recent years by improvements in the dietary, as shown in the following table for the navy, but no such diminution has taken place through the Empire:

Year.	Force.	Cases.	Deaths.	Year.	Force.	Cases.	Deaths.
1878	4,528	1,485	32	1886	8,475	3	.....
1879	5,081	1,978	57	1887	9,106	.....	.....
1880	4,956	1,725	27	1888	9,184	.....	.....
1881	4,641	1,163	30	1889	8,952	3	1
1882	4,769	1,929	51	1890	9,112	4	.....
1883	5,346	1,236	49	1891	10,223	1	.....
1884	5,638	718	8	1892	9,747	3	.....
1885	6,918	41	.....	1893	9,322	1	.....

The lines of steamships from this port to America are the same as detailed for Hongkong and Kobe, viz, one line to each of the following places: San Francisco, Tacoma, Seattle, Portland, Oreg., and Vancouver, British Columbia, and several small lines to New York via Suez. The records in the office of the United States consul-general furnish the following list of vessels clearing for the United States:

	1892–93.	1893–94.	1894–95.	1895–96.	1896–97.
For New York:					
Sail	7	5	6	9	13
Steam	34	20	17	17	28
For San Francisco:					
Sail	0	7	6	3	7
Steam	22	40	36	40	44
For Tacoma:					
Sail	1	2	1	2	0
Steam	8	15	13	17	27
For Portland, Oreg.:					
Sail	0	3	4	1	2
Steam	1	0	1	13	10
For Seattle:					
Sail	0	0	0	0	0
Steam	0	0	0	1	12
For all Pacific coast ports:					
Sail	1	12	12	10	15
Steam	31	56	50	72	93

Add 17 steamships for the Canadian Pacific line in 1896–97, and the total is 125 ships for Pacific coast ports in the past year. It is estimated that over 75 per cent of the exports to the United States are landed at Pacific coast ports. The Japanese customs reports give the following values of exports to and imports from the United States (in yen, worth about 50 cents gold):

Year.	Exports.	Imports.
1892	32,535,000	2,889,000
1893	21,394,000	2,521,000
1894	36,002,000	4,864,000
1895	44,065,000	4,046,000
1896	27,710,000	15,720,000

The principal articles of export are practically the same as mentioned under Kobe. Provisions, feathers, furs, and raw hides are the only exports that might come under suspicion in time of epidemic, and, with the exception of tea and rice, small amounts only of these are exported. No rags are shipped from here and no lily bulbs.

During the fiscal year 1896–97, 885 steerage passengers left here for San Francisco, 206 for Tacoma, 23 for Seattle, and 15 for Portland, Oreg. These are the figures obtained from Sanitary Inspector Eldridge. The Occidental and Oriental and Pacific

Mail Steamship companies make the following statement of Japanese carried to San Francisco:

1892	1,219
1893	725
1894	845
1895	678
1896	725

The Canadian Pacific Company carried 224 Japanese in steerage in 1896 from Yokohama and 146 from Kobe, and in 1897 to this date 5 from Yokohama and none from Kobe. This small number in 1897 is stated to have been due to the smallpox epidemic in Japan and the refusal of the company to accept any passengers of this class from Kobe or any infected locality.

The sanitary inspector for the Marine-Hospital Service at Yokohama makes a careful inspection of all vessels, both sail and steam, bound for the United States, and at all times, irrespective of epidemics; and on passenger ships he inspects as strictly steerage passengers from China and from Kobe as those just embarking at Yokohama. The benefits to be obtained from this are evident. All the Chinese steerage passengers embark at Hongkong, and ten to twelve days elapse before the ship leaves Yokohama, time sufficient to cover the incubation stage of cholera surely, of plague probably, and of smallpox often. In November and December, 1895, he put into force the detention of steerage passengers for medical observation on account of the prevalence of cholera. During the recent smallpox epidemic he has inspected all Japanese steerage passengers on shore and has had all bathed and clothing and all effects fumigated with sulphur. These emigrants have been vaccinated, at times at the inspection on shore, and at times by the ship's surgeon after leaving Yokohama. At all times the inspector is able from the passports to learn from what part of Japan each emigrant comes, and from the Government reports he can ascertain what contagious diseases exist in any district. At the inspection of sailing vessels he has vaccinated all members of the crews so long as smallpox was epidemic in Yokohama.

At present all vessels from Formosa and from ports of China as far north as Shanghai are subject to inspection by Japanese quarantine officers before entering Yokohama. So it happens that the steamships from China for the United States are given three inspections by Japanese officials if they call at the three ports, Nagasaki, Kobe, and Yokohama.

The quarantine station for Yokohama is at Nagahama, 10 miles across the bay from the former. This station was so fully described by Sanitary Inspector Eldridge in the annual report for 1896 that a detailed description is omitted here. The general plan is much the same as at Kobe and Nagasaki (see descriptions), and the plant the largest of the three, but still regarded as insufficient, and tents are provided for emergency. No special apparatus for the disinfection of ships or cargoes exists, and the station is so far from deep water and the course of vessels entering the bay that the boarding officers live on a steamer anchored in the bay. Steam launches are provided for boarding. Report has already been made by Sanitary Inspector Eldridge of two cases of plague taken to this station recently from a steamship from Formosa.

REPORT ON HONOLULU.

HONOLULU, HAWAIIAN ISLANDS, *September 14, 1897.*

This is a city of 30,000 inhabitants, situated at the foot of a mountain range reaching a height of 4,000 feet. Native Hawaiians constitute about 10,000 of the population; Chinese, 8,000; Japanese, 3,000; Portuguese, 4,000; and other foreigners about 5,000. The water supply is obtained partly from surface water from these mountains and partly from artesian wells, but there is no means for filtration, and the surface water, at certain seasons, is looked upon with suspicion. The city has practically

no sewers. The contents of cesspools and privy vaults are pumped out and dumped into the outer bay.

Cholera was imported from Asia in 1895 and obtained a foothold for a while in Honolulu. By most energetic measures it was stamped out, but not until there had been 87 cases and 64 deaths. The water of the harbor became infected, and a culture of comma bacilli was later obtained from the water in rice fields bordering the city. Careful disinfection of infected localities was carried out at the time, and measures for the sanitary improvement of the city were instituted and are still progressing.

The date and mode of origin of leprosy in the Hawaiian Islands are uncertain. It was probably imported from China. Previous to 1860 the number of cases is reported to have been small. Not long after this, however, attention was drawn to the apparently rapid increase, with the result that a law for segregation was enacted in January, 1865. "The first twenty years[1] of vacillating segregation produced 3,076 lepers. The last nine years of more active segregation, have gathered up 1,932." Every possible means are now used to discover cases at large. All suspects are examined by a board of physicians, the undoubted cases are at once sent to the settlement, while those whose diagnosis is questionable are allowed to remain at their homes and are reexamined at short intervals. The reports of the government physicians on the different islands would lead to the belief that comparatively few cases now exist outside of the leper settlement, and these are kept in concealment in the mountains.

Through the courtesy of the president of the board of health, opportunity was provided me to visit the leper settlement in company with the port physician and others. The location selected many years ago, and eminently adapted for this segregation, is a portion of the island of Molokai, distant 55 miles by water from Honolulu. It has an area of 8 square miles, is bounded by the ocean on three sides, and separated from the remainder of the island on the fourth by a precipitous mountain wall, hardly under 2,000 feet high at any point, and inaccessible save by a difficult trail at two points.

The lepers live in small, wooden houses of neat appearance. These are largely the property of the State, but individuals are permitted to erect houses for themselves. The State provides subsistence for all, but all who are able prepare their own food and care for their own houses, and only those incapacitated and without a relative or other helper are entirely cared for by the State. Private endowments provide a home for girls and women and another for boys and men, each containing about 120 members, and under the care of Catholic orders. There are Protestant and Catholic churches. No systematic treatment is insisted upon for all at present, but a resident physician attends to all desiring help. In their removal from their homes families are not separated, but husband or wife, or at times other relative, is permitted to accompany, reside with, and care for the diseased, until the patient dies, when the helper is subjected to careful examination, and, if free from leprosy, is permitted to return to any of the islands. Daughters of leprous parents can be sent from the settlement, so long as free from leprous taint, to a privately endowed home in the suburbs of Honolulu, but no provision has yet been made for the removal of boys at the settlement, at least until they become of age. There are instances of husband or wife continuing to live with a leper for years and yet remaining free from any evidence of the disease, yet such cases are believed to constitute "a small minority in comparison with those who would have become lepers under the same exposure." There is no enforced segregation of the sexes at the settlement, and marriages occur, yet few children are born.

At the last official report, December 31, 1895, the settlement contained 1,087 lepers—633 males and 454 females—native Hawaiians and half-castes, 1,035; Chinese,

[1] Report of the president of the board of health for the twenty-one months ending December 31, 1895.

29; Americans, 6; British, 5; Portuguese, 4, and the remainder of various nationalities. Besides these there were 125 nonleprous residents—the physicians, representatives of religious bodies, etc.—of whom 105 were natives. At this date there were 58 children born at the settlement. The figures are somewhat less at the present date—about 1,120, leprous and clean. A comparatively small number of new cases has been received in the past eighteen months. The death rate in the settlement in 1895 was 10.21 per cent, the lowest yet recorded. All stages of the disease are to be seen—some totally blind, very many with sight more or less impaired, large numbers with faces and hands covered with nodules, in many cases hands or feet crippled by contractures, or loss of part or whole of phalanges. Ulcers are very frequent and chronic. Some cases of the so-called anæsthetic variety, while exhibiting almost no cutaneous lesions, are marked, in addition to areas of anæsthesia, by extreme muscular wasting and paralysis.

I have not been able to obtain any figures to show the extent of beriberi in these islands, but it is not considered endemic. Cases are believed to be imported, and are mostly among Asiatics. The mortality report for Honolulu for the nine months ending December 31, 1894, shows 6 deaths from this disease, and for the year ending December 31, 1895, 14 deaths.

The total death rate for Honolulu in 1895 (the year of cholera) was 26.12 per 1,000; for the Hawaiian population alone, 41.05; for Asiatics, 17.15; Portuguese, 15; all others, 19.05.

From the office of the United States consul-general at Honolulu I was able to obtain the following tables of vessels sailing for ports of the United States:

	1892–93.	1893–94.	1894–95.	1895–96.	1896–97.
Sail	102	112	131	138	155
Steam	23	26	26	35	55

For—	1896–97.	
	Sail.	Steam.
San Francisco	85	47
Port Townsend	39	.....
Seattle	1	8
Other Pacific coast ports	7	.....
Atlantic ports	23	.....

The passenger lines for the United States are the Pacific Mail and Occidental and Oriental companies for San Francisco, leaving twice a month; the Oceanic Steamship Company for San Francisco, twice a month, and the Oregon Railway and Navigation Company for Portland, Oreg., leaving a few times a year (5 in 1895, none in fiscal year 1896–97). The Canadian-Australian Steamship Company also carries passengers to Vancouver, British Columbia, one ship every twenty-eight days.

The quarantine regulations of the Hawaiian Republic are practically the same as those in force in the United States. The port physician at Honolulu is the quarantine officer. He boards all vessels from Asia. He meets all passenger steamships from China and Japan a few miles out in the bay, and makes a careful inspection of the crew and all steerage passengers, those for the United States as well as for Honolulu, before the ship enters the harbor.

After arrival at the dock the Asiatic steerage passengers for Honolulu are removed from the ship by boat across the harbor to the quarantine station, which occupies the whole of a small island, Mauliola, and are there detained until eighteen days have elapsed since their departure from Yokohama, to cover in full the incubation period of smallpox. All their effects, including personal clothing, are disinfected in a steam chamber with the exception of containers and any articles which might be injured by steam. These latter are disinfected by sulphur.

The water surrounding the quarantine island is very shallow. In crossing to this island from Honolulu, a landing is made at a small pier, which extends out some 2,000 feet. A railroad runs on this for convenience in handling baggage. On reaching the shore one comes at once to the disinfecting plant, flanked on either side by a "corral" for detention of Asiatics. At the time of my visits the Japanese were in one of these "corrals," and the Chinese in the other. Each consists of an inclosure surrounded by a high board fence, and containing long, airy, frame barracks, with bunks arranged in tiers, also detached cook house, bathhouse, and latrines. The uniformly warm climate simplifies these arrangements. The water supply is furnished from the Honolulu mains. The latrines are simply shallow, cemented trenches at the water's edge, closed at both ends by gates, which are opened at the beginning of ebb tide only, so that the contents are flushed and carried seaward. At low tide a long stretch of beach or coral is laid bare outside these latrines. The average tide is about 2 feet, and spring tides are never over 4. The larger of these two "corrals" will accommodate 1,200 coolies and the smaller 750.

The disinfecting buildings contain one steam chamber, one sulphur furnace and fan, a dynamo for electric light, boiler, and a special room for sulphur fumigation. The steam chamber is all iron, jacketed, about 18 feet long, rectangular, 52 by 64 inches, and is provided with two carriages on rails, each carrying two wire shelves. Both doors of the chamber are in use, one for entrance, the other for exit, but both are in the same room. A vacuum pump is not used. All articles are steamed which are not liable to injury. The sulphur furnace and fan are near the room used for sulphur fumigation. This room was apparently tight, and I was informed that four or five hours was the time ordinarily used in fumigating the containers, books, shoes, and any other articles not treated with steam. The room was of ample size for the treatment of a large quantity of goods. The electric light plant has just been installed, and is of best modern construction. The outfit now is 126 lights of 16 candlepower, but is capable of increase to at least 200 such lights. The general boiler supplies steam for heating the water in the bath tubs in "corrals."

There are various other buildings, all quite remote from one another. The chief ones are a detention house for cabin passengers, hospitals for noncontagious diseases—one for cabin and one for steerage passengers—one smallpox hospital for steerage passengers, a smaller "corral," a small "lockup," and houses for attendants.

The detention house for cabin passengers is a long, one-story, wooden building with detacted kitchen in rear, many trees in front, the whole inclosed by a fence, and contains 12 small rooms, 4 bathrooms, and a dining room. The bedsteads are iron and furniture all wood. The latrines here are simply privy vaults, with no provision for removal of contents. The hospitals for noncontagious diseases can accommodate 12 to 24 patients. The third "corral" is far distant from those first mentioned; consists of 3 wooden buildings, fenced about, and is now used only when smallpox has broken out in one of the others, so that all may be removed to new surroundings. It is estimated that altogether the three "corrals" can accommodate 2,300 coolies. If disease breaks out it is the custom to disinfect the "corrals" by spraying with bichloride solutions, 1 to 500, from a three-fourths-inch hose; then all is whitewashed. The dead are buried on the island.

REPORT UPON SANITARY CONDITION OF VERA CRUZ, MEXICO.

By P. A. Surg. W. J. Pettus.

VERA CRUZ, MEXICO, *June 7, 1897.*

SIR: I have the honor to report that, according to instructions in your telegram of May 29, I proceeded to this city on June 5, and immediately began, with the assistance of the American consul, Mr. Schaefer, who acted as intrepreter, to ascertain the sanitary condition of the place. The records of the consulate gave the last death from yellow fever as having occurred on November 28, 1895, though there have been

a good many cases since that date, with no deaths. There have been two cases reported this year, both taken sick about May 25 and now convalescent. One case was a soldier in the castle of San Juan d'Ulloa, a military prison out in the harbor, about one-half mile from the shore; the other a Scotchman working on the docks. I called on Dr. del Rio, assistant surgeon in the Mexican army, and both the health and quarantine officer for Vera Cruz, and he stated that these two cases were doubtful and he considered them both malarial fever. I was shown a postal card containing a printed notice of contagious cases coming under the notice of any practicing physician in Vera Cruz, also a copy of the municipal law requiring a practitioner to at once notify the health officer of any case of contagious disease seen by him, with a penalty of a fine of from $10 to $100 for noncompliance. The consul and myself visited the Hospital de San Sebastian, a large charity hospital of about 400 beds, but could find no cases of yellow fever in it. The health of Vera Cruz seems to be better than for years, but the health officer apprehended some trouble on account of the filling in with sand done by the new harbor improvements, so that where the sewers formerly poured directly into the harbor, now the filthy water runs across the newly filled basin for a distance of about 200 yards. The authorities intend to construct a covered way for the sewers emptying on this part of the sea wall out to the water. Until this is done the present stagnation of the sewage on the sand will be a serious menace to the healthfulness of the harbor. Under the present harbor regulations vessels are compelled to anchor out in the harbor about one-half mile from the wharves and take on cargo from lighters. In such cases, and when only the captain and steward are allowed ashore, as is the custom with the better class of vessels, a minimum amount of danger of contagion is incurred, even when yellow fever is present. When the new port works are completed it is probable the vessels will lie alongside the new wharf when loading and discharging.

Very respectfully,

W. J. PETTUS,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT UPON THE SANITARY CONDITION OF HAVANA, CUBA, WITH REFERENCE TO SMALLPOX AND YELLOW FEVER.

By P. A. Surg. J. J. KINYOUN.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., March 1, 1897.

SIR: In compliance with bureau order of February 15, 1897, I have the honor to submit the following report of my visit to Havana, Cuba, made with special reference to the present epidemic of smallpox prevailing there, and also with reference to yellow fever during the approaching season.

On arrival I was met by Sanitary Inspector Burgess, to whom I made known the object of my visit.

As is well known, the present epidemic of smallpox had its beginning with the importation of recruits for the Spanish army. Many of these recruits were suffering with the disease on arrival, and added not only new material for its propagation and spread, but also distributed the disease to other parts of the island. It would be next to impossible to do more than approximate the number of cases now in Havana. According to the reported number of deaths from smallpox, there were at the time of my visit no fewer than 4,000 cases.

As previously reported by Sanitary Inspector Burgess, the majority of the cases are among the civilians, and only a few, in comparison, among the troops, these latter having had the disease or being protected by vaccination.

It would be difficult to state what localities are not infected. Evidences of the

disease are everywhere, houses are placarded on account of the disease, and convalescents are met on the streets and in the markets. Certain portions of the city, however, appear to contain more cases than others. The localities affected most are along the bay, near the wharves, and in the suburbs. Here, on the one hand, are segregated the poorer classes, in overcrowded and unsanitary dwellings, and, on the other, the refugees from the country. The unusual epidemic is mostly due to the great influx of these refugee country people, who, as a class, are ignorant of the benefits of vaccination and are prejudiced against it. The overcrowding, the narrow streets, and the unsanitary conditions form ideal material for the epidemic.

According to the reports in the Havana papers, the smallpox prevails in epidemic form in many places in the provinces of Pinar del Rio and Havana. The same causes and conditions exist in these places as you find in Havana, save that in many instances the people who are cooped up in the towns are starving.

The native has a prejudice against the hospitals, and will keep out of them just as long as possible. The term hospital conveys to the ordinary native mind the same impression as the term lazaretto, which may in many countries be freely translated as a place in which to die.

At the present time there are no adequate hospital accommodations. All the hospitals, save one or two small private affairs, have been taken for the use of the Spanish army, and nearly all the convents, charitable institutions, and asylums (the leper hospital excepted) have been put to a similar use; so nothing remains for the native but to be treated in his home.

Just prior to my visit the authorities—the mayor and sanitary council—suddenly became aware that the disease had assumed the proportions of a huge epidemic and that something must needs be done. So a proclamation was issued calling the attention of the people to the existing laws and regulations concerning smallpox, and requesting all good citizens to assist, so far as lay in their power, to suppress the disease. Vaccination and revaccination were urged, and every physician was ordered to report cases coming to their notice. The mayor has also prohibited persons from visiting the cemetery, on account of the danger from the bodies of those dead with the disease.

The sanitary council has established at several places within the city stations for vaccination, where a physician is on duty for several hours every day to vaccinate the poor gratis, and others at a cost of 1 peso or more.

When a report of a case is made by a physician there is a rule that the house containing the case shall display a yellow flag bearing the letter "V" (viruela). This is done in many instances. This flag has, however, an uncertain value. Wherever it is displayed it means smallpox within, but it does not follow that when the flag is removed smallpox is not within; it may only signify that the patient is convalescent and is able to go about, even into the street. The sign may remain for several weeks, or may be taken down within a few days. A yellow flag is often displayed on one side of a door, while the other bears the inviting legend, "Apartments to let."

In many places in the city where the disease was most prevalent little, if any, attention was payed to vaccination—that is to say, if the children of the locality could be taken as an example. A few of these bore signs of recent vaccination, while the majority of the half-nude little creatures had never been vaccinated. Many of these latter went in and out of houses displaying the yellow flag.

Houses on the main thoroughfares and resident portions of the city were not placarded, yet the daily papers noted the deaths from these places.

The main feature in the control of the disease appears to have been overlooked; there has been no house-to-house inspection, and consequently no vaccination to speak of.

The so-called military hospitals comprise, as before stated, nearly all the hospitals and charitable institutions of the city, as well as the large sugar and tobacco warehouses situated around the harbor and several large pavilion hospitals some distance

away from the city. From what I could see and learn, all these hospitals were well filled with the sick soldiers. The same system appears to be in practice in these places as in the city. No particular care is exercised in isolating the infectious and contagious cases from the rest. Smallpox, yellow fever, malarial fever and dysentery, and the wounded are treated in the same wards; every condition is present to promote the spread of the disease.

The docks alongside some of these warehouses are still used in discharging coal and lumber. Only a few days before my visit a case of smallpox developed on board a vessel lying alongside discharging coal.

From the present outlook it appears that the epidemic will remain for a considerable time—for several months at least—even if it does not receive fresh pabulum from the country. It is natural to suppose that it will gradually decline.

Sanitary Inspector Burgess has recently commenced the inspection of crews of vessels with special reference to their immunity to smallpox, and has begun to vaccinate crews when in his judgment it is required.

Since the correspondence concerning the case of smallpox which developed after vaccination, the crews of vessels have been vaccinated several days before their departure, in order to insure a successful vaccination. Dr. J. Y. Porter has requested Dr. Burgess to vaccinate all persons leaving Havana for Florida, and to detain them twelve days after successful vaccination. This in part was being enforced.

The baggage of the second-class passengers, if bound for Florida, is marked to be disinfected, also some of the first class. If the passengers are not to stop in Florida the baggage is marked "inspected and passed."

Dr. Burgess interpreted Dr. Porter's requests as an order, and was carrying them out to the best of his ability. It was suggested to Dr. Burgess that while these may have been good regulations, such requests should have reached him through the proper channels.

The twelve days' detention may be well applied to the native Cuban who desires to leave for the United States, and is on the whole a wise precaution with this class of people, but it would work a great hardship to those arriving in Havana from the United States who expect to remain for a short time. This class of passengers, and the crews of vessels, for that matter, could be better protected by vaccinating them prior to their landing, rather than by keeping them for twelve days, and perhaps exposing them to infection.

If the present arrangement stands it should be subject to considerable discretion on the part of the inspector.

It was suggested to Dr. Burgess that the vaccination of crews and persons prior to their debarkation would better meet the present conditions, and that such would be my recommendation.

The schedules or certificates for smallpox are now furnished to passengers bound for New Orleans, Florida, and New York. The statements contained therein are as correct as it is possible to make them.

In the bill of health no mention is made, under the title of "Sanitary condition of passengers and crew," of any of the facts stated in these certificates, nor is there any mention made of the vaccination of crew, if such has been done.

The number of vaccine points furnished is inadequate, and I am informed that an additional requisition will be forwarded. In the meantime it was suggested to purchase enough to meet the exigency.

The vaccine points that are now furnished do not appear to retain their potency; they deteriorate in a very short time. The glycerinated lymph which has been freed from pus organisms gives the best results. I would recommend that the glycerinated virus be furnished hereafter.

The subject of disinfection of baggage was discussed with Dr. Burgess. He was of the opinion that it might be possible to disinfect the baggage of the better class of passengers if some preparation of formalin was used for this purpose. The use of it would be on board the vessel. For obvious reasons it would not in his opinion be wise to undertake it on land.

The estimate of the number of pieces leaving Havana, given by him, is a maximum; during the summer months it will be less. The method of using formalin in the manner described in my report would be especially applicable to the disinfection of baggage leaving Havana for the United States. The chief obstacle to putting the method into operation is its cost, even if the Spanish Government would permit the free entry of formalin. It will cost from 15 to 30 cents for each trunk or package, not taking into consideration the additional help which would be necessary. The method is entirely feasible for all baggage leaving Havana, and I believe it should be used notwithstanding the cost.

The formaldehyde lamp was explained to Dr. Burgess, who was informed of its advantages in the disinfection of apartments where yellow fever and smallpox had occurred.

While in Havana I made an inspection of the several parts of the city with reference to the prevalence of yellow fever. The disease appears to exist, but in a mild form, and causes but few deaths in comparison with those from smallpox, although the death rate is somewhat higher than is usual at this time of the year. The disease is confined principally to the troops quartered in the city and in the many hospitals around the harbor. The large sugar warehouses across the bay—San Catalina, Regla, and Los Haciendados—are now filled with the sick and wounded who have been invalided from the field. Many who are not suffering from an infectious disease when they arrive soon become an easy prey to one of the infections.

On the city side of the harbor are the celebrated military hospital, the female hospital, and the San José warehouses. These warehouses are used principally as an entrepôt for troops arriving in or passing through Havana. Sometimes they remain for several days. On either side of these there are yellow fever and smallpox, and not a few of the troops contract one of these diseases.

There are several other places in or near the city which are used for military hospitals. Yellow fever exists in these also.

The prospect for the ensuing season is not encouraging. No doubt there will be about the same conditions as those of last year, as Havana will be the base for all military operations just as long as the war continues, and will also be the chief hospital center. Yellow fever will become prevalent now very soon.

The wharves at which American vessels discharge their cargoes are the Taliapiedra and San José. At these wharves, especially the former, nearly all the sailing vessels (schooners) are brought to discharge their cagoes, consisting of lumber. By reason of their construction it is necessary that these vessels carry ballast on the return trips, and, in view of the fact that these vessels ply between Havana and Southern ports, it is believed that they are the greatest menace. There is another class of sailing vessels which carry coal from Philadelphia and Norfolk to Havana, and discharge alongside the Regla and San Catalina wharves—just in the rear of the warehouses now used as hospitals. Steam vessels as a rule do not lie alongside the Taliapiedra, San José, or Regla wharves, but some of these vessels do go to the San Catalina wharf. Steamers as a rule anchor in midstream some distance from the shore and discharge and take on their cargoes by lighters. On the date of my first visit very few vessels were in the harbor. The present movement of vessels is chiefly confined to the regular lines of steamers and schooners trading between the Southern lumber ports and Havana. The coal trade is principally from Philadelphia.

With the present unsanitary condition of Havana in general, and especially the wharves before mentioned, I would recommend that steps be taken to prevent vessels going alongside these wharves and to compel them to discharge and take on their cargoes in midstream. The limited number of vessels in the harbor means fewer vessels coming from Havana to the United States, particularly the Southern ports. On this, more than all other factors, rests the security from yellow fever. With the present unsanitary conditions and normal trade, yellow fever would doubtless be present on many vessels arriving at our quarantines.

While there, the subject of a floating disinfecting plant was discussed with Dr. Burgess, and a careful examination of the harbor was made with this object in view.

The upper part of the harbor—that is to say, where the Plant, Morgan, and Ward line steamers moor during the summer season, would, I think, be a suitable place for such a plant. This part of the harbor is rather large, containing a sufficient depth of water for steamers, and under proper police supervision could be made safe. If a floating disinfecting plant could be established there, and maintained by our Government—even for the preliminary treatment of vessels, their cargoes and personnel—it would add to the safety of our country, and would in no way place a burden on the shipping interests. The Plant and Morgan lines have for the past five years maintained a service between Havana and the United States. These vessels come into the harbor during the day, receive and discharge their freight and passengers by lighters, and have no direct communication with the land. The cargo, so far as I could learn, is never disinfected, although it is brought to the ship in lighters, which are infected if anything in the harbor is, and yet it does not appear that any harm has come from this procedure. Further, the passengers and their effects, particularly those bound for the Northern ports of the United States via Tampa, are not disinfected at the Florida quarantine, but are allowed to pass through; while the baggage of passengers stopping in Florida, or any place below the southern boundary of Maryland, is treated as if disinfected. Now, if it is possible that the baggage of these persons is infected, it stands to reason that it would infect the ship; but in practice it does not appear to be the case. Now, if it is possible for vessels to ply between Havana and Southern ports of the United States under the present rules, it is also possible to perform the same character of disinfection in the harbor with as little danger as now exists. It stands to reason that if vessels come and go without detention, with little if any treatment at the local quarantines, and have not under these regulations brought yellow fever, there is little danger of a vessel being contaminated by simply coming into the harbor and tying up to a mooring buoy. Admitting for the sake of argument that these vessels are not infected, would a vessel after having been properly disinfected in Havana Harbor just prior to leaving be any more liable to convey the disease than one not so treated? The Ward Line now has been running from New York to Havana and Southern ports for several years. Formerly, it was not infrequent that cases of yellow fever occurred among the crew—contracted evidently by them through the lax rules governing the vessel in the port of Havana. The personnel of the vessel were allowed to go ashore, and in consequence thereof yellow fever was contracted. But, since no one has been allowed ashore, save the captain and purser, who are immune to yellow fever, no case of yellow fever, so far as I know, has been contracted by members of the crew, notwithstanding the fact that the vessel has entered Havana Harbor and even remained there as long as three or four days in close proximity to other vessels. Another instance: Cases of fever have developed among the passengers en route or on arrival of these vessels in New York, and the vessel has in many instances not been held for general disinfection—only a local disinfection of the apartment has been attempted—yet no member of the crew contracted yellow fever from this case.

The conclusions which one might draw from these instances are that, first, under the surveillance now being enforced in Havana Harbor the traffic is reasonably safe, but the surveillance could be improved on in many ways; second, that the infection, if any exists, does not contaminate the vessel when it is anchored in midstream and no communication held with the shore, except through the captain and purser; third, the infection is brought aboard by passengers and their effects; fourth, that with proper inspection and disinfection of passengers and cargo steam vessels can be rendered safe.

Respectfully, yours,

J. J. KINYOUN,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE HOSPITAL SERVICE.

A REPORT ON YELLOW FEVER AT SANTIAGO DE CUBA,

By Dr. H. S. CAMINERO, *Sanitary Inspector, M. H. S.*

SANTIAGO DE CUBA, *June 1, 1897.*

The subject of permanent infection with yellow fever of our seaboard cities is one which has powerfully awakened our attention on account of the innumerable victims made yearly by this terrible disease. Undoubtedly the future of Cuba depends greatly upon the disappearance or reduction at least of the mortality from this endemic fever. Without it it would be possible to have a large current of immigration coming to our shores to develop our natural resources; commerce would largely increase, and a prosperous and peaceful existence for its inhabitants would result.

Unfortunately, very little is known about yellow fever. The causes that produce it have been discussed, accepted by some, denied by others. Its malarial origin has been proven to be erroneous, and no one who has studied the disease believes it now to be due to emanations from swamps and lagoons. Modern pathologists make the presence of certain microbes in the system responsible for the disorders of this grave malady; for some it is the bacillus described by Barbis in 1883, and possibly seen also by Lacerda, 1887; for others it is the cryptococcus xanthogenus (amarillus bacterium) of Domingo Freire (Medical News, 1887), the peronospora lutea of Carmona (Mexico), or the specific bacterium of Gibbier (1888) found in the black contents of the intestines. A very competent authority, Sternberg, 1888, declared that the presence of specific microbes in the blood of yellow-fever patients still had to be demonstrated.

Without denying the scientific or practical interest of the problem, we can at once state from old and vulgar experience that yellow fever is endemic with us, and that its permanent infection is greatly favored by unhealthy localities, and is propagated by the air and human relations; especially those maintained by ships, as has been recently demonstrated by Pettenkoffer. Proust assures us that the agent of yellow fever is transmitted by the air and penetrates through the respiratory apparatus. (Arnould, 1895.) Confining ourselves strictly to the city of Santiago de Cuba, and to the causes of its permanent infection with yellow fever, I may safely state that it is owing to its very bad sanitary condition, always notorious, but more so at present, owing to the devastating war which has been raging for the last two years.

Santiago de Cuba, one of the oldest cities of the American continent, with about 59,000 inhabitants, according to the census of 1895, is built on four hills, which slope gradually to the bay from where its amphitheater-like construction can be easily noticed. The houses, with very few exceptions, are low and one story high. The center of the town is inhabited by the white native and foreign population, and may be considered as the city proper, while 300 meters from the center and surrounding it, the negroes, coolies, and mulattoes are huddled together in low, dirty, poverty-stricken shanties, unworthy of a civilized country.

There is no sewerage in the city, the streets, with few exceptions, are unpaved and never swept or cleaned. Vegetable and animal matter are constantly thrown on the thoroughfares, and the heat and rain combined putrifying them, produce a horrible stench and fill the air with deadly emanations. Dead animals, such as dogs, cats, and rats, lie exposed for days to the action of the sun, and no one pays attention to the danger arising from the presence of these rotten carcasses. The refuse material from the houses are simply dumped on the suburbs or in the open lots in the town, there to rot and decay.

During the rainy season the streets are cleaned by the heavy showers provided by the clouds, and all the garbage accumulated in the streets during the dry season is carried into the bay by the torrent-like streams of water running down the narrow and sloping streets. Pools of stagnant water are very common in our thoroughfares, the soft ground giving away in parts, leaving large holes and ruts when evaporation has taken place.

The dwelling houses are unprovided with water closets proper; in their stead large pits are dug on the ground and covered over with a box, there the excrementitious matters are allowed to collect until filled, when they are cleaned out and left ready for use again. It is needless to state that the emanations issuing therefrom are not healthy nor likely to purify the air.

There are no public baths, and very few houses have private ones, and during the summer months water is so scarce that it has to be dealt out by turns to the different quarters of the town. Add to these evils the enforced concentration of the poor country inhabitants into the city, there to suffer hunger and miserable poverty, and no one will wonder at the bad sanitary condition of Santiago de Cuba and the danger of infection with yellow fever run by unacclimated persons. Yellow fever has always been a deadly disease with us. Beginning its yearly work of destruction about the month of May it keeps increasing the mortality as the summer months roll on until the month of December, when it seems to die out with the appearance of the northern winds.

The following statistics for the last ten years (1887 to 1896, inclusive), copied from the municipal records, show the mortality to have been as follows:

Years.	Military.	Civilians.	Total.	Years.	Military.	Civilians.	Total.
1887	47	8	58	1892	103	30	133
1888	62	33	95	1893	59	15	74
1889	56	10	66	1894	56	20	76
1890	67	13	80	1895	629	35	664
1891	97	18	115	1896	972	30	1,002

The enormous increase of the mortality in the last two years is due to the devastating war raging in the island since February, 1895. Two hundred thousand men, all young and inexperienced recruits, have been sent over from Spain, and were suddenly turned from their homes in a colder climate to endure the hardships and fatigues of a dreary campaign under a tropical sun.

Civilians do not show a great mortality, because there are not many foreigners among us, and those that come from the mother country are generally Government employees, who come under more favorable conditions and are more careful about their health.

Yellow fever hospitals are unknown in Santiago. At the military hospital, for example, patients are placed where there is room for them, being all mixed up in the wards; the consequence is that many soldiers that enter for wounds or some slight ailment contract yellow fever during their permanence in the hospital.

A prolonged and careful study of the conditions that result in the permanent infection with yellow fever of the city of Santiago leads me to believe that it would be a Titanic work and take years of labor to eradicate the disease from our city. Nothing of any importance is ever practiced by the health authorities to prevent the spread and contagion of infectious diseases. No hygienic measures are ever dictated, no sanitary rules promulgated, municipal boards are disregarded and disobeyed. Epidemics visit and leave us, and no measures are adopted to prevent their occurrence again. Isolation of the sick is never absolute.

To prevent as much as possible the permanent infection of Santiago with yellow fever, the following measures should be adopted:

A thorough system of sewerage, which would carry far out to sea all the scum and dirty water deposited in the houses, and which are now thrown out into the streets; the stone paving of all the thoroughfares, which should be swept and cleaned at least every other day; absolute prohibition of dumping any animal or vegetable matter on the same; destruction by fire of all matters susceptible of decomposition and of infecting the air, etc., which are now thrown on empty lots and on the suburbs of the town. No animals, such as hogs, dogs, horses, etc., should be permitted in the yards of the houses, as it is at present. Perfect cleanliness of the water-closets

should be enforced, also their frequent disinfection. The lagoons and pools of stagnant water around the city should be drained and dried as perfectly as possible and their soil cultivated, if practicable. As yellow fever is transmitted by the sick, isolation of such patients in hospitals expressly put up for that purpose should be rigidly enforced. The attendants and nurses should be all acclimated persons, natives, if possible. The bedding, clothes, utensils, etc., should be properly disinfected and rendered aseptic as much as possible. The rooms should be thoroughly fumigated when empty, even if no death takes place.

These hygienic measures strictly carried out would certainly render the mortality from yellow fever less alarming, and would probably lessen the number of cases.

The foregoing remarks apply only to the city of Santiago de Cuba. I have purposely left the question of infection with yellow fever of the harbor for the last part of my report, because to-day no practitioner believes yellow fever to be caused by sea-water emanations or poison. During the last two years an epidemic has been raging through the island and, strange to say, the shipping has suffered very little or nothing from its ravages. I have seen no cases on board foreign vessels, mostly steamers, which never lie alongside of the wharves, but anchor in midstream, whence their cargoes are taken out. The tramp steamers of the iron companies have their anchorage about 1 mile from the city limits, and never take but one or two days to load their cargo and leave.

The harbor of Santiago is a landlocked bay, about 6 miles long and 3 wide, surrounded on all sides by high hills which seem to rise abruptly from the water. Bordering the eastern shore lies the city of Santiago. There are two wharves for coastwise steamers and sailing vessels, the large steamers, both national and foreign, anchoring in the middle of the bay. At the western shore there are no buildings or piers—in fact, nothing but a sorry-looking barrack called by courtesy the "Lazaretto."

Some years ago, when steamships were a novelty here and all the sugar trade was confined to sailing vessels, yellow fever was very common among the crews. Vessels would remain in port from two to five or six weeks loading sugar, and the crews would mix and communicate with one another, infecting each other with the germs of yellow fever. Now foreign sailing vessels are very rare, all our trade being carried by steamers, which remain away from the shore, and only for a short time.

For the last two years the Government has undertaken to build a stone pier, which will be about 1,200 feet long, and will be finished within the next ten or twelve years. This will, of course, render the port a little healthier, especially as dredging of the bottom has been going on for some time.

Nothing has ever been attempted in the way of sanitary engineering to bring about a healthy condition of the harbor. Our medical literature is very meager, and nothing has been written on this subject; but I believe that a stone pier built as far out as possible and bordering the whole of the city front, with frequent dredging of the bottom, would certainly make our harbor healthier.

I would also suggest the putting up of a steam plant on the western shore for the thorough fumigation and disinfection of all steamships about to start for the United States, especially during the summer months, when the risk of importing yellow fever increases greatly.

Unfortunately, neither the General Government nor the municipality take any interest whatever in matters appertaining to the public health. No laws are promulgated to prevent the outbreak of contagious or infectious diseases. I have seen smallpox and yellow fever patients carried in public carriages to the hospital.

I have communicated in this report all that my personal experience has shown me. I know it is far from being entirely satisfactory, but the fault is not mine, but of the medium in which I live, far from any center of instruction, with very little reading about yellow fever, of which we know only certain facts. No facilities are ever afforded to study this malignant fever, which makes so many victims yearly.

Respectfully,

H. S. CAMINERO.

NATIONAL QUARANTINE ADMINISTRATION (DOMESTIC).

Circulars Relating to Quarantine Regulations.

The following circulars were issued, calling attention to the requirements concerning quarantine certificates at the port of arrival, and promulgating additions to the quarantine regulations. Circular No. 37, relating to the bedding used by immigrants and mattress and pillow covers used by other passengers, was the result of complaints received from health officers and others that foul bedticking and mattress covers used on the voyage to the United States were sold on arrival and used by dealers as head covering of barrels of vegetables and other subsistence supplies shipped to various localities.

[Department Circular No. 159, Marine-Hospital Service, 1896.]

CERTIFICATES OF INSPECTION.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., November 21, 1896.

TO COLLECTORS OF CUSTOMS:

Your attention is called to the following paragraphs of Article I, page 24, of the Quarantine Regulations of the Treasury Department:

"1. Vessels arriving at ports of the United States under the following conditions should be inspected by a quarantine officer prior to entry:

"A. Any vessel with sickness on board.

"B. All vessels from foreign ports.

"C. Vessels from domestic ports where cholera or yellow fever prevails or where smallpox or typhus fever prevails in epidemic form.

"*Exceptions.*—Vessels not carrying passengers on inland waters of the United States. Vessels from the Pacific and Atlantic coasts of British America, provided they do not carry persons or effects of persons nonresident in America for the sixty days next preceding arrival, and provided always that the port of departure be free from quarantinable disease. Vessels from other foreign ports via these excepted ports shall be inspected."

Reports from the inspecting officers of the Marine-Hospital Service show that at a number of stations quarantine inspection is maintained throughout only a portion of the year, and that during the winter months at some stations this provision of the regulations is not carried out.

As this regulation is one that is essential for the prevention of the introduction of contagious disease, your attention is particularly directed to the above-mentioned clause in the regulations, and you are requested to notify the proper health authorities that it will be enforced. You are directed hereby to admit no vessel to entry without the required certificate.

W. E. CURTIS, *Acting Secretary.*

[Department Circular No. 12, 1897.]

CALLING ATTENTION TO THE QUARANTINE REGULATIONS TO PREVENT THE INTRODUCTION OF PLAGUE, AND PROMULGATING ADDITIONAL REGULATIONS.

TREASURY DEPARTMENT,
OFFICE OF SUPERVISING SURGEON-GENERAL
U. S. MARINE-HOSPITAL SERVICE,
Washington, D. C., January 18, 1897.

To United States consular officers, masters, and owners of vessels, collectors of customs, national, State, and local quarantine officers, and others:

In view of the prevalence of the bubonic plague in India and China, attention is called to the United States Quarantine Regulations, Treasury Department, 1894, to be observed at foreign ports, and particularly to Article IV, paragraph 4, relating to cargo, and Article V, paragraph 8, relating to passengers, crew, and baggage.

Your attention is also called to Article X, paragraph 4, United States Quarantine Regulations, to be observed at domestic ports, and to the certificate therein required that all regulations have been complied with, and that the vessel, when granted free pratique, will not carry quarantinable disease.

In addition to the above precautionary measures, the following regulations are hereby promulgated:

QUARANTINE REGULATIONS TO BE OBSERVED AT FOREIGN PORTS AND AT SEA.

ART. IX. At all foreign ports and places infected, or suspected of being infected, with plague, the United States Quarantine Regulations, Treasury Department, 1894, relating to cholera, shall be observed with regard to vessels and cargoes bound to the United States. Passengers and crews of said vessels who have been exposed to the infection, or are liable to convey the disease, shall be detained a period of not less than fifteen days from the last possible exposure to infection, under the same regulations as those relating to cholera.

QUARANTINE REGULATIONS TO BE OBSERVED AT PORTS AND ON THE FRONTIERS OF THE UNITED STATES.

ART. XIII. The regulations heretofore promulgated with regard to cholera shall be observed with regard to vessels, cargo, passengers, and crews infected, or suspected of being infected, with plague, but persons who have been exposed to the infection, or are liable to convey the disease, shall be detained for a period of not less than fifteen days from the last possible exposure to infection.

WALTER WYMAN,
Surgeon-General U. S. M. H. S.

Approved:
J. G. CARLISLE, *Secretary.*

[Department Circular No. 37, Marine-Hospital Service, 1897.]

BEDDING USED BY STEERAGE PASSENGERS, ETC.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., February 28, 1897.

To officers of the Treasury Department, State and local quarantine officers, consular officers, and others concerned:

The following is hereby promulgated as an addition to the United States Quarantine Laws and Regulations issued by the Treasury Department April 26, 1894, viz, under "Quarantine regulations to be observed at ports and on the frontiers of the United States," Article III, add:

"Paragraph 7. All bedding provided for steerage passengers must be destroyed or be disinfected before being landed. Bedticking or other covering of mattresses and

pillows used by passengers or crew shall not be landed unless disinfected at the quarantine station in accordance with these regulations, and tagged with labels certifying to said disinfection."

J. G. CARLISLE, *Secretary.*

[Department Circular No. 121, Marine-Hospital Service, 1897.]

DISINFECTION BY FORMALDEHYD GAS.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., August 5, 1897.

To national, State, and local quarantine authorities, collectors of customs, and others concerned:

Addition is hereby made to the quarantine regulations of the Treasury Department issued April 26, 1894, by inserting under Article V, "Quarantine regulations to be observed at ports and on the frontiers of the United States," paragraphs 8 and 9, as follows:

Paragraph 8. *Disinfection of steerage, forecastle, and cabin of vessels by formaldehyd gas.*—After the removal of the bedding, carpets, and furnishings, all apertures being tightly closed, the steerage, forecastle, and cabin of a vessel may be disinfected by formaldehyd gas in a percentage of not less than 2 per cent per volume strength, the time of exposure to be not less than twelve hours. The gas may be generated by one of the following methods:

(*a*) From methyl (wood) alcohol by means of special lamps, using not less than 600 grams (750 cubic centimeters, 1½ pints) of methyl alcohol for each 25.5 cubic meters (1,000 cubic feet) of space, the time of exposure to be not less than twelve hours.

Lamps used for generating formaldehyd gas from methyl alcohol should change not less than 1 liter (1.01 quarts) of the alcohol within an hour.

(*b*) From an aqueous solution, containing 40 per cent of the gas, known under the names of formalin, formol, or formalose. The gas is best evolved from these solutions by the addition of from 10 to 30 per cent of a neutral salt, preferably calcium chloride or sodium nitrate, and heating the mixture in a special boiler. One liter of a 40 per cent solution of formaldehyd gas will evolve about 1,425 liters (50.1 cubic feet) of the gas at 20° C. (68° F.), and will be sufficient for 71 cubic meters (2,505.5 cubic feet) of space.

(*c*) From the substance known as trioxymethylene by means of a special lamp, not less than 2 grams (30 grains) to be used for each cubic meter (35.29 cubic feet) of space.

After the disinfection of apartments (steerage, cabin, and forecastle) by formaldehyd gas, the latter should be neutralized by ammonia gas, evolved from water of ammonia by heat, or by evaporation from water of ammonia sprinkled upon the floor.

NOTE.—The quantity of water of ammonia required for neutralization after each of the above-named methods is as follows: After method (*a*), 1 liter (1.01 quarts) of water of ammonia for each 1,000 cubic centimeters (1.01 quarts) of wood alcohol used; after method (*b*), 1¼ liters (1.26 quarts) of water of ammonia for each liter (1.01 quarts) of formalin; after method (*c*), 1 liter of water of ammonia for each 150 grams (5 ounces) of trioxymethylene.

Paragraph 9. *Disinfection of clothing, bedding, upholstered furniture, articles of leather etc., by formaldehyde gas.*—These may be disinfected by formaldehyde gas in the ordinary steam disinfecting chamber, the latter to be provided with a vacuum apparatus and special apparatus for generating and applying the gas. The gas should be applied in a dry state in not less than 20 per cent per volume strength, the time of exposure to be not less than one hour. Clothing, bedding, etc., thus disinfected, should be

exposed in situ to an equal amount of ammonia gas generated by the special apparatus attached to the chamber, using 1 liter of water of ammonia to each liter of formalin; or compressed ammonia gas may be used.

NOTE.—The special apparatus must consist of a generator, constructed of copper, for evolving formaldehyde gas from its solutions, and a similar one of iron for evolving ammonia gas for neutralization. The principle upon which this apparatus is constructed is described and illustrated in Public Health Reports, Marine-Hospital Service, January 29, 1897, Vol. X, No. 5.

L. J. GAGE, *Secretary.*

LEGALITY OF THE QUARANTINE REGULATION REQUIRING ADDITIONAL PRECAUTIONS AT PORTS SOUTH OF THE SOUTHERN BOUNDARY OF MARYLAND.

The question having been raised as to the legality of Article II, paragraph 2, chapter 2, page 25, Quarantine Regulations of 1894, requiring that vessels from yellow-fever ports arriving at ports in the United States south of the southern boundary of Maryland should be subjected to certain requirements not demanded of vessels arriving at ports north of said boundary, this matter was referred to the Attorney-General, whose opinion follows. It should be remarked that other regulations are provided relating to vessels, persons, and effects destined for points in the South, but entering at a Northern port:

OPINION OF THE ATTORNEY-GENERAL.

DEPARTMENT OF JUSTICE,
Washington, D. C., November 7, 1896.

SIR: I have the honor to acknowledge your communication of October 31 asking my opinion with relation to a quarantine regulation respecting yellow fever. The quarantine law of February 15, 1893, chapter 114, section 3, provides that "all rules and regulations made by the Secretary of the Treasury shall operate uniformly and in no manner discriminate against any port or place." Your regulations with respect to quarantining against yellow fever provide for an exception in the case of "vessels bound for ports in the United States north of the southern boundary of Maryland, with good sanitary condition and history, having had no sickness on board at ports of departure, en route, or on arrival, provided they have been five days from last infected or suspected port." The Supervising Surgeon-General of the Marine-Hospital Service, in his communication concerning this regulation, says: "It is as absurd to disinfect a ship from Havana at Portland, Me., as it is dangerous not to disinfect one from Havana at New Orleans." [1]

Since our country contains such great variety in climate and sanitary conditions, it is clear that every regulation of your Department with relation to quarantine can not with wisdom be made applicable to the whole coast line. I do not think that Congress intended unwisdom in this respect. I do not think that this exception, which in effect covers that part of our coast which is north of the yellow-fever danger line, constitutes a discrimination within the meaning of the quarantine act. I therefore advise you that the regulation is lawful.

Very respectfully,

JUDSON HARMON, *Attorney-General.*

The SECRETARY OF THE TREASURY.

[1] This quotation refers to a vessel from a yellow-fever port arriving without evidence of infection.—W. W.

REPORTS FROM THE NATIONAL QUARANTINE STATIONS.

CAMP LOW, SANDY HOOK, NEW JERSEY.

As intimated in the last report, and in consequence of the necessity for its use as a proving ground for the Army, the quarantine station known as "Camp Low," situated at Sandy Hook, New Jersey, was abandoned and definitely closed in March, 1897. The steam disinfecting chamber was transferred to the immigration service on Ellis Island, the laundry plant to the marine hospital at New York, and the available equipment was sent to other United States quarantine stations. The remaining property was sold at public auction and the proceeds, $1,134.61, were deposited with the Assistant Treasurer of the United States at New York by the medical officer in command of that station. This plant consisted of barracks belonging to the United States Army and some additional buildings, which were erected in the summer of 1893 during a threatened invasion of cholera. It had not been in use since that date.

REEDY ISLAND QUARANTINE; POST-OFFICE ADDRESS VIA PORT PENN, DEL.

Report of P. A. Surg. R. M. WOODWARD, in command.

REEDY ISLAND QUARANTINE, *October 12, 1897.*

SIR: I have the honor to submit herein the report of the transactions of this station for the fiscal year ended June 30, 1897.

Vessels inspected and passed	935
Vessels spoken and passed	3
Vessels disinfected	10
Steerage passengers inspected	11,017

Repairs and improvements.—An artesian well has been sunk 574 feet, giving a natural flow amounting to more than 20 gallons a minute of excellent water for both household and boiler purposes. Pipe has been purchased with which to conduct the water to the boathouse for the boarding steamer's tanks and to the various buildings on the island, where a pump and tank have been supplied. The riprap on the island levee has been completed and the levee repaired where washed away. Three telephones have been erected, connecting the pier, island, and Port Penn. A bridge has been built over the canal in the rear of the surgeon's residence. Fender piles have been driven at the boathouse, also along the pier. The pier has been further strengthened by iron rods and turn-buckles; also new timbers and bridge work beneath the steam chambers. A wooden railing has been erected on the gangways on the island and painted. Sod has been laid on a 10-foot bank running around the base of the surgeon's residence, also on an area 60 by 100 feet to the south of the latter. Grass seed was sown over remainder of grounds, but did not do well, owing to the fact that the earth was "sour." The portion of the telegraphic cable buried on the island was uncovered and replaced by poles and overhead wires, permitting the removal of a portion of cable containing seven splices.

Recommendations.—Bathing facilities should be erected on the pier for use in bathing crews of vessels undergoing disinfection; estimate, $2,000.

The levee on the island should be raised until all parts are as high as the northeast corner now is, to prevent overflow during high tides accompanied by southeast wind; estimate, $300.

New piling should be driven and a new pier built on the Port Penn side of the island, extending out to 3 feet of water at low tide, for use of the launch; estimate, $150.

A brick chimney should be erected on attendants' building to allow of use of large room in winter; estimate, $50.

An office for the medical officer should be built detached from the residence, which would avoid the necessity of the attendants passing through the quarters, and would give the medical officer the present office room for use as a spare bedroom, which is much needed; estimate, $300.

Board walks should be laid across the island connecting the gangways with the artesian well and with the launch pier; estimate, $100.

A windmill with tank should be erected over the artesian well in order that the water may be utilized for boat, household, and fire purposes; estimate, $250.

The inside of the angles of the ice breaks on the pier should be filled with large rock, either on mats or in caissons, to prevent the damage done by the ice; estimate, $5,000.

R. M. WOODWARD,
Past Assistant Surgeon, M. H. S.

DELAWARE BREAKWATER QUARANTINE; POST-OFFICE ADDRESS VIA LEWES, DEL.

Report of P. A. Surg. C. P. WERTENBAKER, *in command.*

DELAWARE BREAKWATER QUARANTINE, *July 31, 1897.*

SIR: Following is the report of the transactions of this station for the fiscal year ended June 30, 1897:

Asst. Surg. Emil Prochazka was in temporary command of the station from November 10, 1896, to March 22, 1897.

Vessels inspected and passed	245
Vessels spoken and passed	1
Vessels allowed to proceed without pratique	16
Total	262
Held for observation	3
Remanded to Reedy Island for disinfection	2

Two vessels arrived at the station during the year with contagious disease on board. The British S. S. *Farnwell*, from Colon, with 3 cases of smallpox, arrived August 27, 1896, and the British S. S. *Delaware*, from London, England, with 9 cases of smallpox, arrived March 28, 1897. In each case the patients were removed to the station for treatment, and the crew brought ashore to the detention barracks, and held for fourteen days. The vessels were remanded to the Reedy Island quarantine for disinfection. All the cases of smallpox recovered except one, which died a few hours after being brought ashore. The number of vessels arriving at this station has been smaller than last year, due in part to the disturbed condition of the island of Cuba, and consequently but little sugar from there is being shipped. There has been an increase in the amount of sugar arriving from Egypt and from South America. Several vessels have arrived during the year from Honolulu, Hawaiian Islands, being the first that have arrived at this port. They all brought sugar.

The greater number of vessels arriving at this port are flying the British flag, and bring sugar from East Indian ports for orders. There has been but little sickness on the vessels. One sailing vessel from the East Indies had one case of beriberi, and several cases of moonblindness that were interesting. Violations of the quarantine regulations have been few and of a trivial nature. As the regulations are being better understood the violations decrease. I beg to again suggest that at all quarantine stations the quarantine flag be displayed daily from sunrise to sunset during

the period when quarantine is in force at that port; that all vessels subject to quarantine inspection be required to hoist the quarantine flag to the foretop on entering the harbor, and to keep it there until after the vessel has been inspected and discharged by the boarding officer; that a list of the quarantine stations of the United States, with their location in the harbor, and other information, be published and furnished vessels through consulates, collectors of customs, quarantine officers, and others. I believe that such action would materially lessen violations of the quarantine laws, with all the dangers incident thereunto, and contribute largely to the efficiency of the service. In this connection, I beg to again suggest the advisability of a law requiring all registered vessels of the United States to carry a set of international signal-code flags. Many of the smaller vessels have no means whatever for communicating by signal and are unable to understand signals from quarantine stations, life-saving stations, or other vessels. The small cost of a set of these flags and the great advantages to be derived from them would seem to be a sufficient reason to make them compulsory. Masters of vessels say that they would be very glad to have the flags, but the owners of the vessels will not expend the small amount necessary to purchase them. When it is considered that at times they may be the means of saving both the vessel and the lives of all on board, their necessity becomes apparent.

Additions and improvements.—During the past year the following additions and improvements have been made to the station. A Rider hot-air engine for pumping water from the cistern to the tank in the attic of the executive building was transferred from the Mobile marine hospital to this station, and has been doing satisfactory work. A telephone system, connecting with all the buildings on the station and terminating on the commanding officer's desk, has been put in at a total cost of $100, and has proved a great convenience. The telephone line connecting the station with Lewes, Del., also terminates on the desk. By a 3-point line-changing switch either system can be placed in communication with the other, though ordinarily there is no connection between them. An auxiliary bell, so arranged that if when using one line the other wishes to call the office in the executive building, this bell rings instead of the bell on the telephone. The arrangement is ingenious and satisfactory, and greatly facilitates the administration of the station. In November, 1896, we set out 200 cottonwood cuttings, and nearly all have taken root and are growing nicely. We have had great success with our cottonwoods. Three years ago there was not a tree on the reservation with the exception of a few salt-water pines. In November, 1894, some 100 cuttings of cottonwood and willow were set out; the cottonwoods are now fine trees, some of them 25 feet high and in full leaf. The willows are also growing well, but they grow much more slowly. As a quick-growing tree for sandy soils I know nothing better than the cottonwood.

It is with much pleasure that I record the fact that the contagious-disease camp is now completed and in perfect working order. In the early part of the year the grading of the grounds was completed, and a bulkhead built to retain the sand in place. A space 110 feet square was then inclosed by a picket fence 8 feet high, with two gates. Within this inclosure are two tent wards, one for males and one for females, each 14 by 48 feet; a tent for nurses adjoins each, and also a tent for disinfectants. On the opposite side of the camp, and running parallel with the wards, are placed in the order named, a dining-room tent, a kitchen tent, and a commissary tent; between these two rows of tents are four small tents, used as sleeping quarters for the cook, scullions, and others in the camp. Near the entrance gate is the tent of the medical officer of the camp. This tent has a special water supply, and has a telephone that connects with the rest of the station. The camp has a double water supply; one by a pump connecting with a driven well, remote from the reservation, and the other is from the regular water supply of the station. These connect with the kitchen of the camp, and with a separate tap, which furnishes water for the rest of the camp. This camp is intended to be absolutely independent of the rest of the station; doing its own cooking, etc., and the only method of commu-

nication with the rest of the inclosure and the outside world is by telephone. An arc electric-light plant was transferred from Camp Low to this station. Electrical experts who have examined it say that it is in good order. As soon as practicable it will be set up and put in running order. It is hoped that an incandescent system, for lighting the buildings on the reservation, can be put in at the same time. Two hundred and fifty-nine tents and some miscellaneous articles were received at the same time as the electric-light plant. Some much-needed furnitnre for the surgeon's quarters and some table furniture for the steward's quarters was purchased at a cost of $180.98. A files case was put in the executive building at a cost of $40. Some needed repairs to the executive building cost $171. Thirty thousand feet of rough lumber was bought at a cost of $459, with which were laid by the attendants, without extra cost, walks from the suspect hospital to the camp; walks laid in the camp; frames for the tents and flooring for the same. A boathouse was built on the small landing pier for the small boat, numerous repairs to buildings and walks, new coal bins, etc.

A temporary standing roof was built over the cockpit of the launch to protect it from the elements, and has proved a great benefit. A permanent standing roof should be put on the launch, with movable glass windows, as the present arrangement, while acting well in summer, is not sufficient protection in winter. The cork-filled fender that surrounds the launch, after another year of trial, has demonstrated the fact that it is invaluable, and I recommend its adoption on all boarding launches of the Service. This fender consists of a long bag of "OO" canvas filled with granulated cork and held in place by a lacing, which passes through large brass screw eyes in the plankshеer and lower molding. The small cost of the fender (for it can be made by any sailor), and the great advantage to be derived from its use, makes it desirable for all boarding launches. Our fender is 20 inches in circumference at its largest part, and it extends entirely around the launch. A new piazza, to extend extirely around the executive building, has been contracted for, and work on it will commence within a few days. It will add greatly to the appearance of the house and to the comfort of its inmates.

Needs of the station.—The detention barracks for immigrants are badly in need of repairs. The roof was originally covered with tarred paper. The tar has melted and run off, and the paper has been torn by the winds until there is practically no covering to the building except the saddle boards. The barracks, both male and female, the dining room, kitchen, and storeroom should all be shingled. The lower portion of the rear wall of both the male and female barracks has rotted away, owing to the banking up of sand against it during the winter. The rotten boards should be replaced by new ones, which should be painted with tar to preserve them. All buildings on the station are badly in need of paint, except the executive building, the woodwork of which has recently been painted. I beg to renew my recommendations of last year for lavatories for the immigrant barracks, the need for which being as great as ever. The platforms in front of the barracks have rotted away and should be replaced as soon as possible. I would recommend that they be replaced by asphalt, concrete, or stonine instead of boards. The life of pine-board walks in this climate, if resting on the sand, does not exceed four years; if these walks are made of some material like asphalt they may cost more at first, but they are very much cheaper in the end, as they will last much longer and do not have to be renewed every few years. Barracks for cabin passengers should be built as soon as possible, for while we have not as yet been called on to care for such passengers, the occasion may arise at any moment, and our present facilities in that direction are limited. Several formaldehyde generators are much needed. When the arc-light system of lighting is put up it is desirable that an incandescent system for lighting the hospitals, camp, executive building, etc., should be put in at the same time. The same boiler can run both systems at but slightly increased cost. Another horse for use on the station is very desirable. Fire extinguishers have been requisi-

tioned for, but have not arrived as yet. An addition to the present blacksmith shop, to be used as a carpenter shop, is much needed.

A small building in which lunatics, unruly immigrants, or disorderly persons can be confined is much needed and can be erected at small cost.

An ice-making plant with a capacity of 1 ton of ice daily would be a great addition to the station, and would pay for itself in a few years by the saving on the cost of ice.

The fish-oil factories near the station are still filling the air with nauseating odors and polluting the water of the bay with their foul, ill-smelling, disgusting refuse, in spite of the efforts that have been made to dislodge them. The case is still in the United States courts, but it is thought that some decision will be rendered during the coming fall. Since my last report another factory has been established nearer to the station than any of the others. They were notified by the Department that they would be proceeded against if they proved to be a nuisance. The claim that there would be no more odor from this new factory than from "a well-conducted kitchen" is not borne out by the facts.

C. P. WERTENBAKER,
Past Assistant Surgeon, M. H. S., in Command.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

CAPE CHARLES QUARANTINE; POST-OFFICE ADDRESS, FORTRESS MONROE, VA.

[Boarding and disinfecting station, ship *Jamestown*, Hampton Roads; hospital and detention barracks, Fishermans Island, off Cape Charles, Virginia.]

Report of P. A. Surg. W. J. PETTUS, *in command.*

CAPE CHARLES QUARANTINE, *August 11, 1897.*

SIR: I have the honor to submit the following report of transactions at this station during the fiscal year ended June 30, 1897. One hundred and nineteen vessels were boarded and inspected, 13 of which were disinfected and held for observation.

Additions, alterations, and repairs.—Steamer *Dagmar* hauled out on ship's ways on January 14, 1897, and bottom scraped and painted. Afterwards the vessel was thoroughly overhauled and repaired at the Norfolk Navy-Yard and put in first-class condition. A new boiler was put in; new circulating pump, more than double the capacity of the old one, was substituted for former one, which was found to only supply about half the necessary amount of water to the condenser; all old iron piping was taken out and new ones made of brass put in; new awnings made; house over boiler renewed; anchor engine repaired; water-closets repaired; bilge scraped and painted with red lead, and all machinery overhauled and put in good condition. Every part of the steamer was found very much in need of repair and the hull badly covered by rust in several places from having been in the water so long—about fourteen months—without being scraped and painted. The total cost of repairs, including a new inside smokestack, was $3,232.19.

Steamer Koch.—Smokestack was repaired in July, 1896, at a cost of $8.23. In September a new smokestack, umbrella, and connection door was put in at a cost of $195. The old smokestack, in very bad condition, was struck by lightning and so weakened that it collapsed while disinfecting a steamer; 200 feet of rubber hose for bichloride solution was bought, cost $96.50, and 75 feet of sulphur hose, cost $331.75. Several times during the summer the guard rails were broken off while disinfecting large steamers during the rough weather so frequent in Hampton Roads. Ten white-oak fenders were bought to save the guard rails, at a cost of $10; but even these did not prevent damage being done occasionally. On January 14 the vessel was hauled out on ship's ways and bottom was scraped and painted. Hull was found

corroded by rust in several places. Vessel was thoroughly overhauled at the navy-yard; new boiler tubes were put in; new steam gauge put in; fire-brick casing around boiler removed, also asbestos and canvas covering for the top of boiler and steam chamber. The two forward tanks were connected with inspirator to feed pump aft, and new awnings made for after deck. Some changes were made in the sulphur furnace; fitting the doors and raising the cooling chamber and fixing the top so it could be quickly removed to clean the tubes when they get clogged with sulphur. A movable hatch was put in the house directly above the furnace to lessen danger of fire and render it easy to get at the furnace for repairs; cost, $1,055.90, all above repairs included.

Quarantine ship Jamestown.—No repairs were made to the ship itself. In August a cooking stove was bought, at a cost of $18. This was broken by the anchor chain, and a new range was then purchased, at a cost of $51.50. New tubes were put in the boiler, at cost of $106, and a new inspirator was purchased, costing $15. One clear hawse shackle and two devil claws were bought for use in handling the heavy anchors and chains, at a cost of $18.30. While the ship was at anchor it was found necessary to secure a sheet anchor for use in any emergency that might arise on account of the violent storms that sometimes occur in Hampton Roads. One was obtained from the commandant of the Norfolk Navy-Yard, weighing 3,000 pounds, and hung on the starboard cathead ready for use, without cost to the Service. The navy-yard engineer put up awning stanchions and ridgepoles on the forward and after decks without charge. These were much needed, and have caused the old and rotten awnings to last until the present, which would have otherwise been torn to pieces. The entire ship has been painted by the crew.

While the vessel was anchored at the navy-yard a heavy lighter collided with it, tearing away the companion ladder. The owners of the lighter were compelled to repair the damage done, so the ladder was made stronger than before. All the pumps on the ship were fitted with reducers of the same size, so that the same hose would fit any pump, thus increasing the strength of the crew for extinguishing fire, should such an emergency arise.

Naphtha launch.—The launch required but few repairs during the year. The steering spindle was broken one stormy day. A new one was bought, costing $2.50. A new coil was purchased for the engine, costing $18.50, and the hand wheel and safety-valve ball renewed, at a cost of $2.05. The launch has rendered good service to the station, though it should be about 1 horsepower stronger to go against the strong tides and winds here. It is the right size.

Fishermans Island, off Cape Charles, Virginia.—During January, 1897, 40 creosoted piles were driven under wharf and gangway (8 under the house on wharf and the rest under gangway), both of which were in a dangerous condition; cost, $996. Three thousand cypress shingles were purchased, to repair roof of keeper's house, costing $22.50. Water-closets and lavatories were put up on south barracks, and sewerage connections with tide water made. The partitions between the wards were built up to the roof, and ventilators put in each end of barracks; cost, $1,386.60. During the year the keepers retarred all the roofs, and put new tubes in the upright boiler used for pumping purposes. A small sailboat was bought for the use of the keeper in communicating with the mainland; cost, $65. A gangway was built by the keeper on east side of the island, extending out through the marsh and shallow water a distance of about 400 feet to where the water was deep enough to bring up the sailboat.

Additions, alterations, and repairs necessary during 1897.

Ship Jamestown.—Should be coppered along the water line, where copper is badly worn. New awnings are badly needed, those in use being old and rotten; and a hand windlass should be put on the spar deck for use in hoisting heavy weights aboard or handling the boats. Estimated cost of these improvements, $800. A steam windlass is needed forward on the gun deck for getting up anchors. Such a windlass was included in the original plan of improvements; cost, about $1,500.

Steamer Dagmar.—No repairs needed, as the entire boat has recently been put in good repair. Should be hauled out and bottom scraped and painted about October or November; cost, $150.

Steamer Koch.—A new sulphur furnace of modern design should replace the old one, which works in a very unsatisfactory manner and requires too much time to burn the sulphur. A new fan for forced draft is badly needed; the one in present use forces about as much of the sulphur fumes back through the furnace as goes into the hold of the vessel being fumigated. Vessel should be hauled out and bottom scraped and painted this fall. Cost of sulphur furnace, $500. Estimated cost of sulphur furnace with fan, $1,000, including cost of changes in superstructure necessary to fit in a new furnace, fan, and filter.

Fishermans Island.—About 40 additional creosoted piles should be driven under the wharf and gangway to render it secure during the coming winter; estimated cost, about $1,200. A new house for the keeper should be built, as the present one is in a ruinous condition. Two or three rooms should be added for the use of the medical officer when his presence is necessary on the island. It is thought $1,500 would build a suitable house. The storms have washed away a great part of the beach in front of the disinfecting house, and it may be necessary to fill in with stone to protect the building.

The large tank on the wharf should be taken down and put upon a frame to replace the small one now used to supply water to the bathrooms, which is much too small. General repairs to buildings, $500. Repairs to tank, $250, including supporting trestle.

W. J. PETTUS,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

CAPE FEAR QUARANTINE, SOUTHPORT, N. C.

Report of P. A. Surg. J. M. EAGER, *in command.*

CAPE FEAR QUARANTINE STATION, *October 12, 1897.*

SIR: I have the honor to present the following report of the transactions and general condition of the Cape Fear Quarantine Station for the fiscal year ending June 30, 1897, with recommendations for the completion of the station:

Sanitary transactions.—Vessels inspected and passed, 89; spoken and passed, 1. Four of these vessels had, under your directions, been remanded to the South Atlantic Quarantine Station and were disinfected there, this station not being equipped at that time with a disinfecting plant. Another vessel was remanded to Cape Charles Quarantine Station for disinfection. No vessels were disinfected at this station during the fiscal year.

General transactions.—During the fiscal year all the work of construction at the station under the original contract was completed, so that the station now consists of a wharf built upon metaled piling, a disinfecting house, a hospital, and a ballast crib. The disinfecting house is provided with a sulphur furnace, a steam disinfecting chamber, and a bichloride tank and a steam pump. The hospital, amply furnished throughout, has a ward for four beds, a nurse's room, a small dispensary, and a kitchen. The station is furnished with a carpenter's and a blacksmith's outfit. The quarantine employees are quartered on the quarantine steamer *Woodworth,* which is tied up in a slip behind the disinfecting house. The artesian well, which is 45 feet deep, delivers a sufficient quantity of water for the purposes of the station. On the initial trial the flow was 102 gallons a minute. The water, which is from a gray sand stratum, is extremely hard, but has been used for steaming without any perceptible injury to the boilers. It is hardly potable.

A whaleboat and a flat-bottomed sailboat have been added to the flotilla of the

service. They are both well built and very useful. The quarantine naphtha launch *Hermes* has during the year been sheathed below the water line with Muntz metal to prevent the ravages of water worms, and parts of the engine have been renewed. She is now in a first-class condition.

The quarantine steamer *Woodworth*, used as quarters for employees, is in a very bad condition. She has been submitted to a thorough survey, and can not be placed in good repair without an expenditure of money that would not, in my opinion, be warranted by the value of the vessel.

The condition of the braces, binding together the piling of the wharf, was made the subject of a communication, dated April 12, 1897, addressed to the honorable the Secretary of the Treasury, in which report it was stated that the braces were covered with barnacles and were honeycombed by the teredo, and that the iron bolts and nuts fastening the braces were eroded by galvanic action from contact, in the presence of sea water, with the yellow metal sheathing of the piles. In the communication referred to, I recommended that the damaged braces be replaced by creosoted yellow pine braces, fastened with copper bolts and nuts, in order to forestall injury to the wharf from storms and tides.

Action on this matter was deferred until the beginning of the ensuing fiscal year.

A requisition was forwarded to the Bureau March 22, 1897, for a double-acting suction hand pump. This apparatus became necessary from the fact that steam is not at all times kept up in the disinfecting house, so that the steam pump can not at all times be used without necessary delay, and because, in addition to the use of a hand pump in case of fire, the leaky condition of the steamer *Woodworth* requires prolonged pumping twice daily. I was directed to renew the requisition after June 30.

Inquiries were made during the fiscal year with a view to marking out with buoys the limits of the quarantine anchorages for infected and noninfected vessels. The difficulty in arranging such anchorages, rendering it indeed impracticable, consists in the fact that the station is on the edge of a channel not more than 1,000 feet wide, and that outside the channel, which is largely artificial, there are only 6 or 7 feet of water, not sufficient for vessels of ordinary draft. But the disadvantage remains that this narrow channel, through which vessels are constantly passing, is the only available place for vessels riding quarantine.

Recommendation.—In order to perfect this station the purchase of an additional site is necessary. It is inadvisable to erect more buildings on the present wharf, owing to the fact that since the building of the Government dams above the quarantine pier the tides have greatly increased in swiftness, and, further, the river in the neighborhood is much exposed and often stormswept. There is high land on the west shore of the Cape Fear River at a location about 1,000 or 1,500 feet below a point directly opposite the station, 3 acres of which, together with a suitable water skirt of not less than 209 feet on the river front, would be suitable for the purpose of an additional site. The tract of land in question is covered with a growth of oak scrub and underbrush, and 100 feet back from high-water mark the high land begins by an abrupt embankment rising 10 feet above the level of the beach. Before building on the site it would be necessary to clear the land and round off the embankment.

Owing to the proximity (1 mile) to Southport, a place of 1,200 population, and to the fact that cattle and hogs roam about the neighborhood at liberty, fencing for this tract would be absolutely essential. Although the tract designated is nearer the channel of the river than any neighboring land, the distance from high-water mark to a point where there is a depth of 5 feet at mean low water is 460 feet. So, without a pier the land would be inaccessible by boats from the river, and consequently from the quarantine wharf across the channel.

Quarters for a medical officer are needed. A house built in accordance with the original plans prepared in the office of the Supervising Architect, but set on brick piers ashore instead of on piling at the quarantine wharf, would be in every way suitable.

A house for quarantine employees is urgently needed, especially as the steamer *Woodworth* is not likely to continue serviceable as quarters for any extended period. The house, designed in the office of the Supervising Architect to be built at the wharf, should be built on brick piers ashore and would answer the purpose.

There is at present no available place at the station for storing supplies, and a storehouse is needed. A suitable one-story house having two 15 by 15 foot rooms should be erected on the tract of land recommended.

The small hospital building at present on the quarantine pier is the only building belonging to the station, except the disinfecting house. It is unfit for the reception of patients seriously ill with contagious diseases because it is too close to the other portions of the plant and is just at the edge of the channel where vessels pass constantly. I renew, therefore, the recommendation made in the report for the last fiscal year that the hospital now on the pier be used as a hospital for "suspects" and that another similar hospital building for contagious cases be erected on separate metaled piling 500 feet inshore from the ballast crib.

To furnish a potable water supply there should be two 3,000-gallon brick, mortar-lined cisterns—one connected with the medical officers' quarters and one with the men's quarters. The water furnished by the artesian well is so hard as to be unfit for drinking purposes, and there should therefore be a 3,000-gallon cedar cistern placed on the quarantine wharf, taking its supply from the roof of the disinfecting house, which is already guttered.

A plot of land on the site ashore should be set aside for a quarantine burying ground.

There is no appliance at this station for transferring ballast to the wharf from vessels at the wharf head, and steam hoisting apparatus is much needed.

With the building of the medical officers' house and employees' quarters an expenditure for furniture will be necessary.

Respectfully submitted.

J. M. EAGER,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

[Inclosure 1.]

ANALYSIS OF WATER SUPPLY, CAPE FEAR QUARANTINE.

WASHINGTON, D. C., *February 10, 1897.*

The SUPERVISING SURGEON-GENERAL,
United States Marine-Hospital Service, Washington, D. C.

SIR: I have the honor to submit the following results of analysis of a sample of water from the new artesian well at the United States quarantine station at Southport, N. C.:

	Parts per 100,000.
Residue on evaporation	95.726
Calcium carbonate ($CaCO_3$)	17.400
Magnesium carbonate ($MgCO_3$)	5.045
Silica (SiO_3)	2.200

Other ingredients undetermined.

From the quantity of lime and magnesia salts contained the water is hard, and care will be necessary in using it for steaming purposes.

Very respectfully,

H. D. GEDDINGS,
Passed Assistant Surgeon, M. H. S.

Respectfully forwarded.

J. J. KINYOUN,
Passed Assistant Surgeon, M. H. S., in Charge of Laboratory.

SOUTH ATLANTIC QUARANTINE, BLACKBEARD ISLAND, GA.; POST-OFFICE ADDRESS VIA INVERNESS, GA.; TELEGRAPHIC ADDRESS VIA DARIEN, GA.

Report of P. A. Surg. JAMES A. NYDEGGER, *in command*.

SOUTH ATLANTIC QUARANTINE STATION, *October 14, 1897*.

SIR: I have to submit the report of the transactions at this station for the fiscal year ending June 30, 1897:

Sanitary.—During the period from May 1, 1896, to April 30, 1897, 125 sailing vessels and steamships arrived. Of this number 63 were inspected and passed and 62 were detained for disinfection. During this year, which, for convenience, may be termed the quarantine year, the work of the station was increased over that of any preceding year, and exceeded that of the previous year by 131 per cent. During the fiscal year 134 sailing vessels and steamships reported at the station. The British bark *Cambrian Queen*, from Rio de Janeiro, with a history of having had 3 cases of yellow fever on board in that city, received a "preliminary fumigation," and proceeded without pratique to the Savannah quarantine station, first having obtained permission from the board of sanitary commissioners of the city of Savannah to go to that point. The remaining 48 vessels and 7 steamships were held for disinfection, and were treated in accordance with the quarantine regulations as apply to vessels coming from ports infected or suspected of being infected with yellow fever. The months of their arrival, where from, where bound, kind of ballast, and number of days detained in quarantine, etc., are shown in the following tables:

Steamships disinfected.

Date.	Arrived.	Disinfected.	Where from.						Where bound.		Days at quarantine.	Remarks.
			Matanzas.	Rio.	Vera Cruz.	Havana.	Rosario.	Santos.	Savannah.	Port Royal, S. C.		
1896.												
July	1	1	1	...	...	...	...	...	....	1	7	Remanded from Port Royal, S. C.
August	1	1	...	1	...	...	...	...	1	....	5	
October	4	4	...	...	1	2	1	...	4	....	26	One remanded from Savannah quarantine station.
1897.												
April	1	1	...	...	...	...	..	1	1	....	6	Remanded from Savannah.
Total ..	7	7	1	1	1	2	1	1	6	1	*a* 44	

a Average number of days at quarantine, 6⅔.

Sailing vessels disinfected.

Date.	Arrived.	Disinfected.	Where from.													Where bound.						Ballast.				Days at quarantine.	Remarks.
			Santos.	Havana.	Rio.	St. Paul de Loanda.	Guadaleupe.	Para.	Colon.	San Juan, P. R.	Nuevitas.	Pernambuco.	Tuxpan.	Demerara.	Montevideo.	Savannah, Ga.	Brunswick, Ga.	Wilmington, N. C.	New York.	Sapelo, Ga.	Darien, Ga.	Stone.	Sand.	Mixed.	No ballast.		
1896.																											
July	7	7	1	1	4	1	..	..	..	..	..	..	..	..	..	5	1	1	..	..	..	5	1	..	1	92	One remanded from Wilmington, N. C., quarantine station. One remanded from Brunswick. Two remanded from Wilmington, N. C. One remanded from Brunswick quarantine.
August	6	6	1	..	1	..	1	1	1	1	..	..	..	..	..	1	2	2	a1	..	..	2	2	1	1	68	
September	9	9	1	4	..	..	..	1	..	..	1	1	..	1	..	6	1	1	..	1	..	3	4	2	..	149	One remanded from Wilmington, N. C.
October	3	3	..	2	..	..	..	..	..	..	..	..	1	..	..	2	..	..	..	..	1	2	..	..	1	22	
November	3	3	..	2	1	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	3	..	..	..	41	
1897.																											
January	2	2	1	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	1	..	..	1	19	
February	1	1	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	8	
March	8	8	..	2	6	..	..	..	..	..	..	..	..	..	..	7	..	..	..	..	1	5	..	1	2	109	
April	4	4	..	1	3	..	..	..	..	..	..	..	..	..	..	2	b1	..	..	1	..	2	..	..	2	41	One, cargo of salt. One remanded from Brunswick quarantine.
May	5	5	..	..	4	..	..	..	..	..	..	..	..	..	1	1	..	..	..	4	..	4	1	..	..	85	
Total	48	48	4	14	19	1	1	2	1	1	1	1	1	1	1	30	5	4	1	6	2	27	8	4	9	b634	

a Ordered to New York. *b* Average number of days at quarantine, 13⅛.

The vessels disinfected represented a net tonnage of 47,918. Eighty-six hundred tons of stone and sand ballast were removed from vessels. Twelve hundred and ten tons of hard, close-grain stone were furnished vessels coming with sand ballast. Thirty-five hundred and ten tons of stone were dipped in mercury bichloride solution. Thirty-eight vessels disinfected had no history of any sickness either at port of departure, intermediate ports, or at sea. Two had smallpox aboard at port of departure; these also came from yellow fever infected ports. One had typhoid fever; 1, beriberi. Two were suspected of having had yellow fever on board at port of departure. Two vessels had yellow fever on in port of departure. The remaining 9 vessels had had sickness aboard, but the histories did not point to diseases of an infectious nature. During the year vessels remanded here from other Federal quarantine stations, State and municipal, were disinfected, as follows: Cape Fear quarantine station, 4; Brunswick quarantine station, 3; Port Royal quarantine station, 1; Savannah quarantine station, 4. In addition to these a number of vessels were remanded here from Tybee Bar by Savannah pilots. No contagious diseases were treated during the year. The infectious diseases treated were 4 cases of typhoid fever from Montevideo; 1 case of beriberi from Rio; 1 case of dysentery from Havana, and 6 cases of chagres fever from Colon, sent here from the Brunswick quarantine station. All recovered.

In connection with the last cases mentioned, it might not be amiss to relate some facts that came to my knowledge which go to show how shabbily the average American vessel is provided with things necessary for the care and treatment of her crew, should any of them fall sick or meet with an accident, as is frequently the case. According to the statement of the master of the barkentine *Henry A. Litchfield*, her

medical supplies, at the time she set sail from Colon, consisted of about 3 grams of quinine and a half dozen doses of Epsom salts. Six of her crew were down with chagres fever at the time she arrived. Three more had been sick with it but were convalescent enough to partially work ship, and the captain himself had not been feeling well for a number of days. The anæmic and haggard appearance of the sick men fully confirmed the truthfulness of the master's statement.

The schooner *Lizzie Heyer* presented another example of this kind in the case of a sailor sick with dysentery. Upon boarding, this poor fellow was found in a condition of extremis. For several days his life was despaired of. Inquiry developed the fact of no medicine on board. The sick man had been so neglected that he actually lay in his own excreta. In these cases a few cents judiciously invested beforehand in proper remedies would have prevented much suffering. I have no doubt but that many more cases like these related occur. Such wanton neglect of helpless and suffering men would seem to call for the enactment of a law making it compulsory on the part of owners and agents of American vessels to provide the same with medicine chests furnished with a suitable selection of medicines. Of all nationalities sailing upon the seas, the sailor under the Stars and Stripes of the American merchant marine seems to be the least cared for.

The greatly increased amount of work thrown on the station last summer taxed its facilities to the utmost, and necessarily a limited number of vessels were obliged to remain at quarantine a period of time not warranted. The class of vessels which seem especially unfortunate are those coming in sand ballast, for double the time is required to put a vessel through quarantine at this station carrying this class of ballast than would be the case if it carried stone, as all the sand must be discharged, and then the stone put in, which, with the best of facilities, is a somewhat slow process.

Repairs, alterations, and additions.—Repairs were made to the large boiler and a new smokestack furnished; cost, $372.72. The steam chamber was fitted with new lead gaskets, and its steam pipes recovered; cost, $88. Steam connection was made between the large boiler and the hoisting engine and bichloride pump. This has resulted in the saving of much fuel. The cost was $9 for piping. One hundred feet of 6-inch rubber suction hose was purchased; cost, $275. Minor repairs were made to the bichloride pump at a cost of $5.50. Four hundred feet of 1-inch cotton covered rubber-lined hose for the distribution of bichloride solution was purchased, costing $83.60. Five steel ballast tubs; cost, $120. One rotary ballast car; cost, $50.

The damages done to buildings at the south end by the hurricane of September last were repaired; the necessary material cost $155.55. The repairs were made by the station force. The fences on the reservation were blown down by the same storm. They are still in a dilapidated condition for want of lumber to repair them. The yellow-fever camp at the north end, destroyed by the same blow, was rebuilt, and in addition a substantial frame building 16 feet wide by 22 feet long, containing two rooms, was erected for use in conjunction therewith. This building will be used as a storeroom when the camp is unoccupied, and as a kitchen, dining room for nurses, and commissary when open. The material cost $117.85. The work of construction was performed by attendants. The laundry building was removed to a more suitable part of the reservation, renovated, and the necessary water connections made at no additional cost. Four creosoted telephone poles, each 50 feet long, costing $56, were procured and driven in line between the wharf and shore; they should be serviceable for several years. All buildings at the north end were painted. Considerable work has been done on the reservation in the way of filling in some large sand holes in front of officers' quarters. The reservation is once more clear of the fallen trees and upturned stumps and roots as a result of the storm. Minor repairs were made to the roofs of the kitchen, mess, and storeroom, and new piles placed under these buildings. The roof of officers' quarters was repaired and repainted. Executive building, attendants' quarters, mess hall, and outbuildings were given a coat of whitewash. A coal house 16 by 24 feet was built at the south

end; the lumber cost $120. One end of the space was partitioned off and will be used for storing unserviceable property. Temporary repairs are being made to the iron pier, gangway, and substructure of the ballast wharf. These structures will require extensive repairs by next year, estimates for which have been submitted. The ballast wharf, gangway, and ballast spur, for which an appropriation was made by the Fifty-second Congress, are now in course of construction. The wharf is 116 feet long by 32 feet wide. The gangway is 200 feet long by 16 feet wide. These structures, when completed, will be exceedingly substantial and should be durable for many years. The contract price for material and construction is $13,788.

Appropriations made by the last Congress for improvements are: For boathouse, $1,000; hospital for contagious diseases, $2,500; landing pier, mooring dolphins, piles, and ballast gangway, $1,425; quarters for crew, shed, and bath house of four compartments with tub and shower bath, $1,000; hoisting engine for ballast wharf, $900; sulphur furnace and appliances, $1,000; mooring buoys, $500; buoys for marking quarantine limits, $600; additional for dredging Elliotts Cut, $500.

Plans and specifications are now being prepared for the boathouse, hospital, landing pier, quarters for crew, and bath house.

Recommendations.—The following are respectfully submitted: Repairs of roofs, veranda floors, and substructures, medical officer's and steward's quarters; estimated cost, $275. Repairs to old ballast wharf; estimated cost, $3,000. Repairs to iron pier and connecting gangway, $1,575. Two bichloride pumps; estimated cost, $200. Two cypress tanks of 4,500 gallons capacity each, for containing bichloride solution; estimated cost, $125. Fifty feet of 9-inch galvanized-iron pipe for sulphur dioxide distribution; estimated cost, $100. Four hundred and fifty feet of 1 and 1½ inch galvanized-iron pipe for mercury bichloride distribution; estimated cost, $55. Additional for dredging Elliotts Cut; estimated cost, $1,800. Construction of telephone line from north end to Crescent, Ga., a distance of 14 miles; estimated cost, $2,500.

With the establishment of a telephone line direct communication with the outside world will be possible. The present facilities via mail to Darien are poor, as usually four to five days are required before a reply to a telegram can reasonably be expected. The station should be provided with a small tug or a 70 to 80 foot stanch, seagoing steam launch. The ever-recurring trouble of transportation of supplies would then be done away with. It could also be used to much advantage hauling vessels to and away from the wharves. Naphtha launches have not proved a success here. Long runs, the use of them for the transportation of freight, and possibly shallow water, may be cited as some of the causes of their frequent getting out of repairs.

I would recommend that this station be officially known as the Sapelo Quarantine Station; because it is already generally known by this name, and because it is so written on the consular bills of health. Locally the name South Atlantic quarantine Station is never used, and it appears only in official correspondence.

JAMES A. NYDEGGER,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

BRUNSWICK QUARANTINE, BRUNSWICK, GA.

Report of Sanitary Inspector R. E. L. BURFORD, *in command.*

BRUNSWICK QUARANTINE, *October 12, 1897.*

SIR: The following is a report of the transactions of the service at this station for the year ending June 30, 1897:

During the year 247 vessels were inspected, 95 of which were disinfected, and 152 given pratique at time of inspection; 310 vessels, coastwise, were spoken and passed.

Three vessels were remanded to South Atlantic Quarantine for disinfection, viz: Spanish bark *Triunfo*, from Havana, which had aboard a number of Cuban refugees; the American bark *Henry A. Litchfield*, from Colon, with several cases of suspicious fever, and the Spanish brig *Tuya*, from Havana, that had 1 case of smallpox aboard while in port of departure. Of the 95 vessels disinfected, 24 were from Havana, 10 from other Cuban ports, 14 from Rio, 8 from Santos, and 39 from other infected or suspected ports.

The following table gives the number of vessels disinfected and inspected and passed by months, their nationality, and ports of departure:

Months.	Vessels disinfected.																Inspected and passed.											Total number treated.
	Nationality.										Port of departure.						Nationality.											
	American.	Spanish.	Norwegian.	British.	Swedish.	German.	Portuguese.	Italian.	Brazilian.	Danish.	Havana.	Cuban ports other than Havana.	Rio.	Santos.	Other infected or suspected ports.	Total.	American.	Spanish.	Norwegian.	British.	Swedish.	German.	Portuguese.	Italian.	Danish.	Russian.	Total.	
July	...	5	2	4	..	..	..	..	1	..	2	.....	1	2	5	10	3	1	1	...	..	..	..	..	..	..	5	15
August	2	2	2	...	..	..	..	..	..	..	2	1	...	..	4	7	3	..	2	2	..	..	..	..	..	..	7	14
September	3	. .	2	...	..	..	..	..	..	..	...	.....	...	1	4	5	1	1	4	1	..	..	..	..	..	..	7	12
October	2	2	2	1	..	..	..	..	..	..	1	.....	2	..	4	7	1	..	2	8	..	1	..	..	..	..	12	19
November	2	6	1	...	..	..	..	..	..	..	4	2	1	1	1	9	12	..	6	4	..	..	..	..	..	2	24	33
December	...	1	1	...	..	..	1	..	..	..	1	.....	1	..	1	3	4	..	3	4	..	..	..	..	..	..	11	14
January	3	2	1	1	..	..	..	..	..	..	1	.....	...	1	5	7	4	..	1	3	1	..	..	..	..	..	9	16
February	...	6	1	2	..	..	..	1	..	..	5	1	2	1	1	10	11	..	1	5	1	..	..	1	..	2	21	31
March	1	...	2	1	..	..	..	..	..	..	...	.....	. .	..	4	4	3	1	4	3	..	..	1	..	1	1	14	18
April	...	3	4	2	1	..	..	..	..	..	3	.....	2	1	5	11	6	..	5	6	..	..	..	..	..	1	18	29
May	5	3	1	3	..	..	1	..	..	..	3	4	3	..	3	13	2	1	4	...	3	..	..	..	..	..	10	23
June	2	4	...	...	1	1	..	..	..	1	2	2	2	1	2	9	2	..	1	5	2	..	..	3	..	1	14	23
Total	20	34	19	14	2	1	2	1	1	1	24	10	14	8	39	95	52	4	34	41	7	1	1	4	1	7	152	247

During the summer months, or from May 1 to November 1, 51 vessels were disinfected in accordance with regulations prescribed for vessels infected of yellow fever, each being detained five days afterwards. The remaining 44 vessels of the number disinfected arrived after October 31 and prior to May 1; had ballast discharged at station and hold and dunnage wood washed with solution of bichloride of mercury before pratique was given for entry.

The following additions were made during the fiscal year: A small frame building of two rooms, hall, and piazza, designed for emergency hospital; cost, $217.98. One hundred and fifty feet of ballast trestle, $243.00; 4 steel ballast tubs, $121. Twelve fumigating pots were purchased for use in compartments above deck of vessels fumigated. A new cooking stove was furnished at a cost of $17.45, and $43.75 was expended in furniture for surgeon's quarters. Paints and oils were purchased at a cost of $14, and the disinfecting building and attendant's quarters painted. One hundred and twelve dollars and seventy-one cents was expended in repairs to boilers and pumps.

The storm of September 29, 1896, caused the loss of 1 ballast wharf, 1 eight-horse power hoisting engine, 2 ballast cars, 2 ballast tubs, and gutters to disinfecting building. The surgeon's quarters were blown down and most of the furniture demolished. Appropriation was made for replacing the wharf, engine, and cars. No provision was made for rebuilding surgeon's quarters. An appropriation has been asked for to erect permanent and suitable buildings. The officer in charge occupies at present the small hospital building.

Repairs made by attendants of the station.—From the material obtained from wreck of surgeon's quarters the attendants have built a substantial frame house of two rooms, weatherboarded and ceiled. New shingles were purchased, at a cost of $16,

to cover same. One room is used for storing provisions; the other is occupied by one of the attendants. After destruction of ballast wharf by storm the attendants built 150 feet of ballast trestle, 7 feet in height, connecting with remaining ballast wharf. This was necessary for accommodation of vessels discharging ballast. Two new flag poles, one for displaying quarantine and the other for national flag, have been made by the attendants without cost to the service except for halyards. Minor repairs have been made by attendants to machinery, buildings, and wharves.

From May 1 to November 1, 3 male attendants are employed, and 1 female, who does the cooking and washing. From November to May, 2 male attendants and 1 female are employed. One more attendant is needed during the summer months. One man is required for each ballast engine when in operation, and this leaves only one man to do the work of disinfection. The attendants are all immunes.

R. E. L. BURFORD,
Sanitary Inspector, M. H. S.

SURGEON-GENERAL MARINE HOSPITAL SERVICE.

TORTUGAS (UNITED STATES) QUARANTINE; POST-OFFICE ADDRESS VIA KEY WEST, FLA.

Report of P. A. Surg. L. L. WILLIAMS, *in command.*

TORTUGAS QUARANTINE, *October 20, 1897.*

SIR: In compliance with Bureau telegram of the 11th instant I have the honor to submit the following report of the operations of the service at this station during the fiscal year ending June 30, 1897:

Sixty-three vessels were boarded during the year. Of these 12 were inspected and passed and 51 disinfected and held for observation. The vessels subjected to disinfection included 17 steamers, 5 barks, 2 barkentines, 1 brigantine, and 26 schooners, a total tonnage of 55,661. One case of yellow fever, terminating fatally, was treated during the year; 9 cases of other diseases were treated in hospital and relief was given to 21 out-patients.

Disinfecting machinery.—The steam chamber is in poor condition, the lead joint being worn out and the top plates of jacket and bottom plates of inner chamber very thin. With a new head joint the chamber may last for a long time, but there would be constant risk of a breakdown—an awkward accident during the active quarantine season. The repair of the plates would be costly, owing to the remoteness of the station from business centers, and would require that the chamber be dismantled for a considerable period. For these reasons I would recommend a new chamber for the station. The boiler requires minor repairs only. During the year new galvanized iron sulphur pipes have been purchased. The new piping extends along the entire front of the wharf and has three outlets available for delivering gas through either galvanized iron pipes or rubber hose.

Wharf.—The wharf is in good condition, but is too short, and the recommendation contained in my last report, that the shoal at the north end be dredged and the wharf extended, is respectfully renewed. Five thousand feet of lumber and 10,000 shingles have been purchased and used in constructing an extension of the wharf shed, a greatly needed improvement.

Quarters.—The officers and attendants' quarters have been painted throughout. The iron stairways, including those in unoccupied portions of the building, have been chipped and treated with coal tar. The cistern under the officers' quarters has been cemented. All the cisterns necessary to supply the station are now in good order and the water supply is abundant.

Bird Key Hospital.—This building has been equipped with the necessary furniture and utensils. The roof leaks badly, and will be reshingled as soon as practicable. An annex strongly built upon piles is greatly needed, as the hospital is too small.

The new building should be used as quarters for the medical officers and nurses, and would serve as a refuge for all the inmates during a hurricane. A small landing pier, available for the naphtha launch at low water, has been constructed at Bird Key by the station force, material on hand being utilized. This pier is connected with the hospital by a board walk.

Floating property.—The steamer *Charles Foster* received minor repairs at Key West at the beginning of the present season. A new propeller and shoe have been purchased, but have not yet been put in position, because the *Foster* has been constantly in use and could not be spared. At the close of the active season the shoe and propeller should be put on. The boiler requires new tubes, and all the machinery a thorough overhauling. The metal on hull below the water line is in bad condition and should be renewed. The vessel leaks, and some of her timbers have probably been attacked by worms, owing to defects in the copper. The thorough repair of the *Foster* during the coming winter is earnestly recommended. The work of the station is steadily increasing, the services of a tug are indispensable, and a breakdown during the quarantine season would be very unfortunate. The schooner *Montross*, used as a ballast lighter, requires no repairs at present. The naphtha launch *Mary Lee* is in good condition, her engine having been repaired by the makers during the past winter. The small boats belonging to the station are all in good order.

L. L. WILLIAMS,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

GULF QUARANTINE STATION, SHIP ISLAND; POST-OFFICE ADDRESS, VIA BILOXI, MISS.

Report of P. A. Surg. A. C. SMITH, *in command.*

GULF QUARANTINE STATION, *October 18, 1897.*

SIR: As directed in Bureau telegram of October 11, 1897, I have the honor to report upon the transactions of the service at this quarantine station for the fiscal year 1897.

The total number of vessels inspected was 214, classified as follows:

Flag or nationality.	No.	Flag or nationality.	No.
United States	70	Austrian	2
Norwegian	61	German	1
British	59	Dutch	1
Russian	9	Spanish	1
Swedish	4	Portuguese	1
Italian	4	Mexican	1

Classification as to ports of departure, by months.

Month.	(*a*) From foreign ports.	(*b*) From foreign ports in yellow-fever latitudes via domestic ports.	(*c*) From domestic ports.
July	22	5	3
August	15	.....	.....
September	8	.....	.....
October	14	.....	.....
November	12	.....	.....
December	9	.....	.....
January	21	.....	.....
February	9	.....	1
March	24	.....	.....
April	17	.....	.....
May	36	1	1
June	16	.....	.....

Countries or regions from which vessels came.

Country, etc.	No.	Country, etc.	No.
Great Britain	27	Mexico	35
France	2	Central America	2
Germany	1	Domestic ports	5
Holland	1	South America, outside of Brazil	19
Norway and Sweden	2	Brazil	36
Italy	2	West Indies, outside of Cuba	26
South Africa	20	Cuba:	
Cape Verde Islands	1	(*a*) Havana	20
Canary Islands	3	(*b*) Other ports	12

Destination of vessels.

Mississippi ports	202
Mobile	10
Apalachicola	1
Havre, France (in distress)	1

Cargo.

Lumber	4
Ballast alone	142
None	68

Kind of ballast.

Water	32
Stone	31
Clean sand	23
Rubbish and various materials	56

History as to health.

Infectious disease aboard on arrival	1
Infectious disease arising in quarantine	0
Infectious disease reported in course of voyage	7
Clean history reported	206

Treatment of vessels, by months.

Month.	Passed without disinfection.	Disinfected and held.	Month.	Passed without disinfection.	Disinfected and held.
July	9	21	January	21	.....
August	4	11	February	10	.....
September	2	6	March	24	.....
October	2	12	April	16	1
November	12	.....	May	18	20
December	9	.....	June	7	9

Only one case of quarantinable disease was received at the station during the year. This was a case of yellow fever on board a small vessel seven days out from Havana. The remainder of the medical and surgical work consisted in the treatment of such ordinary cases requiring relief as existed or occurred on vessels in quarantine. A certain number of these occur every season, making it necessary to have hospital accommodations for noninfectious as well as infectious diseases. The whole number of hospital patients was 26, and of out patients 38. The ailments among the quarantine attendants were few and slight, showing the station to be a very healthy place.

The quarantine steamer *William H. Welch* was laid up, November 12, in Crooked Bayou, near Mosspoint, Miss. Later she was repaired and put in order for the next season, and was put in commission again May 1. The disinfecting barge *Zamora* was kept at the station until a new house could be built over a part of the deck for the protection of the machinery, and was sent to Mosspoint January 22, where repairs were also done to her. The work of repair done to the *Welch* and *Zamora* was not very satisfactory, and a great deal of trouble was had with it after they were placed in commission.

A feature of the history of the station during the year was the attack made upon it by the Mississippi State board of health, in an effort to supplant it with a system of State quarantine. The events in this affair were quite fully reported by me from time to time, and I will not dwell upon them here.

Some improvements and additions were made to the station in course of the year. Besides the ordinary repairs to the disinfecting machinery, a new deck house was built on the *Zamora*, under a special appropriation. A telephone line was built across the lagoon and between the buildings, also under special appropriation. This line connects the surgeon's quarters, hospital, and executive building with a telephone in each, and it has proved a great convenience. Two new chimneys, with four grates, were built to the executive building. These were greatly needed, and have added much to the comfort of the building in winter. The surgeon's quarters and the executive building were painted by the labor of the quarantine attendants. An old ballast lighter became unserviceable, and a new and very strong one was built, under contract, to replace it. A small sailboat and a skiff were built at the station.

For the better marking of the limits of the quarantine reservation and anchorages, two signboards, marked "U. S. Quarantine," were erected on the island, at about the north and south limits, and four quarantine buoys were bought through the Light-House Establishment and placed on the limits of the infected anchorage. The transfer barge was also marked with an iron quarantine flag.

The expenses of the station for the year were as follows:

General expenses and repairs	$16,663.72
Under special appropriation:	
House on *Zamora*	91.01
Telephone line	99.58
Total	16,854.31

* * * * * * *

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.
SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

SAN DIEGO QUARANTINE.

Report of Acting Asst. Surg. W. W. MCKAY, *in command.*

NATIONAL QUARANTINE STATION,
San Diego, Cal., October 11, 1897.

SIR: I have the honor to forward hereby the report of the transactions of this station for the past fiscal year.

The number of vessels inspected and passed was 138. Vessels disinfected, none. The ports of departure of the vessels inspected were as follows: Ensenada, Mexico; Newcastle, New South Wales; London, England; Honolulu, Hawaiian Islands; Swansea, Wales; Melbourne, Australia; Cardiff; the islands off the Mexican coast and in the Gulf of California; Guaymas, Mexico; Acapulco, Mexico; Sydney, Australia, and San Benito, Mexico.

The repairs and improvements made at the station during the past fiscal year have been as follows:

A cistern, equipped with a good force pump, has been constructed near the center of the quarantine grounds, and about equidistant from the buildings, so as to be available in case of fire at a time when the pressure in the water mains might prove to be deficient. The force pump is constructed entirely of brass, so as to resist the action of the damp salt air. The cost of the cistern and pump complete was $347.50. There has been provided 300 feet of 6-inch woven linen hose, thoroughly paraffined, for use in conveying the sulphur fumes to a ship's hold; also, 300 feet of 2-inch "mineralized rubber hose," for use with the bichloride solution. This rubber hose is in 50-foot sections, is supplied with brass couplings, and is carefully sealed at the ends in order to prevent the action of the acid bichloride of mercury solution on the materials of which the hose is constructed. The total cost of the sulphur and bichloride hose was $375. A flat-bottom boat was built for the use of the station, by the employees, at a total cost for material of $10. The flagstaff was repainted at a cost of $10. The cement work about the base of the flagstaff and about the wooden parts of the marine ways was renewed, at a total cost for material of $10. Repairs to downspouts of buildings, $5; kitchen pumps, $2.50; naphtha launch engine, $96.51; water tanks and for new ball faucets, $10; boathouse landing, for material, 50 cents; repairing and repainting boats and launch, for materials, $15.62; for fire underwriters' fire extinguishers, to be conveniently placed in the different buildings, $70; total, $952.63.

Improvements, alterations, and additions recommended for the ensuing fiscal year which are necessary for the completion, equipment, and efficient administration of the station have already been enumerated in my letter of date August 10, 1897. They are as follows:

A new engine for the quarantine launch.—A more powerful, quicker, and more reliable engine is needed for the quarantine launch. The present engine is not suitable for work in rough weather. It is about worn out and has become very unreliable. It is now disabled and undergoing repairs. The disadvantages under which we frequently find ourselves from failure of this engine at critical times are fully set forth in my letter of date November 28, 1896. Conditions are such at this station that all large vessels have to be boarded outside the harbor or just at the very entrance, where the tides are very swift and where there is a great amount of floating kelp and seaweed, which frequently fouls the propeller of the launch, causing the pressure in this engine to run down rapidly or the packing to be blown out, which renders the boat helpless. What is needed is a strong, reliable engine under all conditions and in all sorts of weather, one in which full power is immediately available after stoppage or at all times, such as is found in the steam engine or the Hercules gas engine, the latter being in extensive use on this coast, very economical, and as powerful as steam. The steam engine, however, would be more economical here than the naphtha engine in present use, because only the best grades of naphtha will do for these engines and 76-per-cent naphtha comes high on this coast, and a steam engineer is necessarily kept employed at the quarantine stations on account of the steam disinfecting machinery. The advantages claimed over steam by persons using the gas engines most extensively in launches on this coast are economy, more power for the space occupied, always ready without keeping the fires banked, so that when a vessel is sighted the launch may be gotten under way in two or three minutes' time by simply turning on the electrical current from the storage battery, which is kept charged from a small dynamo which runs when the launch engine is in motion. There are a number of such launches in use in this harbor. Some of them have been in constant daily use for years and the engines are apparently as good as ever. Some of these same launches have towed us out of a close place at times when our engine has failed us. The cost of a new engine, either improved Hercules gas engine or a compound condensing steam

engine, together with the necessary cost of stiffening and strengthening the hull of the launch and the changes in the cabin necessary to receive it, would be about $1,600.

A portable forge, blacksmith tools, etc.—A portable forge with drills, stocks, press, anvil, blacksmith's tools, pipe, tongs, dies, and cutters should be provided, in order that the station might be enabled to make its own repairs on ironwork and steam and water pipes. The cost of the outfit would be about $125.

Canvas stretchers.—A couple of canvas stretchers should be provided. They can be made by the carpenter. The cost for material would be about $8.

Additional fire apparatus.—Two more underwriters' fire extinguishers and 250 feet of 1½-inch rubber fire hose should be provided, as the old rubber-lined cotton hose is so badly deteriorated as to be unfit for use. (See my letter of date April 8, 1897, together with special requisition of same date.) The cost as per proposal forwarded at that time would be $165.50.

Gasoline torch for removing old paint.—A gasoline torch is needed to be used in the removal of old paint from the quarantine vessels preparatory to repainting. The cost would be $6.

Laundry stove.—A laundry stove is needed for boiling the clothing in the laundry and for ironing purposes. (See recommendation of Surg. John Godfrey in his inspection report.) The cost would be $25.

Extension of water service about grounds.—About 600 feet of water pipe, with fittings, is needed to enable the employees of the station to extend the water service to different portions of the quarantine grounds, so that trees and grass may be grown in order to prevent as far as possible the shifting sand and dust from being blown into and through the buildings. Nine months of the year here are practically months of drought, not a drop of rain falling during the whole time, the landscape being one of desert sameness and desolation, but almost every variety of semitropical tree and shrub can be grown with irrigation. The dreary, uninviting appearance of the grounds could be greatly relieved in this way. The water rental would not be materially increased, as an acreage rate of 6 cents per 1,000 gallons can be obtained where 2 acres or more are irrigated. The cost of the pipe and fittings would be about $40.

Connection of the water service with reservoir.—In view of the fact that the water pressure in the mains at the station is frequently insufficient for protection in case of fire, I would recommend that the service pipes of the station be connected directly with the large reservoir on the hill just back of the station which has recently been completed by the water company. By this means a good fire pressure could always be maintained. (See recommendation of inspector, Annual Report, 1896, p. 905.) The cost of the connection, which is over a distance of about 2,500 feet, would be $850.

Lamp-posts for lighting the quarantine grounds.—Two lamp-posts with suitable lamps should be provided for lighting the darkest portion of the quarantine grounds, as the board walks are narrow and in places from 6 to 18 inches above ground. Several accidents have occurred to the persons about the station by accidentally stepping off of these walks in the dark. The cost of the posts and good lamps that could not be blown out by the wind would be $15.

Horse, wagon, and harness.—A good, strong horse, a one-horse wagon, and a good, strong, single harness should be provided for use of the station. The one in present use is owned by the quarantine officer. The horse is too small and old, the harness and rig too light, for the work for which they are needed, such as hauling tools and materials for the repair of the telephone lines belonging to the station and for hauling supplies from the town when the launch is disabled or being repaired or painted. A suitable outfit of this character can be purchased for $175.

Material for repairing and repainting the boats.—The usual quantity of paint material for this purpose will be necessary; also about 45 feet of new canvas to

replace the rotten and worn-out storm curtains on the quarantine launch. Canvas will also be needed to cover the worn-out cushions in the whitehall boat. Total cost of material, $40.

Formaldehyde generator.—A formaldehyde generator would add greatly to the efficiency of the disinfecting apparatus of the station. Also a couple of formaldehyde lamps, to be used in the smaller rooms and spaces aboard vessels. These articles, of sufficient capacity, could be purchased at a cost of about $60.

Lumber and materials for tent floors, etc., and canvas tents.—Pending the completion of detention barracks, there ought to be supplied and kept on hand at least 10 additional canvas tents. About 300 feet of pine flooring, for constructing flooring for the tents, should be provided. There ought also to be about 1,000 feet of rough pine lumber kept on hand for use about the station and in case it should become necessary to establish a small detention camp. The cost of the tents and lumber would be about $320.

Soldering outfit.—A soldering furnace, irons, and a supply of solder should be provided for use of the station, as they are continually needed in making repairs to the cooking utensils. Heretofore we have depended upon borrowing the soldering outfit belonging to the harbor light keeper, whose storehouse is near the quarantine grounds. The cost of a suitable soldering outfit would be $12.50.

An estimate for the completion of the station buildings, such as detention barracks, extension of wharf and warehouse, together with facilities for bathing steerage and cabin passengers, the crews of infected vessels, and for providing bathing facilities for the employees of the station, were all fully set forth in my estimate of last year, complete data of which will be found on pages 543 to 546, Annual Report for 1896. These estimates were approved by the honorable Secretary of the Treasury, in amount $12,000, but the amount was not allowed by the Fifty-fourth Congress, so that the station is still without facilities for properly handling the crew or passengers of an infected vessel, and there is no place provided where infected passengers and crews, or where the employees of the station, may be given a bath. Accordingly the amount of $12,000, as recommended for this purpose, is herewith reinserted, making a total of $15,442 needed for the completion and equipment of the station. These estimates are based on careful figuring, and as the amount ($12,000) as recommended by the honorable Secretary of the Treasury was cut down to that sum from my estimate of $15,235 (see Annual Report, 1896, p. 546), it is extremely doubtful if lower figures could be obtained by actual competitive proposals for supplying the labor, materials, etc.

The necessity for the completion and equipment of this quarantine station has been fully demonstrated the past two seasons by events showing the gradual extension and increase of the infected condition of the lower coast ports; they have also verified the assertions made (see Annual Report 1895, p. 296) with regard to the existence and spread of yellow fever on the Pacific coast of Mexico and Central and South America. Most of the steamers plying between Panama and San Francisco and way ports in Mexico and Central America have had from 1 to 3 deaths occur aboard of them during the past summer from yellow fever, one of them, the *City of Para*, losing her captain from this disease. These steamers have only recently stopped entering this port, and the stoppage is but temporary; they usually pass, however, very near this point in order to be spoken and reported by telegraph to the home port in San Francisco, and are liable at any time when under stress of severe and fatal sickness aboard to put in here for relief, as I have been informed by one of the pilots who was on duty at the time, that one of them, the *San Juan*, it was thought, did start in, heading in almost as far as the entrance of the harbor, but afterwards turning out and continuing on her course to San Francisco. That night the passenger that was then ill aboard of her died, and the autopsy at Angel Island, California, held two days afterwards, revealed the existence of yellow fever. Had the steamer come into this port, as was apparently the intention, the situation

would have been an awkward one—with a large infected steamer to handle and a hundred and twenty-five or fifty persons to be placed under observation, with no facilities for detaining them or for bathing infected persons; while, on the other hand, a thoroughly equipped station at this point might often help to prevent an overcrowding of infected vessels from the South, in times of epidemics, of the Angel Island Quarantine, at San Francisco, Cal., as with the awakening of China and Japan and their rapidly opening up to commercial relations with the Pacific coast will, in the very near future, make that station one of the busiest and most important in the United States.

This being the first quarantine station available to steamers coming from the South and being located in the extreme southwest corner of Uncle Sam's domain, easy of access and in the direct line of travel of all these lower-coast steamers, it is plain to be seen how helpful it might prove to be to an overcrowded and overworked station at the busy port of San Francisco, especially during the occurrence of epidemics, both in the Orient and in the Pacific coast ports of the South at the same time, which in view of the conditions at present existent in these places is not an improbable event in the near future. The Medical Record of date August 21, 1897, page 274, says: "Dr. T. M. Calnek, of San José, Costa Rica, member of the international executive commission of the Pan-American Medical Congress, in a recent communication to the secretary, Dr. Chas. H. Reed, of Cincinnati, states that it is the intention of the Government of that country to establish a fully equipped quarantine station with all necessary disinfecting appliances. The necessity for this course is found in the infected condition of practically all the tropical ports of the Pacific."

W. W. McKay,
Acting Assistant Surgeon, M. H. S.

Surgeon-General Marine-Hospital Service.

San Francisco Quarantine, Angel Island, California. Telegraphic Address, via Tiburon, Cal.

Report of P. A. Surg. M. J. Rosenau, *in command*.

National Quarantine Station,
Angel Island, California, October 16, 1897.

Sir: Complying with instructions, I have the honor to submit the following report of transactions at this station for the fiscal year ending June 30, 1897:

During this fiscal year vessels were disinfected at this station on account of yellow fever, plague, cholera, and smallpox.

All the Chinese and Japanese steerage passengers arriving at this port were bathed and their body clothing and baggage disinfected. This was done as a matter of precaution.

Beginning with the steamship *Colon* on May 25, every vessel from Panama and Central American ports was disinfected on account of yellow fever prevailing in that locality. Most of this work will, however, appear in the transactions of the next fiscal year.

In all, 8 vessels were disinfected; 5,540 persons were treated in quarantine; 11,765 pieces of baggage were opened, assorted, and disinfected; 1,459 bags of mail were disinfected; several hundred persons were vaccinated, and large quantities of bedding and other material were disinfected. Two cases of smallpox were treated; both recovered.

The following is a table showing more in detail the vessels, passengers, and crews treated in quarantine:

Vessels and passengers quarantined during the fiscal year 1896–97, Angel Island, California.

Date.	Vessel.	Cabin passengers.	Steerage passengers.			Crew.	Pieces of baggage disinfected.	Bags of mail disinfected.	Remarks.
			Chinese.	Japanese.	European.				
1896.									
July 5	U. S. S. Peking	....	59	....	....	....	101	.....	
12	British S. S. Doric	....	89	....	3	....	223	.....	
19	British S. S. China	....	228	44	....	....	675	.....	Detained fourteen days on account of 1 case of varioloid.
30	British S. S. Belgic	....	48	17	....	....	157	.....	
Aug. 9	U. S. S. City of Peru	....	28	....	....	....	61	.....	
13	British S. S. Coptic	....	182	22	....	....	600	.....	
27	U. S. S. Rio de Janeiro	....	43	10	....	....	116	.....	
Sept 10	U. S. S. Peking	....	218	31	....	....	534	.....	
22	British S. S. Doric	....	77	....	....	....	190	.....	
30	British S. S. China	....	109	16	....	....	410	.....	
Oct. 7	British S. S. Belgic	....	137	8	....	....	267	.....	
19	U. S. S. City of Peru	....	36	8	....	....	102	.....	
Dec. 10	British S. S. China	....	.....	19	....	....	.....	.....	
11	U. S. S. City of Puebla	....	.....	4	....	....	.....	.....	
22	British S. S. Belgic	....	88	9	....	....	298	.....	
26	U. S. S. City of Puebla	....	.....	18	....	....	25	.....	
28	U. S. S. City of Peru	....	56	8	....	....	140	115	
1897.									
Jan. 7	U. S. S. Mexico	....	.....	12	....	....	25	.....	
8	British S. S. Coptic	....	102	6	....	....	284	110	
10	U. S. S. City of Puebla	....	.....	2	....	....	.....	.....	
15	U. S. S. Walla Walla	....	.....	1	....	....	2	.....	
19	U. S. S. Rio de Janeiro	....	46	7	....	....	154	97	
20	U. S. S. Umatilla	....	.....	16	....	....	30	.....	
23	British S. S. Gaelic	....	139	7	3	....	419	103	
Feb. 5	U. S. S. Peking	....	5	13	....	....	146	148	
13	British S. S. Doric	....	51	4	....	....	177	90	
19	British S. S. China (1)	32	49	19	....	165	145	113	Disinfected and held on account of 1 case of variola.
Mar. 3	U. S. S. Walla Walla	....	.....	19	....	....	30	.....	
4	U. S. ship Eclipse (1)	18	.....	....	....	....	50	.....	Disinfected on account of a case of smallpox, disembarked at Yokohama.
6	British S. S. China	112	47	19	....	....	145	.....	
17	U. S. S. City of Peru	....	23	25	....	....	95	100	
20	U. S. barkentine Willie D. Hume (1).	12	.....	....	....	....	26	.....	Disinfected and held for observation—8 of the crew sick with bubonic swelling.
20	British S. S. Coptic	....	80	55	3	....	304	145	
20	British ship Clan Macfarlane (1).	26	.....	....	....	....	41	.....	Disinfected on account of 5 cases and 1 death from diarrheal disease, probably cholera.
31	U. S. S. Rio de Janeiro	....	38	4	2	....	105	.....	
Apr. 1	U. S. S. Walla Walla	....	.....	3	....	....	15	.....	
11	British S. S. Gaelic	....	183	78	1	....	620	93	
12	U. S. S. Queen	....	.....	41	....	....	48	.....	
18	U. S. S. Peking	....	171	42	....	....	416	120	
22	U. S. S. Umatilla	....	.....	45	....	....	65	.....	
29	British S. S. Doric	....	227	45	....	....	589	77	
May 7	U. S. S. Umatilla	....	.....	51	....	....	70	.....	
10	British S. S. China	....	577	40	4	7	1,500	.....	
12	U. S. S. City of Puebla	....	.....	21	....	....	23	.....	
21	British S. S. Belgic (1)	....	195	25	6	....	443	120	Disinfected on account of a case of smallpox, disembarked at Kobe.
25	U. str. Colon (1)	23	15	....	25	83	108	18	Disinfected on account of three deaths from yellow fever.
30	British ship Matterhorn (1)	....	.....	....	....	22	.....	.....	Disinfected on account of a case of smallpox on board.

(1) Disinfected.

Vessels and passengers quarantined during the fiscal year 1896–97, etc.—Continued.

Date.	Vessel.	Cabin passengers.	Steerage passengers.			Crew.	Pieces of baggage disinfected.	Bags of mail disinfected.	Remarks.
			Chinese.	Japanese.	European.				
1896.									
May 31	U. S. S. City of Peru	....	109	32	6	....	285	.....	
June 6	British S. S. Coptic	....	211	2	1	....	555	.....	
13	U. S. S. City of Para (1)	11	.....	....	11	93	189	10	Disinfected and held on account of 2 deaths and 1 case of yellow fever.
17	U. S. S. Rio de Janeiro	....	120	38	....	....	308	.....	
27	British S. S. Gaelic	....	199	....	....	....	454	.....	
	Total	234	3,985	886	65	370	11,765	1,459	

[1] Disinfected.

Aid to immigration service.—Complying with directions contained in your telegram of May 11, 1897, the officers on duty at this station assumed the duties of the medical inspection of immigrants on that day. Between May 11 and June 30 282 immigrants were inspected from ports other than Canadian and 27 from Canada. There were no rejections.

On account of the comparatively few steerage passengers, technically known as immigrants, arriving at this port, this inspection is very little additional work for the quarantine officer. It has lifted a tedious load from the junior officers on duty at the Marine Hospital, San Francisco, who sometimes had to make the long trip to the water front just to examine one or two immigrants. It has further relieved the steamship companies of the annoyance of multiple inspections and inspectors.

Aid to sick and disabled American seamen.—The *Sternberg* has on several occasions acted as an ambulance boat for our hospital in the city, bringing sick and disabled seamen ashore from American vessels. We have also towed a bark off the rocks, rescued the crew and passengers from a wrecked steamboat, and in other ways have rendered emergency aid to shipping in the bay.

Our relations to the local board of health has been one of opposition on their part to the establishment of the bay inspection service. This attitude was much to be regretted, because it prevented that entente cordiale essential for cooperation. The local quarantine officer insisted that the superior authority in all matters relative to the quarantine of this port was vested in his office.

This attitude raised a conflict of authority and caused a division of responsibility that was only finally settled when the President, by virtue of the power given him by section 3 of the act of February 15, 1893, granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service, detailed me on May 20, 1897, for duty "as quarantine officer at the port of San Francisco, Cal., to enforce the rules and regulations which have been, or may hereafter be promulgated by the Treasury Department under the authority of said act."

Uniformity of quarantine restrictions on the Pacific coast.—It was arranged through the bureau that in essential features the work at this station and at the Port Townsend quarantine should be uniform. This most desirable action was brought about by complaints of discrimination by the rival steamship companies. This station and the station at Port Townsend will hereafter keep each other informed of any important changes of quarantine procedure.

Additions and improvements.—The important additions, improvements, and repairs during the fiscal year are as follows:

Tools for steamer *Geo. M. Sternberg*	$20.48
Lights, anchor, compass, etc., for *Bacillus*	70.07
Fitting out *Omaha* with disinfecting machinery, etc	2,429.40
Repairs to wharf, 92 creosoted piles	3,100.00
Paints and oils	188.83
Water-closets, bath tubs, etc., surgeons and steward's quarters	146.00
Pipe and lumber for extending salt-water inlet	14.50
Vaccum apparatus for disinfecting chambers	395.00
Carpenters and engineers' tools	219.62
Hose carts	38.00
Kitchen utensils	32.30
Water pipe and connections to complete cistern	42.00
Bath house	5,000.00
Formaldehyd disinfecting attachment to the steam chambers	200.00
18 street lamps and posts	162.00
Shirt, collar, and cuff ironer	142.00
Steel range and fittings for attendants' kitchen	103.45
24 bathing robes	78.00
Repairs to steamer *Geo. M. Sternberg*	139.19
Repairs to launch *Bacillus*	37.15
Total	12,557.99

The repairs and improvements authorized since the first of this fiscal year and now under way or completed are:

Lamps and lanterns	$99.75
Furnishings for bath house	348.00
Bath tub, washstand, etc., attendants' quarters	70.58
Beds, mattresses, pillows	890.00
Painters	120.00
Artesian wells	288.00
Extending vacuum apparatus	188.00
Worthington steam pump	99.69
Engineer's tools	243.05
Lumber	109.00
Total	2,456.07

Changes.—One of the Chinese barracks buildings has been moved several hundred yards from its old position and placed on underpinning. The attendants have been given quarters in a wing of the new bath house, and the surgeons' quarters have been moved to the building formerly occupied by the attendants. This building was first renovated and newly painted inside and outside. The building vacated as surgeons' quarters is being fitted out for cabin passengers. These changes have the advantage of housing the attendants nearer their work, of giving the medical offices a more central and commanding location, and of furnishing accommodations for about 25 more cabin passengers.

The new bath house has been built at a total cost of $5,000. The building consists of the bath house proper and two wings. The bath house proper contains 18 rain baths and 18 dressing rooms. The baths are supplied with hot and cold water, and have for flooring a removable grating, under which is a galvanized iron trough. The wings of the building contain the waiting rooms, and wash rooms, and water-closets, also the quarters for the attendants and a few private rooms. The building is of wood and rests on brick piers. It is 140 feet long. The main wing is two stories, and contains the attendants' kitchen and dining room, storeroom, linen

closets, and lavatories. The waiting rooms are furnished with a cork carpet, oak tables, chairs, shades, mirrors, lamps, etc., and contain each open fire places, making them cozy and comfortable. The bath house proper is finished in white, with nickle-plated fittings. It has abundant light and ventilation and steam heat.

Accommodations for cabin passengers.—The hospital for noncontagious diseases has been fitted out with white enameled iron bedsteads, silk floss mattresses, and new bedding, with chairs, tables, looking glasses, lamps, etc., and can accommodate 30 passengers. The "white house" and the building formerly occupied by the medical officer has been similarly furnished, and together can accommodate 40 more, a total of 70, without crowding.

The *Omaha* has been moored off San Quentin, in the northern portion of the bay, about 4 miles from the station. The old hulk has been fitted up with sulphur furnace and fan, with tanks and pumps for bichloride solution, with a still and condenser to supply fresh water, and with all necessary piping, fenders, etc. Thus fitted out she is a floating wharf to which vessels may tie up in order to be disinfected. In this manner we have successfully disinfected 18 vessels, most of them large passenger liners.

The wharf has been strengthened with 78 standard creosoted piles and 16 fender piles sheathed with yellow metal, at a cost of $3,100.

The disinfecting machinery has been overhauled and given several important improvements. The vacuum apparatus consists of an ejector and 6-inch iron pipe, and will produce 15 inches of vacuum in a few minutes with 80 pounds of steam. The copper and iron cylinders for evolving formaldehyd gas and ammonia from solutions have been valuable additions to our method of disinfection. These cylinders are attached to the steam disinfecting chambers, and this method has almost entirely replaced the old process of sulphur fumigation for the trunks, containers, and articles ruined by steam.

The boats.—Only minor repairs have been made to the *Geo. M. Sternberg* and the steam launch *Bacillus*. All the small boats have been overhauled and painted.

The interior of the lazaretto has been painted, so that the walls may now be flushed, scrubbed, or disinfected. The attendants' quarters have been furnished with a porcelain-lined bath tub and marble washstand. Two artesian wells have been sunk. The grounds have been lighted with 18 street lamps, and additional shade trees and flower gardens have been set out.

Practical fire drill was necessitated several times, in order to extinguish fires accidentally started in the dry grass. On two occasions the buildings were saved from destruction only after exhausting efforts. These fires emphasize the need of better fire protection.

Needs of the station.

Additions and improvements to water supply	$5,000.00
Tank and pipe for bichloride solution	500.00
Coal shed	500.00
Portable formaldehyde disinfectors	1,000.00
Cars and galvanized iron hoods for disinfector	3,000.00
Steam disinfector, shower baths, etc., on *Omaha*	2,000.00
Telephone to mainland	2,000.00
Ceiling old bath house and Chinese kitchen	200.00
Paints and oils and painters	500.00
200 jean suits	200.00
Concrete walk	1,500.00
Crematory	2,500.00
Sea wall	3,000.00
New boarding boat	30,000.00
Grading	500.00
Larger boilers for disinfectors	1,000.00
Total	53,400.00

Water.—There is not sufficient fresh water to tide over the dry season. The wells sunk in the ravine a short while ago demonstrate that there is plenty of water at no great depth. A large well should be sunk to bed rock, about 70 feet. This well should be at least 4 feet in diameter and cased with perforated galvanized iron. A windmill, deep-well pump, and accessory steam pump and pump house should be erected over the well and the delivery pipe connected to the present system. The salt-water tanks should be raised so as to give sufficient pressure in case of fire. The pipe from these tanks should be extended to all the buildings.

A tank and pipe for bichloride solutions.—At present there is no means of using bichloride solutions except by the slow and clumsy method of making the solution in tubs and buckets. A redwood tank should be placed on the hillside for this special purpose, connected with the fresh and salt water systems, and a delivery line of pipe led to the dock.

Portable formaldehyde disinfectors, which evolve the gas from solutions and force it through pipe, are needed in disinfecting the cabins, the surgery, the chart room, the wheelhouse, etc., on board vessels, and could also be used for many purposes at the station. The lamps which generate the formaldehyde gas from methyl spirits can not be relied upon.

Electrical thermometers and annunciators for the steam disinfecting chambers are needed to make the process more accurate and to save much labor, as well as the wear and tear of climbing about the chambers to read the thermometers.

Cars and trucks and galvanized-iron hoods should be furnished for two of the disinfecting chambers. Their necessity has been emphasized before.

The boiler for the steam disinfection is much too small for the purpose. It should be replaced by a larger one and this boiler used to replace the one in the pump house, which is worn and can not last another year.

A crematory is an essential feature of a modern quarantine station of this size and importance. A furnace for this purpose, using oil for fuel, may be had for $1,800. It could be placed under the lazaretto, or, better still, it should be inclosed in a suitable and independent structure.

The *Omaha* should be furnished with a steam disinfector of the Kinyoun-Francis pattern, and boiler, and 6 shower baths. Thus equipped, the boat would be a complete quarantine station in herself. The advantage of this in case of double quarantine is apparent.

A small steam disinfector on the *Omaha* would, in addition, be a great convenience and save much transporting of crews and their baggage to the station. In disinfecting steamers we tie the vessel up alongside the *Omaha*, and then transfer the crew, with their baggage, to the island for disinfection. While the crew is away the vessel is disinfected. However, masters will never, unders these circumstances, leave their vessel without 12 or 15 men to stand by for an emergency. This necessitates a second transferring of the 12 or 15 who remain behind. With a steam disinfector on the *Omaha* this emergency watch could be bathed and disinfected there, rendering the process more perfect and saving time and trouble.

In the case of sailing vessels the entire crew could be handled on the *Omaha*.

A telephone to the mainland is a necessity. The importance of a telephone in conducting the business of the station during quarantine needs only to be mentioned. Telephones connecting the office and surgeon's quarters with the various buildings on the reservation is also a desideratum. Telephonic communication with the lazaretto, in order to receive reports and issue orders, would save unnecessary communication and lessen the danger of spreading infection.

A coal shed is sorely needed to protect the coal, which is brought to the station in 100-ton lots and unloaded on the dock, where it is exposed to rain and weather. This causes a deterioration of the coal, and in addition to being unsightly causes much dirt and extra work.

Concrete walks should be laid about the reservation and the wagon road macadamized, ditched, and drained. In the rainy season the road becomes little less than a mire.

Grading.—Another landslide has occurred behind the building formerly occupied by the medical officer. The slope should be graded and slide removed.

Sea wall.—The reservation at the water's edge is gradually being eaten away by the action of the water. This is seriously endangering the road which runs between the water's edge and the base of the cliff. A suitable stone wall should be laid around the cove.

Ceiling.—The old bath house and the Chinese kitchen and the pump house should be ceiled with tongue and grooved redwood.

Painting.—Most of the buildings will need a coat of paint next year for their preservation and appearance. This may best be done by authorizing the purchase of paints and oils and the employment of painters.

The station has at present 200 jean suits used by the passengers after their bath, and while waiting for their own clothing to be disinfected. Two hundred more are needed.

Boarding boat.—The *Sternberg* was built for a fumigating tug, and has neither the model nor power to make a good boarding boat. She can only make about 6½ knots an hour, and is besides rather top heavy. A new boat to meet the needs of the Service and conform to the dignity of the Government will cost $35,000.

A steel wharf that may be built out into Raccoon Straits and that would allow vessels to come to the station is desirable, and may be built for $40,000.

M. J. ROSENAU,
Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL, MARINE-HOSPITAL SERVICE.

PORT TOWNSEND QUARANTINE: BOARDING STATION, PORT TOWNSEND, WASH.; DISINFECTING STATION AND HOSPITAL, DIAMOND POINT.

Report of P. A. Surg. W. J. STIMPSON, *in command.*

PORT TOWNSEND QUARANTINE, *October 13, 1897.*

SIR: I have the honor to make the following report upon the transactions at this quarantine station for the fiscal year ending June 30, 1897, as directed by your telegram of October 11, 1897.

Three hundred and seventy vessels were inspected; 11,271 sailors were inspected and 4,769 passengers—2,642 white, 1,850 Chinese, and 277 Japanese; 438 persons were detained in quarantine for observation; 15 vessels and 801 pieces of baggage were disinfected. Two patients were treated in the hospital for infectious diseases. They were Chinese passengers on the British steamship *Victoria*, and they were suffering from smallpox. Both patients recovered.

The additions, improvements, and repairs made during the fiscal year are as follows:

Fresh-water plant	$2,550.50
Mooring buoy	960.00
Clearing 16 acres of land	900.00
Repairs to wharf	280.00
Removal of *Iroquois*	150.00
Building telegraph line	135.00
Lumber, brick, shingles, etc	721.37
Pipe, fittings, etc., for bath house	330.40
Canvas for bunks in barracks	178.00
Paints, oils, etc	59.95
Repairs to launch	4.54
Total	6,229.76

A well 6 by 6 feet was dug on the hill about 100 yards north of the surgeon's residence. Water was obtained at a depth of 80 feet. This water is pumped from the well to the storage tanks in the tank house by a Gould steam pump. The pump has an 8-inch cylinder, 36-inch stroke, 3½-inch suction, 2½-inch discharge, and is fitted with a 3¾-inch combined well point and strainer. It raises 1.2 gallons of water at each stroke. This well furnishes a large quantity of excellent water. A 4-inch main carries the water from the tank house to the foot of the hill and distributes it to the wharf and the different buildings. The pump house is 30 by 16 by 11 feet. It is divided into three rooms, one for the boiler and pump, one for a workshop, and the third is used as a sleeping room by the engineer.

A mooring buoy was placed 130 fathoms off the face of the wharf. The buoy is 15 by 15 feet by 32 inches and is made out of cedar logs covered with 2-inch plank; over the plank is a layer of tar felting, and a board sheathing covers the felting. The buoy is held in place by 75 fathoms of 1½-inch new, first-quality stud chain attached to a 7,000-pound anchor. This buoy has been of inestimable value. It has been used by every ship coming to the station since it was planted.

Sixteen acres of land west of the buildings were cleared of trees and underbrush to protect the buildings from fire in case of forest fire. Trees greater than 22 inches in diameter were reserved to be used in the future for firewood, posts, etc.

The wharf has been strengthened by a number of brace and fender piles and two strong mooring dolphins, each composed of six large piles, were driven on each side of the wharf.

The *Iroquois* was moved from Port Townsend Bay to Discovery Bay and moored one-half mile from the wharf. She was used in April to quarantine 354 Chinese and Japanese passengers of the steamer *Victoria*.

A telegraph line was built from the line of the Puget Sound Telegraph Company at Eagle Creek to the station, a distance of 3 miles. One of the attendants at the station is an operator, and telegrams can now be sent between the station and Port Townsend and other points.

A warehouse 50 by 20 by 15 feet was built near the shore line, and the boats, tackle, and other movable things on the *Iroquois* were stored in it. A bath house 50 by 20 feet is nearly completed. It contains 3 rooms, an undressing room, a bathroom, and a dressing and waiting room. The bathroom is fitted with 14 shower baths, and there are 2 shower baths with separate dressing and undressing rooms for women. These buildings, together with the pump house, have been built by the attendants.

The following repairs, alterations, and additions should be made at this station:

Wharf	$17,000.00
House for cabin passengers	8,000.00
Barracks	5,000.00
Laundry	5,000.00
Crematory	2,000.00
Telephone	800.00
Fence	500.00
Carpenter shop	200.00
Sulphur pipes	150.00
Trees and shrubs	100.00
Formaldehyde plant	500.00

The depth of water at low tide at the front of the wharf is only 18 feet at one end and 24 feet at the other. A temporary addition has been built extending the wharf 12 feet to get a sufficient depth of water for large steamers. The face of the present wharf is only 109 feet. This is too narrow, as a large steamer coming alongside in rough weather may knock it down.

The face of the new wharf should be 350 or 400 feet. It should be built with large piles, covered with yellow metal, and have firm connection with the shore.

A house for cabin passengers and ships' officers is very much needed at this sta-

tion, as there is no place to put persons of this class when it is necessary to quarantine them. When the officers of the steamship *Braemer*, 6 in number, were in quarantine, I had to place them in my own quarters, and as there were only three small rooms to cook, sleep, and eat in, they were not very comfortable. The large room in the attendants' quarters is now being divided by partitions into a number of small rooms to use for cabin passengers. This arrangement, however, is only temporary, as the building is not suited for the purpose, and the passengers will be very much crowded.

Two more buildings are required for barracks. The present building will hold about 150 Chinese, but it is not large enough to hold the number which may have to be quarantined. In April 354 Chinese and Japanese were quarantined on the *Iroquois*. It is very inconvenient to use this vessel, however, for this purpose, as in rough weather it is difficult to get water and provisions out to her, and if sickness should occur on her it would be hard to disinfect her, as she can not be taken to the wharf. In case of fire a serious panic might arise, as there is no apparatus on board for extinguishing a fire.

A steam laundry is required for this station to wash the clothes of those in quarantine and also to wash the jean suits which are used after bathing.

A crematory should be built to burn up rubbish and to incinerate bodies of those dead of infectious diseases.

The station should be connected to Port Townsend by telephone. This line need not run all the way to the city, but could connect with the Puget Sound Telephone Company at Junction City.

A fence should be built around the reservation to keep stray cattle away.

A carpenter's shop is needed for the carpenter to work in, and also as a place to keep spare lumber, tools, paints, oils, etc.

The 100 feet of 6-inch canvas hose now at the station is entirely worthless and can never be used again. The canvas is rotten and tears upon the slightest strain. It is now full of holes and in places torn completely across. If it is the intention of the Department to continue the use of sulphur in the disinfection of yellow-fever ships at this station 100 feet of 6-inch galvanized-iron pipe will have to be supplied.

Fruit trees, berry bushes, and a few shrubs and flowers should be planted on the reservation to beautify the grounds, so that the station may present a more attractive appearance.

An apparatus should be provided for the generation of formaldehyde gas, so that this disinfectant may be used at this station.

WM. G. STIMPSON,
Passed-Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

RELATIONS WITH STATE AND LOCAL QUARANTINES.

In the performance of the duties imposed by act of Congress approved February 15, 1893, entitled "An act granting additional quarantine powers to and imposing additional duties upon the Marine-Hospital Service," the Bureau has steadily endeavored to exercise the additional powers granted by that law in such a manner as to avoid, so far as possible, any friction or the exciting of unfriendly or inharmonious feeling. As pointed out in previous communications, the duty is an ungracious one, inasmuch as it requires the inspection by the Bureau of establishments which it does not operate and the enforcement of the Treasury regulations regarding equipment and methods at quarantine stations owned and conducted by State and local governments.

In the main, it may be said that the relations with these State and local quarantines have been, and are, friendly and harmonious. The spirit of willing cooperation and mutual help in the great work of barring out the epidemic foe has generally prevailed. But there have been exceptions, notably during the past year, when the Bureau has been forced to exercise the higher prerogatives with which it has been clothed by the national quarantine law, both in maintaining the rights and privileges of its own quarantine stations, established under Congressional enactment, and forbidding dangerous laxity of administration at the State quarantine stations. In the performance of this duty, successful in every instance, the Bureau has not escaped misrepresentation and the accusation that it is seeking in this manner to add to its importance by taking to itself, under pretext of law, as many of the local quarantines as possible. Such accusations are unjust and not warranted by any facts, yet attempt has been made to utilize them adversely to the Service.

During the past year interesting events have transpired in connection with three stations, viz, the United States Quarantine Station (Gulf Quarantine) at Ship Island, Miss., the State Quarantine Station at Sabine Pass, Tex., and the United States Quarantine Station (San Francisco) at Angel Island, Cal. Without acrimony, but firmly, the Service has maintained its position at each place.

At the Gulf Quarantine Station, Ship Island, Miss., where the Government was in fixed possession and where the local quarantine had been abandoned, an effort was made to revive the local quarantine service, and to this end one of the members of the State board of

health began a movement looking to the forcing of the national quarantine station away from Ship Island. The letter of the governor of the State of Mississippi, transmitting his report, and requesting the Secretary of the Treasury to remove the station, and the reply of the Secretary inclosing my answer to the statements made were duly published in my last annual report.

Finding the Secretary of the Treasury immovable, a State quarantine was nevertheless established on a neighboring island (Cat Island), and endeavor was made under State law to inspect vessels before they visited the national quarantine station, to proscribe the national quarantine station as an infected spot, and to require redisinfection of vessels after leaving there before they could be admitted to entry. In declaring it an infected spot, the contractor for supplies, who lived in the city of Biloxi, was threatened with legal punishment if he should transport to the barge lying at the noninfected anchorage, a mile from the station, the supplies necessary for the same. The presence of a revenue cutter for the purpose of obtaining the necessary supplies and landing in Biloxi, if necessary, and the firmness of the Department, soon demonstrated the futility of these attempts and caused the abandonment of the Cat Island station.

Later, when yellow fever appeared at Ocean Springs, Miss., it gave opportunity for reviving the contest by casting suspicion on the Ship Island station, although as will be seen there was no justification for any of the many false rumors which were spread with regard to its establishment and conduct.

At Sabine Pass, Tex., the attention of the Bureau was called to the fact that a town had been founded and was being built in immediate contiguity to the quarantine station, and that vessels from infected ports were discharging their ballast, to be used in filling the grounds necessary for the town, and that the very same procedure which resulted in bringing yellow fever, through local neglect, into Brunswick in 1893, was being permitted at Sabine Pass, Tex., where the men engaged in discharging the ballast from the infected vessels were allowed free communication with the town, there being but an imaginary boundary line between the quarantine reservation and the town proper.

This demanded the presence of a marine-hospital inspector, whose instructions were in the nature of demands upon the local quarantine for procedures in conformity with the Treasury regulations, and the collector of customs was directed to refuse entry to vessels without certificate from said inspector that the regulations had been complied with.

The officer was kept there until the necessary changes in administration had been made and measures taken for the removal of the quarantine station a safe distance from the city.

At San Francisco, as narrated in my last annual report, the Government had established a complete quarantine plant at large expense on

Angel Island, San Francisco Bay, but the boarding and inspection of vessels by the national officers had been deferred pending the completion of the boarding vessel provided by an act of Congress and the appropriation of a sufficient sum to put the same in commission. As shown in the last report, an additional sum was granted by Congress for the express purpose of placing this vessel in commission for half the year, and the Secretary of the Treasury, out of the epidemic fund, appropriated a sufficient sum for the remainder of the year.

The boarding was then commenced by the national quarantine officer, when the local quarantine officer made protest, claiming it was an interference with his function. As hereinafter detailed there was friction with the local quarantine officer, until his inefficiency and the lack of local quarantine appliances were amply demonstrated, and the President was requested to take action under section 3 of the law of February 15, 1893, and to detail the national quarantine officer there regularly as quarantine officer of the port, which was done.

From that time on the Bureau disregarded the local quarantine officer altogether, and the station is now being conducted independently as a national quarantine station without division of authority.

Following are the details connected with the above transactions at the stations named:

TRANSACTIONS RELATING TO THE GULF QUARANTINE STATION (NATIONAL), SHIP ISLAND, MISS.

May 14, 1896, a letter was received from the president of the State board of health of Mississippi, requesting authority for placing a State board of health inspector on the west end of Ship Island. The letter was referred to the medical officer in command of that station, who reported adversely with regard to the inspector who it was known would hold this position. It would have imposed a State quarantine officer on a national reservation and caused the collection of fees for the inspection of noninfected vessels, which was intended as a function of this officer.

The proposition was therefore declined, as was also that of a former harbor master for the privilege of exercising his functions in the quarantine reservation with regard to the discharge of ballast from vessels, which would also have placed a State officer within the national reservation.

Then followed the letter of the inspector, dated June 24, 1896, to the chairman of the executive committee of the Mississippi State board of health, asserting the dangers of the national quarantine station on Ship Island, and the letter of the governor of the State, dated August 4, 1896, transmitting this report, indorsed by the board, to the honorable Secretary of the Treasury; the reply of the Secretary of the Treasury, dated August 27, 1896, including my report upon the matter, dated August 25, 1896, which latter correspondence was published in the annual report for 1896.

Nothing further was heard until the receipt of a report of the local inspector of the port of Biloxi, dated Biloxi, Miss., October 1, 1896, addressed to the State board of health, Jackson, Miss. This report was printed in pamphlet form and was not received at the Bureau until February 8, 1897.

Inasmuch as it cast reflections upon the management of the United States station, it was forwarded to P. A. Surg. A. C. Smith, medical officer in command, Gulf Quarantine Station, who replied seriatim to the charges made. These latter are sufficiently indicated in the reply of Dr. Smith, which is as follows:

REPLY TO REPORT OF THE STATE QUARANTINE INSPECTOR, PORT OF BILOXI, DATED OCTOBER 1, 1896.

[The Roman numerals and pages refer to portions of Dr. Haralson's pamphlet.]

GULF QUARANTINE STATION, *March 18, 1897.*

I. Page 5. Quotation: "On June 22 a vessel from a South African port, I believe Port Elizabeth, came in the port of Biloxi. * * * When the quarantine physician went aboard he found a sick man with a trouble that to me simulated typhus fever. The vessel was not detained."

This charge has been sufficiently answered by the Supervising Surgeon-General, as quoted by Dr. Haralson on page 13 of the pamphlet, but there is a circumstance connected with it which ought to be known.

Dr. Haralson was my guest at the quarantine station on the occasion referred to, and when the Norwegian bark *Fortuna* arrived from Port Elizabeth I invited him to go aboard with me. The vessel was inspected and passed in his presence, and went immediately to the common harbor and established communication with Biloxi without objection or hindrance from him. Without entering into a discussion of the symptoms of typhus fever, there is something extraordinary in the account given by Dr. Haralson. If the quarantine inspector for the port of Biloxi saw an apparent case of typhus fever on a vessel just about to open communication with his city, what was his duty in the matter? Certainly, to protest against the vessel leaving this quarantine and entering the common harbor; or, if he did not wish to do that, then to keep the case under constant observation until he had determined definitely whether it was or was not typhus fever. But he did neither of these, and two days later, under date of June 24, he writes his report exactly as if he had not seen the case again, nor troubled his head about completing the diagnosis. It is apparent that he never considered the case typhus fever, and was merely making an unsupported effort to injure the professional reputation of a fellow physician.

II. Page 8. Dr. Haralson here says that I told him that I "would advise against the fumigation and detention of vessels from tropical points, provided such vessels had clean bills of health." He further says, referring to Bureau order of June 20, 1896, extending the regulations to an enforcement of quarantine against all tropical American ports: "The information to me came too late, for before we received it the executive committee had established the Cat Island station with a regulation requiring detention and fumigation of such vessels."

As a matter of fact, he knew before he made his report of June 24 and before he recommended the establishment of the Cat Island station that I had recommended an extension of the rules and had received a telegraphic order to enforce quarantine against suspected as well as infected ports irrespective of the character of the bill of health given at the port. On June 20 I received a Bureau telegram dated June 18, ordering me to extend the enforcement of disinfection and detention to vessels from suspected ports. Having had some conversation with Dr. Haralson on the subject,

I wrote him a note telling him of the new order and asking him to come over and talk with me about it. He came June 22. On this occasion I expressed myself quite freely and candidly to him, saying that I regarded as dangerous all Cuban and Brazilian ports and all ports at which yellow fever had occurred during the current or the preceding calendar year, but did not believe in quarantining against such a port as Kingston, against which there was no shadow of suspicion. I could not get any expression of opinion from him on the subject and he seemed unwilling to discuss the matter with me, which I thought very strange at the time, as I had invited him to the station for that purpose. This was two days before the date of his report recommending the establishment of a State quarantine at this port.

III. Page 9. Dr. Haralson here represents that a vessel arriving from an infected Cuban port June 15, 1896, would not have been detained at this station. It is well known to the Bureau that this is a false representation, since vessels from such ports were disinfected and detained at all times after May 1, whether giving a history of sickness on board or not.

IV. Page 29. Quotation: "I know that during the present quarantine season there was almost daily direct communication between that station and the Mississippi shore."

While quarantine rules require a theoretical "no direct communication" with the outside world, certain kinds of direct communication occur unavoidably, as follows:

(1) When a vessel receives pratique, no matter how long she may have been detained, she makes a direct communication with the shore when she leaves the quarantine. This must occur at the most secluded refuge station as well as elsewhere; it happened ninety-four times at the Gulf quarantine station between May 1 and November 1, 1896.

(2) When a patient is treated in hospital at a quarantine station, and recovers, it not to be supposed that he is imprisoned the entire season thereafter. He is released under proper precautions, and makes a direct communication with the shore.

(3) Occasionally the service of an employee is terminated in the midst of the close season. Proper precautions are taken against any possibility of his carrying infection, and he is sent ashore.

(4) Sometimes some absolutely necessary business requires a person connected with a quarantine to go ashore during the close season, taking the same precautions that are taken with a vessel before releasing her.

(5) Mail and supplies have to be received, and mail sent away. Occasionally a verbal message has to be delivered to the transfer boat. The steward commonly carried such messages at this station, having nothing to do with the disinfection of vessels. Occasionally I carried them myself, considering it no more dangerous than boarding a vessel to release her from quarantine.

(6) Dr. Haralson visited the station himself June 22, 1896, and went ashore again the same day. I considered his visit on this occasion entirely free from risk, as he evidently believed it to be himself.

(7) Twice while vessels were detained in quarantine in 1896 Dr. Haralson came to the limits of the station in a tug boat and signaled for me and met me there. On one of these occasions there was a vessel lying in the anchorage on which there had been yellow fever at sea to his knowledge, but this did not deter him from seeking a meeting with me. He is not immune to yellow fever, and I considered that he ran no more and no different risk than the master of a vessel that might have come in for inspection.

The above are the kinds of communication which took place between this station and the shore during the season of 1896, and Dr. Haralson's reference to them is a mere quibble.

V. Page 29. Quotation: "I know that their men—men who had been placed there with the avowed purpose of protecting our people during this quarantine season, and while vessels from infected ports were in quarantine—would, under cover

of darkness, visit the Mississippi coast and the city of Biloxi, and withdraw before that darkness was lifted by the light of day."

I pronounce this a false statement, without color of truth. Dr. Haralson gives no instance and no evidence to support his statement, and therefore makes only a general denial possible. The station is well under the eye of responsible persons, and such an occurrence is next to impossible. I have, however, made every inquiry here, and have even asked the president of the Biloxi board of health if he ever heard a complaint of the kind, but I can learn of nothing to give foundation to such an assertion.

VI. Page 29. Quotation: "I know that on the 19th day of June the quarantine physician of that station, * * * while vessels were in quarantine, left his station, a yellow-fever refuge station, and came to the city of Biloxi, and mixed and mingled with her people."

I visited Biloxi June 19, 1896, as is recorded in the medical officer's journal at this station. The records of the station also show that there was no vessel of any kind in quarantine on this date except the station's boats, and that a period of seven days had elapsed since the completion of disinfection of the last vessel detained. The station was as clean and as free from the dangers belonging to a yellow-fever refuge station on this occasion as it was three days later when Dr. Haralson visited it himself.

VII. Page 29. Quotation: "I know that in April last, while your executive committee, under your orders, was visiting the coast, a vessel, on which had occurred during the voyage six cases of yellow fever and one death, arrived at this station. The quarantine physician—not the assistant, as Dr. Wyman would have you believe, but the commanding officer who is nonimmunized—boarded her and inspected her, and immediately and without fumigation or disinfection, boarded another vessel from a healthy port and whose crew had never had yellow fever, and while this vessel was in quarantine his assistant physician came ashore and went to New Orleans, and some of his men came into Biloxi and spent the night."

The British ship *Tuskar*, which arrived from Rio de Janeiro at Ship Island April 10, 1896, having had six cases of yellow fever on board in Rio and just after leaving, is evidently the vessel referred to here, since it is the only one answering Dr. Haralson's description in any particular and the only infected vessel arriving in April. The records of the station show that this vessel arrived and was inspected April 10, and that no other vessel arrived or was inspected on that day. This disproves entirely the first assertion quoted above. It was fourteen days later, but while this vessel was still in quarantine, that the committee named above called upon me at the limits of the station.

While the *Tuskar* was in quarantine in April[1] I allowed two employees and Acting Assistant Surgeon Moncure to go on short leaves of absence, exercising the same precautions in releasing them from quarantine as in releasing vessels. The leaves of absence had been promised before the 1st of May, and I decided not to revoke them.

VIII. Page 29. Quotation: "I know that on the 19th or 20th of last August a vessel with sickness aboard was lying in quarantine. On this vessel a man, the master of the vessel, died. Dr. Smith very promptly sent over to Biloxi with a request that I permit the interment of the remains in the city of Biloxi. I confess I was shocked at the temerity of the man, but concluded to confer with the president of the city board of health. We denied the request, the president of this board saying: 'Admitting there is no danger if the remains are brought here, the city of Biloxi will be almost depopulated in twenty-four hours.'"

While I did not make the request here recited, I did permit the mate of the Norwegian bark *Golden Sunset*, whose master died suddenly of noninfectious disease after the vessel had been disinfected, to send such a message to Dr. Haralson by the

[1] The close season does not begin until May 1.—W. W.

master of the transfer boat. I was led to allow this by the fact that Dr. Haralson had granted the same privileges in a similar case, at the request of the master of the steamship *Janeta,* whose first engineer died in quarantine of noninfectious disease the morning of August 9, 1896, after the vessel had been disinfected. In this case a funeral was held in Biloxi after the vessel's release from quarantine, Dr. Haralson, or his assistant, having inspected and passed the vessel with the dead body aboard, and Dr. Haralson having sanctioned the burial in Biloxi. It is unwise to ever allow such a thing to be done here, but Dr. Haralson should have tempered his indignant tremor in the second case with the knowledge of his action in the first.

IX. Pages 29 and 30. Quotation: "While the boat (transfer boat) was lying there, and while the passengers were yet on a barge, the master of a vessel from an infected port, and then in quarantine, came out to the barge, and while he did not get off on the barge, lay immediately around it to windward or leeward, as it suited him, for several minutes, and, indeed, until the boat on which the passengers were left."

On one occasion I permitted the masters of two vessels which were to be released from quarantine the same morning, but which I did not have time to release immediately, to row out to the transfer barge to meet the transfer boat and make some business arrangement there. This is perhaps the instance referred to in the paragraph above. On one or two other occasions I was annoyed by masters of vessels which had been disinfected and were awaiting release, attempting to communicate with the transfer boat without permission, but there was no occurrence of this kind which could be construed in the slightest degree dangerous.

The first part of the same paragraph is sufficiently referred to under IV.

X. Page 30. Dr. Haralson here refers again to the case of the British ship *Tuskar* (VII), and to the charge that I went immediately from the inspection of that vessel, April 10, to the inspection of another vessel, which I have shown was not done, and he says: "Dr. Smith never denied his conduct in this matter to your committee, but said *it was impossible to convey infection on the waters of that station.*"

What I did do and did not deny was as follows: When the *Tuskar* was undergoing disinfection April 20, and while I was viewing the completion of a portion of the work the schooner *Palos* arrived and I went directly from the *Tuskar* to inspect her. The following day I was on board the *Tuskar* and a similar thing occurred. Dr. W. G. Kiger, in company with Dr. Haralson, called upon me at the limits of the station April 24, and in conversation mentioned my having gone directly from the *Tuskar* to other vessels. I did not deny the occurrences of April 20 and 21, recited above, and did not consider them subject to reasonable criticism. I did not say it was impossible to convey infection on the waters of this station, but probably did say it was impossible to convey infection in this manner.

XI. Page 32. Quotation: "Dr. Smith knows that I have seen him board vessels before the junior ascertained the condition of the vessel."

I do not know how often Dr. Haralson has watched me as I performed my duties at the station, but it is true that I did a large part of the inspecting of vessels in 1896 without the assistance of the junior officer, although I understand now that it was not the intention of the Bureau that I should do so. The work was done thus without the knowledge or direction of the Supervising Surgeon-General. If I had contracted yellow fever it would have been a temporary embarrassment to the station, but not more dangerous than any other cases of yellow fever, since I should have been treated under the same careful isolation as another.

XII. Page 32. Quotation: "Dr. Smith reports that the State board of health is seeking the removal of Gulf Station merely in the hope of 'squatting' in this establishment. Dr. Smith can give no reason for this statement in his report."

I used the term in a simple expression of opinion as to the purpose of the State quarantine on Cat Island, and I based the opinion on the fact that the State occupied the national establishment on Ship Island before when the Gulf Quarantine Station was at Chandeleur Island.

XIII. Pages 33 and 34. On these pages Dr. Haralson attacks the truthfulness of an official report made by me August 20, 1896, of an inspection, the previous day, of

the Cat Island Quarantine Station of the Mississippi State board of health. The report is given on pages 14 and 15 of the pamphlet, and is commented upon on page 14 as well as on pages 33 and 34.

Dr. Haralson disputes only two of the statements of fact in my report, the absence of buoys and the unsuitability of the anchorage. I desire to present evidence on these two points in order to show the disingenuous character of his reply.

There were no buoys marking the anchorage August 19, and none were placed there until August 22, three days, as it happened, after my visit, and two days after the report was written and forwarded. Upon this point I present the following letter:

LIGHT-HOUSE ESTABLISHMENT,
OFFICE OF THE LIGHT-HOUSE INSPECTOR, EIGHTH DISTRICT,
New Orleans, La., 23d October, 1896.

P. A. Surg. A. C. SMITH, M. H. S.,
Gulf Quarantine, Biloxi, Miss.

SIR: In reply to your letter of 14th instant I have to state that on application, dated 23d July, 1896, of Dr. H. H. Haralson, member of the Mississippi State board of health, 3 buoys were placed on August 22, 1896, to mark the Cat Island Quarantine Anchorage, Mississippi.

The buoys are third-class can, painted yellow, and marked "Q."

Respectfully,

J. B. COGHLAN,
Commander, U. S. N., Inspector Eighth Light-House District.
GEO. W. VAUGHAN,
Clerk.

Dr. Haralson must have known this, and if he had wished to make a straightforward reply to my report he would have given the date when the buoys were placed.

With reference to the depth of water in the anchorage, I refer to the official chart of the waters. The limits of the station are taken from Dr. Haralson's latest definition of them, running 2 miles north of great Sand Hill and 1½ miles west, but the depth of water is no better still farther north and west. If a line is drawn on the chart one-third of a mile from the beach within the anchorage, following the curves of the shore, the depths of water expressed in feet are as follows, starting from off North Point: 8, 6, the deepest water being 8 feet; running from east to west, 1 mile north of the north shore, the depths are 8, 9, 11, 12; from east to west, through the middle of the quarantine anchorage, 13, 14, 11, 12; along the north limit of the anchorage, 16, 14, 13, 12. At no point within the anchorage is 17 feet of water shown, and only in the exposed northeast corner is there 16 feet by the chart. My actual experience in the waters was that I rounded North Point and entered the harbor and tried to land at the tents. I could not approach the shore there, and had to go back around North Point and Raccoon Spit and land near the east foot of Great Sand Hill. The reference to the nearest deep water, in my report, was to water of 3 fathoms and over, which is the depth at Ship Island.

Many vessels entering this harbor are of too deep draft to lie safely in 16 feet of water, and few of importance could go well into the shelter of Cat Island. A depth of 3 fathoms and over is required to make a fit anchorage for all sorts of tides and weather.

Further, upon the subject of my report, another occurrence is cited. On August 6, 1896, the schooner *Palos* finished her period of detention at this quarantine and received pratique to enter at Shieldsboro, Miss. On leaving, the captain asked me if he would have to stop at the Cat Island Quarantine for inspection, and was advised to do so. Following is a letter from him on his experience:

NEW ORLEANS, *September 14, 1896.*

Dr. A. C. SMITH, *Gulf Quarantine.*

DEAR SIR: Yours of the 9th instant duly to hand and contents noted. The day I left your station, on the 6th or 7th of August, I proceeded toward Cat Island and

approached the shore so near as the draft of the *Palos* would allow me and looked for the quarantine station, but I could not find or see a sign of a quarantine station of any kind whatsoever, and as I had no direct information of said station I kept off for Pass Christian and came to anchor, sent my crew to New Orleans, and entered the vessel in custom-house at Bay St. Louis (Shieldsboro) without any trouble. Same time I asked the deputy collector about the Cat Island Quarantine, and he could not give me any information about it. Naturally I never troubled myself about it. About the 12th or 13th of August the owners of the *Palos*, Messrs. Poitevent & Favre, of Pearlington, received a letter from Dr. Haralson, of Biloxi, inspector of Cat Island Quarantine, informing them that I violated the State quarantine law by passing Cat Island station without being inspected, and also demanded that I should return with vessel and crew to Cat Island for inspection. Messrs. Poitevent & Favre telegraphed to me at Pass Christian to come to Pearlington immediately, which I did. I explained the case to Mr. Poitevent, and he directed me to go to Bay St. Louis and see their lawyer, Mr. Bowers, and put the case before him, which I did. I got a letter from Mr. Bowers to Dr. Haralson, at Biloxi. I went to Biloxi and overread the letter to Dr. Haralson myself in person, and same time explained the whole case to him. I told him that I had no direct information about Cat Island Quarantine; all the information I had was from Dr. A. C. Smith, and Dr. Smith could give me no direct information or particulars about it. For all that, I did my best to find the station, and nobody came near me and could see no sign of a station; and while I was lying at Ship Island Quarantine I noticed vessels got released from quarantine at Ship Island, proceeded direct to their loading place, and didn't go near Cat Island. I also told Dr. Haralson the day and hour I passed Cat Island that there was nobody on or near the island belonging to the quarantine? What else could I do than go to my destination? The consequence was that Dr. Haralson redemanded his order, and that I needn't take the vessel back to Cat Island; that I could go ahead with my business.

* * * * * * *

Very truly, yours,

FRED NEWMAN.

It is well known here that not only did Dr. Haralson live in Biloxi while acting as quarantine inspector, but his assistant, the quarantine physician of the Cat Island Station, also lived in Biloxi a great part of the time, and the inspections were made most frequently from the tugboat *New York* or other tugs plying in the harbor.

XIV. Page 39. Quotation: "The commanding officer can not be the proper person to supervise the unloading of ballast. He knows nothing whatever of the harbor, having gone there last spring, and, besides, his duties as quarantine physician call him away from such work, and sometimes the ballast is discharged when the vessel lies at its moorings instead of being carried to the ballast ground."

Page 42. Quotation: "There is danger of the harbor being seriously damaged now by the discharge of ballast without direction from the harbor master, as it is known that ballast is often thrown overboard when the vessel is anchored in quarantine instead of being moved beyond the limits of the channel."

The discharge of ballast at this quarantine was supervised during the season of 1896 by the same employee of the station whom Harbor Master James proposed to make deputy harbor master. He is a reliable man and knows the ground well, and he performed his duties no less faithfully as a simple employee under my command than he would have done as deputy harbor master. The charge that vessels have discharged their ballast where they lay at anchor at the station is absolutely without foundation in fact. The work was carefully and constantly supervised, and I know that no such thing happened with any vessel detained in quarantine. If the harbor master claimed to know of such a case, why did he not prosecute the offender?

As once before, Dr. Haralson gives here no instance nor proof, and only a general denial is possible.

XV. Page 42. After devoting the preceding pages of his report to denouncing the

United States Gulf Quarantine Station as inefficient, dangerous, and badly conducted, in every way, by officers who know nothing of scientific quarantine and who have no interest in their work and no sense of truth and duty, he here demands that this institution shall continue to do for the State of Mississippi the most dangerous and critical class of work and the class requiring the greatest skill, courage, and attention—in fact, the whole of the real quarantine work—and he only specifies that it shall be done "at some isolated point on the Gulf."

Truly he has a better opinion of the station than he has before revealed, and he only wants it to get out of his way. He destroys the effect of his whole report in this last paragraph.

In conclusion, I desire to say that there are but two items in the entire pamphlet which could be construed as fair criticisms of the conduct of the Gulf Quarantine Station, and there are strong reasons for asserting that these criticisms are not honestly made. They are as follows:

(1) The comments upon the station's boat sometimes meeting the transfer boat at the barge. This was done under my direction and under circumstances which were perfectly safe. It is an unimportant point. As Dr. Haralson did not hesitate to communicate directly with me and with the station several times during the season, I do not regard his criticism here as candid.

(2) The comments upon my having made inspections in person of all classes of vessels, and, in particular, while I was engaged in treating the ship *Tuskar* at the station. The following instance bears strongly upon this point: Dr. Kiger and Dr. Haralson called upon me at the limits of the quarantine station while the *Tuskar* was in quarantine and after it had been reported to them that the vessel was infected and that I was daily in contact with it. I met them under exactly the same conditions as I meet a vessel for inspection, and they shook hands with me and sat close to me in my boat and talked with me. After the conference they returned immediately to Biloxi and the Mississippi coast. Neither one is immune to yellow fever, and I can not believe they thought themselves in any danger of contracting that disease and so infecting their State.

On page 30 Dr. Haralson uses the words, "The infected vessel which came into this station in April, and to which Dr. Smith so recklessly exposed healthy vessels and the people of Mississippi." What does this language mean if for "healthy vessels" are substituted the words, "Dr. Kiger and Dr. Haralson, with their own knowledge and connivance?" It must mean that he is setting forth an opinion which he does not hold himself.

A. C. SMITH,
Passed Assistant Surgeon, M. H. S., in Command of Gulf Quarantine Station.

THE CAT ISLAND QUARANTINE STATION.

The quasi quarantine station of the State on Cat Island, without equipment, as shown in the letter of Dr. Smith in the last annual report, maintained a semblance of existence, with a published set of regulations, during the summer of 1896, but though the United States Quarantine Regulations require the boarding and inspection of all vessels throughout the whole year the station was entirely closed during the winter of 1896–97, and was not opened again until May, 1897, when its status was made known to the Bureau in the following letter and telegrams from Passed Assistant Surgeon Smith:

GULF QUARANTINE STATION, *May 28, 1897.*

SIR: Referring to the Cat Island quarantine station of the Mississippi State board of health, I have the honor to say that I have delayed reporting upon the subject, waiting to learn definitely what the station was to be this season.

The site was entirely abandoned last winter and was not occupied again until the 23d of the present month. The new rules of the station have just been issued within the past few days, and I inclose a copy herewith.

I visited the station to-day and found Dr. H. M. Folkes, the quarantine physician, on duty there. The location and equipment have been given in my telegrams of the 27th and 28th instant, and little can be added in the way of description. The purchase of the steamer *New York* was reported in my letter of December 8, 1896. It was refitted and placed in commission early in the present month.

I did not examine the disinfecting machinery minutely, but believe it is of a pattern in accordance with the latest ideas in marine sanitation. It consists of sulphur furnace, steaming chamber, and hand pump for bichloride solution. The sulphur furnace is of good size and design; the steaming chamber, or retort, is small, and the barge on which the machinery is placed is cramped, and I believe disinfecting a large vessel with this apparatus will prove a very tedious job, if it is completely done. Steam will be supplied to the apparatus from the boiler of the *New York*.

There are no buildings nor facilities of any kind visible for the care of the sick.

Dr. H. H. Haralson, who is the "member of the executive committee of the State board of health of Mississippi," referred to so impersonally in the rules and regulations, lives at Biloxi and holds the station in his fist, so to speak. Dr. Folkes, in charge at the station, is a young man who has lately had experience as a quarantine inspector in Central America, I think, in the employment of the Louisiana State board of health.

In case the station is put to the test of actual quarantine work, it is evident that Dr. Folkes will have to board and inspect all classes of vessels, and that the steamer *New York* will have to be used, as now, for the boarding of clean vessels, and also for assisting in the disinfecting of infected vessels.

It is impossible to learn at present what the State is going to do with the Cat Island station. I suspect they are going to try to force vessels to go there for sanitation before coming to this station, but do not know. Nothing has been done so far except to inspect vessels, sometimes before they reach this station, but commonly after they leave it. No vessel yet has been compelled to go to Cat Island for inspection or disinfection.

Inspecting was done all through the past winter, but was only nominal. Dr. A. P. Champlin, who acted as quarantine physician previous to Dr. Folkes, died suddenly the 9th of this month.

I will report any further developments by mail or telegraph.

Very respectfully, yours,

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.

SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

[Telegram.]

WASHINGTON, *May 31, 1897.*

Passed Assistant Surgeon SMITH,
Gulf Quarantine, Biloxi, Miss.:

Under article 11, page 31, Quarantine Regulations, inspect Cat Island quarantine at once, and report fully on methods and plant.

WYMAN, *Surgeon-General.*

[Telegram.]

WASHINGTON, *May 31, 1897.*

Passed Assistant Surgeon SMITH,
Gulf Quarantine, Biloxi, Miss.:

Wire your report in full after inspection Cat Island. Should plant and methods be complete, even then it will not affect Government's position. Order is given

believing you can be spared from station long enough to make inspection. Wire if contrary. Two other telegrams go with this.

WYMAN, *Surgeon-General.*

[Telegram.]

GULF QUARANTINE, *Biloxi, Miss., June 3, 1897.*

Surgeon-General WYMAN,

Marine-Hospital Service, Washington, D. C.:

Inspection Cat Island quarantine to-day; location on north point of Cat Island and waters north and west of same; three buoys on north; anchorage for infected vessels to west, but not clearly defined. Depth of water as reported by me last year not sufficient for large vessels except at limit of anchorage on northeast, or else outside; vessels inspected on arrival at eastern limit or before. No building; physician's residence projected; he now lives in tent. One other single tent for possible case sickness. Disinfecting apparatus consists of a small scow barge holding steaming chamber 9 by 5 by 5 feet; good sulphur furnace, Olliphant pattern, with return current; 12 Dutch ovens or sulphur pots; hand bichloride pump. No suitable facilities for treatment of sick; simple cases to be treated aboard ship. Infections in tents. Mail and telegraph via Biloxi. Personnel: Dr. H. M. Folkes; has not had yellow fever, but has been in contact with it; 5 men in crew of steamer, mostly immune, do the disinfecting. Laundryman on island. Two men in crew of transfer sloop live in Biloxi. Regulations of the Secretary of Treasury are the guide in all disinfecting, and quarantine procedures said to be closely followed. Vessels from all tropical American ports held and disinfected; five-day detention in general, sometimes three days. After completion of disinfection vessels from all domestic ports inspected. Disinfection claimed to be done promptly. Only one small schooner treated so far, and capacity of station has not been tested. Believe large steamship will strain it. Rules strict against communicating with vessels before arrival and while in quarantine, but anchorage is not well guarded against trespass, and no guard is kept at night. Reliance is upon isolated position, but fishermen and the like frequent it as much as any other, and small vessels going between points on coast sail through or near anchorage. No communication to be allowed between vessels in quarantine. Record of cases of sickness is kept in physician's journal. Quarantine fees and expenses: Inspections, $5 to $10; disinfection, $25 to $80, dependent on size of vessel and amount of materials used. Discharge of ballast costs the same as outside quarantine. Twenty-two vessels inspected by present quarantine officer, and 1 disinfected; one from domestic ports and others from foreign; former records not at hand. I believe quarantine facilities not sufficient for such a crowd of vessels as entered this port last month. They have not been tested yet, and there is now a lull in business. Formal report by mail.

SMITH, *Passed Assistant Surgeon.*

GULF QUARANTINE STATION, *June 4, 1897.*

SIR: I have the honor to forward herewith printed rules and regulations promulgated by the Mississippi State board of health for the purpose of quarantining the State of Mississippi against the United States Gulf quarantine station, together with a copy of correspondence on the subject had with the State quarantine inspector.

Very respectfully, yours,

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.

SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

[Inclosure.]

RULES AND REGULATIONS OF THE MISSISSIPPI STATE BOARD OF HEALTH GOVERNING THE QUARANTINE AGAINST GULF QUARANTINE STATION.

OFFICE OF MISSISSIPPI STATE BOARD OF HEALTH,
Jackson, Miss., April 24, 1897.

At a meeting of the board of health of the State of Mississippi, held in the city of Jackson, April 5, 1897, it was declared and ordered that quarantine be maintained against the Gulf quarantine station of the Marine Service, located at Ship Island, beginning the 1st day of May and ending the 1st day of November, 1897.

1. During the time above specified there shall be no communication between said station and the shore except such as may be permitted by an authorized representative of the Mississippi State board of health according to the following rules and regulations:

2. No officer or attendant of the Gulf quarantine station at Ship Island shall be allowed to come to any point on the Mississippi shore without a written permission from an authorized representative of the Mississippi State board of health.

3. No person or persons shall visit said station and return to shore without a written permission from an authorized representative of the Mississippi State board of health.

4. No person or officer in charge of any boat or craft, propelled by steam or otherwise, shall bring to any point in Mississippi any person or persons from the Gulf quarantine station of Ship Island, nor any person or persons who have been within the quarantine limits of said station under quarantine without a written permission from an authorized representative of the Mississippi State board of health.

5. No person or officer in charge of any boat or craft, propelled by steam or otherwise, if said boat or craft is communicating or expects to communicate with any point in Mississippi, shall allow any person or persons from said station or any person or persons who have been within the quarantine limits of said station under quarantine to come aboard said craft or boat without a written permission from an authorized representative of the Mississippi State board of health.

6. No person or officer in charge of any boat or craft, propelled by steam or otherwise, if said boat or craft is communicating with any point in Mississippi, or expects so to communicate, shall go to or lay along the transfer barge of said station while any person or persons from said station or from within said limits is on or alongside of said barge without the written permission of an authorized representative of the Mississippi State board of health.

7. No officer in charge of any vessel lying in Ship Island harbor and outside of quarantine limits of Gulf quarantine station shall allow any person or officer from said station to board or come alongside of his vessel, provided there is any communication or proposed communication by any person or persons of said vessel with any points in Mississippi, or with any person or persons having such communication.

8. No person or officer in charge of any boat or craft, propelled by steam or otherwise, and communicating or proposing to communicate with any point in Mississippi, shall receive on his boat or bring to any point in Mississippi from Gulf quarantine station at Ship Island any article or articles capable of conveying infection, unless said article or articles are accompanied by a certificate from the quarantine physician of Gulf quarantine station that said article or articles have been subjected to thorough fumigation. Provided that the words "article or articles" do not refer to the United States mails, except at times when there is an infected vessel or a vessel from an infected port in quarantine.

9. The penalty fixed by the statutes of Mississippi for violation of these regulations is $50 and imprisonment for thirty days, one or both, and the quarantine physician at Cat Island and the quarantine inspector at Biloxi are especially required to enforce their execution and prosecute, in behalf of the State board of health of Mississippi, all violations of same.

W. G. KIGER, M. D., *President.*
J. F. HUNTER, M. D., *Secretary.*

As shown above and by the following telegrams, an effort was made by the State quarantine officials to force pilots to bring vessels first to the Cat Island station, and also to enforce a quarantine against the national station on Ship Island, treating the latter as though it were an infected locality. In a letter to the medical officer in command, the State quarantine officer gave to him the rules under which he would "permit intercourse between the national quarantine station and the mainland," involving an inspection on the quarantine barge of all persons wishing thus to go, etc., and it was reported to the Bureau that the contractor furnishing supplies to the national quarantine station, who lived in Biloxi and transported his supplies to the barge, as previously stated, was threatened with arrest.

These attempts were all negatived by the action of the Bureau and Department, as will be seen by the following telegrams, the pratique of the State quarantine not being recognized by the collector of customs and a revenue cutter being sent to keep up the necessary communication between the national quarantine station and the shore, if interfered with.

[Telegram.]

GULF QUARANTINE, *Biloxi, Miss., May 29, 1897.*

Surgeon-General WYMAN,

Marine-Hospital Service, Washington, D. C.:

State has demanded of pilots to take all vessels entering here direct to Cat Island before coming to this station. Pilots have appealed to me. Have advised the Secretary of Treasury has remanded vessels to this station and believe they will offend against law if they interfere with order of Secretary and take vessel away her destination. Ask immediate instructions and that collector of customs have instructions, if necessary.

SMITH, *Passed Assistant Surgeon.*

[Telegram.]

GULF QUARANTINE, *Biloxi, Miss., May 30, 1897.*

Surgeon-General WYMAN,

Marine-Hospital Service, Washington, D. C.:

Have just seen letter from Haralson to pilots, in which he says he can and will prosecute vessels for coming to this station before receiving State pratique; but we can not prosecute them for going to Cat Island before receiving our pratique. On this premise he will coerce vessels to go first to Cat Island. Steamships *Bentala* and *Mortlake*, now here, are to be prosecuted. Schooner *Gertrude A. Bartlett*, from tropical port, came in this afternoon and went straight to Cat Island. Shall I enforce full rules on her when she comes here?

SMITH, *Passed Assistant Surgeon.*

[Telegram.]

WASHINGTON, *May 31, 1897.*

Passed Assistant Surgeon SMITH,

Gulf Quarantine, Biloxi, Miss.:

Have seen Secretary. Government will not yield in this matter. Pending further action, however, if convinced schooner *Bartlett* has been properly disinfected and is free from possible infection, disinfection need not be repeated. This is in the

interest of the vessel, to prevent unnecessary delay, and you will notify master and all others interested that no right of the Government is waived or prejudiced thereby. If not convinced as above mentioned, enforce full rules. Collector, of course, will not admit to entry without your certificate.

WYMAN, *Surgeon-General.*

[Telegram.]

WASHINGTON, *May 31, 1897.*

DEPUTY COLLECTOR OF CUSTOMS,
Ship Island, Mississippi:

You will continue to require a certificate from the United States quarantine station, Ship Island, as a prerequisite of admission to entry of vessels from foreign ports.

By direction of the Secretary of the Treasury.

WALTER WYMAN,
Surgeon-General M. H. S.

[Telegram.]

WASHINGTON, D. C., *June 1, 1897.*

COLLECTOR OF CUSTOMS,
Shieldsboro, via Biloxi, Miss.:

The quarantine certificate of the medical officer in command of the national quarantine station (Gulf quarantine) at Ship Island must be furnished by vessels from foreign ports prior to entry Ship Island Harbor or other ports in your district not included in previous order. No other quarantine certificate will be required for entry. You will notify masters accordingly.

O. L. SPAULDING,
Acting Secretary.

[Telegram.]

WASHINGTON, D. C., *June 1, 1897.*

Passed Assistant Surgeon SMITH,
Gulf Quarantine, via Biloxi, Miss.:

Secretary to-day wires collector of customs as follows:

"The quarantine certificate of the medical officer in command national quarantine station (Gulf quarantine) at Ship Island must be furnished by vessels from foreign ports prior to entry Ship Island Harbor or other ports in your district not included in previous orders. No other quarantine certificate will be required for entry. You will notify masters accordingly." Signed Secretary.

You will ignore the recently established quarantine and inspect and treat all vessels as heretofore.

WYMAN, *Surgeon-General.*

[Telegram.]

GULF QUARANTINE, *Biloxi, Miss., June 3, 1897.*

Surgeon-General WYMAN,
Marine-Hospital Service, Washington, D. C.:

Collector of customs has issued orders to pilots that vessels must receive my certificate before entering Ship Island Harbor. He and I interpret order of Secretary that I should board vessels outside of island. Is this so, and how is it in the case of vessel that has to be brought in and disinfected before pratique is given? Shall I simply order pilot to take her in, or place officer on board? If vessels to be boarded

outside, seaworthy steam launch required immediately. *Welch*, engaged in disinfecting, and naphtha launch, too small for outside. If necessary, will try to hire extra tug here temporarily. Haralson has suspended his rules temporarily on account of this order, and I have taken liberty to authorize pilots to bring vessels inside to quarantine station pending decision about boarding outside. Have private information that Haralson has gone to Jackson to call meeting of State board of health to declare this station a nuisance. State board has legislative and executive functions, under law, and probably expects to legislate us away by resolution and seek order of court to remove us.

SMITH, *Passed Assistant Surgeon.*

[Telegram.]

WASHINGTON, D. C., *June 4, 1897.*

Past Assistant Surgeon SMITH,
Gulf Quarantine, via Biloxi, Miss.:

Board as before. Order does not require boarding outside. Inform collector.

WYMAN, *Surgeon-General.*

[Telegram.]

GULF QUARANTINE, *Biloxi, Miss., June 11, 1897.*

SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C.:

Rules of State board quarantining against this quarantine are interfering with release from hospital of patients after recovery. Can test case be made? Prosecution will be directed against transportation boat, and I am not willing to cause this unless United States can be made defendant and bear burden of legal proceedings. Ask immediately instructions, as patient now here is nearly ready to go, and if State has right. He can not leave station on my pratique without written permission from State health officer. Ask instructions also, on whole subject, to what extent I must conform to rules in question.

SMITH, *Passed Assistant Surgeon.*

[Telegram.]

WASHINGTON, D. C., *June 12, 1897.*

Dr. SMITH,
Gulf Quarantine, via Biloxi, Miss.:

Continue to purchase goods and continue transportation as at present. Inform contractor for carrying supplies he must live up to contract and will be held responsible for any additional cost to Government by reason of his failure. If contractor for transportation fails to comply with his contract, revenue cutter *Seward* will be at your service to take his place. Cutter will be under instructions to land at Biloxi, take on supplies for Ship Island, and also to land patients at Biloxi whom you have discharged from hospital. Revenue cutter ordered to report to you.

WYMAN, *Surgeon-General.*

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL, M. H. S.,
Washington, D. C., June 15, 1897.

P. A. Surg. A. C. SMITH,
Gulf Quarantine Station, via Biloxi, Miss.

SIR: On June 1 the following telegram was sent you:

"Secretary to-day wires collector of customs as follows: 'The quarantine certificate of the medical officer in command national quarantine station (Gulf quarantine)

at Ship Island must be furnished by vessels from foreign ports prior to entry Ship Island Harbor or other ports in your district not included in previous orders. No other quarantine certificate will be required for entry. You will notify masters accordingly. Secretary.' *You will ignore the recently established quarantine and inspect and treat all vessels as heretofore."*

Your attention is called to the lines underscored, in which you are directed to ignore the recently established quarantine and inspect and treat all vessels as heretofore.

The provision of the law requiring aid to State and local quarantines does not require that the Government should admit that its own quarantine which is established and maintained as a protection is in itself a menace. Consequently, any request made of you on this assumption, as in the letter of June 4 from the representative of the State board of health implying that the national quarantine station at Ship Island is a menace, you will not comply with.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

[Telegram.]

GULF QUARANTINE, *Biloxi, Miss., June 18, 1897.*

Surgeon-General WYMAN.
Marine-Hospital Service, Washington, D. C.:

Revenue cutter reported yesterday; no interference with transfer yet. Will send released patient to transfer boat, and if boat refuses to take him cutter will do so. Cutter not required constantly, but is to call at station again to render aid if necessary. Do not think State people will try to bother us much.

SMITH, *Passed Assistant Surgeon.*

FAULTY ADMINISTRATION OF THE STATE QUARANTINE.

In the meantime the danger attending the administration of the State quarantine was made known by the receipt of a copy of the following letter:

OFFICE OF COLLECTOR OF CUSTOMS, SHIELDSBORO, MISS.,
Biloxi, June 8, 1897.

SIR: It has been reported to me that the State quarantine steamer *New York*, with a crew consisting of 5 men, arrived in Biloxi on June 3 direct from the State quarantine station on Cat Island, immediately after having in quarantine the schooner *Gertrude A. Bartlett* from a Mexican port, which vessel was detained and fumigated by the State quarantine at Cat Island.

I am reliably informed that the said vessel, *New York*, remained at the wharfs in Biloxi several days, and that her crew landed and mingled with the citizens of Biloxi during that time, and that neither the vessel nor the crew were inspected by or reported to the national quarantine station at Ship Island before landing direct from intercourse with a vessel from a suspected Mexican port.

As it is my duty to assist in carrying out the quarantine regulations, and believing that the board of health of Biloxi should be informed of this occurrence in order to prevent a repetition of the same, I make this report to you that you may take such action in the matter as you may deem proper to prevent the possibility of infectious diseases being brought from the State quarantine station to Biloxi.

Respectfully,

A. M. DAHLGREN,
Collector of Customs, Pearl River District, Mississippi.

Dr. J. J. LEMON,
President Board of Health of Biloxi, Miss.

ABANDONMENT OF EFFORTS AGAINST THE UNITED STATES STATION AT SHIP ISLAND.

The result of the efforts to displace the national station is announced in the following letter and extract from the Times-Democrat of New Orleans:

GULF QUARANTINE STATION, *July 11, 1897.*

SIR: I have the honor to forward herewith a copy of a letter just received from Dr. H. H. Haralson, of the Mississippi State board of health, informing me of the suspension, for the present, of the quarantine declared by the State board of health against this station.

Very respectfully, yours,

A. C. SMITH,
Past Assistant Surgeon, M. H. S.

SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

[Inclosure.]

OFFICE STATE QUARANTINE SERVICE,
Biloxi Miss., July 9, 1897.

DEAR SIR: I am instructed by the executive committee of the Mississippi State board of health to inform you that the quarantine regulations against the Gulf quarantine station have been suspended for the present.

Yours, very truly,

H. H. HARALSON.

Dr. A. C. SMITH, *Ship Island, Miss.*

[From the New Orleans Times-Democrat of July 10, 1897.]

JACKSON, MISS.

[Special to the Times-Democrat.]

JACKSON, *July 9.*—The executive committee of the State board of health at a meeting in this city decided to run the quarantine station just as has been done in previous years. The trouble between the State officers and those of Uncle Sam has been settled satisfactorily to both parties, and there will be no more clash of authority.

SUBSEQUENT CHARGES AGAINST THE SHIP ISLAND QUARANTINE STATION.

The presence of the revenue cutter and the expectation that the Marine-Hospital Service would begin boarding vessels before entering the harbor and, therefore, before coming within reach of the State quarantine's jurisdiction, together with requiring the pratique of the regularly established national quarantine station, operated to restrain the efforts of the State quarantine station, and no further trouble was experienced. This closed the incident so far as the attempt to supplant the United States quarantine station on Ship Island by a local quarantine station on Cat Island was concerned.

In the meantime, as subsequently proven, the yellow fever was already existing in Ocean Springs, Miss.

It did not take long for those who had heretofore attempted, unsuccessfully, to supplant the national quarantine station at Ship Island with a local quarantine on an island still nearer to the mainland to point the finger of suspicion at the national station and by means of interviews in the public press to attempt to create a public sentiment against this station. They were joined by others who for any reason whatever maintained a feeling of opposition to the Marine-Hospital Service or national quarantine.

Ship Island is the only national station in the Gulf, save Tortugas, which is at the eastern entrance thereto. It lies between the Louisiana quarantine on the west and the Mobile and the Florida quarantines on the east, and it was a convenient assumption upon the part of those already inimically inclined, to express more than suspicion that this national station had been the open gateway for the inroad of the disease, diverting as it did, at the same time, suspicion from the other quarantines.

Accordingly State health authorities in neighboring States, with, however, some notable and honorable exceptions, the daily press and medical journals took up the rumors that were quickly spread, and published with a strong coloring many items of so-called information which were either greatly distorted or absolutely false. The station was under a blaze of fierce criticism, which even extended to the press of the North and embraced public statements on the part of the governors of at least two States.

In the meantime the Bureau, from its own careful inspections and confidence in the medical officer in command, feeling sure that time would demonstrate the falsity of these charges and having in its possession a number of facts indicating, though up to the date of this report not absolutely proving, the true source of the fever, contented itself with noting carefully every published criticism that was made and sending the same to the medical officer in command for his reply thereto. These replies are, therefore, matters of record in this office. The medical officer in command of the station, with the consent of the Bureau, also made replies which were published in the secular and medical press with a view to correcting, so far as might be possible, the false impressions created.

It would be futile to attempt to enumerate the various charges made with regard to this station, but they are sufficiently indicated in the following letters sent by P. A. Surg. A. C. Smith to the publications mentioned, and it is my intention to make a full report to you upon the subject in my next annual report.

Following are the letters of Passed Assistant Surgeon Smith replying to the various charges which were made against the station over which he exercised command:

GULF QUARANTINE STATION, *September 10, 1897.*

SIR: I hope the yellow fever, if it exists on the coast, will be traced to its source with certainty, and I want to offer some suggestions. I am positive that no infection has

slipped through this station. I do not know what there is to the Cuban refugee theory, but unless there is something to support it, I am more inclined to believe the fever reached Ocean Springs by rail, through passengers or baggage having entered this country by way of New Orleans or Mobile or some Florida port. Ocean Springs is not a port or place for shipping, but a seaside resort much frequented by New Orleans and Mobile people. So far as I know, it has nothing to do with Ship Island or the shipping here, and no tug or other boat runs from there here. It is situated within the entrance of Biloxi Bay, and Deer Island lies across the mouth of the bay outside, stretching completely between it and Ship Island. No other spot on the coast is so well shielded from the quarantine station, if there were danger to be feared from it. I am eager to take part in the investigation of affairs on the coast, but have refrained from asking permission to do so, thinking you would want me at my post here in this emergency. I write in much haste.

Very truly, yours,

A. C. SMITH,
Passed Assistant Surgeon, Marine-Hospital Service.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

GULF QUARANTINE STATION, *September 16, 1897.*

SIR: I have the honor to acknowledge the receipt of Bureau letter of the 10th instant, which transmits clippings from the New York Herald and the New Orleans Times-Democrat, in which it is implied that this quarantine station is responsible for the outbreak of yellow fever which has just occurred on the nearby coast.

The article in the Herald contains an abridgment of a long interview given out by Dr. ———, in which he recalls that Dr. ———, of the Mississippi State board of health, prophesied last year that this station would be the cause of yellow fever on the coast, and says that the prophecy has come true, while at the same time he acknowledges that there is no present proof that the fever came through this station.

The New Orleans Times-Democrat of September 8 publishes this interview in full, and bases its editorial on it and on the charges made against this station by Dr. ——— last year, charges which I answered in my report of March 18, 1897, and which were recognized as notoriously false and unjust by people familiar with affairs on Ship Island and the coast.

The whole argument is *post hoc, propter hoc.* The first statement to note, referring to the present time, is in these words:

"There has never been sufficient isolation or separation there."

This is a misrepresentation. The separation between the quarantine anchorage and the main harbor is complete. Vessels discharging ballast lie about 2 miles from the vessels in quarantine, and those in the loading berths are 4 miles away.

I number, consecutively, other quotations from the editorial:

(2) "The infected vessels going into quarantine have to pass between the healthy ones."

This is a misrepresentation. Vessels come through Ship Island Pass half a mile to a mile away from the nearest shipping, and do not come through the shipping to reach the quarantine anchorage.

(3) "Excursionists visiting Ship Island and bumboats and peddling vessels mingle almost indiscriminately with the crews of vessels which are supposed to be in quarantine."

This statement exceeds the charges in inventive mendacity. Such a thing has not been seen nor heard of here, nor anything to excuse such a story.

(4) "There is no trouble for one of the crew of these infected vessels to slip ashore in the skiffs or small sailboats to be found skirting the fleet at Ship Island."

Utterly false and absurd. It would be a great deal of trouble to cross 10 miles of open sound in a skiff or small sailboat, and such craft do not skirt the fleet.

(5) "There have been stories of mattresses washed ashore from infected vessels and other circumstances to increase the danger."

I have never heard of such stories, and if they are told they are without foundation.

(6) "Excursion vessels ran from the shore to Ship Island, and the passengers came in contact with the ships just out of quarantine and boarded them at pleasure."

Vessels are not released from this station until they are perfectly safe and their freedom from infection has been proven. Excursionists may then visit them not only at pleasure, but with security.

(7) "It was further asserted that the quarantine officers frequently went alongside of incoming vessels, and after inspecting them would then visit the excursion steamers as though they had not been exposed to contagion."

Utterly false.

The article in the ——— contains but one further statement which can be picked out for remark. It is as follows:

"It has been learned that persons who attend yellow-fever patients at the station have time and again met visitors from shore on a barge anchored halfway between the coast towns and the quarantine station, and this practice, it is feared, has led to the introduction of the disease into the towns."

This is utterly false. Such a thing has never taken place at this quarantine station during the two seasons that I am able to answer for.

It is appropriate here to describe briefly the methods by which the spread of infection from this station and from vessels arriving here is guarded against.

The transfer barge is placed on the southwest limit of the anchorage, a mile and a half from the executive building and a like distance from the anchorage for infected vessels. The mail and mail bag and other articles which are to leave the station are fumigated over night and are taken to the transfer barge before 7 o'clock in the morning and are left there. After the transfer boat from Biloxi has made the exchange, the station's men go again and bring away the articles left for us. Exceptional pains has been taken this season to avoid unnecessary contact with the outside world, and isolation has been successfully maintained.

When a vessel enters quarantine it is inspected promptly, and if any case of sickness is found the patient is removed ashore at once. If the case is infectious or suspicious the patient is put in the lazaretto, and the attendants waiting upon him are as separate from the others as if they were on another island.

The majority of vessels are disinfected the day of arrival, and if a vessel has a bad history disinfection is begun at once at all hazards. In this way the danger from an infected vessel is removed immediately, so far as this can be done in one day. An infected vessel having ballast is disinfected both before and after the discharge of ballast. During the detention of a vessel in quarantine the crew is examined and accounted for daily.

When a patient is confined in the lazaretto everything that comes in contact with him and everything that comes from his body is disinfected, and when the building is emptied it is disinfected, however often this may happen. By these means I consider that the station is kept from ever becoming infected.

In all that has been published concerning the present outbreak of yellow fever on the coast, I have only seen two items that are intended to connect fever directly with this quarantine. The first is the case of Captain Lyons, of Scranton, the same case referred to in the clipping from the New York Sun sent me in Bureau letter of September 11. It has been given out that Captain Lyons got yellow fever by speaking the British brigantine *Estella* before her disinfection at this station, in August, and as the report has spread it has been made to say that he boarded the vessel in quarantine. I will give the real history of the matter.

The *Estella* came in sight of Ship Island in very heavy weather August 18, 1897. She anchored several miles outside and put up a distress signal. The tug *Nellie*, Captain Lyons master, went to her and stood by to windward, barely within hail-

ing distance, for a few minutes only, and then left her. She was seen from the quarantine station, and the gale was so heavy that no boat could have lain alongside and nobody could have boarded her. Captain Lyons had no other communication with the *Estella*, and he was not taken sick until September 3, sixteen days later.

This theory of the introduction of yellow fever to Scranton is published as coming straight from the secretary of the ——— State board of health. Considering that the ——— health board bases its quarantine procedure on the supposition that the incubative period of yellow fever does not exceed three days, this is an extraordinary theory to be promulgated by the secretary of the board.

The second statement referring to this station was published in the New Orleans Times-Democrat of September 11, claiming to come from Sheriff Moore, of Jackson County, Miss., and was to the effect that I took a party from the quarantine station on board the U. S. S. *Montgomery*, while she lay at this port in August. This is not true, and coming with the purpose that it does at this time I can only characterize it as malicious. Neither I nor anyone connected with the station was on board the *Montgomery* during her stay here.

In contrast with this report concerning me is a statement in the New Orleans Item, made by the former pilot of the State quarantine Steamer *New York*, which says that the *New York* ran excursions from Pass Christian to the *Montgomery* during the latter's stay at Ship Island. The *New York* is controlled by Dr. ———, and earlier in the season was used in the disinfection of a vessel from a suspected port.

Not a single fact has been discovered to connect the present outbreak of yellow fever with this quarantine station or with the shipping entering here by regular channels, and I am sure none exists; but it is clear that the health officers of the coast intend to make the Gulf Quarantine Station their scapegoat, wherever the responsibility may be lodged.

In conclusion, I wish to call attention to the position of Ocean Springs, on this coast. The town is situated on the northeast shore of Biloxi Bay, on the Louisville and Nashville Railroad. Outside and across the mouth of the bay Deer Island stretches for 5 miles, lying directly between the bay and the waters surrounding Ship Island. Ocean Springs is not a shipping port, has no lumber trade nor bumboat trade, no tugboats, and no association of any kind with this island and the shipping here. It is the least exposed of all places on the Mississippi coast to dangers from the shipping in this harbor. On the other hand, if there is any danger to be feared from other parts of the coast outside the State, it is exposed to this in large measure. The visiting population in summer is estimated to be nearly or quite equal to the resident population, and comes from New Orleans and Mobile and other places on the coast and in the interior.

Other theories of the origin of the fever besides the spiteful outcry against this station have been broached, but as I know nothing of their likelihood and have no means of testing it, I will not deal with them in this letter. The New Orleans ——— divides its accusations between Ship Island and Mobile, and says that both are responsible for the calamity. What Mobile's reply is I have not heard.

Very respectfully, yours,

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

GULF QUARANTINE STATION, *November —, 1897.*

SIR: I have the honor to acknowledge the receipt of an extract from the New Orleans Times-Democrat of October 25, in which charges are made against the conduct of this quarantine station by Dr. ———, of the Mississippi River quarantine

station, and I return the clipping herewith, together with a copy of a reply addressed by me to the editor of the Times-Democrat.

My reply is a somewhat general defense, and answers not only Dr. ——— charges, but several other attacks.

Very respectfully, yours,

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.

SURGEON GENERAL MARINE-HOSPITAL SERVICE.

[Inclosure.]

GULF QUARANTINE STATION,
Ship Island, November 1, 1897.

EDITOR NEW ORLEANS TIMES-DEMOCRAT:

So much has been printed, from various sources, about the national quarantine station at Ship Island, in connection with the present epidemic of yellow fever on the Gulf coast, that I believe the public will be interested in a statement from the officer in charge of the station. I have refrained from appearing in the matter to any extent until very recently, partly because I hoped an honest investigation of the subject would be made by some of the many local people who are interested in the health of the coast, and partly because I have been waiting to see some definite charge tending to connect the epidemic directly with this station. There is no one in the United States more interested than I am in tracing the epidemic to its source, but I do protest against the many vague and extravagant charges which have been made by newspapers and individuals who have no knowledge of the facts and no evidence to support their outrageous statements, and particularly I wish to call the attention of both public and health officers to the fact that nothing is gained, but all is lost, by accepting a false theory of the origin of the fever and failing to find the real source of danger. It is of the utmost importance not to lose the true scent altogether by stopping to bark, and little or nothing has been done so far except to bark at Ship Island, with an occasional yelp at Mobile.

At the very beginning of the present excitement the secretary of the ——— board of health came out in an interview, which was given to the newspapers generally, in which he expressed the opinion that the epidemic would be traced to Ship Island, but said that there was no present proof. I have seen nothing from Dr. ——— on the subject since, and believe he has never discovered the evidence sought. Indeed, he acknowledged that the quarantine was well isolated, claiming the credit, however, for the State board of health.

The ——— ——— took up this interview in a leading article, and added an array of extraordinary charges, which I take occasion here to pronounce absolutely false severally and in full. It is not necessary to take up these charges individually. The ——— ——— gave no source of information, nor evidence, nor specific instances which could be traced up. It has not since published any evidence in support of its charges.

The latest and most conspicuous attacks on the station have come from Dr. ———, of the Mississippi River quarantine station, and Dr. ———, of Chicago. Both are alike remarkable for their lack of correct information of the actual situation at Ship Island and for the lack of any effort to obtain information.

Dr. ———'s article is an attempt to establish, by a process of inductive reasoning, a question of present fact which he knows nothing of directly and does not even pretend to know. He begins by telling how yellow fever slipped into Fort Barrancas, Fla., one year. Good. Let him be careful it does not escape past his own quarantine some time. The president of a local board of health not far away thinks he can prove it did so this year.

He says yellow fever was undeniably traced from Ship Island to Biloxi in 1886. I dispute this absolutely. There was an active and bitter discussion as to the character of the fever that year, but no evidence was ever brought forward to connect

it, whatever it was, with Ship Island. All the evidence which I have heard or seen tended to show that the first cases occurred in some oyster openers, who had just arrived from some place, I think, in Louisiana.

Dr. ——— then proceeds with some historical matters, which have since been very much lighted up by a letter from Surg. H. R. Carter in the Times-Democrat of October 26. He touches upon the great storm of 1893, and compares the Chandeleur quarantine station, built on a heap of sand in the open Gulf, with the Mississippi River station, situated many miles up the river. Finally he arrives at the abrupt statement, "From Ship Island quarantine station has come to the Southern country this visitation of yellow fever."

How does he attempt to establish this?

Argument 1.—Dr. John Guiteras has said that the present yellow-fever invasion came from Cuba. Several vessels have come from Cuba to Ship Island this season. Ergo, yellow fever reached the coast from Cuba through Ship Island.

But did no vessels reach New Orleans from Cuba this year, and does not the ergo apply there as well? Does Dr. ——— mean to say that the 10 vessels cited by him are the only ones from Cuba to the Gulf coast this season, and that none came through any port except Ship Island?

Argument 2.—This is a touch of poetry. The Doctor pictures the masters and crews of vessels and their wives and sweethearts and friends rushing into each other's arms across Mississippi Sound as soon as the first night falls. It is pretty, but it exists only in the Doctor's imagination. Poetry and fact are often at variance, and are so in this instance.

Argument 3.—Colon, a highly infected place, is another port from which some vessels have sailed to Ship Island. *Ergo* again, as in argument 1 and with equal absurdity.

By the same method of inductive reasoning, Dr. ——— attempts to reverse the diagnosis of 7 cases of disease treated in hospital here, and claims to find something in this. I have already commented upon this absurd reasoning in a previous letter.

The whole argument is absurd, for when yellow fever does come here, whether from Havana, or Colon, or New Orleans, the station is perfectly adapted to care for it and is here for that purpose. The greater number of vessels he can show to have come to Ship Island from Cuba and Colon the greater value he gives to the station.

The accusations against the station made by Dr. ———, of Chicago, has attracted a great deal of attention, but I will not dwell upon them at length. It seems strange that the people of this part of the country should look to Chicago for evidence of things which are right under their noses; nevertheless, when Dr. ——— says that Ship Island is only 5 miles from the mainland and is surrounded by shoal water on three sides, the newspapers print it after him in great glee, and refer to it as an argument against Ship Island quarantine station.

* * * * * * *

The fundamental part of his whole argument is his false account of the geography of Ship Island. There is no excuse for this, for there are charts of these waters, issued by the Coast and Geodectic Survey of the United States, which are readily accessible to all and absolutely reliable.

By far the most important item that has yet been published has appeared in an interview from Dr. ———, of New Orleans, in the Picayune of October 27. It is there made public that a case of yellow fever arose in New Orleans in May or early in June of the present year, and the sufferer, Dr. ———, had not been out of the city for the seven days preceeding the attack. This carries the infection farther than has before been known.

In the fashion of the day, Dr. ——— heaps his curse upon the universal scapegoat, Ship Island quarantine, and in order to do so he claims a period of incubation of nine days, and advances a theory of infection which is contrary to facts that I can positively prove. The subject is under investigation now, and I only want to say here that I can completely disprove Dr. ———'s charges when all is brought out.

I would like to give a short description of the situation of the quarantine station and the manner of conducting it, as they really are. Ship Island is 8 miles long and is somewhat curved in outline, the extreme eastern end being 9 miles from the nearest part of the coast, and the western extremity 12 miles. Mississippi Sound separates it from the mainland and is so deep that large steamships pass through it from Ship Island to Horn Island. The island is in two parts, joined by a long, low neck of sand, sometimes cut in two by the tide. The lighthouse, fort, and ruins of the old national board of health wharf are at the west end, and the quarantine station is on the eastern portion, the buildings being 10½ to 10¾ miles from the nearest part of the coast. The quarantine buildings are separated into two groups by a lagoon, the administrative department being on the west and the isolation hospital on the east of this lagoon.

Parallel with the slightly concave shore of Ship Island, and half a mile out, is a deep channel the full length of the island. The eastern part of this is reserved for the quarantine station, and the western part is the harbor. The vessels lying in the two anchorages are separated by an average distance of 4 miles, and those in quarantine are completely isolated from those in the loading berths. There is a general quarantine anchorage, and to the east a special anchorage for infected vessels, both being well marked with buoys.

The method upon which I have mainly relied to prevent the possibility of any spread of infection from or in the station is to destroy all infection as soon as it reaches quarantine. To this end, a sick person is removed from the vessel at once and taken ashore, his body is bathed in bichloride solution, clean hospital clothing is put on, and his own clothing and effects are thoroughly disinfected. The vessels are disinfected as promptly as possible after arrival. After disinfection they are, of course, no longer infected, and the subsequent detention is only for the purpose of seeing whether any new infection is going to arise in the crew within the period of incubation of the disease guarded against.

Following this system, I have enabled several nonimmune persons to live at the station without danger. For dealing with the infected vessels immediately on arrival there were two immune assistant physicians at the station this summer and several immune attendants. I can confidently assert that I have prevented the lazaretto itself from becoming infected, and I offer proof of this. Contrary to the theory of quarantine, I employed a nonimmune nurse to tend yellow fever here, only requiring that he should be capable, reliable, and not afraid of that disease. During the present epidemic there has been a large number of local cases of the fever treated at the station, and this nonimmune nurse has lived for weeks continuously in the hospital, not leaving its immediate vicinity night or day, and has not contracted yellow fever. This is certainly a physiological test.

In regard to the wild statements about communication with the outside and about persons stealing ashore at night and troops of "nurses" going on excursions and meeting people on wharves, they are all absolutely false. These things can not and do not take place here. During the quarantine season the station lives apart from the rest of the world.

I am ready to explain anything about this quarantine to anyone who is interested in the truth, and I refer to others who are familiar with the situation here, only protesting against extravagant charges from persons who do not know what they are talking about. Notwithstanding the opposition of the Mississippi State board of health to the location of the station on Ship Island, I do not hesitate to refer to Dr. H. M. Folkes, State quarantine physician for Cat Island, and to Dr. B. F. Duke, State quarantine physician for Round Island, as to the health of vessels released from here, and to Dr. Folkes as to the location of the station and facts regarding its conduct, of which he has knowledge. I also invite statements from any others who are in a position to know the actual situation at Ship Island and what takes place here.

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.

LETTER PUBLISHED IN THE LOUISVILLE MEDICAL MONTHLY, NOVEMBER, 1897.

EDITORS LOUISVILLE MEDICAL MONTHLY:

My attention has lately been called to an article in the Texas Medical Journal reflecting on the conduct of the United States gulf quarantine station, of which I am in charge, and to some other attacks upon the station in journals published at a distance from the scene of events.

Although a great outcry was raised by a few people against this station as soon as the present outbreak of yellow fever was discovered on the neighboring coast, I have not taken the trouble heretofore to make any public denial of the charges, partly because everybody familiar with affairs at this port knew them to be false, but chiefly because not a single fact has been published to connect the epidemic of fever with this station or with any vessel that has undergone quarantine here. Much currency, however, has been lately given among people at a distance from the sources of information to absurd charges against the conduct of the station, and I avail myself of the courtesy of your journal to make a brief answer and present the real condition of things.

It would be hard to catalogue all the various statements that have been made, but it has been represented that little distinction is maintained here between vessels in quarantine and those outside; that the station is unguarded; that excursionists visit vessels in quarantine; that fishermen frequent the anchorage and the shores; that there is free direct communication between the station and the coast; that sailors desert vessels in quarantine, and that it is possible for them to wade ashore from Ship Island; that the place is a pesthole, breathing death for miles around, and so forth. These charges are all absurdly false, and can best be answered by giving a description of the station as it is.

The Gulf quarantine station is situated on Ship Island, at a point between 10 and 11 miles from the nearest part of the coast, and the anchorage occupies the northeastern portion of the ship's channel, the northernmost buoy lying full 9 miles from the opposite shore. The portion of the anchorage to the west is the general anchorage, four miles distant from the main harbor, and the anchorage for infected vessels is to the east, a mile farther away from the harbor. These anchorages are plainly marked with buoys, and the separation from the main harbor is complete and perfectly maintained. The anchorage is guarded with vigilance, but there is little trouble in this direction, as the quarantine limits are generally respected, and neither fishermen nor others venture inside them during the quarantine season. Within the island is a lagoon separating the administrative buildings on the west side from the lazaretto on the east.

During the active quarantine season the station lives to itself, and is as much separated from neighboring places as if it were many miles farther away. In addition to this, every precaution is taken to keep the station from becoming infected with yellow fever, and I can confidently assert that this is successfully accomplished, even with the lazaretto itself. Those who are acquainted with yellow fever sanitation know that this can be done, if the physician has sufficient control of the patient and surroundings.

Vessels are inspected promptly on arrival, and if any case of sickness is found the patient is removed ashore at once. If it is infectious or suspicious the patient is put in the lazaretto and isolated from the rest of the station. The majority of vessels are disinfected the day of arrival, and if the vessel has a bad history disinfection is begun at once at all hazards. In this way the danger from an infected vessel is removed immediately, so far as can be done in one day. After the completion of the disinfecting process the crew is examined and accounted for daily till the detention period is passed.

As to this being a refuge station constantly filled with yellow fever, I have to say that during the season of 1896 not a single case of that disease was received here, and during the present season only one case prior to the outbreak at Ocean Springs.

The Texas Medical Journal makes use of the following expression: "Should yel-

low fever slip by him at Sabine Pass, as it evaded the Marine-Hospital Service at Brunswick, Ga., in 1893, and at Biloxi, Miss., in 1882, and at Ocean Springs in 1897, * * *." I deny this unjust representation from beginning to end. There has never been the slightest foundation for any part of it.

The origin of all the present attack was from an effort on the part of the Mississippi State board of health to supplant the national quarantine system on this coast with a State system. To this end a set of remarkable charges was made last year against the conduct of the Gulf quarantine station, and these were published in pamphlet form and quite widely distributed. Early in the present year a State quarantine, located on Cat Island, was equipped, and there it was proposed to treat and detain vessels from any infected or suspicious port. Notwithstanding the objection which had been made to the nearness of the Ship Island station to the coast, the Cat Island station was still nearer, being only 8 miles away, and the anchorage extending to within 6 miles. The Cat Island station had no hospital, but it was intended to treat cases of yellow fever in tents, and to leave cases not adjudged infectious aboard their vessels. This was the quarantine which was to supplant the national system; but the Secretary of the Treasury did not give his approval, and it failed.

The present epidemic on the Mississippi coast has given the opportunity for a new outcry against the Gulf quarantine station, to those who were determined beforehand to convict it; but so far the antagonists of the station have brought forward nothing to support their theory, and have had to content themselves with pointing out that the quarantine station is here and the yellow fever there. As a matter of fact, Ocean Springs, where the fever was first found, is not a shipping port, and has no association with Ship Island. It lies on Biloxi Bay, sheltered by Deer Island from the waters surrounding Ship Island. It is not frequented by sailors, but by pleasure seekers from a large section of the Gulf coast, in other States as well as Mississippi.

A. C. SMITH,
Passed Assistant Surgeon, M. H. S.

GULF QUARANTINE STATION, *October 14, 1897.*

STATEMENT BY HON. A. M. DAHLGREN, COLLECTOR OF CUSTOMS SHIELDSBORO DISTRICT, MISSISSIPPI.

BILOXI, MISS., *September 11, 1897.*

First. Fever did not originate in Biloxi, the place it is claimed by the Mississippi board of health that communicated so freely with the shipping at Ship Island, but at Ocean Springs, where no communication is charged with Ship Island, and from that point it was carried several weeks later to Biloxi.

Second. No excursionists or other parties ever went aboard of vessels in the quarantine grounds or mingled with the crews of vessels so detained.

Third. The first authentic cases of yellow fever at Ocean Springs were among the wealthier and better class of visitors there, and not of the "bumboat or peddling class," as is alleged, that visited infected vessels.

Fourth. The national quarantine officers never went on vessels coming in or alongside of them and then visited excursion steamers, for the incoming vessels have to report within the quarantine limits, which are marked off by buoys, inside of which no other vessel is allowed to come on pain of being detained in quarantine, as other vessels are, and the law strictly enforced.

Fifth. Ship Island quarantine is some 13 miles from the main shore, and too far and dangerous for skiffs to reach main shore, as if it was attempted both the quarantine officers and the master of the vessel would know it.

Sixth. If Ship Island is a dangerous place for the national quarantine, then why did the Mississippi State board of health establish their State quarantine station at Cat Island, only a few miles distant, and nearer the main shore than Ship Island?

Seventh. If the Ship Island Station is dangerous and ought to be moved, then will not the State occupy it with their station if they can get it?

Eighth. Vessels coming to Ship Island quarantine do not have to be brought right through the shipping that is loading at west end of Ship Islaad, but pass not nearer than 2½ miles of it.

Ninth. Why is it that the State of Mississippi expends so much money to run the Cat Island station when the Ship Island station costs the State nothing?

A. M. DAHLGREN,
Collector of Customs.

TRANSACTIONS RELATING TO THE SAN FRANCISCO QUARANTINE.

As shown in the previous annual report, by request of the local quarantine authorities at the port of San Francisco, the quarantine certificate of the national quarantine officer was required prior to the admission to entry of incoming vessels from foreign ports. There was nothing in this arrangement that forbade the exercise of the quarantine function on the part of the local quarantine authorities. It seemed a confession of their want of confidence in their own quarantine officer; nevertheless it was claimed under their State laws they were obliged to continue their exercise of the quarantine function. There was an effort made for an understanding between the local and the national quarantine officers for the harmonious performance of the quarantine inspection duty by both officers. As might have been expected, this double exercise of the function did not prove harmonious, and testimony was collected and put in due form to warrant Presidential action under the provisions of section 3 of the act of Congress approved February 15, 1893.

The details are sufficiently set forth in the following correspondence, but it is proper to add that public sentiment, as expressed in the public press of San Francisco, in a resolution of the chamber of commerce, in a resolution of the State legislature, and in a letter received from a United States Senator and two Representatives from California appeared unanimous in demanding that the quarantine function be placed exclusively in the hands of the national quarantine authorities.

The following is a copy of a letter received from the local quarantine officer at San Francisco, addressed to the Secretary of the Treasury, making complaints against the national officer:

SAN FRANCISCO, *January 20, 1897.*

DEAR SIR: I beg leave to call your attention to a conflict between the State and United States health and quarantine authorities at the port of San Francisco.

I am the regularly and duly appointed quarantine officer of the board of health of the city and county of San Francisco, whose right of appointing power is regulated by the political code of the State of California. My duties are defined by the regulations of that board as well as by the State laws contained in what is known as "The Political Code of the State of California."

I herewith inclose a pamphlet containing that portion of our political code which relates to the subject in hand, and I beg leave to call your attention to certain sections, to wit: 3014, 3015, subdivision 2, 3017, and 3018.

You are doubtless familiar with the provisions of the act approved February 15,

1893, relating to "quarantine laws of the United States." (Refer to section 1, lines 1, 2, 3, 4, 5.)

Section 3 of the same act, which I inclose, on account of its length will not quote, referring to marked lines 1, 2, 3, 4, 5, 6, 20, 21, 22, 23, 31, 32, 33, 34, 35.

And it also further limits the duties and jurisdiction of the United States authorities to such States and municipalities as have not, in the opinion of the Secretary of the Treasury, sufficient quarantine regulations to prevent the introduction of diseases to be provided against, or those possessing such failing or refusing. (Line 35, section 3.)

I beg to state the State of California and the city and county of San Francisco have provided the means and methods for thorough examination of quarantinable diseases.

Every suggestion offered by the Surgeon-General of the Marine Hospital or any of his duly authorized agents to the board of health of the city and county of San Francisco, or to myself, have been cheerfully complied with; but for some reason which I do not understand, an effort seems to have been made to take the whole matter of quarantine of the port of San Francisco out of my jurisdiction and place it in the hands of the United States authorities, where I respectfully suggest it does not belong under the laws as they exist.

As you will observe by the laws heretofore quoted (section 3014), the quarantine officer of this port must board a vessel before passengers or freight are permitted to be landed, and it is also his duty under (section 3014) to prevent any communication with the shore until the quarantine officer of this city and county has given the necessary orders and directions, and under (section 3017) until the quarantine officer has boarded and given the required orders by law no foreign vessel is permitted to cross the quarantine line, and under (section 3018) it is the duty of the quarantine officer of this port to determine the period of quarantine of all vessels subject to quarantine which arrive at this port.

In many instances the United States quarantine officer has taken from incoming vessels their bills of health (hereafter mentioned), so that when said vessels were boarded by myself there were no data upon which I could base any opinion as to the condition of the vessel or of the port of departure. This, of course, has very seriously hampered me in my duty. This is a very serious grievance, as you can well understand, when I state that the original bill of health is required at the custom-house, and the duties of my office require me to file the duplicate with the board of health of the city and county of San Francisco. Of course when such papers are taken by the United States authorities I am unable to comply with my duties as they are fixed by law. This course has been pursued with reference to certain vessels arriving here from foreign ports (hereafter mentioned).

The United States quarantine officer upon a number of occasions has given authority to the captains of vessels from foreign ports to go ashore before the quarantine officer of this port has inspected the vessel and granted the necessary permit, as absolutely required by our local quarantine regulations (section 3014).

The United States quarantine officer upon several occasions has brought the captain of vessels subject to quarantine ashore on his own boat without waiting for the local quarantine officer to board the vessel, thus rendering it impossible for that official to perform any of the duties required of him by law.

The United States quarantine officer has made it a daily practice to board a vessel and make inspection prior to the arrival, if possible, of the local quarantine officer, grant free pratique, and depart; this course absolutely nullifying the intent of the law with reference to quarantine, as it is the duty of the United States quarantine officer to see that the inspection of the vessel by the local authorities is properly carried out. This, of course, is utterly impossible if the United States quarantine officer conducts the inspection and departs before the arrival of the local officer.

This action has occasioned a great deal of annoyance to shipping people and to

passengers at this port. The shipowners and captains are uncertain of authority, and consequently have been put to very great trouble and inconvenience on account of this method of procedure, arising from apparent conflict of authority.

This grievance is a very serious one and one of very recent growth, because for many years the State authorities have conducted quarantine matters at this port, and shipowners and captains have been accustomed to act under their orders and are familiar with their mode of procedure. Each pilot has been furnished with a printed copy of the local quarantine laws, as required by (subdivision 4 of section 3015).

A very serious grievance of which I complain, according to the United States laws governing quarantine, is the general lack of cooperation, occasioned entirely by the United States officer, which renders it utterly impossible under the present system to properly carry out the quarantine laws, either State or Federal.

I beg to submit the following grievances, which I respectfully suggest should be remedied by an order from the Secretary of the Treasury, if in his judgment they are considered proper.

GRIEVANCES.

1. Taking bills of health from British ship *Carleton* July 2, 1896 (reference section 3014).

2. Taking duplicate bill of health from British ship *Drummuir* December 6, 1896 (reference section 3014).

3. Same complaint, British ship *Sutlef* December 6, 1896.

4. Ship *Mary Dodge* arrived November 26 from Kahului; captain had gone ashore before my arrival with the permission of United States quarantine officer, Dr. Blue, who told him he was free to go ashore, and granted free pratique (reference section 3014).

5. Ship *Pitcairn* arrived November 26; United States quarantine officer told him he was free to go ashore, and granted him free pratique (reference section 3014).

6. Ship *Andromeda* arrived November 24, 1896; United States quarantine officer told him he was free to go ashore, and granted him free pratique (reference section 3014).

7. Steamer *Protection*, Capt. C. Ellefson, arrived November 29, 1896, from Mexican ports, under oath states United States quarantine officer told him he could go to the dock passing quarantine line and go ashore as soon as he liked (reference sections 3017, 3014).

8. Steamer *Costa Rica*, October 24, 1896, from Panama; United States quarantine officer told him everything was all right and could go to the dock, again passing quarantine line (reference sections 3014, 3017).

9. Ship *John C. North*, same complaint; same reference.

10. Steamer *Newport*, from Mexican ports, with passengers and cargo, was admitted by United States quarantine officer to dock after I had ordered her detained, as she had arrived after daylight, and inspection was illegal according to United States quarantine regulations (reference sections 3014, 3015, 3017).

11. Steamer *Mariposa* arrived September 24, 1896, with heavy passenger list, from Australia; captain was told by United States quarantine officer he could go ahead to the dock, crossing quarantine line, and passed by boat without waiting for me to board, while I was attempting to board and inspect (reference section 3017).

12. Steamer *Belgic* arrived October 7, 1896; was told by me, as State quarantine officer, that he was free to enter port on account of clean bill of health and inspection proving satisfactory; United States quarantine officer countermanded my order (reference section 3018).

13. Bark *Albert;* Captain Griffiths was told by United States quarantine officer he could go ashore, was given free pratique, and landed passengers before my inspection as State quarantine officer.

14. Steamer *Walla Walla*, from Victoria, British Columbia, with one Japanese on board, which the local authorities, by a resolution passed, would remand to quaran-

tine station for disinfection, was taken by United States quarantine officer ashore before the local quarantine officer had time to make the proper inspection and while he was on board of said vessel inspecting the steerage passengers. To this grievance I particularly call your attention.

You will doubtless observe from a consideration of sections heretofore mentioned that some conflict might arise between the State and Federal authorities, and in fact such conflict has arisen, to which I submit the following protests for consideration and adjustment:

PROTESTS.

1. The right of the United States quarantine officer to give a certificate, as it gives free pratique.

2. The right to dictate or advise as to passing quarantine grounds or placing in quarantine any vessel or persons subject to quarantine as conflicting with State laws (reference section 3018).

3. Telling any captain he is free to go ashore before the State quarantine officer has inspected and given permission (reference section 3014).

Or bringing any person from a vessel until he has been inspected by local quarantine officer (reference section 3014).

4. Priority of inspection (reference United States laws, section 3, lines 4,5. State law, section 3015).

5. Detaining any vessel after I have given permission to enter port (particular reference section 3018).

6. General lack of cooperation (reference United States laws, section 1, 3).

7. By giving permission to persons desirous of visiting passengers or in a business capacity to board any vessel subject to quarantine before my arrival (reference section 3015, subdivision 2).

In conclusion I will state, as quarantine officer of port of San Francisco, legally appointed under the laws of the State of California, for the last nineteen months I have performed all the duties required of me by the laws of the State of California, of the United States, and of the board of health of San Francisco. I am provided with a steamer, with all the necessary equipments, and am furnished everything necessary to properly perform the duties required under the State and local laws.

As stated before in this communication, I have heretofore complied with every suggestion made by the United States authorities, but have been interfered with in a way which I consider unwarranted by law.

I have offered every service at my disposal to cooperate, namely: At any and all occasions an invitation to the United States quarantine officer to accompany me and witness inspection on any vessel arriving subject to quarantine rather than precede and grant free pratique, which I deem illegal and improper. In this I believe the United States law has been satisfied. Rather than inflict penalties when possible for violation of State law, I offer this communication for your consideration, as the service and authorities at this port consider themselves entirely competent to protect against the introduction of disease.

Hoping you will examine into the competency of those in charge of quarantine matters here, the grievances here, and protests heretofore mentioned, and adjust accordingly.

Respectfully submitted.

W. Z. CHALMERS, M. D.,
Quarantine Officer.

Hon. J. G. CARLISLE,
Secretary of the Treasury, Washington, D. C.

We, the undersigned members of the board of health of the city and county of San Francisco, have read the foregoing statement of Dr. Chalmers, and it states the facts as we believe them to exist.

We trust that the Secretary of the Treasury will do what he can to harmonize the differences which seem to exist between State and Federal authorities.

JAS. D. PHELAN.
JOHN F. MORSE.
GERALD G. FITZGIBBONS.
HENRY H. HART.
JOHN M. WILLIAMSON.

[Seal health department, San Francisco.]

Attest:
EDMOND GODCHEAUX, *Secretary.*

[Telegram.]

SAN FRANCISCO, CAL., *January 22, 1897.*

Hon. JOHN G. CARLISLE,
Secretary of the Treasury, Washington, D. C.:

San Francisco board of health hereby protests against action of Federal quarantine officer in boarding vessels and removing passengers therefrom, also granting free pratique in absence of and without cooperation of State quarantine officer. Explanation to follow in letter.

JAMES D. PHELAN,
Mayor and ex officio President.
JOHN F. MORSE,
G. G. FITZGIBBONS,
H. H. HART,
J. M. WILLIAMSON,
Board of Health.

Soon after receipt of foregoing letter the following telegram, which is in itself a comment thereon, was received from the national quarantine officer:

PORT OF SAN FRANCISCO, CAL., SURGEON'S OFFICE,
Angel Island, January 24, 1897.

Surgeon-General WYMAN, *Washington, D. C.:*

Bark *Snow & Burgess*, from Sydney, arrived before sunset last night, but not visited by local quarantine officer until this morning. Steamer *City of Pueblo*, from Victoria, arrived early this morning and boarded by me at the quarantine anchorage at sunrise. Not boarded by local quarantine officer at all, but met by him after she had docked and half an hour after gang plank was out. Surely such continued negligence can not be overlooked.

ROSENAU.

RESOLUTION OF CHAMBER OF COMMERCE OF SAN FRANCISCO, URGING SHIPOWNERS TO RESIST PAYMENT OF QUARANTINE FEES TO LOCAL QUARANTINE OFFICER AND OFFERING FINANCIAL AID IN ANY SUIT.

JANUARY 22, 1897.

To American shipowners using the port of San Francisco.

GENTLEMEN: The present conditions connected with the quarantine establishment at this port are well known to you as unjust and objectionable to all ships arriving from foreign ports. This Chamber of Commerce has for years contended that the quarantine service should be under Federal control at all United States ports, and has been pleased to observe the acceptance of this view in actual practice. Thus we have now both a Federal and a State quarantine service at this port, only recently in contention with each other as to their respective rights.

The controlling factor, however, is that the collector of customs will recognize only the certificate of the United States quarantine officer and ignores that of the State. The former service is rendered free of cost, while the latter is charged against the ships. The State government possesses no quarantine facilities, while the United States has a properly equipped station. The State service is worthless for the public good, and an unnecessary tax on an interest already unjustly burdened with taxation. The delay, annoyance, and at times danger of two stoppages at or near the entrance of the port is also a serious and proper cause of complaint on the part of the shipowners, pilots, and masters. An effort will be made to have the State quarantine law repealed at the present session of the legislature. In the uncertainity of success in obtaining repeal we respectfully suggest that parties in interest apply a prompt remedy by a joint refusal to pay the State quarantine duties, at the same time an unnecessary and unjust exaction on our maritime commerce.

The board of trustees is respectfully suggesting to shipowners and agents resistance to this useless burden placed upon our shipping, volunteers to join in their defense whenever a test may be made, and so far as within its means to aid in the litigation, which may possibly but not probably ensue. We are confident that the remedy is in the hands of the shipowners if they will refuse payment of this unjust demand. We may properly commence our efforts in behalf of the shipping interest of San Francisco by contesting this vexatious and unjust annoyance.

THE CHAMBER OF COMMERCE OF SAN FRANCISCO.

By order of the board of trustees.

HUGH CRAIG, *President.*
WM. L. MERRY, *Secretary and Treasurer.*

REPLY OF THE NATIONAL QUARANTINE OFFICER TO THE LETTER OF THE LOCAL QUARANTINE OFFICER OF JANUARY 20, 1897.

PORT OF SAN FRANCISCO, CAL., SURGEON'S OFFICE,
Angel Island, February 7, 1897.

SIR: I have the honor to make the following statement relative to the conduct of quarantine at this port, and also to include an explanation of certain statements made by Dr. W. Z. Chalmers, the local quarantine officer, in his letter of January 20 to the honorable Secretary of the Treasury:

Peculiar conditions of the port relative to quarantine.—There are peculiar conditions existing at this port which render it particularly necessary for the quarantine officer to be watchful and active in the execution of his duties.

The anchorage is immediately off the city front. The bay is infested with agents, runners, solicitors, tradesmen, and others, who in small boats keenly vie with each other to board all incoming vessels as soon as possible. The commercial competition between these men is so keen that it is a recurring menace and a source of constant anxiety to the quarantine physician.

Necessity of the boarding officer meeting vessels immediately upon arrival.—In order to prevent these boatmen from boarding and leaving vessels and possibly carrying contagious disease into the city, it is essential that the quarantine officer be constantly on duty from sunrise to sunset, and board and examine vessels immediately upon entering the Golden Gate. It is only by such a procedure that a safe quarantine can be conducted.

The Federal quarantine officer is constantly on duty and is alert to prevent violations of the law, and the need of the same precaution has been strongly urged upon the local health authorities. It is plainly incompatible with the conduct of proper quarantine at a large and busy port for the quarantine officer to be engaged in an active private practice and other affairs that continually interfere with his presence on the water front.

As a result the local quarantine officer is habitually late, and in consequence the quarantine laws and regulations are frequently violated.

Temptation to leave ship.—The temptation for the captain and crew who are lying within a few cable lengths of the city wharves to leave the ship and communicate with shore is very great, and, as will be shown, this has frequently occurred before the local quarantine officer makes his appearance. In fact, captains have sometimes been obliged, after waiting an unreasonable time, to take their bills of health ashore to find the local quarantine officer. (See inclosure No. 28.)

Concerning the violation of the law and the negligence of the local quarantine officer.—It will be seen by the inclosed correspondence (Nos. 1, 2, 25, 26, 27, 28, 29, 30, and 31) that the local quarantine officer has been guilty of misdemeanors which have threatened our country with epidemic disease, and that the local health authorities were duly notified in writing (inclosures Nos. 1 and 2) of these misdemeanors and of the general negligence and inefficiency of their quarantine service, and that they acknowledged verbally the truth of this allegation to me, and apparently being unable to correct the abuses, they requested the honorable Secretary of the Treasury to cause the Federal quarantine officer to assume control of quarantine affairs at this port, as will be apparent from the following letter:

The SECRETARY OF THE TREASURY, *Washington, D. C.:*

The board of health of the city and county of San Francisco, with a view of increasing the effectiveness of the quarantine service at the port of San Francisco, a port peculiarly liable to be a starting point for infectious and contagious diseases, hereby expresses its desire that the pratique of the national quarantine officer shall be necessary to the entry of vessels at this port, in addition to any requirements of the laws of the State of California.

E. GODCHAUX,
Secretary for the Board of Health.

Some facts showing the negligence, etc., of the local quarantine officer.—The local quarantine officer issued free pratique to vessels from foreign ports without visiting the vessels, examining the circumstances, or taking any precaution dictated both by law and by reason.

This power he claimed was vested in him by the State quarantine laws (section 3019), even after the attorney of the board of health in my presence upon two separate occasions told him to be illegal.

He further left blank signed certificates granting free pratique at his office and in case he was not there the office boy issued these to agents. (See inclosure No. 26.) After these practices were discontinued as a result of our repeated and earnest solicitation, he permitted the pilot of his launch to make medical inspections of passengers and crew and to issue certificates granting free pratique which had previously been signed by the local quarantine officer.

A reference to inclosures 1 and 2 and 25 will show that in two instances the pilot, Mr. Milestone, substituted the quarantine officer upon vessels from Honolulu with passengers and smallpox on the bill of health.

The following specific instances of violation of both the Federal and State quarantine laws will be cited:

The bark *Leahi* from Kahului, Hawaiian Islands, arrived May 24 with 9 passengers, and Captain Johnson brought the bills of health to Dr. Blue at the appraisers' building, wanting to know what to do in order to comply with the quarantine regulations. The 9 immigrants were landed without being seen by the local quarantine officer.

The steamer *Walla Walla* arrived July 4 with 107 cabin and 26 steerage passengers, and neither the ship, crew, passengers, nor papers were examined by the local quarantine officer. The boat docked and passengers were landed without the local quarantine officer putting in an appearance at all.

The schooner *O. M. Kellogg* arrived September 25 from Santa Rosalie and San Marcus Island. A certificate granting free pratique was sent the boat without the local quarantine officer putting in an appearance.

The steamer *China* arrived July 19 from Hongkong and Japanese ports with a case

of smallpox in one of the Chinese steerage passengers. The malady was not recognized by the local quarantine officer, who gave the vessel free pratique.

The bark *Martha Davis*, with 7 passengers and with smallpox upon her bill of health, arrived from Honolulu August 25. A certificate granting free pratique was sent her by the local quarantine officer without himself going near the vessel.

The brig *Wm. G. Irwin* arrived about the same time and under similar circumstances, and was granted pratique in a like manner, except that in this case Dr. Milestone, the pilot of the launch, took the precaution to make a medical inspection of the crew.

The steamer *City of Pueblo*, from Victoria, arrived January 24, and despite the fact that this line of steamers has been carrying Japanese direct from the Orient, the local quarantine officer did not board her at all, but met the vessel at the wharf half an hour after the gang plank was out.

These and other violations of the law were presented in due form to the local health authorities (inclosures Nos. 1 and 2), and in order to secure a safer conduct of quarantine they requested the Secretary of the Treasury to require the pratique of the Federal quarantine officer before permitting vessels to enter at the custom-house. (Inclosure No. 5.)

Responsibility.—This placed the responsibility on the shoulders of the Federal authorities, and several of the grievances and appeals contained in Dr. Chalmers's letter grew out of the exercise of this authority.

It was nevertheless constantly borne in mind by the Federal quarantine officer that this new order did not displace the local quarantine officer nor give him the privilege of violating local laws. And he continued to be careful to cooperate with the local authorities in all proper ways.

Concerning cooperation with the local authorities.—In fact, it has ever been patent to the Federal quarantine officer that it was his duty to cooperate in all proper ways with the local authorities, and he has been careful by his own acts and by impressing his assistants with this intent of the law. In the few cases in which it seems that he has failed to cooperate with the representative of the local health authorities it was on account of the necessity to act in order to prevent the introduction of contagious disease into our country.

In other words, when the local quarantine officer was belated or otherwise failed to perform his duty it became necessary for the Federal quarantine officer to act, and in such cases as will be seen by the correspondence the local health authorities were duly notified.

In further confirmation I inclose correspondence with the local board of health, showing how in many particulars they were consulted and notified of changes as they occurred.

Concerning the grievances and appeals cited.—It will be seen that most of the grievances and appeals cited by the local quarantine officer could not have happened had he been reasonably active in the performance of his duties and had he exercised the vigilance and care necessary at a great shipping port peculiarly liable to be a focus for the starting of contagious disease.

Quarantine equipment.—It should be borne in mind that the Federal Government owns and operates the only quarantine plant at this harbor, and as it is called upon by the local authorities in all cases requiring disinfection, detention of suspects, or treatment of sick, the Federal officer must be familiar with the minute facts of the case, rendering boarding and inspection a logical necessity of the circumstances.

Recognition of infectious diseases.—The diagnosis of cholera, the plague, relapsing fever, diphtheria, etc., can only be made by bacteriological methods.

This special skill the local quarantine officer acknowledges to lack, and the facilities rendered by the Federal service in the trained hands and complete laboratory equipment here is essential for the purposes of the quarantine officer.

NOTE.—Particular attention is called to section 3018 of the State's quarantine laws, which states: "The quarantine officer must board every vessel subject to quarantine or visitation by him immediately on her arrival," etc.

Referring seriatim to the protests in Dr. Chalmers's letter, I have to state in reply:

1. "The right of the United States quarantine officer to give a certificate, as it gives free pratique."

This is done in accordance with the request of the local board of health. (See inclosure No. 5.)

2. "The right to dictate or advise as to passing quarantine grounds or placing in quarantine any vessel or persons subject to quarantine, as conflicting with State laws."

The right to dictate or advise has never been assumed, except in case of negligence or violation of the law on the part of the local quarantine officer, when the necessary precautions to be taken were insisted upon.

3. "Telling any captain he is free to go ashore before the State quarantine officer has inspected and given permission."

This evidently could not happen if the local quarantine officer were present and attentive to his duties, and to the best of my knowledge and belief captains have never been told by the Federal quarantine officer to go ashore, etc. The contrary has always been insisted upon in all cases when the local quarantine was late. The captain was warned by me or my assistant to wait for him. And in the cases in which they have not done so it was as a result of the captain taking the law into his own hands and, losing patience waiting for the local quarantine officer, leaving the ship.

4. "Priority of inspection."

In all instances the inspection is made in accordance with the request of the board of health (inclosure No. 3): "The proper inspection of such vessels shall be made conjointly by the Federal officer detailed for that purpose and the local quarantine officer." In the few instances in which this has not been done it was in order to prevent the entrance of contagious diseases into the country through the negligence, absence, or violation in other ways of the law by the local quarantine officer.

5. "Detaining any vessel after I have given permission to enter port," etc.

The only instance of this that can be called to mind is the case of the steamship *China*, which arrived July 9 from Hongkong and Japanese ports. The steerage passengers were held fourteen days on account of a case of smallpox. Dr. Chalmers had inspected the vessel and had granted free pratique. The case was afterwards discovered by the Federal quarantine officer and the passengers very properly held.

6. "General lack of cooperation."

Refer to what has been previously said under this heading and inclosures 7 to 23.

7. "By giving permission to persons desirous of visiting passengers or in a business capacity to board any vessel subject to quarantine before my arrival."

This also evidently could not have happened if the doctors were prompt and exercised proper vigilance. No instance of this can be called to mind, it being contrary to my direct instructions.

Concerning the grievances, I have to state that the duplicate copy of the bill of health, by special agreement with the local health authorities, is always left on board the ship in case Dr. Chalmers is belated, it having been agreed after the first discussion on this subject that the original copy belongs to the custom-house and that the duplicate copy may be taken by the local quarantine officer.

The cases mentioned (grievances Nos. 1, 2, and 3) probably resulted by captains taking the bill of health ashore to find the local quarantine officer, a practice habitual with them before the Government assumed surveillance of the quarantine here.

Concerning grievances Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, I have to reiterate that we have been careful to inform captains that in case the local quarantine officer was late to wait for him. We have always been careful not to advise such action as complained of or any procedure contrary to State laws. And it must again be evident that if the local quarantine officer had been attentive to his duties such grievances as cited could not have taken place. Concerning grievance No. 14, to which special attention is attracted, I have to state that the local quarantine officer has never

boarded this line of steamers from British Columbia, even after being directed by the board of health to do so, claiming it was not necessary, as infection could not be carried from British Columbia. However, this line of steamers began to carry Japanese direct from Japan, via the Empress line, from Victoria, and the board of health then passed a resolution requiring them to be disinfected. (See inclosure No. 19.) Even after this Dr. Chalmers did not board these vessels, but met them at the dock at a variable time after the gangplank was out and communication with the shore established.

In conclusion I have to state that almost all the points and facts raised by Dr. Chalmers in his letter occurred long ago and were long ago discussed and settled, and that the present status is not incompatible with the law or the wishes of those who desire a conservative quarantine safely conducted.

Respectfully submitted.

M. J. ROSENAU,
Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REQUEST FOR ACTION BY A SENATOR AND TWO REPRESENTATIVES FROM CALIFORNIA.

UNITED STATES SENATE,
Washington, D. C., May 14, 1897.

MY DEAR DOCTOR: We desire to very respectfully call your attention to the condition of quarantine at the port of San Francisco, Cal., and to inquire whether it may not be put upon the same footing as in New York and other large cities. The United States Government has established on Angel Island a very complete quarantine station, with all necessary disinfecting facilities, and it is the desire, as heretofore expressed, of the Chamber of Commerce and other commercial bodies of San Francisco, of the members of the State legislature, of shipping and other firms, that all quarantine matters be placed in charge of the United States quarantine officer at the port of San Francisco. It is believed that the establishment of the quarantine system at San Francisco on these lines would be for the best interests of the port, and we would very respectfully but earnestly suggest that measures be at once taken to that end.

We have the honor to remain, your obedient servant,

GEO. C. PERKINS,
United States Senator of California.
S. G. HILBORN,
Representative Third District of California.
E. T. LOUD,
Representative Fifth District of California.

WALTER WYMAN, M. D.,
Supervising Surgeon General M. H. S., Washington, D. C.

FORMAL PRESENTATION, CITING DEFICIENCIES OF EQUIPMENT AND ADMINISTRATION UNDER THE LOCAL QUARANTINE AT SAN FRANCISCO, AND ACTION OF THE PRESIDENT THEREON.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., May 14, 1897.

SIR: I beg leave to invite your attention to section 3 of the act of Congress approved February 15, 1893, entitled "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service."

Section 3 reads as follows: * * * "If the State or municipal authorities shall

fail or refuse to enforce said rules and regulations, the President shall execute and enforce the same, and adopt such measures as in his judgment shall be necessary to prevent the introduction or spread of such diseases, and may detail or appoint officers for that purpose."

I have respectfully to request that in accordance with the terms of this section of the law P. A. Surg. M. J. Rosenau, Marine-Hospital Service, be detailed by the President for duty as quarantine officer at the port of San Francisco to enforce the rules and regulations which have been promulgated by the Secretary of the Treasury.

From the inclosed reports (Exhibits A, B, C, D, E, F, G, and H) and memoranda it will be seen:

First. That the quarantine regulations of the Treasury Department, as well as the local quaratine regulations, have been repeatedly violated by the local quarantine officer.

Second. That the local quarantine authorities have made no provision whatever for the necessary disinfection of vessels and personal apparel, nor for the isolation and treatment of the sick, nor for the detention of suspects.

Third. That the legislature of the State, the Chamber of Commerce of San Francisco, and even the board of health itself, have requested the National Government to take entire control of quarantine matters at that port, but that they are opposed by the local quarantine officer, prompted chiefly, it is believed, by pecuniary motives, and that he has proved himself wholly incompetent to perform the duties imposed by the local laws, and has frequently ignored the quarantine laws and regulations of the United States.

In these circumstances the detail of Passed Assistant Surgeon Rosenau as quarantine officer for the port of San Francisco, by the President, appears to be an absolute necessity in order to protect the country from the introduction of foreign pestilence.

I have the honor to be, respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General Marine-Hospital Service.

The SECRETARY OF THE TREASURY.

Approved:

L. J. GAGE, *Secretary.*

Approved: May 17, 1897.

WILLIAM MCKINLEY.

EXHIBIT A.

PORT OF SAN FRANCISCO, CAL., SURGEON'S OFFICE,
Angel Island, August 24, 1896.

DEAR SIRS: My duties as inspector of the quarantine at this port have brought to my attention certain violations on the part of your local quarantine officer, Dr. W. P. Chalmers, of section 3018 of the health and quarantine laws of the city and harbor of San Francisco, and also violations of the United States quarantine laws and regulations, article 1, page 24.

Before taking further steps in this matter I deem it proper to acquaint you with the facts.

At a recent meeting of your board, at which I had the honor to attend, it was emphasized that your quarantine officers must board every vessel subject to quarantine or visitation by him before granting his permit, and that it is contrary to law to issue a permit granting free pratique to a vessel from a foreign port without first making the necessary visit. This attitude was taken because Dr. Chalmers confessed that it was his practice to issue permits from his office without visiting the boat in such cases as he considered the visit unnecessary.

Although your attorney and several members of your board on two separate occasions, in my presence, informed the doctor that such practice is a violation of the law and fraught with danger to the community, nevertheless I understand that similar instances have occurred.

The doctor has issued permits to vessels without visiting them, and under circumstances that can not be passed in silence.

The bark *Martha Davis* arrived here from Honolulu August 20 with 7 passengers and 14 in the crew and a bill of health showing 4 cases of varioloid at the port of departure. The vessel arrived after sunset, and was given the usual quarantine visit by Asst. Surg. Rupert Blue, Marine Hospital Service, who refused a permit granting free pratique, because the captain had violated all quarantine laws and precedents in permitting 5 of the passengers to land during the night; nevertheless, the bark was afterwards given a permit to enter by Dr. Chalmers, who, I am informed, sent the paper by the pilot of his launch, without himself visiting the vessel, inspecting the passengers and crew, examining the circumstances or taking those precautions dictated by the law and by reason to protect the county and community against the invasion of epidemic disease.

The brig *Wm. G. Irwin*, twenty-four days from Honolulu, with 4 cases of varioloid on the bill of health, arrived on the 20th, and was given a permit granting free pratique under similar circumstances. But in this case it appears Mr. Milestone, the pilot of the State launch *Gov. Perkins*, presented the captain with the permit just before Dr. Blue arrived. Mr. Milestone was in the act of taking the captain ashore in his launch when intercepted by Dr. Blue, who made the necessary inspections of personnel, papers, and vessel.

I will not weary you with repetitions, but I could state several occasions in which Mr. Milestone substituted your local quarantine officer, and in the presence of Dr. Blue mustered the crew and then went through the form of a medical inspection, after which he would grant a bill of health.

I can not refrain from emphasizing the danger that menaces the community in permitting a layman to issue permits granting free pratique to a vessel with passengers from a foreign port, and with smallpox in the bill of health, and this in face of the presence of a regularly appointed medical officer, trained and detailed for this purpose.

Your board is already in possession of the knowledge from Dr. Chalmers's own lips that he has, whenever he considered it proper, issued permits granting vessels free pratique without first making a visit to the boat in order to satisfy himself of the fact.

And I am further informed by Mr. Bellingall, custom-house broker, that it was the custom of his firm to send to Dr. Chalmers's office for a permit for their boats, and that in case of the doctor's absence the office clerk would issue a permit granting free pratique. It appears that the doctor left signed blanks at his office for this purpose.

I know it is not the intention of your board to permit the local quarantine officer to delegate the tremendous responsibilities of his office to the pilot of his launch, or his office boy, or to any layman.

I am further under the painful necessity of again inviting your attention to violations of the agreement between your board and the National Government concerning the conduct of the quarantine at this port. That agreement states: "The proper inspection of such vessels shall be made conjointly by the Federal officer detailed for that purpose and the local quarantine officer."

Dr. Chalmers, on July 22, violated this compact by boarding the steamer *City of Sydney* far out the gate. He finished his inspection and had granted his permit before the arrival of Dr. Blue, although Dr. Blue boarded the vessel at the quarantine grounds without delay and in full sight of Dr. Chalmers. This action was plainly a willful breach of our agreement, and has not yet been explained. Again, yesterday, Dr. Chalmers boarded the *Australia* and began inspecting the steerage passengers before the arrival of Dr. Blue, who was only five minutes behind him.

Similar instances might be multiplied to indicate the unwillingness of your quarantine officer to cooperate with the Federal authorities, but I refrain from useless

repetition, because you are already aware of the doctor's attitude of resentment and belligerency from his own statements in my presence.

We have done all in our power to aid and cooperate with you in all proper ways, and have been animated by the sole desire to establish a safe quarantine at the principal gateway of our Pacific coast. Our conduct, I believe, needs no explanation.

I thank your board for the attitude you have taken in increasing the efficiency of this Service, as I have to congratulate you upon the many other energetic and useful measures you have instituted in order to place the city in better sanitary condition.

I know your desire has been for harmony, and I can not but feel aggrieved that your representative should not more effectually carry out your desires in this direction.

Respectfully, yours,

M. J. ROSENAU,
Passed Assistant Surgeon, M. H. S.

The BOARD OF HEALTH, CITY AND COUNTY OF SAN FRANCISCO,
San Francisco, Cal.

EXHIBIT B.

[P. W. Bellingall, ship and custom-house broker, 508 battery street, opposite post-office.]

SAN FRANCISCO, *August 24, 1896.*

DEAR SIR: In response to your verbal request, I have to say that it has been my practice as a custom-house broker for vessels laden entirely with coal to send to the State quarantine officer for certificates to collector before entry of vessel at custom-house. The clerk in quarantine office, when in, always gave us a certificate on call, filling in name of vessel, etc., on blanks signed by quarantine officer.

Very respectfully,

P. W. BELLINGALL.

Dr. R. BLUE,
United States Marine-Hospital Surgeon.

EXHIBIT C.

ANGEL ISLAND, CAL., *August 31, 1896.*

SIR: In answer to your request for a report on the case of the *Martha Davis*, I have the honor to transmit the following statement: The bark *Martha Davis* arrived here after sunset on the 20th instant, from Honolulu, Hawaiian Islands. She carried 7 passengers and a crew of 14 seamen. Five passengers and 6 members of the crew were put ashore without waiting for a visit from the quarantine officer. On my visit to the vessel the following morning I learned of the violation of the United States quarantine regulations, and thereupon refused a permit of free pratique. However, the vessel was entered on the 21st, on a certificate of discharge from State quarantine sent to the captain by the local quarantine officer. There was no inspection of ship, crew, or passengers. In an interview a day or two later, Captain Saule admitted the irregularity of the proceeding and stated that Dr. Chalmers had been very kind in the past in allowing him the privilege of docking his vessel without an inspection, before or after. * * *

The consular bill of health showed the presence of four cases of varioloid at Honolulu at the time of sailing.

Respectfully, yours,

RUPERT BLUE,
Assistant Surgeon, M. H. S.

P. A. Surg. M. J. ROSENAU,
United States Marine-Hospital Service, San Francisco Quarantine.

EXHIBIT D.

SAN FRANCISCO, CAL., *September 26, 1896.*

This certifies that a discharge from State quarantine was sent the schooner *O. M. Kellogg* on September 25, 1896, by Dr. Chalmers, and that he did not visit the vessel before or after sending said certificate.

W. C. IVERSON, *First Officer.*

EXHIBIT E.

PORT OF SAN FRANCISCO, CAL., SURGEON'S OFFICE,
Angel Island, September 26, 1896.

DEAR SIRS: The captain (C. Iverson) of the American schooner *O. M. Kellogg*, which arrived during last night from Santa Rosalie and San Marcos Island, Mexico, states that he received his permit granting free pratique from your local quarantine officer by messenger and without being visited by Dr. W. P. Chalmers It is believed by Asst. Surg. Rupert Blue, who was a witness of part of the proceeding, that the messenger was Mr. Milestone, the pilot of the launch *Gov. Perkins.*

This action, in view of my letter of August 24, and the apparent inaction of your board to prevent a repetition of such violations of the law, excites surprise.

Very respectfully,

M. J. ROSENAU,
Passed Assistant Surgeon, M. H. S.

The BOARD OF HEALTH, CITY AND COUNTY OF SAN FRANCISCO, CAL.

EXHIBIT F.

PORT OF SAN FRANCISCO, CAL., SURGEON'S OFFICE,
Angel Island, June 25, 1896.

DEAR SIR: I am directed by the Surgeon-General to notify you that the National Government will begin boarding and inspection of vessels entering this port from the first of next month, or as soon thereafter as practicable.

The steamer *George M. Sternberg* will be placed in commission for this purpose, and this inspection service will be done either by myself or my assistant.

Very truly, yours,

M. J. ROSENAU,
Passed Assistant Surgeon, M. H. S., in Command.

The QUARANTINE OFFICER,
Port of San Francisco, Cal.

[Same letter sent to board of health, San Francisco.]

EXHIBIT G.

[Telegram.]

ANGEL ISLAND, *July 4, 1896.*

Surgeon-General WYMAN, *Washington, D. C.:*

Steamer *Walla Walla* arrived from Victoria this morning with 107 cabin and 26 steerage passengers. Inspected and given our pratique. But neither the ship, crew, passengers, nor papers were examined by the local quarantine officer, and the boat and passengers landed without the local quarantine officer putting in an appearance.

This flagrant repetition of negligence of duty requires our immediate intervention.

ROSENAU.

EXHIBIT H.

[Telegram.]

ANGEL ISLAND, *July 5, 1896.*

Surgeon-General WYMAN, *Washington, D. C.:*

Steamer *Colon*, from Panama and eight Mexican ports of call, with 101 passengers, 20 of whom were alien Chinese in transit, arrived yesterday evening. Boarded and inspected by us and given pratique. The local quarantine officer did not put in an appearance again.

Surely the Department can not overlook these repeated violations of the regulations.

ROSENAU.

MEMORANDA.

"At a fully equipped quarantine station there should be adequate provision for boarding and inspection, apparatus for mechanical cleaning of vessels, apparatus for steam disinfection, apparatus for disinfection with sulphur dioxide, apparatus for disinfecting solutions, hospitals for contagious and doubtful cases, detention barracks for suspects, bathing facilities, crematory, and sufficient supply of good water." (*United States Quarintine Regulations.*)

The United States Government has established on Angel Island, harbor of San Francisco, a fully-equipped quarantine station as above required.

The municipal government of San Francisco has nothing of the kind.

The following sections are all the provisions made for the government of quarantine by the "Political code" of the city of San Francisco:

"SEC. 3014. No captain or other officer in command of any vessel sailing under a register, arriving at the port of San Francisco, nor any owner, consignee, agent, or any other person, having charge of such person must, under a penalty of not less than one hundred dollars, land, or permit to be landed, any freight, passengers, or other persons from such vessels until he has reported to the quarantine officer, presented his bill of health, and received a permit from that officer to land freight, passengers or other persons.

"SEC. 3015. Every pilot who conducts into the port of San Francisco any vessel subject to quarantine, or examination by the quarantine officer, must—

* * * * * * *

"2d. Prevent any person from leaving, and any communication being made with the vessel under his charge until the quarantine officer has boarded her and given the necessary orders and directions.

"SEC. 3017. All vessels arriving off the port of San Francisco from ports which have been legally declared infected ports, and all vessels arriving from ports where there is prevailing at the time of their departure any contagious, infectious, or pestilential diseases, or vessels with decaying cargoes, or which have unusually foul or offensive holds, are subject to quarantine, and must be by the master, owner, pilot, or consignee, reported to the quarantine officer without delay. No such vessel must cross a right line drawn from Meiggs's Wharf to Alcatraz Island until the quarantine officer has boarded her and given the order required by law.

"SEC. 3018. The quarantine officer must board every vessel subject to quarantine or visitation by him immediately on her arrival, make such examination and inspection of vessel, books, papers, or cargo, or of the persons on board, under oath, as he may judge expedient, and determine whether the vessel should be ordered to quarantine; and if so, the period of quarantine."

On the other hand, the United States quarantine laws and regulations state especially which vessels are subject to inspection upon arrival (Article I, p. 24) and the details required of the inspecting officer. They also minutely define under what conditions vessels are to be quarantined (Article II, p. 25), and state precisely the measures to be taken in quarantine, namely, the methods of disinfection, the treat-

ment of the sick and of suspects and the segregation of those under observation. (Articles III, IV, and V, et seq.)

No similar provisions are found in the local law.

They require steerage passengers to be vaccinated. (Article II, par. 4.)

No similar provision found in the local law.

They forbid the landing of a leper under any circumstances and, should one arrive, describe the methods and measures to be taken for his deportation. They also provide for preventing the introduction of bubonic plague and relapsing fever.

No similar provisions are found in the local law.

They are definite concerning the length of time quarantine is to be imposed upon passengers from infected vessels.

No similar details in the local laws.

They are explicit in requirements to be observed by captains of vessels while at sea, sanitary condition of their vessels, the isolation of the sick, the inspection of vessels and passengers by the ship's surgeon, disinfection of water-closets and bilge, cleanliness of living compartments, ventilation, with detailed instructions as to the management of any contagion which may arise on board. (Article IV, pp. 19 and 20.)

Nothing of the kind found in local laws.

They prescribe special precautions for passengers and their baggage embarking at an infected port or from an infected locality, and similar regulations are provided concerning cargo, ballast, etc., and inspection cards furnished immigrants, all minutely itemized. (Articles IV and V, pp. 14–19.)

No similar provisions found in local laws.

They are particularly explicit concerning cargo. Certain articles from infected localities are interdicted (Article IV, par. 2, 6, and 12), and certain articles must be disinfected prior to entry (Article IV, par. 3, 4, 6, 7, 8, 9, 10, and 11). Other articles (par. 5) may, under certain conditions, be admitted without sanitary restrictions.

No similar provision in local laws.

They forbid persons suffering from scarlet fever, measles, or diphtheria, from shipping.

No similar provision in local laws.

They require vessels from infected ports to be inspected, and they must be in a good sanitary condition, have sufficient air space in the living compartments, must have pure food and good water, must have a hospital on board and a physician for every 250 passengers, etc. (Article III, par. 5–8.)

No similar provision in local laws.

They specify particularly the kind of ballast prohibited and the kind recommended, as well as the kind of disinfection to be made of the ballast. (Article IV, par. 1, p. 14.)

The inadequacy of the local quarantine laws as above shown, and the fact that the city of San Francisco provided no quarantine establishment for the disinfection of vessels or the isolation and care of persons suffering from contagious or infectious diseases naturally led to the passage of the following joint resolution in March, 1895, by the State legislature of California, mention of which is made in the Annual Report, 1895, of this Service:

"*Resolved by the assembly, the senate concurring,* That our Senators in Congress be instructed, and our Representatives requested, to urge upon the Secretary of the Treasury that the Department assume entire control of the maritime quarantine service at the port of San Francisco."

Previous to the above the Chamber of Commerce of San Francisco passed a resolution urging the United States Government to perform all quarantine service, and a bill abolishing the office of State or local quarantine officer was passed by the legislature, but failed of signature by the governor.

By reference to the Annual Report of the Marine Hospital Service for 1895, above referred to, it will be seen that the boarding of vessels arriving at San Francisco was done by the local quarantine officer, and the local authorities having no pro-

visions whatever for the disinfection of vessels, the treatment of cases of epidemic diseases or the detention of suspects, this work was performed by the United States quarantine officer at Angel Island.

The arrival at the port of San Francisco of the steamer *Belgic* from Hongkong and Yokohama in September, 1895, having had cholera on board during the passage, led the Department to place in commission the United States quarantine steamer *Sternberg*, and to send an officer to Angel Island with a complete bacteriological outfit for the purpose of examining suspicious cases of disease. A double service (national and local) was then maintained until the close of the quarantine season.

By reference to the Annual Report of the Marine-Hospital Service, 1896, page 957, it will be seen that protest was received from the board of health of San Francisco in regard to boarding and furnishing pratique to vessels arriving from foreign ports. Subsequently a letter was addressed by the medical officer in command of the national quarantine station to the board of health, complaining of certain violations (on the part of the local quarantine officer) of the health and quarantine laws of San Francisco, and also of the United States Quarantine Regulations, giving details. (Exhibit A.) Finally the board of health of San Francisco addressed the following letter to the Secretary of the Treasury, requesting that the order to the collector of customs be changed so that a vessel could not be admitted to entry unless it had the quarantine certificate of the national quarantine officer:

BOARD OF HEALTH, *San Francisco, October 2, 1896.*

DEAR SIR: The board of health of the city and county of San Francisco, with the view of increasing the effectiveness of the quarantine service at the city of San Francisco, a port peculiarly liable to be a starting point for infectious and contagious diseases, hereby expresses its desire that the free pratique of the national quarantine officers shall be necessary to the entry of vessels in this port in addition to the requirements of the laws of the State of California.

Yours, respectfully,

ADOLPH SUTRO, *Mayor;*
J. F. MORSE,
GIRALD FITZGIBBON,
JOHN M. WILLIAMSON,
HENRY M. HART,
Board of Health.

Per EDMOND GODCHAUX,
Secretary Board of Health.

The SECRETARY OF THE TREASURY,
Washington, D. C.

This request was doubtless emphasized by subsequent information obtained from various parties, including Asst. Surg. Rupert Blue, of this service, showing that the local health officer furnished certificates of discharge to vessels from quarantine without having first visited said vessels.

Complying with the above request, Acting Secretary W. E. Curtis, on October 9, 1896, sent the following telegram to the collector of customs, San Francisco, Cal.:

"Hereafter no vessel requiring quarantine certificate under the Treasury regulations will be admitted to entry at the port of San Francisco without the proper quarantine certificate of the national quarantine officer."

Increased friction between the local and national quarantine officers continued, and on December 12, 1896, the following telegram was received from the national quarantine officer:

"I have disinfected baggage of Japanese steerage passengers arriving on steamer *China*, from Japan, and steamer *Pueblo*, from Victoria, on account of cholera and smallpox in Japan. Local quarantine officer opposes, and maintains I have no right to disinfect this baggage without his consent. Please wire if my action is approved. Have I the right to disinfect this baggage without consent of local authorities?"

On January 22, 1897, the following telegram was received from the national quarantine officer:

"Recommend that the President be requested to assume control of the quarantine at this port, in accordance with section 3 of the act of 1893. Refer to correspondence concerning misconduct of quarantine affairs here, and the apparent inability of the local board of health to control matters satisfactorily, and their refusal to answer specific charges. The chamber of commerce has passed strong resolutions favoring Federal control, and all the shipping interests desire same. Urge prompt action."

On January 24, 1897, the national quarantine officer telegraphed as follows:

"Sixteen Japanese passengers taken from the steamer *Umatilla* to the station for disinfection by me, as per resolution of local board of health, and in absence of local quarantine officer, because he was late. He never boards this line of steamers from Victoria, but meets them at the dock. I have cooperated fully in all ways in every other particular. Chamber of commerce in a public resolution states in substance that the quarantine service should be under Federal control, and is pleased to observe the expedience of this view in actual practice. Deplores conflict of authority, and favors national supremacy, because State has no quarantine facilities and the State service is a tax on shipping and is an annoyance, and is unnecessary. They further recommend parties interested, in view of the uncertainty of State repeal, to refuse to pay the State quarantine dues as a means of abolishing the fees, volunteering to join in their defense should a defense be made."

On the same date the following telegram was received from the national quarantine officer:

"Bark *Snow and Burgess*, from Sydney, arrived before sunset last night, but not visited by local quarantine officer until this morning. Steamer *City of Pueblo*, from Victoria, arrived early this morning, and boarded by me at the quarantine anchorage at sunrise. Not boarded by local quarantine officer at all, but met by him after she had docked and half an hour after the gang plank was out. Surely such continued negligence can not be overlooked."

It is evident from the above facts that a "double service" at the port of San Francisco is not only unnecessary expense to commerce, as well as a delay to vessels entering that port, but that the local quarantine officer does not carry out the regulations of his own board of health, much less does he comply with the national quarantine regulations in furnishing a certificate to the master of the vessel when she is released from quarantine, as provided by said regulations, as follows:

"——, ——, ——, 189—.

"I certify that —— ——, of ——, from ——, has in all respects complied with the quarantine regulations, prescribed by the Secretary of the Treasury, and that in my opinion she will not convey quarantinable disease. Such vessel is this day granted free pratique.

"—— ——,

"*Health (Quarantine) Officer, Port of* ——,"

and that, under the present condition of affairs, there can be no satisfactory solution other than for the National Government to take possession and exercise entire management of the quarantine establishment at San Francisco, as provided in section 3 of the act of February 15, 1893.

DETAIL OF P. A. SURG. M. J. ROSENAU AS QUARANTINE OFFICER AT THE PORT OF SAN FRANCISCO, BY THE DIRECTION OF THE PRESIDENT, IN ACCORDANCE WITH THE ACT OF CONGRESS APPROVED FEBRUARY 15, 1893.

TREASURY DEPARTMENT, *Washington, May 20, 1897.*

SIR: In accordance with the provisions of section 3 of the act approved February 15, 1893, entitled "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," you are hereby detailed, by direc-

tion of the President, for duty as quarantine officer at the port of San Francisco, California, to enforce the rules and regulations which have been, or may hereafter be, promulgated by the Treasury Department under the authority of said act.

Respectfully yours,

O. L. SPAULDING, *Acting Secretary.*

P. A. Surg. M. J. ROSENAU,
U. S. Marine-Hospital Service, San Francisco Quarantine, Angel Island, Cal.

ACTION OF DEPARTMENT TO MAINTAIN THE STATUS OF THE NATIONAL QUARANTINE OFFICER AT SAN FRANCISCO.

The status of the national quarantine officer at San Francisco having thus been fixed, in accordance with the law and with the action of the President, the local quarantine officer was thereafter ignored. He continued to conduct his quarantine inspections, and, some question having arisen as to his right to one copy of the bill of health brought by a vessel, which is a Government document, and which the law requires shall, both copies, be deposited with the collector of customs, the following letter was addressed to the collector of customs at San Francisco relative to this matter:

TREASURY DEPARTMENT, *Washington, July 30, 1897.*

SIR: You are hereby directed to require all masters of vessels entering the port of San Francisco to deposit in the custom-house, together with other ship's papers, the two copies of the bill of health provided for in sections 2 and 5 of the quarantine law approved February 15, 1893, and discontinue the custom of permitting the local quarantine officer to retain one copy of said bill of health.

Respectfully yours,

O. L. SPAULDING, *Acting Secretary.*

COLLECTOR OF CUSTOMS, *San Francisco, Cal.*

DISINFECTION OF MAILS.

An incident arose in connection with this controversy relating to the disposition of the United States mails. The local health officer, for reasons best known to himself, decided that the United States mails from the steamer *Peru* from China and Japan should be fumigated, and directed that they be turned over to the United States authorities for such attention. The medical officer in command of the United States quarantine station declined to receive them, as he considered such procedure unnecessary, the ship having a clean bill of health. It raised the question of local jurisdiction over the United States mails, and was of such an important character that it was referred to the Department for decision.

The correspondence in the matter follows herewith:

SAN FRANCISCO POST-OFFICE, OFFICE OF THE POSTMASTER,
San Francisco, Cal., June 1, 1897.

SIR: I respectfully invite your attention to the following condition of affairs at this port as to quarantine regulations and their relations to the mail service.

Two quarantine services are in operation here—one maintained by the Federal Government, and having a well-equipped quarantine station, launches, etc. The second one is maintained by the State, and is largely theoretical; it has no station

or plant for disinfecting or quarantine, and simply provides a launch, with a boarding officer to inspect incoming vessels.

It has been the custom heretofore for these two services to act in harmony—the State board of health taking note of danger and issuing its manifestoes of infection, and the Federal authorities doing most of the work.

From time to time there has been friction, and now there is open rupture between these two authorities. This was emphasized last night upon the arrival of the steamer *Peru* from China and Japan.

Dr. Rosenau, surgeon in charge of the Federal quarantine station on Angel Island, declined to receive the mails for fumigation, and ordered them turned over at once to the postal officials. He gave as his reason for this course that the ship had a clean bill of health, with no signs of disease, and that quarantine was unnecessary.

Dr. Chalmers, the State quarantine official and boarding officer, objected on the ground that the embargo against the infected ports of Japan had not as yet been raised by the State board of health.

After considerable discussion and some delay the mails were permitted to land in this instance without fumigation. This morning I had a call from Dr. Blue, of the Federal service, who informed me that his service was under instructions from the Treasury Department to assume entire and exclusive charge of quarantine matters in this port. Under such authority he said the mails from Japan and China would not be detained in future, unless some special circumstance made it necessary.

I am informed that the State board of health will take issue with this proposition and may endeavor to enforce a quarantine of some kind upon the arrival of the next steamer from the Orient.

The question before us is this: May the State authorities detain the United States mails for fumigation after the competent and duly authorized quarantine agents of the Federal Government have passed them as free from contagion or danger?

Is there any obligation upon this office to take further steps toward fumigation after the mails have been ordered ashore by the Federal quarantine authorities?

It is most desirable that some adjustment of this question should be reached at an early day, as the delays and annoyances resulting from the present quarantine are the source of bitter complaints from the business community. This disposition to complain is intensified by the general belief that the quarantine is unnecessary. It is further heightened by the fact that the cabin passengers and their baggage are landed in every instance after a short detention, while the mails and steerage passengers are ordered into quarantine, lasting from sixteen to twenty-four hours. The feeling is that either the quarantine is necessary or it is not necessary. If it is necessary, it should be thorough, and bear equally on the ship with all she contains. If not necessary, it should be declared off.

The Federal authorities have apparently reached the latter view. Our men have been ordered home from the quarantine station and the expense incidental thereto will cease from this date.

I would respectfully ask your early instructions for my guidance in the event that the State should attempt to enforce a quarantine or detain future mails upon arrival.

Pending the receipt of your reply, I am,

Respectfully, yours,

R. E. DOYLE, *Acting Postmaster.*

Hon. P. S. HEATH,

First Assistant Postmaster-General, Washington, D. C.

POST-OFFICE DEPARTMENT,
OFFICE FIRST ASSISTANT POSTMASTER-GENERAL,
Washington, D. C., June 16, 1897.

SIR: I have the honor to submit herewith a communication from the postmaster at San Francisco, Cal., from which it will be seen that there is a conflict between

the Federal and State authorities concerning the quarantine of mails arriving from China and Japan.

Will you please advise me upon the legal points involved; that is, whether the postmaster shall obey the instructions from the Federal or from the State board of health as to the fumigation of the mails?

Very respectfully,

E. C. FOWLER,
For First Assistant Postmaster-General.

Hon. J. N. TYNER,
Assistant Attorney-General.

POST-OFFICE DEPARTMENT,
OFFICE ASSISTANT ATTORNEY-GENERAL,
Washington, D. C., June 21, 1897.

SIR: In the consideration of the duties of the post-office authorities in matters relating to the quarantine of the mails, I will thank you to advise me what has been the practice of the Treasury Department in instances where the Federal authorities have raised a quarantine against certain ports while the State authorities have continued to enforce theirs.

I will thank you to give me a reply by messenger, if possible.

Very respectfully,

HARRISON J. BARRETT,
Acting Assistant Attorney-General, Post-Office Department.

SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., June 23, 1897.

SIR: In reply to your note of June 21, inquiring "what has been the practice of the Treasury Department in instances where the Federal authorities have raised a quarantine against certain ports while the State authorities have continued to enforce theirs," I have to state that no instances of this kind have arisen within my knowledge, excepting recently at the port of San Francisco, where by direction of the President, in accordance with the act of Congress approved February 15, 1893, P. A. Surg. M. J. Rosenau, Marine-Hospital Service, has been detailed to assume all quarantine functions at that port. I am informed by Dr. Rosenau that the local health authorities demanded disinfection of certain mail which he considered unnecessary, and there is no question in my mind that under these circumstances the mails should not be disinfected.

The action of the President, in accordance with section 7 of the law above quoted, in detailing Passed Assistant Surgeon Rosenau was, on account of marked deficiency in local quarantine appliances and violation of the Treasury quarantine regulations by the local quarantine officer, and it is not unlikely that the demand for the disinfection of the mails by the local authorities when the national authority determined that it was unnecessary was made more as an attempt at legal obstruction than for public safety.

Respectfully, yours,

WALTER WYAMAN,
Supervising Surgeon-General, M. H. S.

HARRISON J. BARRETT, Esq.,
Acting Assistant Attorney-General, Post-Office Department, Washington, D. C.

OFFICE OF THE POSTMASTER-GENERAL,
Washington, D. C., June 24, 1897.

DEAR SIR: I have the honor to call your attention to the inclosed letter of June 1, 1897, from the postmaster at San Francisco, Cal., in which he states that Passed

Assistant Surgeon Rosenau, of the Marine-Hospital Service, in charge of the United States quarantine service at that port, has decided that fumigation of the mails entering the port from the Orient is unnecessary; while the officers of the State board of health have notified the postmaster that the fumigation of the mails must continue, and asks to be instructed as to his duties in the matter.

This presents a question of the rights of your office and the State authorities in the premises, and I submit the matter for your consideration, as you are in possession of all the facts and may desire to obtain from the Attorney-General a construction of the law applicable to this question for the guidance of Government officers in this and future cases of the same character that may arise.

Pending a final settlement of this question, I will thank you to advise me promptly what instructions, in your opinion, should be given to the postmaster at San Francisco as to the treatment of any mails arriving at that port.

Please communicate to this Department the final conclusions in this matter.

Very respectfully,

PERRY S. HEATH,
First Assistant Postmaster-General.

DR. WALTER WYMAN,
Surgeon-General Marine-Hospital Service.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., June 26, 1897.

SIR: Referring to your letter of June 24, relating to fumigation of the mails at San Francisco, and the inquiry of the postmaster at that port whether he shall require the disinfection of the mails upon the order of the city board of health, I have respectfully to inform you that under date of May 17, 1897, the President detailed Passed Assistant Surgeon Rosenau, of the Marine-Hospital Service, as quarantine officer at the port of San Francisco, in accordance with section 3 of the act of Congress dated February 15, 1893, which provides as follows:

"But if the State or municipal authorities shall fail or refuse to enforce said rules and regulations, the President shall execute and enforce the same, and adopt such measures as in his judgment shall be necessary to prevent the introduction or spread of such diseases, and may detail or appoint officers for that purpose."

It will be seen from the above action of the President that all matters governing the quarantine at the port of San Francisco devolve upon the officer thus detailed, and that the municipal authorities have no standing in the matter.

Every necessary quarantine precaution is now being conducted, by the President's order, by Passed Assistant Surgeon Rosenau.

Therefore the postmaster at San Francisco should be instructed to ignore the request of the State and local authorities.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

THE FIRST ASSISTANT POSTMASTER-GENERAL.

LEGAL TEST OF THE LOCAL QUARANTINE OFFICER'S RIGHT TO COLLECT FEES FOR QUARANTINE INSPECTION AFTER THE PRESIDENT HAD DETAILED A MEDICAL OFFICER OF THE UNITED STATES AS QUARANTINE INSPECTOR.

Acting under advice of those commercially interested the captain of one of the steamers of the Occidental and Oriental Steamship Company refused to pay the charge of the local quarantine officer for quar-

antine inspection of his ship. A suit was thereupon brought in the police court to compel payment. As the Government is interested in the outcome of this suit, which though begun in the police court, will doubtless be carried to higher courts and involves an interesting point of law, the Secretary of the Treasury requested the Attorney-General of the United States to instruct the United States district attorney at San Francisco to look after the interests of the Government in regard to Federal control of quarantine at that port.

Following is the correspondence relating thereto:

TREASURY DEPARTMENT,
Washington, September 29, 1897.

SIR: I have to request that the United States district attorney at San Francisco be directed to give aid and advice to the United States quarantine authorities at the port of San Francisco in maintaining Federal control of quarantine operations in accordance with the law of February 15, 1893, and under direction of the President. I have been informed that a suit has been instituted by the local authorities against the captain and the pilot of the steamer *Gaelic* for alleged violation of the local quarantine regulations, in which, and succeeding suits, the right of exercise of quarantine functions by the National Government may be involved.

I have further to request that in all these suits the interests of the Government be guarded by its legal representatives. It is understood that the United States district attorney at San Francisco has already taken cognizance of the matter.

Respectfully, yours,

O. L. SPAULDING, *Acting Secretary.*

The ATTORNEY-GENERAL, *Washington, D. C.*

DEPARTMENT OF JUSTICE,
Washington, D. C., October 7, 1897.

SIR: As requested in your letter of the 29th ultimo, I have to-day instructed Henry S. Foote, United States attorney at San Francisco, Cal., to aid and advise the United States quarantine officers at that port in maintaining Federal control of quarantine operations in accordance with the law of February 15, 1893, and under direction of the President.

It appears that the right of the exercise of quarantine functions by the National Government is involved in a suit pending in that district instituted by the local authorities against the captain and pilot of the steamer *Gaelic*.

Very respectfully,

JAS. E. BOYD.

The SECRETARY OF THE TREASURY.

TRANSACTIONS RELATING TO THE STATE QUARANTINE STATION AT SABINE PASS, TEX.

Following, arranged seriatim, are the sources of information concerning both the dangerous location and imperfect administration of the Sabine Pass quarantine upon which the Bureau found it necessary, in the interest of public safety, to take the action hereinafter indicated.

First should be mentioned the inspection report of P. A. Surg. G. M. Magruder, who, in accordance with Article XI of the quarantine regulations, had been detailed to make a regular inspection of all the Texas quarantines.

The official report of this inspection follows:

INSPECTION REPORT, SABINE PASS QUARANTINE.

By P. A. Surg. G. M. MAGRUDER, M. H. S.

"1. Describe the quarantine station, location, buildings, anchorages, etc. Give limits of anchorage for noninfected and for infected vessels; facilities for inspection of vessels; apparatus for disinfection of vessels and of baggage; facilities for removal and treatment of the sick, and for the removal and detention of suspects; mail and telegraph facilities, etc."

The quarantine station is located 2 miles south of the town of Sabine Pass, on the west side of the pass, on grounds owned by the firm of Kuntz Bros. & Co. About 30 yards south of the quarantine shed the above-named firm is digging a slip and building wharves, employing three dredges and their crews in this work.

The quarantine buildings consist of a shed 100 by 30 feet, with an ell annex 30 feet square, and attendants' quarters. Along the river front of this shed is a wharf 80 feet long, at which vessels may lie while being disinfected. Depth of water along wharf front, 16 feet. Twenty yards from the above building is a four-roomed structure elevated 20 feet on piles and used as attendants' quarters. Buildings in fair condition.

Anchorages for infected and noninfected vessels not marked by buoys. Vessels after fumigation lie at wharf during period of detention, unless wharf is needed for a later arrival. Anchorage ground available, extends from one-half mile below station for a distance of 2 or more miles. Vessels boarded from rowboat.

The disinfecting apparatus consists of a steam boiler, a steam cylinder 50 by 8 feet, made of a simple thickness of boiler iron with steam coils for heating and perforated pipes for admission of live steam, a steam engine, sulphur furnace and fan, with galvanized iron delivery pipe 12 inches in diameter reduced to 6 inches when it enters the vessel, and iron sulphur pots. There is no bichloride pump.

There are no facilities for removal, detention, or treatment of sick or suspects.

Daily mail; telephone service with Beaumont; no telegraph.

"2. Give personnel of the station or port; name of the quarantine officer or officers; post-office address; total number of officers and subordinates, etc."

Dr. A. N. Perkins, quarantine officer; post-office address, Sabine Pass, Tex. Total number of officers and employees, three.

"3. Transmit copies of the laws under which the local quarantine is maintained, and copies of the quarantine regulations; and describe the quarantine customs of the port as they are carried out.

"NOTE.—There are sometimes slight, but possibly important, variations from the letter of the local regulations in the administration of quarantine. Also local regulations generally allow a wide latitude to the quarantine officer, and how this latitude is used, i. e., how the quarantine officer interprets the spirit of the regulations, is very important."

Governor's proclamation inclosed. No quarantine regulations other than those of the Service. All vessels arriving are inspected except those from United States ports, which are hailed, and only inspected in case sickness is on board.

Vessels from points south of 25° north latitude held for fumigation; if quarantinable disease on board sent to Ship Island.

If disinfected at Sabine Pass the vessel is hauled up to small wharf built by a land-improvement company for discharge of ballast. The ballast is hoisted by crew and dumped into wheelbarrows on wharf and rolled away by employees of land company and used as filling. The ballast is not disinfected and laborers not isolated for five days. The vessel is then either fumigated with pots where she lies, or is taken to quarantine station and sulphur fan and furnace used. She is kept closed for from twelve to twenty-four hours, and then opened up and sometimes sprinkled with bichloride solution, but not often. There is no force pump for using bichloride

spray. Clothing and bedding is put through the steam cylinder when vessel is alongside quarantine wharf, but when pots are used with vessel lying at some other point these articles are exposed to sulphur dioxide gas.

In reply to an inquiry as to the amount of sulphur used in disinfecting a vessel, I was informed 10 pounds was burned to every 25 tons of capacity. I then asked how much was used in fumigating a vessel of 1,400 tons, which had just been discharged from quarantine. The reply was nearly 100 pounds.

"4. State what quarantine procedures, either under printed regulations or by custom, are enforced at the port, in addition to the requirements of the Treasury Department.

"It should also be stated whether there is undue or unnecessary detention or disinfection of vessels."

No regulations except governor's proclamation in addition to Treasury Regulations.

No unnecessary detention of vessels is apparent except that they are detained sometimes eight or ten days discharging ballast, there being poor facilities for this work.

"5. State whether the inspection is maintained throughout the year, or for what period, and what *treatment* of vessels is enforced during the entire year.

"NOTE.—Many ports on the South Atlantic coast (e. g., Charleston, Savannah, and Fernandina) require certain ballasts to be discharged in quarantine without regard to season."

The station is only open from May 1 till closed by governor's proclamation about November 1. After this time the quarantine officer boards vessels at request of the deputy collector of customs, charging a fee of $10 in each case. During the period from November 1 to May 1, vessels requiring disinfection would be sent to Ship Island.

"6. Are vessels from other United States ports inspected?"

These vessels are hailed, but not boarded unless there is sickness on board.

"7. Describe quarantine procedures in the inspection of vessels, and, if infected, the treatment. Give time in quarantine (*a*) between arrival and commencement of disinfection, (*b*) the time occupied by disinfection, and (*c*) time after completion of disinfection of vessels until discharged.

"NOTE.—Quick or slow handling of a vessel is of more importance commercially than the question of fees. The time lost is the vessel's heaviest expense, generally."

Quarantine officer boards vessel; inspects bill of health; musters and inspects crew; then inspects vessel. If infected the vessel will be ordered to Ship Island. If from a port south of 25° north latitude, but with no sickness of a quarantinable nature found on board, she will be disinfected in part. Ballast is discharged and disinfection practiced as described under 3. (*a*) Immediately. (*b*) From twelve to twenty-four hours. (*c*) Time variable; not over three days.

The steamship *Kirkfield*, from Rio, arrived July 10; was disinfected and discharged on July 12.

Schooner *Mary*, from Frontera, Mexico, arrived June 28; discharged from quarantine after disinfection June 29.

Bark *Alice*, from Kingston, arrived June 25; discharged June 27.

When vessels are long held in quarantine it is generally due to delay in discharging ballast, due to poor facilities.

"8. What communication is held with vessels in quarantine (and before quarantine by pilots, etc.), and how regulated? Is there any intercommunication allowed among vessels in quarantine?"

Pilots are forbidden to board vessels unless the captain informs them there is no sickness on board. If they board and there is sickness of a quarantinable nature, they are quarantined. Vessels in quarantine are forbidden to communicate, but there are no watchmen or guards.

I was informed by the quarantine officer that an official of one of the land companies of Sabine Pass who has frequently criticised the quarantine administration,

in a spirit of bravado, recently boarded from his tug a vessel in quarantine flying the yellow flag, and then returned to town and boasted to the doctor of the exploit. The quarantine officer failed to put this man and his vessel in quarantine, or to prosecute him for violation of quarantine regulations.

I was informed by the deputy collector of customs that the captain of the bark *Macedon* was seen by him in town while the vessel was flying the yellow flag.

"9. State what will be done with a vessel infected with cholera; second, a vessel infected with yellow fever; third, a vessel infected with smallpox (said vessels carrying or not carrying immigrants), and what conditions are regarded as giving evidence of the vessel's infection in each case."

Remanded to Ship Island. The presence of the disease on board, or the fact of its occurrence during voyage.

"10. State whether records are kept at the station of the cases of disease that have occurred during the voyage, on arrival, and during detention."

None at present.

"11. Transmit schedule of quarantine fees, and give other fees and expenses necessarily and usually attendant on quarantine, as tonnage, ballast, wharfage charges, etc."

A fee of from $15 to $25 for disinfection, and during winter months $10 for inspection. No other fees.

"12. Make a statement showing the number of vessels arriving at the port during the preceding calendar year, by months—(*a*) from foreign ports; (*b*) from foreign ports in yellow-fever latitudes via domestic ports; (*c*) from domestic ports. Show also the character of the commerce carried on by the port, i. e., from what countries chiefly the vessels come, and whether in cargo, ballast, or empty."

1896.	(a)	(b)	(c)	1896.	(a)	(b)	(c)
January	2	0	1	July	4	0	1
February	0	0	4	August	5	0	3
March	3	0	4	September	3	0	0
April	2	0	3	October	10	0	1
May	3	0	2	November	8	0	0
June	1	0	7	December	16	0	2

Imports, none; exports, lumber. Vessels come chiefly in ballast from South America, West Indies, and Mexico.

"13. State results of your visit to (*a*) the custom-house; (*b*) the immigration bureau."

Duplicate bills of health and proper quarantine certificates duly filed. No immigration bureau.

"14. State whether in your opinion the quarantine facilities are sufficient to care for the shipping entering the port."

No; the quarantine station from its location is a source of danger to the country.

"15. Name the quarantine regulations of the Treasury Department which are not properly enforced, and state specifically whether the regulations regarding inspection and disinfection, and particularly the period of observation after disinfection, of vessels are observed."

The regulations relative to the disinfection of vessels and clothing and the period of observation after disinfection are not strictly observed.

"16. Does the certificate of inspection, or of pratique, signed by the quarantine officer, state that the Treasury Regulations have been complied with as required by section 5, act of February 15, 1893? Transmit copy of certificate."

Yes.

"17. What disposition is made of the consular bills of health?"

Duplicate kept by deputy collector of customs and original sent to custom-house at Galveston.

"18. Mention any facts which in your opinion should be known to the Department, bearing directly or indirectly upon the quarantine service, and make such recommendations as seem proper."

The location of the station is a menace to the health of the town. A number of workmen are employed dredging out the slip, not more than 30 yards from the quarantine shed, and when this slip is completed vessels will load and unload there.

The ground immediately around the station is laid off in lots, buildings are going up, and proper isolation of quarantine attendants and crews will be and is impossible.

The quarantine officer, who is 63 years of age, is seriously handicapped by defective vision and is physically unable to undergo severe exertion.

Respectfully submitted.

G. M. MAGRUDER,
Passed Assistant Surgeon.

JULY 13, 1897.

Almost coincidently with the receipt of this report of Passed Assistant Surgeon Magruder the following report was forwarded to the Bureau by the Chief of the Revenue-Cutter Service, being the report of the commanding officer of the United States revenue cutter *Galveston*, the conditions at the Sabine Pass quarantine being so pronounced as to excite his attention and prompt him to report conditions, as required under section 98, paragraph 3, of the Regulations of the United States Revenue-Cutter Service:

REPORT ON STATE QUARANTINE STATION AT SABINE PASS, TEX.

By Capt. JOHN DENNETT, U. S. R. C. S.

UNITED STATES STEAMER GALVESTON,
Galveston, Tex., June 20, 1897.

SIR: Under section 98, paragraph 3, Revised Regulations, I would respectfully ask the attention of the Department to the quarantine as maintained by the State of Texas at Sabine Pass. I have just visited that point and made an informal examination into the surroundings and workings of that station.

The quarantine was formerly located near the mouth of Texas Bayou, which connects the river with a small lake as marked on accompanying sketch.

At the time of the storm and inundation of this section in 1886 the quarantine station was washed away. It was afterwards located in its present position. This answered very well for the time being, as the town was then some 1½ miles away and but very little navigation came to this badly barred harbor. Since that time, however, improvements have been made to the bar and harbor. Mills have been built at Orange and Beaumont, whose natural outlet is Sabine Pass. Lake Charles, which also has large mills, sends out of Calcasieu, some 30 miles east of Sabine, large quantities of lumber by tow barges to be loaded on board vessels at Sabine for Europe, Mexico, and South America. Sabine Pass, therefore, is the most accessible port to this enormous trade of the long-leafed pine.

The improvements made by the Government to the bar at Sabine Pass have so deepened the water that vessels of 23 feet draft can enter. This has brought to the port a great many vessels for lumber cargoes. The fact that large vessels can enter the port has warranted the building of railroads to the west through these pine forests, and more mills have been built to turn their product into merchantable exports. This action on the part of railroads and mill owners has stimulated the building up of the old town as well as starting new ones adjacent thereto. Port Arthur, which is now a thriving town 10 miles across the lake from Sabine Pass, has forced into being the rival town of Kountzeville, below or south of the old town of Sabine

Pass. This town of Kountzeville has been started on land belonging to the Kountze Brothers. The first town lots laid out and the first docks built are in the immediate vicinity; in fact, within the close limits of the present quarantine station.

On the 19th instant there were 3 steamers, 7 square-rigged vessels, and 1 schooner in port, all from and bound to foreign ports. One ship, 2 barks, and 1 schooner lay at quarantine, which had been or were at the time discharging, or were waiting to discharge, ballast on the bank.

The projectors of the town are anxious to obtain this ballast to fill and raise the grade of their property. The land upon which the town is laid out is barely two feet above ordinary tide. They have therefore built short T wharves for the vessels to lie at and discharge.

I sent an officer, Lieutenant Carmine, to the station to make inquiry of the quarantine physician as to his manner of enforcing the quarantine, etc. He met Dr. Perkins, a very agreeable elderly gentleman, who readily gave him the information as follows: Of the vessels now in quarantine 1 arrived on the 12th instant from Barbados, 2 on the 13th from Barbados and Montevideo, and 1 on the 18th from Vera Cruz; that there is no sickness on either of them. He boards them upon arrival at quarantine limits. If there be no sickness on board, they are permitted to come to these short pierheads within the quarantine limits (which have been conveniently arranged to include them) and then discharge their ballast upon his permit.

He says the crews of the vessels deliver the ballast over the rail; that four negroes are employed to wheel it away. These negroes are kept within the quarantine limits, and sleep on board the vessel until she is released. They can then return to their homes in the town.

That if any vessel should arrive with sickness on board, he should send her down the river to what they call the marine-hospital station, and give orders that no communication should be held with her.

That while discharging ballast no one except quarantine officials and employees are allowed on board or to visit the shore from the vessel; that he lives in town himself, has two men at the station, but keeps no watchman day or night; that he depends upon the masters of the vessels to carry out his orders and keep their people on board ship until regularly released from quarantine.

That there is no customs officer or United States official connected with the station in any way. Now, my own observation and inquiry in other directions lead me to believe that while Dr. Perkins no doubt intends to do his duty and render the quarantine as effective as possible, I really fail to see when this quarantine is other than the merest form.

These vessels bring ballast which is valuable to the owners of the new town for filling, as before stated. These people in order to obtain this material have built these short ballast landings, and the quarantine limits have been made to cover them.

The work is going on upon the new town, and the line which divides the town from the quarantine station is drawn, but to technically comply with rather than to fulfill the law. On the west side of this imaginary line are the workmen employed by the town-site owners; on the east side are the quarantine persons unguarded.

It is unreasonable to suppose that either party will respect this line if there be any inducement to cross it. Directly in line and nearly adjoining, possibly 50 feet away from the landing of one of these ballast wharves, are two large shanties sheltering thirty or forty men, employees of the town site owners, who eat and sleep there. The north-limit quarantine flag is, I judge, 20 feet from the northern shanty. It is nonsense to suppose that these men do not communicate with people on the vessels who are of the same class, with interests and tastes in common.

Directly astern some 30 feet from one of the vessels flying a quarantine flag 3 dredges and a pile driver are at work building docks and slips; within a quarter of a mile 12 buildings are being erected, some of which are much nearer than this. There is but one customs officer at this port. He has his office at the town of Sabine

Pass. Of course there is a little friction between the United States and the State officials, nothing important; in fact, rather desirable than otherwise, as they may possibly each do their duty better for it. Should the inspector venture to board a vessel in quarantine no doubt the State quarantine official would either prevent his doing so or put him in quarantine, and the vessel can not enter at the custom-house until released from quarantine.

It appears to me that an acclimated special customs officer should be stationed at this place to look after the interests of the Government, for these vessels are as practically in port and as accessible as after official entry. For a smuggling proposition I can see no scheme better than the present arrangement. I think the quarantine should be moved south of Texas Bayou, and if Kountze Brothers want the ballast some other arrangement should be made by them to get it, which, if not so convenient for them, would certainly render the quarantine less a farce, and not endanger the public health, as is evidently the present situation.

Very respectfully, yours,

JOHN DENNETT,
Captain, Revenue-Cutter Service, Commanding.

The SECRETARY OF THE TREASURY,
Washington, D. C.

On receiving the two foregoing reports Passed Assistant Surgeon Magruder, who had reported his arrival in the meantime at Galveston, was telegraphed to for further information, as follows:

[Telegram.]

WASHINGTON, *July 17, 1897.*

Dr. MAGRUDER, *Galveston, Tex.:*

Is Sabine Pass quarantine properly located for safety, or too near Kountzeville? Await orders at Galveston.

WYMAN, *Surgeon-General.*

[Telegram.]

GALVESTON, TEX., *July 17, 1897.*

Surgeon-General WYMAN,
Marine-Hospital Service, Washington, D. C.:

Location Sabine Pass station dangerous in the extreme; 50 men working on wharf 30 yards from station. Vessels will load at this wharf when completed, in about a month. Appropriation for moving station has been made by State legislature, but quarantine officer states change will not be made this session. I await orders.

MAGRUDER, *Passed Assistant Surgeon.*

Later the following letter was received from a member of Congress representing the district in which Sabine Pass is located, requesting the Treasury Department to take action in the matter. In the meantime, also, the Department received letters and telegrams from business men and others interested in the commercial welfare of Sabine Pass, calling attention to the conditions as previously stated and expressing their grave apprehension lest there should result not only the fatality due to disease but ruin to the material interests of the locality. In fact, the pressure was strong upon the Department to take action.

LETTER FROM CONGRESSIONAL REPRESENTATIVE.

WOODVILLE, TEX., *August 4, 1897.*

SIR: I am advised that the State quarantine at Sabine Pass, Tex., is insufficient and that there is danger of the introduction of yellow fever into Sabine Pass and

southeast Texas by vessels from Cuba and other countries where yellow fever of a virulent nature is now prevalent. The danger at this port, which is now being built up very rapidly and there is now considerable commerce there, and I think it proper that especial care and caution be now used to prevent the introduction of yellow fever into this section of the State, therefore, I call your attention to this matter and beg that you will give that port such service as will prevent the introduction of yellow fever or other contagious diseases through that port. I am not sure that this matter comes properly under the Treasury Department, but under the Marine-Hospital Service you have charge of this matter. If you do not have charge, please refer this letter to the proper authority.

Very respectfully,

S. B. COOPER.

The SECRETARY OF THE TREASURY,
Washington, D. C.

Following is the correspondence between the Bureau and the Department and Passed Assistant Surgeon Magruder and the collector of customs at Sabine Pass, from which it will be seen that the collector of customs was directed by the Secretary of the Treasury to admit vessels to entry only upon the quarantine certificate of Passed Assistant Surgeon Magruder, but that Dr. Magruder was not directed to take command of the station. He was there as inspector to certify that the quarantine regulations of the Treasury Department were complied with, observing the operations of the local quarantine authorities in order to give this certificate. As the local quarantine officer was physically or otherwise unable to carry out the requirements of the regulations, he consented to Dr. Magruder doing it for him.

[Telegram.]

WASHINGTON, *July 19, 1897.*

Dr. MAGRUDER,
Marine-Hospital Service, Galveston, Tex.:

Having mailed report, return to Sabine Pass quarantine. Vessels from Vera Cruz or other infected ports can not be admitted unless disinfected at a regular quarantine station. Paragraph 2, article 3, page 26, Quarantine Regulations, it is believed, is violated, ballast crews being allowed to return to their homes in town. State health officer has been notified to have inspection lower down. See that all regulations are complied with by local quarantine officer. Remain until further orders, and wire anything important.

WYMAN, *Surgeon-General.*

[Telegram.]

GALVESTON, TEX., *July 19, 1897.*

Surgeon-General WYMAN, *Washington, D. C.:*

Please define regular quarantine station.

MAGRUDER, *Passed Assistant Surgeon.*

[Telegram.]

WASHINGTON, *July 20, 1897.*

Passed Assistant Surgeon MAGRUDER,
Marine-Hospital Service, Galveston, Tex.:

By regular quarantine station is meant any quarantine station, State or local, fully equipped with disinfecting apparatus.

WYMAN, *Surgeon-General.*

[Telegram.]

WASHINGTON, *July 22, 1897.*

Passed Assistant Surgeon MAGRUDER,
Sabine Pass, Tex.:

Remain temporarily at station for observation and insistence on Treasury Regulations. It is understood actually infected vessels are remanded to Ship Island. Vessels from yellow-fever infected ports, all Cuban ports, Haiti, Vera Cruz, and other ports infected as shown by the bill of health must be prevented from discharging their ballast at the present ballast wharves. Must discharge same at a safe distance below, and by vessel's crew only. Vessel and dunnage then to be disinfected at quarantine, but no communication allowed. You are authorized to offer such assistance in the way of guards as may seem necessary. See article 3, paragraphs 2 and 3, page 26, Regulations.

WYMAN, *Surgeon-General.*

UNITED STATES MARINE-HOSPITAL SERVICE, DISTRICT OF THE GULF,
Sabine Pass, July 23, 1897.

SIR: Upon the receipt of your telegram of yesterday I have the honor to state that I immediately called upon the quarantine officer (Dr. Perkins) at this port, and communicated to him the substance of your instructions. He agreed to complete the outfit of this station by the purchase of a force pump for the use of bichloride solution, and the pump with hose and the necessary attachments was ordered by wire from New Orleans, and should be in place and ready for use by Monday. I then called on Mr. Osgood, superintendent of the Sabine Land and Improvement Company, and after a short interview this gentleman, "keenly alive to the situation," agreed to build a wharf without expense to the State for the unloading of infected ballast at any point I might designate, and placed a tug at my disposal for the selection of a site.

This morning, in company with Dr. Perkins, we steamed down the channel and selected a site, which you will see indicated on the inclosed chart. This point is 1¼ miles below the present quarantine station, and at the head of the proposed wharf there will be a depth of 15 feet at low water; from the rear a gangway will extend about 200 feet, crossing a shoal over which the water is about 2 feet deep, and ending in water about 7 feet deep, into which the ballast will be thrown. This shoal will prevent the ballast from drifting into and obstructing the harbor, and it is believed the War Department will raise no objection to the plan, especially as Mr. Osgood has been informed by Major Quinn, who is in charge of the jetty work at the mouth of the river, that he intends recommending that the harbor line be changed so as to conform to a dotted line marked on the chart. By this change the location of the ballast dump would be no longer under the control of the War Department. The wharf could not be located farther down the river, because at all points below the proposed site the ship channel is at present so narrow that entering vessels would be compelled to pass dangerously near any ship discharging infected ballast.

I am keenly alive to the fact that the location of this ballast wharf is not an ideal one, but it is a vast improvement over the present arrangement, and as a temporary expedient pending the building of a new station it is the best that suggests itself to me, and I respectfully request the Bureau's approval of my action.

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C.

UNITED STATES MARINE-HOSPITAL SERVICE, DISTRICT OF THE GULF,
Sabine Pass, Tex., July 24, 1897.

SIR: In order that you may more fully appreciate the existing status of affairs at this port with reference to the change in location of the quarantine station, I inclose copies of a correspondence on this subject between Dr. Swearingen, State health officer, and Mr. J. O. Osgood, manager Sabine Land and Improvement Company.

This latter gentleman has urged for some time the necessity of immediate removal, and has offered to donate to the State the lands necessary for the new station. The site selected by Dr. Swearingen you will find indicated on the chart I inclosed yesterday by a red cross mark a short distance below the mouth of Texas Bayou, and is known as Grass Islands, two small islands about 20 feet across being found there.

This location would seem entirely unsuited for a quarantine. It is only three-quarters of a mile distant from the present station, around which the new town and wharves are being built, and is too easy of access. A public road is now being opened which will pass within a short distance of the site. I stated these objections to Mr. Osgood and Dr. Perkins when my opinion was recently asked, and suggested as far preferable that the station be built on piles near the east side of the west jetty, about 800 feet from the junction of the jetty with the shore. At this point the channel is much wider than below. Infected ballast could be readily disposed of by building a short gangway and discharging it into the Gulf on the west side of the jetty. The station would be fairly well isolated and desertion from vessels in quarantine rendered more difficult, the chief objection being that some dredging would be required, and then only $10,000 appropriated for the entire station.

The spirit of delay manifested by the State health officer is much to be deplored, and were it not for the fact that the quarantine is so deplorably administered at this port, I would recommend that I be ordered elsewhere without delay, as from the tone of Dr. Swearingen's letter and his well-known views in regard to State's rights it is evident that he regards with suspicion any action of the Service, and in order to avoid the appearance of coercion by Federal authority he may delay the desired change longer than he otherwise would.

As matters now stand, however, I would suggest that I stay here until two or three vessels arrive, whose disinfection I will supervise for the instruction of Dr. Perkins, and that I then be ordered away. I am glad to say that my relations with Dr. Perkins are very friendly. He readily agreed to the plan I have outlined, and takes in good part any suggestion I may make.

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C.

UNITED STATES MARINE-HOSPITAL SERVICE, DISTRICT OF THE GULF,
Surgeon's Office, July 26, 1897.

SIR: Referring to my letter of the 23d, I have the honor to state that I am just informed that no pump can be bought in New Orleans or Chicago, and that it will probably be a week or ten days before one is obtained.

No vessels have entered this port since my arrival, but several are daily expected.

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C.

[Telegram.—By telephone from Beaumont.]

WASHINGTON, *July 27, 1897.*

Dr. MAGRUDER, *Sabine Pass, Tex.:*

Your action securing unloading vessels from infected ports lower down approved.

WYMAN, *Surgeon-General.*

MARINE-HOSPITAL SERVICE, DISTRICT OF THE GULF,
Galveston, Tex., July 31, 1897.

SIR: Since the receipt by the State quarantine officer of a copy of my report on his station, I have the honor to state that our relations have become somewhat strained, and I am informed by Dr. Perkins that no courtesies, such as boarding vessels from his boat, will be extended me.

In view of this, but one course seems to be left, viz, to charter a sailboat or naphtha launch (at about $150 or $200 per month for boat and crew), from which I will board at the head of the jetties all incoming vessels and will order to Ship Island the following classes:

(1) All actually infected vessels.

(2) All vessels from infected ports arriving before the outfit of the station is completed, so that they can be disinfected in accordance with Treasury regulations.

(3) Vessels in ballast from infected ports arriving before the ballast wharf lower down is completed, unless the ballast is rock, which shall be disinfected by dipping in bichloride solution, or unless the ballast can be discharged in the Gulf beyond the 3-mile limit within which, I am informed, it can not legally be discharged.

Please instruct me by wire whether or not this course shall be followed.

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C.

[Telegram.]

SABINE, TEX., *August 3, 1897.*

Surgeon-General WYMAN, *Washington, D. C.:*

Dr. Perkins extremely antagonistic. Refuses to confer with me. I received Bureau instructions. Outfit of station still incomplete. At present location and under present management station a source of danger. Therefore, until its removal I recommend all vessels from infected ports be sent to Ship Island. The two days saved on quarantine there will make delay slight.

MAGRUDER, *Passed Assistant Surgeon.*

[Telegram.]

WASHINGTON, *August 4, 1897.*

COLLECTOR OF CUSTOMS,
Sabine Pass, Tex.:

After notification by Passed Assistant Surgeon Magruder that he has begun inspection of vessels in accordance with orders, you will admit to entry no vessels from foreign ports, without his pratique, until further orders.

O. L. SPAULDING,
Assistant Secretary.

[Telegram.]

WASHINGTON, *August 4, 1897.*

Passed Assistant Surgeon MAGRUDER,
Sabine, Tex., via Beaumont:

Authorized employ sailboat or launch and inspect vessels at jetties and remand or treat them as recommended your letter July 31. Collector has been directed to require your pratique for vessels from foreign ports as soon as you begin inspection. Notify him when ready.

WYMAN, *Surgeon-General.*

[Telegram.]

SABINE PASS, TEX., *August 5, 1897.*

Surgeon-General WYMAN, *Washington, D. C.:*

As quarantine officer refuses to obey Department regulations I can not give pratique. Will be forced to send vessel to Ship Island.

MAGRUDER, *Passed Assistant Surgeon.*

[Telegram.]

SABINE PASS, TEX., *August 6, 1897.*

Surgeon-General WYMAN, *Washington, D. C.:*

Dr. Perkins now agrees to disinfect vessels as directed by Department.

MAGRUDER, *Passed Assistant Surgeon.*

[Telegram.]

SABINE PASS, TEX., *August 12, 1897.*

Surgeon-General WYMAN, *Washington, D. C.:*

Dr. Perkins refuses to permit inspecting of fumigation process; therefore I can not give pratique. Have advised bark *Alice,* from Vera Cruz, to go to Ship Island. Shall I order all vessels from infected ports there?

MAGRUDER, *Passed Assistant Surgeon.*

[Telegram.]

WASHINGTON, *August 13, 1897.*

Dr. MAGRUDER, *Sabine Pass, Tex.:*

Call Dr. Perkins's attention to article 11, page 31, Quarantine Regulations, which authorizes inspection at all times, under all circumstances. If he persists, order all vessels from infected ports to Ship Island. According to reports as late as August 5, received in Bureau, no yellow fever in Vera Cruz since June 29. Consult vessel's bill of health.

WYMAN, *Surgeon-General.*

REPORT ON SABINE PASS.

By E. POLK JOHNSON, *Special Agent, Treasury Department.*

OFFICE SPECIAL AGENT TREASURY DEPARTMENT,
Eagle Pass, Tex., August 16, 1897.

SIR: Referring to Department letters of the 4th and 11th instants, and inclosures, I have the honor to report that I visited Sabine Pass, Tex., in pursuance of instructions therein contained, and found that differences exist between the State health

officers at that port and Passed Assistant Surgeon Magruder, of the United States Marine-Hospital Service, who has recently assumed station there. The deputy collector has received orders from the Department not to permit entry to any vessel except on pratique from Surgeon Magruder, and obeys said orders.

I beg to state that on June 24, of the current year, I visited Sabine Pass officially, and while there two vessels, ostensibly in the State quarantine, were lying along shore, one of them discharging her stone ballast ashore at a point less than 100 feet from where a large number of men were at work constructing a ship. It occurred to me that the proceeding, if not irregular, was, at least, a questionable one. Since the arrival of Surgeon Magruder, vessels in quarantine are held for five days at a point some hundreds of yards from the beach, and if from infected or suspected ports, are fumigated before being granted pratique. Unauthorized persons are not permitted to go aboard nor, when preventable, is any person from such vessels permitted to visit the shore, but I am by no means sure that absolute obedience to this rule is enforceable under existing conditions.

I am informed by the State health officer, who strongly objects to the presence at Sabine Pass of a medical officer from the Federal service, that he will request the governor of this State to take up with the Department the question of interference by the Federal Government with the affairs of the State of Texas in the matter of coast quarantine. He will also ask for the removal to another port of Surgeon Magruder and the withdrawal of the order prohibiting entry to vessels not having pratique from him.

I respectfully represent to the Department the belief, upon my part, that such action as is sought by the health officer of this State would not tend to increase the safety of coast ports against the epidemics now prevalent in neighboring southern countries, and recommend that no change be made from the system now being enforced at Sabine Pass. Discussion of the rights of the States to regulate their own affairs may, in matters of the public health, well be relegated to the blissful period when danger from infectious diseases no longer exists. The Federal Government will scarcely hesitate in safely guarding its coast lines against sickness and death, however much its precautionary measures may conflict with sanitary regulations or the lack of them, in the States most liable to infection.

Relative to the recommendation of Capt. John Dennett, commanding the revenue cutter *Galveston*, referred to in said letters, that an acclimated customs inspector be appointed to service at Sabine Pass, I respectfully state that such an appointment seems to me a proper one, though it may be difficult to find such immune person among the eligibles on the civil-service lists, from which appointments, I understand, must now be made. An acclimated inspector already in the service and now on duty along the Louisiana or Florida coast would probably serve the purpose indicated by Captain Dennett.

In my report of June 28 last I recommended the stationing of a customs inspector at Sabine Pass, and was later directed by the Department to send to that port one of the two inspectors on duty in this district, and Inspector William Furguson was under orders for that duty at the date of his death, July 25. There is but one inspector now on my staff, and his presence is necessary at Laredo, Tex., for service in preventing the illegal importation of Chinese from Mexico. For that reason my recommendation of June 28, that an additional inspector be sent me, is respectfully renewed.

Returning from Sabine Pass, I called at Galveston to confer with Captain Dennett on the subject-matter of his and my reports, but found him absent on leave. The officer commanding informed me that the cutter would be out of service for the next month while undergoing repairs and "cleaning up." This absence of the cutter, which would otherwise make monthly or if necessary more frequent calls at Sabine Pass, renders it more than ever necessary that our inspector be on duty there.

The deputy collector at Sabine Pass, a documentary port merely, claims that his presence is necessary at his office during business hours, and that he has neither time

nor opportunity to visit vessels coming into the port, nor does he make such visits. Vessels come and go without let or hindrance, so far as smuggling is concerned. If there be no smuggling done there, then the Spanish and Mexican leopard has changed his spots and differs from his kind here and elsewhere.

If the inspector herein recommended be found to be not needed at Sabine Pass, he may be made serviceable elsewhere along the long line of coast needed to be guarded here. If one can be found who is immune from yellow fever, as suggested by Captain Dennett, it will be all the better for him and for the service.

Very respectfully,

E. POLK JOHNSON, *Special Agent.*

The SECRETARY OF THE TREASURY, *Washington, D. C.*

SABINE PASS, TEX., *August 19, 1897.*

Surgeon-General WYMAN, *Washington, D. C.:*

Local pressure on Perkins causes him to write me as follows:

"In order to relieve shipping I consent for you to disinfect bark *Alice.* I protest against your right to do so, and pronounce it trespass upon my right and a violation of quarantine law of Texas."

Dr. Perkins means to turn station over to me for inspection of this vessel. Shall I accept?

MAGRUDER, *Passed Assistant Surgeon.*

[Telegram.]

SABINE PASS, TEX., *August 21, 1897.*

Surgeon-General WYMAN, *Washington, D. C.:*

Telegram of 19th transmitted incorrectly; should read: "Dr. Perkins means to turn station over to me for disinfection of this vessel."

MAGRUDER, *Passed Assistant Surgeon.*

UNITED STATES MARINE-HOSPITAL SERVICE, DISTRICT OF THE GULF,
Sabine Pass, Tex., August 19, 1897.

SIR: I give below the full text of the letter from Dr. Perkins, which I abbreviated slightly in my telegram of this morning:

"In order to relieve the embarrassment of the shipping interest at this port I will consent for you to disinfect bark *Alice.* At the same time I protest against your right to do so, and pronounce it a trespass upon my rights and a violation of the quarantine laws and regulations of the State of Texas."

Considerable pressure has been brought to bear on Dr. Perkins by the owners of the bark *Alice,* who reside at Beaumont, and the above letter is the result. As I came to this station as an inspector solely, without authority from you to assume control of the station, I forwarded telegram asking instructions. It would also appear from the Doctor's letter that his action is unauthorized and his expressed willingness to permit a violation of the State quarantine laws is worthy of remark.

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

Surgeon-General WYMAN,
Marine-Hospital Service, Washington, D. C.

[Telegram.]

SABINE PASS, TEX., *August 22, 1897.*

Surgeon-General WYMAN, *Washington, D. C.:*

If telegram of 19th is now clear please state if I shall assume charge of station. See my letter of 19th.

MAGRUDER, *Passed Assistant Surgeon.*

[Telegram.]

AUGUST 23, 1897.

Passed Assistant Surgeon MAGRUDER,
Marine-Hospital Service, Sabine Pass, Tex.:

Command of station can only be authorized by President, unless requested by State authority. Having local officer's consent you may disinfect bark *Alice* without taking permanent command.

WYMAN, *Surgeon-General.*

SABINE PASS, TEX., *August 21, 1897.*

SIR: Referring to your letter of August 18, I have the honor to state that some of my telegrams have been incorrectly transmitted, and the state of affairs is as follows:

After the receipt of a copy of my report on this station by Dr. Perkins, he became very antagonistic and refused to confer with me or receive bureau or Department instructions. I communicated this fact to you with recommendations, and in accordance with your instructions have boarded every vessel from foreign ports since August 2.

On August 6 the Doctor reconsidered his former statements and agreed to follow the regulations of the Department, and invited me to be present while vessels were being disinfected. In accordance with this supervision I supervised disinfection of bark *Ragnar*, and gave her pratique, the collector having been instructed to admit no vessel unless pratique was signed by myself.

In a few days Dr. Swearingen visited the station, and I was then informed by Dr. Perkins that he would no longer permit inspection of his process of disinfection.

Since this time matters have been at a standstill. No vessel has been disinfected, though two are now waiting at the quarantine anchorage, hoping the difficulty will be settled in a short time, and they prefer taking chances of a settlement to the extra delay necessitated by a voyage to Ship Island. One of the vessels (bark *Alice*) is owned in Beaumont, 30 miles from Sabine, and the owners have brought considerable pressure to bear on Dr. Perkins, which has resulted in his offering the station to me for the disinfection of both vessels now in port, although he states that such action is illegal and a violation of the quarantine laws and regulations of Texas.

As I was sent here as inspector and not to assume charge of the station, and surely not to receive it from an officer who stated that he had no authority to transfer it to me, I requested instructions from you by wire.

As his offer of the station would only temporarily relieve matters, it would probably bring about an earlier solution of the difficulty if his offer were declined, as the owners of the *Alice*, being influential men, will bring pressure to bear on the governor and will probably cause the quarantine officer here to resign or obey the Treasury regulations.

The collector is still under orders from the Secretary of the Treasury to admit no vessel to entry except upon pratique signed by myself, and I will continue to board all vessels till further instructions.

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C.

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., August 24, 1897.

SIR: I have to request that you will inform this Bureau on the following points:

(1) Are you making your inspections of vessels at the State quarantine station or below said station, at or near the jetties?

(2) Is the State quarantine station now fully equipped for quarantine work, as required by the Treasury Regulations?

(3) Does the local quarantine officer inspect and disinfect vessels after you have passed them, thus complying with State laws or Regulations requiring his inspection or disinfection?

(4) What progress had been made in the construction of a new wharf lower down for the unloading of ballast of vessels from infected ports?

(5) Has work on the new quarantine station, lower down (permission for the erection of which has been obtained from the War Department), been inaugurated? If so, when is it believed the removal from its present site will take place, and is the new site at a safe distance from the shipping at Kountzville or other inhabited place?

(6) Where is the life-saving station located; and is it at a safe distance from the proposed new quarantine station?

The above information is desired by the Bureau in order that the exact situation at the present time may be fully understood.

By direction of the Supervising Surgeon-General Marine-Hospital Service.

Respectfully, yours,

PRESTON H. BAILHACHE,
Surgeon, M. H. S.

Passed Assistant Surgeon MAGRUDER,
Marine-Hospital Service, Sabine Pass, Tex.

MARINE-HOSPITAL SERVICE, DISTRICT OF THE GULF,
Sabine Pass, Tex., August 27, 1897.

SIR: I have the honor to acknowledge receipt of your letter (no initials) of August 24, and to reply to the questions therein propounded as follows:

(1) I board and inspect incoming vessels near head of jetty, about 1 mile or a mile and a half below State quarantine station.

(2) The station now has the necessary equipment for disinfection of vessels, as required by Treasury Regulations, although some of the apparatus is not in very good order.

(3) The State health officer does not seem to have very well defined rules as to the course he will pursue. The bark *Ragnar*, from Rio, was disinfected by him under my supervision. The bark *Alice*, from Vera Cruz, and ship *Allida*, from Rio (all of the above with foul bills of health), were disinfected by me, in accordance with your permission, and are now undergoing quarantine detention. The State quarantine officer boarded these last two vessels when they arrived, but was not present during disinfection, and has not boarded them since, and they will enter at the custom-house as soon as I give them pratique.

The steamer *Nanette*, from Liverpool, via Port Eads, was boarded by us both almost simultaneously, and was given pratique by me and permitted to enter at once. The sloop *Ceres*, from Santos, with clean bill of health, was boarded by me. I met the doctor a short time after I had boarded this last vessel, told him she was from a clean port, with no sickness on board, and under the Treasury Regulations was not subject to quarantine, and that I was prepared to give her pratique whenever he so

desired. He seemed a little in doubt as to the course he would pursue, but sent me the following note after an hour or two:

AUGUST 26.

In order to relieve the shipping at this port, I consented under protest for you to disinfect vessels at the State quarantine station. As long as you have the right to give vessels free pratique and I have not, you will have to do the disinfecting. I will not do it until I can discharge all the duties of a quarantine officer.

A. N. PERKINS, *S. Q. O.*

I replied as follows:

AUGUST 26, 1897.

Dr. A. N. PERKINS:

From your note I fear I did not make myself clear in our conversation of this afternoon. The idea I intended to convey was that the bark *Ceres*, hailing, as she does, from a clean port, is not required by the Treasury Regulations to undergo disinfection. She is, therefore, subject to your orders, and will be permitted to enter at the custom-house as soon as you indicate that you do not desire to detain her.

G. M. MAGRUDER.

Dr. Perkins replied as follows:

AUGUST 27.

Dr. G. M. MAGRUDER, etc.:

I understand you, but as I am not willing to perform part of my duties as a quarantine officer, and call upon you to perform part, I will have nothing to do with the vessel. In other words, as my certificate will not entitle a vessel to enter the custom-house, I decline to put the vessel in condition to receive the certificate. You alone are authorized to give the certificate. You should, therefore, prepare the vessel for receiving it.

A. N. PERKINS, etc.

I met the doctor a short time after this letter was received, and finally succeeded in making him understand my position, and he then said that his quarantine attendants might disinfect her as required by State regulations, but he would have nothing to do with it. As may be inferred from the above, it is impossible to guess which course he will pursue when future vessels arrive.

(4) The new ballast wharf will probably be completed in a few days (probably four or five). Work has been greatly delayed by inability of contractor to secure the necessary piles.

(5) Work on the new quarantine station has not yet been begun. Bids for the new station were opened August 6 and the contract awarded, the work to be done in three months. My information as to time may not be accurate, as the contract was awarded in Austin, and very little seems to be known about the matter here.

The site of the new station is the same I suggested to you in my letter of July 24, and is 1¾ miles below present site, below which the new town will probably not extend. No other buildings are near it.

(6) The life-saving station is located about one-half mile north of present quarantine, but I am informed a new station is soon to be built, and will be located on the west jetty, about 1¼ miles from its junction with the shore. (See chart.)

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE,
Washington, D. C.

[Telegram.]

WASHINGTON, D. C., *August 30, 1897.*

Passed Assistant Surgeon MAGRUDER,
Marine-Hospital Service, Sabine Pass, Tex.

As collector requires your certificate for entry of vessels, if you can give it on Dr. Perkins's disinfection it is desirable you should do so. If you can not, and Dr. Per-

kins has turned over station to you to disinfect, you should disinfect in order to expedite vessels' entry, even though the station is turned over under protest.

The Bureau is not prompted by a desire to take possession of the quarantine, but to secure safety at Sabine Pass and expedite commerce.

WYMAN, *Surgeon-General.*

SABINE PASS, TEX., *September 8, 1897.*

Surgeon-General WYMAN, *Washington, D. C.*

Perkins now consents to my inspection of his process of disinfection.

MAGRUDER, *Passed Assistant Surgeon.*

MARINE-HOSPITAL SERVICE, DISTRICT OF THE GULF,
Sabine Pass, Tex., September 9, 1897.

SIR: Confirming telegram of yesterday, I have the honor to report that Dr. Perkins now consents to my inspection of his process of disinfection. Whether he will continue for any length of time in this I am unable to say, though I am of opinion that the governor has taken action in the matter. There have been no arrivals from infected ports for several weeks, though vessels are shortly expected from the West Indies, Rio, and Vera Cruz. From those two last ports, however, vessels will probably no longer need to be disinfected.

Very respectfully,

G. M. MAGRUDER,
Passed Assistant Surgeon.

SURGEON-GENERAL, *Washington, D. C.*

From this time on the quarantine work was carried on at Sabine Pass under the foregoing arrangement with safety, until, there being a need of Dr. Magruder's services elsewhere, Passed Assistant Surgeon Bratton was ordered to relieve him. Dr. Bratton had been on duty but a day or two when he met with a fatal accident, October 1, falling down the hold of a vessel, from which he died the succeeding day, as narrated in a previous portion of this report.

SUPPLEMENTAL—CORRESPONDENCE WITH THE STATE HEALTH OFFICER REGARDING SABINE PASS.

Immediately at the beginning of the foregoing controversy the Bureau communicated directly with the State health officer calling his attention to the dangerous location and deficiencies of administration. The duty devolving upon the Bureau in this matter was by no means a pleasant one, and effort was made successfully to have the correspondence with the State health officer conducted in a spirit of amity. It is due to the State health officer to state that he believed the law under which the Bureau was acting to be unconstitutional, but that he placed no obstacle in the way of the measures instituted by the Bureau in the emergency in the interest of public safety.

Following is the correspondence with him:

[Telegram.]

WASHINGTON, *July 19, 1897.*

Dr. SWEARINGEN,
State Health Officer, Austin, Tex.:

Dr. Magruder reports location Sabine Pass station dangerous in the extreme. Fifty men working on wharf 30 yards from station; vessels from infected port Vera

Cruz, Mexico, arriving. Can you place inspector lower down? If not this Service will. Suggest Texas Bayou for inspection station. Immediate action necessary. Please wire.

WYMAN, *Surgeon-General.*

[Telegram.]

AUSTIN, TEX., *July 19, 1897.*

Surg. Gen. WALTER WYMAN, *Washington, D. C.:*

I intend to move Sabine station 2 miles south of present site as soon as permission is given by the Government. The danger has been exaggerated. When infected vessels are there, complete isolation is enforced.

R. M. SWEARINGEN, S. H. O.

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., July 22, 1897.

SIR: The inclosed extracts from the inspection reports of Sabine Pass quarantine, made by P. A. Surg. G. M. Magruder, Marine-Hospital Service, and Capt. John Dennett, of the Revenue-Cutter Service, are herewith furnished for your information, and such comment as may seem to be necessary.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Dr. R. M. SWEARINGEN,
State Health Officer, Austin, Tex.

(See above under dates of June 20 and July 13, 1897.)

[Telegram.]

AUSTIN, TEX., *July 22, 1897.*

Surg. Gen. WALTER WYMAN:

We must get permission of War Department to build on any ship channel.

R. M. SWEARINGEN.

[Telegram.]

WASHINGTON, *July 23, 1897.*

Dr. SWEARINGEN,
State Health Officer, Austin, Tex.:

Am officially informed no Government permission required to locate quarantine station lower down on either bank if obstruction to navigation not involved. Copies of letters mailed you yesterday show actual danger of present location at this moment.

WYMAN, *Surgeon-General.*

[Telegram.]

WASHINGTON, *July 24, 1897.*

Dr. SWEARINGEN,
State Health Officer, Austin, Tex.:

Secretary War has just approved your selection for quarantine station Sabine Pass, and telegraphed Major Quinn, New Orleans.

WYMAN, *Surgeon-General.*

QUARANTINE DEPARTMENT OF TEXAS,
Austin, Tex., August 12, 1897.

DEAR SIR: I have the honor to acknowledge the receipt of your communication of the 9th instant, relating to the assumption of control by the Marine-Hospital Service of the function of quarantine at Sabine Pass. I would respectfully submit that the quarantine act of February, 1893, authorizes such assumption only in case of failure or refusal of the State authorities to enforce the rules and regulations promulgated by the Secretary of the Treasury, and I respectfully beg to assure you that at no time have I nor any of the officers of this department ever failed, refused, or neglected to enforce such rules where it has been necessary or required of us to do so. Dr. Perkins declining to permit Dr. Magruder to exercise a supervision over him, or to obey his verbal orders, can not, by any interpretation, be construed to mean that he refused to enforce the rules and regulations promulgated by the Secretary of the Treasury. Granting, however, that you, acting on Dr. Magruder's report of the circumstance, understood it to mean such refusal, it would have been more satisfactory, and more in accord with the courtesy that has heretofore characterized the official relations of the Marine-Hospital Service and this department, if you had so written me and given me the opportunity to correct the misapprehension. As chief health officer of Texas I am responsible to the people for the safeguarding of the public health, and it is not only my duty but has always been my pleasure to avail myself of everything that might contribute to that end. I have, therefore, been careful to see that no rule or regulation promulgated by the Secretary of the Treasury has been neglected. I trust, for the sake of harmony as well as for the best interests of the Service, that you may see this matter in its true light and hasten to recall Dr. Magruder. His presence there under the circumstances can not but prove a source of friction, being, as I have pointed out, unauthorized by any reasonable construction of the act referred to, and altogether unnecessary.

I have just returned from Sabine Pass, where I spent twenty-four hours. The initiative has been taken for the construction of a new station about 2 miles below the present site, and the work will be pushed to a speedy conclusion.

I expect to attend the meeting of the conference of State boards of health at Nashville on the 18th instant, and to read a paper which I have prepared. It is on the relation of Federal to State quarantine, and I would be much gratified if you can make it convenient to be present.

Very truly, yours,

R. M. SWEARINGEN,
State Health Officer.

DR. WALTER WYMAN,
Supervising Surgeon-General Marine-Hospital Service, Washington, D. C.

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., August 9, 1897.

DEAR DOCTOR: I have to acknowledge receipt of your letter of July 29, 1897, relating to Passed Assistant Surgeon Magruder's presence at Sabine Pass, and the latter's report upon the quarantine there.

In reply, I have to state that reports were received by the bureau regarding quarantine procedures at Sabine Pass independent of Dr. Magruder's report, and to the effect that there was much local concern. The reports of Dr. Magruder and of Captain Dennett, Revenue Cutter Service, extracts from which were mailed you on July 22, clearly demonstrate the dangers incident to the quarantine. Conditions similar to these, permitting communication between the quarantine and the city, were the cause of the last epidemic of yellow fever in this country, namely, at Brunswick, Ga., in 1893. Under these circumstances, it is deemed necessary to retain Dr.

Magruder temporarily at the Sabine Pass quarantine to see that the regulations of the Treasury Department, which have not been complied with, are enforced.

Respectfully yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Dr. R. M. SWEARINGEN,
State Health Officer, Austin, Tex.

On August 3, Passed Assistant Surgeon Magruder reported that bids for the erection of a new station had been advertised for by the State authorities. Dr. Magruder was relieved September 28 by P. A. Surg. W. D. Bratton. After the death of the latter by accident on October 2, on account of the lateness of the season and improvements of conditions at Sabine Pass, and because of the urgent demand for officers elsewhere in the South for service in the prevailing epidemic of yellow fever, no further action was taken.

THE YELLOW-FEVER EPIDEMIC IN THE SOUTH DURING THE FALL OF 1897.

The epidemic of yellow fever which occurred shortly after the close of the last fiscal year has its official beginning from the 4th of September, when an officer of this service proved by post-mortem examination the existence of the disease in Ocean Springs, Miss. This, however, is not the actual beginning of the epidemic, for it had been in existence, though undiscovered, for many weeks before its formal announcement. In another place I have discussed the charge made by others that it originated from contact with persons either residing at or passing through Ship Island quarantine to Ocean Springs. Subsequent information has shown satisfactorily that the first victim of the disease was a person who came from a Central American port, through a local quarantine, in April, prior to the beginning of the quarantine closed season. The mildness of the epidemic prevented it becoming a matter of public concern, and this, coupled with the hesitation which men naturally exhibit in admitting the existence of yellow fever, kept accurate knowledge from the hands of the authorities. The experience at Ocean Springs is evidence of the benignity of the disease, where there were 400 cases of this unrecognized mild type of yellow fever with extremely slight mortality. Indeed, throughout the entire experience of the fall the mortality did not reach as high as 11 per cent. This mild type led to general denial of the first cases appearing in communities, and occasioned widespread discussion as to the correctness of the expressed opinions of acknowledged experts. Controversies proceeded with more or less acrimony in several localities, but the correctness of the opinion of the officers employed by the Government as to the existence of yellow fever was promptly confirmed by local physicians and health authorities.

FEVER AT OCEAN SPRINGS, MISS.

Owing to reported information of an epidemic of fever at Ocean Springs, Miss., about the 20th of August, 1897, members of the State board of health of Louisiana determined to visit Ocean Springs and investigate the disease in conjunction with a member of the Mississippi

State board of health. After a thorough investigation, there having been reported some 400 cases, the following report was made:

OCEAN SPRINGS, MISS., *August 23, 1897.*

Dr. S. R. OLIPHANT,

President Board of Health, State of Louisiana:

DEAR SIR: The undersigned, having been requested to investigate an epidemic of fever prevailing at this place, would report as follows:

In company with Drs. J. H. Bemis and O. L. Bailey, attending physicians, we visited and carefully examined 11 cases of the prevailing disease, of which we are informed there have been during the past six or seven weeks over 400 cases, none fatal, except 2 or 3, complicated with preexisting organic troubles.

After careful inspection and examination of the aforesaid cases, which correspond in clinical history with existing cases and cases which have previously occurred, we are positive in our opinion that the disease is "dengue," and that in no case, either of those seen by us or in cases whose history has been obtained from the attending physicians, is there, or has there been, any symptoms which would lead to even a suspicion of more serious disease.

This report was signed by two members of the Board of Experts and the secretary of the Louisiana State Board of Health; a member of the Mississippi State Board of Health, and two attending physicians.

Notwithstanding the above report on September 3, Passed Assistant Surgeon Wasdin at Mobile telegraphed that the situation at Ocean Springs should be investigated, and requested and received permission to accept the invitation of the Mobile board of health to proceed there with a representative of that body, and the State health officer of Alabama. Two days later he reported that at Ocean Springs there was a history of over 500 cases of disease. Five of these he examined and reported marked symptoms of yellow fever. He insisted on and made a necropsy on an adult 60 years of age, and the result was taken under advisement pending the arrival of the officers of the State boards of health of Mississippi and Louisiana.

A second necropsy was performed by Dr. Wasdin, and his diagnosis of yellow fever was concurred in by the representatives of the Mobile board and of the Mississippi and Louisiana State boards of health September 6.

The following letter from Passed Assistant Surgeon Wasdin gives in detail the report of the necropsies and the consultation over the results obtained at this time.

MOBILE, ALA., *September 7, 1897.*

SIR: As authorized by your telegram of the night of the 3d instant, I left the resident physician, Dr. Porter, in charge and accompanied Dr. W. H. Saunders, of the State board of health, and Dr. Rhett Goode, chairman of the city board, to Ocean Springs, Miss., for the purpose of investigating clinically the fever prevailing at that point. We reached Ocean Springs early on the 4th, and at once consulted the local physician and wired the State health officer, Dr. Harralson, at Biloxi, to join us. We then visited 4 cases of the so-called "dengue" or "fever." The characteristic disproportion in pulse rate, icteroid skin, conjunctivæ, and prostration appealed to us strongly. By accident I heard that there had been a death from the "fever" the afternoon of the 3d. This death the local attending physician had not informed us

of, nor had he directed us to his most serious cases. We at once sought another interview, and this gentleman discouraging the idea of an autopsy, I, with State Health Officer Harralson, visited the mayor and requested his interference, and he readily granted us the power to enforce the post-mortem examination. Fortunately the sons of the deceased readily consented and arranged for it. I conducted the autopsy, Drs. Saunders and Harralson in attendance.

There was presented every pathologic sign of death from acute infection and not from whisky, as reported to us by his attending physician. Microscopic and macroscopic proofs of death from yellow fever were found, Drs. Saunders and Harralson agreeing with me. It had been learned that Dr. Oliphant was en route for Ocean Springs and it was decided to await discussion and action, based upon the autopsy and our general observation of cases, until this official arrived from New Orleans. At 6 p. m. Dr. Oliphant, president of the Louisiana board of health, arrived, accompanied by a large number of his expert officers, equipped for extensive hygienic examinations. Dr. Archinard, microscopist, and Dr. Metz, chemist, with Dr. Gill, expert in yellow fever, were intimately associated with me. At 9 p. m. a general conference was held in the rooms of the Mobile authorities. The views of the presidents of the boards represented were given in detail. Dr. Saunders pronounced for yellow fever. Dr. Harralson was almost persuaded. Dr. Oliphant said that while he still thought it dengue, the situation seemed to demand further research. I affirmed my opinion of yellow fever. It was then proposed that we act together in this research and agreed, whereupon I gave in detail my impressions of the clinical evidence, and my conclusions based upon these and the autopsy held during the afternoon. Discussion was energetic for several hours, and the Louisiana board refused to be influenced unless further proof could be gotten. During the 5th I saw, with Dr. Oliphant, several cases not seen before, and two of these I diagnosed as yellow fever. Dr. Saunders also saw a new case, with Dr. Archinard, not shown us before, and he pronounced it yellow fever. Samples of blood were examined fresh from five cases.

No. 1 I diagnosed as presenting the quartan type of malarial organism, and these were verified by Dr. Archinard and Dr. Saunders, although this case was the one diagnosed by Dr. Saunders "yellow fever." The plasmodia were intracorpuscular, sluggishly ameboid, rather small, and sharply defined, with shrinking of the containing red cell. I could only make out two groups of organisms, one quite small and the other filling the shrunken cell. No segments were seen in this case, nor embryonic extracorpuscular bodies. There were large, bizarre, pigmented bodies, not vacuolated; pigment black and quiescent; polymorphonuclear leucocytes pigmented.

Case No. 2, of McDaniel's, thought by all to be suspicious, had no organisms.

No. 3 was a tertian type, large, poorly defined, actively ameboid organism, in full-sized cell.

No. 4 and No. 5 I believe to be tertian.

Urine, in numerous cases found to have been albuminoid by us, was again tested, and the chemist made a large number of these tests. In nearly all there was 30 to 40 per cent albumen. At 8 p. m. a general conference, all present, Dr. Oliphant stated that he had been able to find nothing to change his views of the situation; his experts had not yet finished and that no decision could be reached. Dr. Harralson thus decided. Dr. Saunders and myself then announced our intention of returning to Mobile, as we were convinced, and our duty was to report there. We were asked to delay. At this stage the resident physician hastily announced the imminent death from convulsions of Miss Shutze, the patient seen by Dr. Saunders and diagnosed yellow fever. This information was a thunderclap to those who had announced it "dengue." Great pressure was exercised on Dr. Saunders and he determined to await the autopsy; Dr. Harralson and Dr. Oliphant specially requested this. At 6 a. m. Dr. Archinard made section of this body, when all the conditions of

the first autopsy were duplicated. At a conference at 9 a. m. each gentleman thus expressed his opinion. We returned to our respective cities.

I can inform you that during these trying hours of investigation and conference, as the representative of the Service aiding Mobile, I was the recipient of much consideration from the hands of the officials of Louisiana and Mississippi, and it will always remain a pleasant experience my contact with such active, earnest, honest, and intelligent health officials, in whom our entire country may feel a perfect confidence. Of Ocean Springs and the *causes* of the outbreak I will try to offer information more exact than that now available. Also as to the dual infection of some of the cases.

Respectfully,

EUGENE WASDIN,
Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

As will be seen from the following chronological summary of events, the disease was discovered existing in a number of places in the South in rapid succession, as was to have been expected, since the fever had evidently existed at this summer resort (Ocean Springs) for some time and people had been coming and going freely.

Although the outlook was not encouraging, the efforts of the Bureau were to formally decide, through its acknowledged experts, as to the nature of the fever in suspected places as fast as reported, and on confirmation to immediately throw around each place the recognized restraints necessary to prevent its spread therefrom.

It has been a matter of interest and study to decide upon the effectiveness of these measures, and my own observation and the observation of other officers of the Service has been that, while the disease was frequently reported in new places after measures had been taken to prevent its spread from previously reported places, the former were found to have been infected before the restraints were thrown around the latter, and inquiry has demonstrated the effectiveness of the quarantine restrictions. In other words, it may be stated that no infection was carried by traffic which was under supervision of the Marine-Hospital Service, neither by goods, people, nor vessels.

To meet the necessities caused by restrictions upon travel from Ocean Springs and the other infected localities, the first essential was the establishment of a detention camp, where people seeking to leave the infected localities could be taken as guests and held a period of time sufficient to demonstrate their freedom from the disease, when with a certificate to this effect they could be passed to localities which would otherwise bar them out.

The speedy establishment of this camp was made possible by the preparations which had been made two years previously in anticipation of an emergency like the present. A portable detention camp, including tents, cots, bedding, laundry machinery, cooking and dining utensils, etc., had been prepared, ready for immediate shipment at the old detention camp near Waynesville, Ga., established during the yellow fever epidemic in Brunswick in 1893. A full description of this

portable probation camp may be found in the annual report of the Marine-Hospital Service for 1895, pages 379–384.

This camp was immediately transferred to a point 20 miles east of Ocean Springs and later to Fontainebleau, Miss., requiring a train of 40 cars. Fontainebleau is but 4 or 5 miles east of Ocean Springs, and although after the arrival of the camp at its destination some delay was caused by difficulty in obtaining lumber for the large kitchen and dining rooms, etc., and by heavy showers of rain, the camp was ready for occupancy on September 19, nine days after it had been started from Waynesville.

The total number of guests admitted to this camp was 1,174, among whom there were discovered in the course of detention 20 cases of yellow fever, each of which was promptly removed to a safe distance as soon as discovered and no new cases developed therefrom; in other words, the camp, by reason of good management, did not itself become infected. It was in operation about one month, at the end of which time its maintenance was no longer required, and its equipment, or a large portion thereof, was shipped to Avondale, La., for the establishment of another detention camp at that point.

This camp at Avondale was named "Camp Hutton," in honor of the memory of Surg. W. H. H. Hutton, whose services in the yellow-fever epidemic of 1893 and at various other critical times had been of so marked a value to the Bureau, the Treasury Department, and the country.

Camp Hutton was established to protect particularly the sugar districts of Louisiana, and received over 1,000 guests, from among whom two cases of yellow fever were strained out, who would otherwise have gone into the sugar districts and infected the localities visited. It also was maintained about one month, being closed on November 10.

A third detention camp was established at Mount Vernon Barracks, Ala., an abandoned military reservation, which had been made over by the military authorities to the governor of Alabama, the latter willingly surrendering it to the Marine-Hospital Service for detention-camp purposes.

This camp was intended particularly for refugees from Mobile, a large number of whom availed themselves of the privileges thereof.

Full reports upon these three camps are contained in the reports of the several officers in command in another portion of this chapter.

In addition to these three camps, the Bureau prepared and shipped to the vicinity of Edwards, Miss., the full equipment of another camp, with a view to establishing the same for the purpose of permitting egress from the infected territory in middle Mississippi. The communities, however, being for the most part rural, there was no desire manifested on the part of the inhabitants to leave. The representatives of the State board of health therefore requested that simply a refuge camp be established and maintained by the Bureau, in which

the people might take refuge from the infected localities and reside until the disappearance of the fever. This request was denied, the object of a detention camp as established by the Bureau being to permit egress from the places which were otherwise shut off from outside communication by the quarantine regulations. Nevertheless, the Bureau offered this camp equipage to the State health authorities for use as indicated by them, disclaiming any responsibility for the management of the camp and declining to meet any of the expenses of conducting it. The offer was accepted, and the camp equipage was used by the State board of health as above indicated.

During the active prevalence of the fever in the South, the Bureau sent daily bulletins by telegram to the State and local health officers in all Southern States, detailing the places and number of cases of fever reported.

As soon as possible a complete organization of the forces employed by the Marine-Hospital Service in the South was effected. The infected and especially exposed territories were divided into well-defined districts, with experienced officers of the Service in command of the same. These officers were authorized to employ such help as might be necessary, and at the same time to render a weekly report to the Bureau of all of their transactions, including an estimate of the expenses which they were incurring.

In addition to the regularly commissioned officers of the Service, there were employed 107 physicians as acting assistant surgeons of the Marine-Hospital Service at various places in the South. Of these it may be mentioned that 29 were employed in New Orleans, 44 were employed by the officer of the Service at Memphis who had charge of steamboat and train inspection service, and 11 were employed in Mobile and vicinity.

ORGANIZATION OF THE UNITED STATES MARINE-HOSPITAL FORCES IN THE SOUTH DURING THE EPIDEMIC OF 1897.

The organization of the Service forces after the epidemic had become well established was as follows:

Surg. R. D. Murray in charge of Service matters in Mississippi, south of, but not including, Jackson and Vicksburg; supervision of guards around Biloxi, Ocean Springs, Scranton, and other localities, and guards in Ship Island Harbor; supervision of special trains from infected towns on the Mississippi coast carrying passengers to Camp Fontainebleau; disinfection of mails.

P. A. Surg. J. H. White in independent command of Camp Fontainebleau, Miss.

Surg. H. R. Carter in charge of all Service matters in New Orleans and Louisiana, including train-inspection service, freight and baggage disinfection at railway stations, steamboat-inspection service, establishment of "Camp Hutton," near Avondale, La.

P. A. Surg. A. H. Glennan in charge of Service matters in Mobile and the State of Alabama, including train-inspection service, freight and baggage disinfection at railway stations and steamboat landings, disinfection of mails and detention camp at Mount Vernon Barracks.

Surg. H. W. Sawtelle, on duty at Atlanta, in charge of Service matters for Georgia; supervision of train inspection at Atlanta to prevent sale of tickets to persons from infected localities to other points in the South until after detention in Atlanta; disinfection of all baggage from infected districts not previously disinfected; disinfection of mail for Atlanta from infected districts.

P. A. Surg. H. D. Geddings, at Jackson, Miss., in charge of northern Mississippi; prepared to establish a detention camp near Edwards; in charge of train-inspection service, Alabama and Vicksburg Railroad; later assigned to scientific investigation of yellow fever in New Orleans.

P. A. Surg. Eugene Wasdin, scientific investigation of yellow fever (bacteriological) at New Orleans and Ocean Springs.

P. A. Surg. G. B. Young, at Memphis, Tenn., in charge of steamboat-inspection service on Mississippi River, barge station on the river below Memphis; in charge of train-inspection service on all railroads entering Tennessee, with headquarters alternately at Memphis, Chattanooga, and Nashville.

Surg. P. C. Kalloch, steamboat-inspection service, Cairo, Ill.

Acting Asst. Surg. S. D. Robbins, steamboat-inspection service, Mississippi River, near Vicksburg, Miss., provided with a steamer by the Engineer Department of the United States Army for inspection and detention of suspects.

Acting Asst. Surg. John Guiteras, expert diagnostician, under orders to inspect various suspected places and report.

From the above it will be seen that great care was exercised to guard the Mississippi Valley against infection by steamboats coming up the river, it being determined not to permit a repetition of the experiences of 1878. The work of the several officers above mentioned is described in their special reports, which follow, and the magnitude of the work they had in hand is in part shown by their reports of inspection and disinfection. For example, in New Orleans, under Surgeon Carter, during September, October, and November there were 1,045 trunks, valises, and packages examined and disinfected at the railroad depots; there were 4,626 cars of freight disinfected, 590 vessels were inspected or disinfected, and 439 up-river boats were inspected; 17,081 passengers were inspected on the various railroads leaving New Orleans.

At Mobile in two months there were more than 3,000 trunks, valises, and express packages inspected.

Three officers of the Service contracted yellow fever this year in the performance of their duties, namely, Surg. H. R. Carter, P. A. Surg. Eugene Wasdin, and P. A. Surg. J. O. Cobb.

The work of the officers of the Service was impeded from time to time by the numerous senseless shotgun quarantines established by local authorities. These have been especially referred to elsewhere in the report, and illustrate the necessity of legislation by Congress preventing these unnecessary restraints upon travel, which, in many instances, are prompted by other motives than those of safety.

Whether it would be possible to forcibly remove these shotgun quarantines, particularly when obstructing the United States mails and the work of the officers of the Service, was gravely considered; but, in addition to the doubt as to legal methods to be employed, it was evident that they could not be suppressed without either the expenditure of much time and effort, or the exercise of force which would certainly create riot, and it was therefore concluded that, inasmuch as the season was far advanced and there was but slight possibility of the epidemic becoming a great one, it would be inadvisable to pursue a course other than that which was pursued.

It must be left to a succeeding report to detail the injuries to commerce and the annoyance to passengers caused by these shotgun quarantines established by local authorities, whose State authorities seemed to have no control over them.

With the foregoing summary of the epidemic, I have prepared and append herewith a chronological statement with regard to its course and the measures which were taken, most of the facts published therein having appeared at the time in the Public Health Reports.

It should be remarked that while the date of this report is November 1, 1897, while going to the press some few details of the epidemic have been received, and for the purpose of completing this account some few dates are enumerated beyond that time.

CHRONOLOGICAL HISTORY OF THE EPIDEMIC OF 1897.

September 4.—Passed Assistant Surgeon Wasdin, with State Health Officer Saunders, of Alabama; Dr. Rhett Goode, chairman of the city board of health, and the State health officer of Mississippi, arrived at Ocean Springs and began the investigation. At 6 p. m. of the same date the president of the Louisiana State board of health and three experts of that board arrived. Conference was held at 9 p. m. and Passed Assistant Surgeon Wasdin affirmed his opinion of the presence of yellow fever, concurred in by Dr. Saunders.

September 5.—Investigation continued. Bureau was informed of probable decision. Dr. John Guiteras was appointed acting assistant surgeon and was ordered by myself from Philadelphia to Ocean Springs.

September 6.—Conference at 9 a. m. Unanimous opinion declaring it to be yellow fever. I received word of the final decision of the representatives of the State boards of health concurring in Dr. Wasdin's diagnosis. Immediately wired Dr. Wasdin directing him to look to the

enforcement of the Treasury Regulations, arrange for a cordon, employ necessary help, and turn matters over to Surgeon Murray on the latter's arrival, reporting to him for duty. Also directed him to notify the railroad ticket agents that until the cordon should be established tickets should be sold only to points north of Washington or in mountainous districts, and directed him to keep a record of all persons leaving, with their respective points of destination, for the notification of the State and local authorities. The same night I ordered Surgeon Murray, then on leave, and Surgeon Carter, stationed at Chicago, by wire, to report at Ocean Springs immediately. Wired P. A. Surg. J. H. Oakley, at Savannah, to immediately forward to Ocean Springs the portable steam disinfecting chamber and portable sulphur fumigating furnace stored at Savannah for use in emergency. Wired him immediately thereafter to proceed to Waynesville, Ga., to superintend the loading of the camp outfit stored there and ship it to a point 20 miles east of Ocean Springs. Also wired Superintendent Haines, of the Louisville and Nashville Railroad, at Waycross, Ga., to send a special train of 40 cars immediately to the detention camp near Waynesville, Ga., for transporting the same, and wired the custodian in charge of the camp to be ready to load the same on cars.

September 7.—Telegraphic messages were sent to the governor of Mississippi and to the health officer of Biloxi, Miss., a short distance from Ocean Springs, and to the president of the State board of health of Louisiana, offering the aid of the Government in preventing the spread of the disease, and the same day copies of the Interstate Quarantine Regulations of the Treasury Department were forwarded to each by mail. Mail from infected districts was ordered to be disinfected.

September 8.—Surgeon Murray arrived at Ocean Springs and, in accordance with orders, assumed command of all operations of the Service. He immediately arranged with Dr. Gant, of the Mississippi State board of health, for the establishment of a detention camp for Ocean Springs, a State cordon of eight posts having already been established, in accordance with the Interstate Quarantine Regulations of the Treasury Department. Surgeon Carter arrived on the same day and was directed to investigate all cases of fever reported as suspicious. Acting Asst. Surg. John Guiteras arrived and was directed to perform the same duty as Surgeon Carter. P. A. Surg. J. H. White was ordered by telegram from New York to report to Surgeon Murray and to take immediate charge of the detention camp about to be established. The total number of cases of yellow fever reported at Ocean Springs on this day was 2 and a sick list of 40 persons. One case, resulting in death, was reported from New Orleans, whose illness was stated to have commenced in Ocean Springs.

September 9.—Yellow fever was reported at Scranton, Miss. Surgeon Murray went to Biloxi to investigate suspicious cases. Several suspicious cases were reported in one locality of New Orleans and were

examined by experts of the Louisiana State board of health. Previous to this date train inspection at the Louisiana State line had been inaugurated and conducted by the State board of health of Louisiana. Train inspection was established at the Alabama State line on this date and railroad authorities notified. P. A. Surg. A. H. Glennan, who had been on the west coast of Florida on an inspection trip, was ordered to proceed to Grand Bay, near the Alabama line, for train-inspection service.

September 10.—Ocean Springs: Six new cases of sickness reported by three physicians.

Pascagoula, Miss.: One case of yellow fever reported by Acting Asst. Surg. John Guiteras, who also reported much dengue there. The case suspected and reported the previous day as at Scranton was now reported to be in the city limits of Pascagoula.

Perkinston, Miss.: Surgeon Carter reported 1 case contracted at Ocean Springs. All precautions taken.

New Orleans, La.: Twelve suspicious cases reported on St. Claude street. No positive diagnosis. Nine of them recovered. Remaining 3 doing well.

Surgeon Murray reported that, in company with Passed Assistant Surgeon Wasdin and a representative of the State board of health, and Superintendent Marshall, of the Louisville and Nashville road, he had decided on Fontainebleau, formerly Bellefontaine, as the location for the detention camp. He had engaged a working train and had ordered a telegraph office set up, and had directed Passed Assistant Surgeon White and Steward Richardson to report there. Water supply from driven wells; provisions to be received from Mobile.

September 11.—Passed Assistant Surgeon Wasdin visited Biloxi to investigate suspicious cases reported there. Acting Assistant Surgeon Gaines, under Surgeon Murray, was ordered to Barkley, Miss., because of a report of 5 cases at that point, though the local physicians had made no report. Acting Assistant Surgeon Guitéras was directed, after the completion of his inspection at Barkley, to proceed at once to Mobile, Ala., for the investigation of a suspicious case in that city. In New Orleans Assistant Surgeon Norman was directed to begin the inspection of passengers and crews of steamers going up the river.

The following telegram was sent to Passed Assistant Surgeon Young, Memphis, Tenn., and to the State health officers of Mississippi, Louisiana, and Texas:

If fever becomes more prevalent wider field of operations may be required. Will you wire names of physicians who would accept position to inspect trains on or near State lines (of their respective States), designating names for each place.

Surgeon Carter reported 4 cases of yellow fever at Barkley, Miss.

September 12.—New Orleans, La.: Dr. S. R. Olliphant, president of the Louisiana State board of health, wired:

Commission experts to-day pronounced 7 of the heretofore suspicious cases positively yellow fever.

The services of Dr. Fagét in New Orleans, as expert, were accepted by the Bureau.

September 13.—Ocean Springs, Miss.: One case reported. Barkley, Miss.: Eight cases reported; 4 deaths. New Orleans, La.: Three cases reported. Mobile, Ala.: One case reported.

Surgeon Carter reported by wire the number of cases in Barkley and the measures which had been taken to prevent the spread of the disease there, and that he had left Acting Assistant Surgeon Gaines in charge.

The following is an extract from a letter received on this date from the State health officers at Biloxi, Miss.:

> Replying to yours of the 7th instant we beg to say that we have been, and are now, acting with your Service in our efforts to arrest the spread of yellow fever in our State. We desire to thank you for your proffer of assistance. We are anxiously awaiting the opening of your camp at Fontainebleau so that we can depopulate the infected towns of our State as quickly as possible. We have about 4,000 people in Biloxi, a large per cent of whom we hope to send to your detention camp as soon as opened.

September 14.—Pascagoula, Miss.: Barkley, Miss.: One case. One case. New Orleans, La.: Five cases. Mobile, Ala.: Two cases.

Dr. John Guitéras wired from Mobile—

> Have found 1 case of yellow fever at city hospital, Norwegian, who has not been out of city. Probably fatal termination. One suspicious case in addition to one reported yesterday. I apprehend serious outbreak.

All measures have been taken to prevent spread of the disease from this case.

Owing to the condition of affairs another shipment of camp equipage, stored at Delaware Breakwater, was placed on cars at this time ready to ship at a moment's notice.

Upon request of Drs. J. H. Purnell and J. F. Hunter, executive committee, Mississippi State board of health, Dr. Guitéras was ordered to Edwards, Miss., to examine some cases of suspected fever. A special train was furnished him for this purpose by the board.

An additional 200 tents were ordered from St. Louis to be shipped immediately to Memphis, Tenn., ready for use if it became necessary.

Dr. C. M. Drake, of Atlanta, Ga., was requested to wire names of reliable physicians, one for each crossing, to inspect trains on roads entering Georgia from Alabama.

Surgeon Carter was directed to proceed to New Orleans for inspection service.

Dr. Olliphant, president State board of health, Louisiana, was wired, inquiring whether he proposed to establish a detention camp for New Orleans, and informing him that Fontainebleau would be extended indefinitely for that purpose.

A similar telegram was sent to the State health officer of Alabama.

September 15.—Biloxi, Miss.: Twenty-two cases reported to date. Edwards, Miss.: Twelve cases.

Surgeon Carter, at New Orleans, and Passed Assistant Surgeon Glennan, at Mobile, were directed to establish train-inspection service, medical inspectors to accompany all passenger trains to the State lines of Georgia, Tennessee, Arkansas, and Texas.

By request of the State board of Mississippi, Actg. Asst. Surg. John Guitéras, having proceeded to Edwards to examine suspicious cases in connection with Dr. Purnell, reported as follows:

The diagnosis of yellow fever made in 6 cases by Dr. Purnell is confirmed. He has 2 or 3 cases that I have not yet seen. There are many children sick with what is probably a mild type of the disease. The cases are not confined to one locality, but are all traceable to the Anderson case, which came from Ocean Springs. The medium of distribution appears to have been the Champion case. Mr. Champion, who died, was a prominent man, and many people congregated in the house during the illness. Dr. Purnell is immune, and I recommend him as competent to take charge of situation if necessary. I shall leave this evening at 10 for Mobile unless otherwise directed.

A later dispatch states that 5 additional cases were discovered at Edwards, and it was ascertained that Mrs. Anderson, the first case, took sick on the 8th of August, the date of her arrival from Ocean Springs. All in the house took sick afterwards on different dates, and Mr. Champion on the 29th, two days after visiting the Anderson people.

Dr. Guitéras was directed to notify the State board of health and place Dr. Purnell in charge on behalf of the Bureau unless State authorities had acted. Subsequently State board notified Bureau that they had placed Dr. Purnell in charge some days previously.

At the request of the State board Dr. Guitéras was directed to stop en route back to Mobile at Pelahatchee, which was later countermanded at request of board on report of no sickness at Pelahatchee.

There were no new cases reported from Mobile.

The board of health of Atlanta, Ga., has thrown open its gates to all yellow-fever districts.

WEEK ENDED SEPTEMBER 22, 1897.

TABLE—*Résumé to September 22.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Mobile	Sept. 13	1	
		Sept. 14	2	
		Sept. 17	2	2
		Sept. 18	11	
		Sept. 19	2	
		Sept. 20	1	
		Sept. 21	2	
		Sept. 22	4	
		Sept. 23	2	
Georgia	Atlanta	Sept. 23	*1	
Illinois	Cairo	Sept. 19	2	
		Sept. 20	†2	1
Kentucky	Louisville	Sept. 23	*1	
Louisiana	New Orleans	Sept. 8		1
		Sept. 12	7	
		Sept. 13	3	
		Sept. 14	5	
		Sept. 15	2	
		Sept. 16	2	
		Sept. 17	8	1

* Refugee. † On dredge boat.

TABLE—*Résumé to September 22*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Louisiana	New Orleans	Sept. 18	5	1
		Sept. 19	6	2
		Sept. 20	*18	.....
		Sept. 21	9	.....
		Sept. 22	12	2
		Sept. 23	9	3
Mississippi	Barkley	Sept. 13	8	4
		Sept. 14	1	.....
		Sept. 18	1	.....
	Biloxi	(†)	22	.....
		Sept. 19	.....	1
		Sept. 20	1	1
		Sept. 21	.....	1
		Sept. 22	5	1
	Edwards	Sept. 15	12	1
		Sept. 19	4	.....
		Sept. 20	2	.....
		Sept. 21	12	.....
		Sept. 22	13	2
		Sept. 23	23	.....
	Ocean Springs	Sept. 8	4	2
		Sept. 13	1	.....
		Sept. 18	2	3
		Sept. 22	4	.....
		Sept. 23	6	.....
	Scranton	Sept. 10	1	.....
		Sept. 14	1	.....
		Sept. 19	1	.....
		Sept. 20	15	.....
		Sept. 22	4	.....
		Sept. 23	6	.....
	Perkinston	Sept. 10	1	.....
Texas	Beaumont	Sept. 22	1	.....

*Nine of these cases should have been reported before. †To September 15.

September 16.—Surgeon Murray is informed that the official name of the detention camp at Fontainebleau, Miss., is "Camp Fontainebleau."

Passed Assistant Surgeon Wertenbaker, at Delaware Breakwater, is directed to ship, as soon as possible, camp equipage by fast freight to Waycross, Ga., care of Superintendent G. W. Haines.

Passed Assistant Surgeon Young, at Memphis, is directed to forward 100 tents instead of 75 to Jackson, Miss.

The mayor of Jackson, Miss., is informed that Passed Assistant Surgeon Geddings has left Washington for Jackson for the purpose of establishing a camp by request of the State health authorities, with directions to confer with Dr. Purnell. Doctors Hunter and Kiger, at Vicksburg, are informed that 100 tents have been sent from St. Louis to Jackson this date, the 16th, via Memphis; also that Geddings has left Washington for the same city. They are requested to notify Dr. Purnell and arrange a conference with Geddings concerning the site of the camp.

State Health Officer Porter, of Florida, is informed that the mails and express matter are being disinfected; freight not yet begun; that Glennan has removed to Mobile from Grand Bay, Ala., to start train-inspection service; medical inspectors placed on each train leaving Mobile; Carter has commenced the same at New Orleans.

State Health Officer Sanders, Alabama, is informed that material has been ordered to be shipped to Waycross, Ga., preparatory to establish-

ing a camp if matters should grow worse in Mobile; also that train-inspection service has been established from Mobile and New Orleans to the borders of Georgia, Tennessee, Arkansas, and Texas, and that in case of necessity hospital cars would be attached to each train in Mobile, to be side tracked at designated points.

September 17.—The following notice of assignments is issued: Surgeon Murray, in charge of Service matter in Mississippi, south of but not including Jackson and Vicksburg; Surgeon Sawtelle, on duty at Atlanta, in charge of Service matters for Georgia; Surgeon Carter, same for New Orleans and Louisiana; Passed Assistant Surgeon Glennan, at Mobile, in charge of Alabama, and prepared to establish a detention camp near Mobile; Passed Assistant Surgeon Geddings, at Jackson, Miss., in charge of northern Mississippi, ready to establish a detention camp near Edwards; Passed Assistant Surgeon Young, at Memphis, to aid the Mississippi River inspection, and to cooperate with the local authorities. Each officer is directed to wire daily reports of cases and deaths at points in his district.

Passed Assistant Surgeon Young, at Memphis, is ordered to employ a physician to begin a supplemental inspection of boats going up the river at a point below Memphis, and to arrange for the care and isolation of suspicious cases.

Passed Assistant Surgeon Kalloch telegraphs that there are two suspicious cases in the marine hospital at Cairo, admitted from a Government dredge. He is ordered to take every precaution to prevent the spread of the contagion, and Acting Assistant Surgeon John Guitéras is directed to proceed to Cairo to examine these cases.

Surgeon Carter reports from New Orleans that the board of health is disinfecting the mail from infected houses with formalin.

Surgeon Sawtelle reports from Atlanta that the railroad authorities agree to sell no tickets to persons coming from infected places, or seeking to go to points south of Atlanta, and that medical inspection of trains from the south was instituted by the board of health on the 16th. Atlanta and West Point trains were inspected 40 miles from the city; Southern Railroad trains from Birmingham, 20 miles from the city; suspicious cases to be put off 4 miles out and cared for in detention camp. The coaches bound south from Atlanta and Montgomery fumigated before departure. New Orleans and New York Pullmans fumigated in Jersey City. Many persons were reported passing through Atlanta for northern points. There were 500 refuges in Atlanta, the health authorities aiding them to reach northern points by giving them health certificates after examination.

Passed Assistant Surgeon White, from Camp Fontainebleau, reports persons in vicinity of camp suffering for food, being cut off from market and from their business on account of the quarantine. He was authorized to make such purchases from them as were necessary for the camp and admit them to it.

It is suggested by Dr. Glennan that Mount Vernon Barracks would be desirable as a detention camp, and he is ordered to inspect if necessary. He reported that Governor Johnston had authorized the use of Mount Vernon Barracks.

Acting Asst. Surg. John Guitéras reports 1 case of yellow fever at marine hospital in Mobile, isolated and cared for in a tent.

Passed Assistant Surgeon Smith, Gulf quarantine, reports his belief that the man sent from the tug *Leo* is convalescent from yellow fever; that he was sick aboard for nine days while the tug was engaged in the usual work among the shipping, and forbidden to go ashore. The tug had been lying part of the time at the wharf in Scranton. Another tug hand went home sick before this man was taken sick. Probable origin of disease, Scranton. The health officer at Scranton was advised that the *Leo* should be disinfected and the crew observed.

Surgeon Sawtelle, from Atlanta, reports the arrival on the 17th of 300 refugees and 250 as having left for the North with health certificates, leaving about 500 in the city. Those desiring health certificates are requested to register on arrival in order to save time.

Surgeon Murray reports that 40 persons will be received in Camp Fontainebleau to-morrow, the 19th—10 from Scranton, 10 from Ocean Springs, and 20 from Biloxi.

September 19.—Acting Assistant Surgeon Guitéras, having confirmed the diagnosis of yellow fever at Cairo, and reported that one of the dredges was at East Cairo, Kalloch is ordered to quarantine the dredge and wire full information.

Dr. Lindsley, secretary, reports that at a called meeting of the Tennessee board of health on the 18th quarantine was ordered against the entire State of Mississippi, including all persons and baggage, to go into effect on the 20th; also that inspectors had been appointed at Memphis, Grand Junction, Raymer, Stateline, Chattanooga, Cleveland, and Ducktown, and that they had been ordered to cooperate with the Marine-Hospital Service. Passed Assistant Surgeon Young was ordered to instruct them.

Surgeon Carter is directed to appoint two inspectors on the Alabama and Vicksburg Railroad.

Surgeon Sawtelle reports 75 refugees as having arrived in Atlanta on the 18th; 1 suspicious case detained at camp 4 miles out of city—a man from Mobile who had nursed a fatal case of yellow fever in that city.

Passed Assistant Surgeon Geddings reports his arrival at Jackson, and that he will confer with Dr. Hunter, secretary, and other members of the State board of health before going to Edwards, and that the camp equipage had arrived at Jackson.

Passed Assistant Surgeon White reports 13 stragglers admitted to Camp Fontainebleau during the last six days, 42 as regularly admitted to-day; will admit those from Mobile to-morrow. Murray giving tickets. Camp is laid out with 200 guest tents, and 100 more can be added when received. Each tent holds 4 persons, or 5 on a pinch. Can

care daily for 150 persons during the next three days, and after that 800 daily.

September 20.—Passed Assistant Surgeon Magruder is directed, on the arrival of Passed Assistant Surgeon Bratton at Sabine Pass, Tex., to proceed to Galveston and await orders.

Passed Assistant Surgeon White, at Fontainebleau, is authorized to purchase formaldehyde generator for the purpose of disinfection.

Dr. Lindsley is informed that the marine-hospital officers at Memphis, New Orleans, and Mobile have been directed to cooperate with the State inspectors.

Surgeon Carter, at New Orleans, is directed to arrange with the Mississippi board, so as to remove the embargo on disinfected mails from New Orleans.

Acting Assistant Surgeon Guitéras, at Cairo, is directed to proceed to Point Pleasant, and have special measures taken regarding the dredge *Gamma*, authorized to employ local physician to carry out necessary measures to prevent spread, and to return to Cairo after completion of work.

Passed Assistant Surgeon Kalloch, at Cairo, is directed to put the dredge *Alpha* in strict quarantine, and prevent escape of the crew except to a place of detention, which he was authorized to establish immediately under strong guard. Employment of physician and necessary guards authorized.

Surgeon Wheeler, at Cincinnati, is directed to proceed to St. Louis for temporary duty, relieving Passed Assistant Surgeon Cobb.

Passed Assistant Surgeon Cobb is directed, on being relieved, to report to Passed Assistant Surgeon Kalloch at Cairo to assist in preventive measures.

In reply to the secretary of the State board of health of Missouri, as to what measures should be taken to prevent spread of yellow fever, he is recommended to take the same course in St. Louis as was taken in 1878. It is suggested that he look after Point Pleasant with reference to the dredge boats and assist the marine-hospital officers.

Passed Assistant Surgeon Geddings, Jackson, Miss., is informed that a formol boiler, with chemicals, had been ordered sent to him from New York.

September 21.—Surgeon Wheeler, St. Louis, is directed to isolate all patients from boat *Alpha*, or other suspects, and to make further report.

Passed Assistant Surgeon Geddings, at Jackson, Miss., is directed to consult by wire Dr. Gully concerning the employment of train inspectors from meridian north and east to State line, making connecting links between inspectors from New Orleans and with inspectors at State lines of Georgia and Tennessee.

The following telegram is sent Dr. Sanders, State health officer of Alabama:

Am informed by Postmaster-General of great restrictions placed on mails at Montgomery, coming from both north and south. All mails passing in either direction

are now fumigated by postal authorities. Mail cars passing through Montgomery without stopping, by order of the Postmaster-General, with doors and windows closed. As to clerks passing through Montgomery, they do not come from any infected section, simply running between Newman and Hurricane. Each clerk is obliged to wear a uniform cap of the Postal Service, with badge, and no other persons are allowed in the car. Under these circumstances no good reason for interfering with United States mails at Montgomery, which, moreover, is contrary to law. Kindly use your endeavors with local authorities to prevent this unnecessary restriction. Mississippi and Louisiana have yielded to like request.

Surgeon Sawtelle, at Atlanta, is authorized to purchase necessary furniture for the detention camp at Mount Vernon Barracks, Ala., for 250 people, on requisition of Passed Assistant Surgeon Glennan.

Assistant Surgeon Norman and Dr. Faget, at New Orleans, directed to report to Surgeon Carter for orders.

Passed Assistant Surgeon Geddings reports the acceptance of the camp equipage shipped to Edwards by Dr. Hunter. Camp to be laid out to-day.

Assistant Surgeon Decker, at St. Louis, reports that the health commissioner regards the case of fever as suspicious and proposes to remove the man to quarantine and take all precautions.

Drs. H. A. Grant and H. H. Haralson, at Biloxi, report:

No precaution taken to prevent infection of field in Ship Island Harbor from Biloxi. Will you please take charge of this work?

Surgeon Sawtelle, from Atlanta, reports nearly one-half the passengers on trains from the south were bound for northern points; no suspicious cases in the city. Identification and evidence required that applicants have not been in infected district for the past twenty days before health certificate is issued.

Surgeon Wheeler, from St. Louis, reports that no further developments have occurred. Precautions have been taken; symptoms do not indicate yellow fever.

Passed Assistant Surgeon White reports 80 discharges from Camp Fontainebleau; remaining, 136, and that Dr. Gill, of the Louisiana board of health, was visiting the camp.

Dr. Lindsley telegraphs:

We informed railway officers that our regulations respecting tropical fruit and freight of all kinds are simply that they obey the rules of the Marine-Hospital Service.

Dr. Glenn Andrews, at Montgomery, Ala., reports that Montgomery has no unnecessary restrictions against mails, the requirements being that all mail from infectious points must be fumigated and brought in a clean car by clerk who has not been in an infected district for past twenty days. No restrictions on any other mail.

Passed Assistant Surgeon Kalloch, at Cairo, Ill., reports all cases doing well. *Alpha* being disinfected.

WEEK ENDED SEPTEMBER 29, 1897.

TABLE—*Résumé to September 29.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Mobile	Sept. 13	1	.....
		Sept. 14	2	.....
		Sept. 17	2	2
		Sept. 18	11	.....
		Sept. 19	2	.....
		Sept. 20	1	.....
		Sept. 21	2	.....
		Sept. 22	4	.....
		Sept. 23	2	.....
		Sept. 24	3	3
		Sept. 25	5	1
		Sept. 26	5	.....
		Sept. 27	3	1
		Sept. 28	10	1
		Sept. 29	4	1
Georgia	Atlanta	Sept. 23	*1	.....
Illinois	Cairo	Sept. 19	2	.....
		Sept. 20	†2	.....
Kentucky	Louisville	Sept. 23	*1	1
Louisiana	New Orleans	Sept. 8	.....	1
		Sept. 12	7	.....
		Sept. 13	3	.....
		Sept. 14	5	.....
		Sept. 15	2	.....
		Sept. 16	2	.....
		Sept. 17	8	1
		Sept. 18	5	1
		Sept. 19	6	2
		Sept. 20	‡18	.....
		Sept. 21	9	.....
		Sept. 22	12	2
		Sept. 23	9	3
		Sept. 24	10	4
		Sept. 25	23	2
		Sept. 26	17	.....
		Sept. 27	22	2
		Sept. 28	19	2
		Sept. 29	25	4
Mississippi	Barkley	Sept. 13	8	4
		Sept. 14	1	.....
		Sept. 18	1	.....
	Biloxi	(§)	22	.....
		Sept. 19	.....	1
		Sept. 20	1	1
		Sept. 21	.....	1
		Sept. 22	5	1
		Sept. 24	15	.....
		Sept. 25	10	.....
		Sept. 26	10	.....
		Sept. 27	17	1
		Sept. 28	13	1
		Sept. 29	15	.....
	Edwards	Sept. 15	12	1
		Sept. 19	4	.....
		Sept. 20	2	.....
		Sept. 21	12	.....
		Sept. 22	13	2
		Sept. 23	23	.....
		Sept. 24	29	.....
		Sept. 25	9	2
		Sept. 26	24	.....
		Sept. 28	21	1
		Sept. 29	24	.....
	Ocean Springs	Sept. 8	4	2
		Sept. 13	1	.....
		Sept. 18	2	3
		Sept. 22	4	.....
		Sept. 23	6	.....
		Sept. 24	1	.....
		Sept. 25	2	.....
		Sept. 26	1	1
		Sept. 27	.....	.....
		Sept. 28	1	.....
		Sept. 29	1	.....
	Scranton	Sept. 10	1	.....

* Refugee. † On dredge boat. ‡ Nine of these cases should have been reported before.
§ To September 15.

TABLE—*Résumé to September 29*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Mississippi	Scranton	Sept. 14	1	.....
		Sept. 19	1	.....
		Sept. 20	15	.....
		Sept. 22	4	.....
		Sept. 23	6	.....
		Sept. 26	1	1
		Sept. 27	2	1
		Sept. 28	5	.....
		Sept. 29	3	1
	Perkinston	Sept. 10	1	.....
Texas	Beaumont	Sept. 22	1	.....

New Orleans.—Number of cases and deaths reported in the table. At the date of this report strenuous efforts are being made by the Louisiana State board of health to limit the spread of the disease in New Orleans by isolation of the sick, depopulation of infected districts, guarding infected premises, disinfection, etc. All baggage leaving New Orleans, except for points in the North and a few points in the mountainous districts, is being disinfected. Mail matter and freight are also being disinfected, the latter in accordance with the classification agreed upon by the Marine-Hospital Service and State health authorities of Louisiana, Alabama, Mississippi, and Tennessee. Efforts are still being made by Surgeon Carter, in conjunction with the State board of health of Louisiana, to relieve unnecessary restraints upon traffic. Through the efforts of Surgeon Carter the restriction upon mail trains passing through Lafayette Parish, La., has been removed. Surgeon Carter has also perfected the train-inspection service on all trains leaving New Orleans.

Coast line of Mississippi between the Louisiana and Alabama State lines.—Surgeon Murray, in charge of Service matters in this district, exclusive of Camp Fontainebleau, has been actively engaged in supervising the cordons around the several infected districts, Biloxi, Ocean Springs, and Scranton, and effected arrangements for the protection of the fleet in Ship Island Harbor from infection from the coast towns. Surgeon Murray has also inspected a number of suspected localities and pronounced them free from yellow fever, and has supervised the disinfection of all mail leaving his district.

At Camp Fontainebleau, Passed Assistant Surgeon White reports that 678 have been cared for and 227 discharged and given free pratique between September 21 and September 30, inclusive. The camp is in excellent condition.

At Mobile, Passed Assistant Surgeon Glennan has supervised the disinfection of freight in accordance with the Service classification, disinfection of mails, baggage, and express packages; has also perfected the train-inspection service on all trains leaving Mobile, and has been engaged in preparing a detention camp at Mount Vernon Barracks, 25 miles north of Mobile.

Surgeon Sawtelle, at Atlanta, Ga., has been conducting supplemental disinfection of mails and baggage, has supervised the train-inspection

service of trains entering that city, and kept the Bureau informed of all matters transpiring in and about Atlanta.

At Cairo, Ill., there has been no further development of fever, and the 4 cases (2 on a barge) have been discharged. The barge *Alpha*, which was infected, has been thoroughly disinfected and the bedding burned under the direction of Passed Assistant Surgeon Kalloch.

At Memphis, Tenn., Passed Assistant Surgeon Young has perfected a supplemental inspection of up-river boats, having obtained through the Secretary of War 2 barges from the Mississippi River Commission for the detention of yellow-fever cases and suspected cases. He has also organized, under direction of the Bureau, a train-inspection service for all trains entering middle and eastern Tennessee, supplementing the service established by Surgeon Carter in New Orleans and Passed Assistant Surgeon Glennan in Mobile.

Passed Assistant Surgeon Geddings has been on duty at Jackson, Miss., keeping the Bureau informed on all matters relating to Edwards and vicinity, and assisting the executive committee of the State board of health in the matter of guards and otherwise. Has appointed 2 train inspectors on the Alabama and Vicksburg road.

Acting Assistant Surgeon John Guitéras reported during the week that the Government dredges at Point Pleasant, Mo., had been examined by himself and no traces of yellow fever found there. From Cairo he was ordered to inspect suspicious cases at Delhi and California, in Madison County, northern Louisiana. He found 1 case, a refugee from Edwards, at California. Strict sanitary restraints have been imposed by the parish health officer, Dr. William Kelley. From northern Louisiana Dr. Guitéras proceeded to New Orleans to await orders.

There have been no new foci of infection reported in Alabama outside of Mobile.

In Mississippi no extension of the disease to new points, excepting in the vicinity of Edwards, which is a country community, and at McHenry.

Report (September 30) from Passed Assistant Surgeon Wasdin states that he has diagnosed 2 cases at McHenry, in Jackson County, 25 miles north of the coast. Energetic measures have been adopted by local authorities.

In Louisiana, outside of New Orleans, 1 case has been reported at Algiers, opposite the first-named city. No other cases, excepting 1 at California, previously mentioned.

There have been no cases reported from Texas, with the exception of 1 case (fatal) at Beaumont; origin, unknown.

One death has been reported from Louisville, Ky., a refugee, who left Mobile on September 7.

Classification of freight for disinfection, as adopted by the Marine-Hospital Service.

REGULATIONS GOVERNING SHIPMENTS UNDER QUARANTINE REGULATIONS.

In response to the request of the joint meeting of the representatives of the industrial, mercantile, health, and transportation interests of New Orleans held

September 16, we beg to advise that merchandise and commodities may be safely handled and transported from New Orleans in accordance with the regulations as mentioned below, which are in accord with the State and interstate quarantine regulations adopted by the United States Government, and which are essentially the same as those required for similar articles of merchandise before entry into the United States from places infected with yellow fever, such as Cuba and Rio de Janeiro.

Class No. 1.—All new and dry material, unpacked, such as lumber, machinery, brick, bar and sheet iron, tin, steel, agricultural implements, iron ties, staves, saddlery, wagons, new furniture, new trunks, hardware without packing, lime, etc., being incapable of conveying infection, require no disinfection.

Class No. 2.—All goods in original wooden or metal packages, not broken in New Orleans, do not require disinfection except outside of container.

Class No. 3.—Goods packed in textile material, not broken in New Orleans, and kept perfectly dry, do not require disinfection, except the container.

Class No. 4.—Fruits, sound, and taken directly from the vessel and transferred immediately to the cars for shipment, require no disinfection.

Class Nos. 2, 3, and 4.—The outside of containers must be submitted to disinfection.

Articles not in these classes, if they have been exposed to infection, will be disinfected before they are shipped; the efficiency of said disinfection shall be certified to by the proper health authorities.

All certificates and disinfection are subject to inspection and approval by authorized agents who may be sent by the various health authorities.

S. R. OLLIPHANT, M. D.,
President Board of Health.
H. R. CARTER,
Surgeon, Marine-Hospital Service.
A. L. METZ, M. D.,
Chemist of the City of New Orleans and Board of Health, State of Louisiana.

WEEK ENDED OCTOBER 6, 1897.

TABLE—*Résumé to October 6.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Mobile	Sept. 13	1	.....
		Sept. 14	2	.....
		Sept. 17	2	2
		Sept. 18	11	.....
		Sept. 19	2	.....
		Sept. 20	1	.....
		Sept. 21	2	.....
		Sept. 22	4	.....
		Sept. 23	2	.....
		Sept. 24	3	3
		Sept. 25	5	1
		Sept. 26	5	.....
		Sept. 27	3	1
		Sept. 28	10	1
		Sept. 29	4	1
		Sept. 30	6	1
		Oct. 1	7	1
		Oct. 2	1	1
		Oct. 3	4	0
		Oct. 5	2	2
		Oct. 6	4	0
Georgia	Atlanta	Sept. 23	*1	.....
Illinois	Cairo	Sept. 19	2	.....
		Sept. 20	†2	.....
Kentucky	Louisville	Sept. 23	*1	1
Louisiana	New Orleans	Sept. 8	.....	1
		Sept. 12	7	.....
		Sept. 13	3	.....
		Sept. 14	5	.....
		Sept. 15	2	.....
		Sept. 16	2	.....

* Refugee.

† On dredge boat.

TABLE—*Résumé to October 6*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Louisiana	New Orleans	Sept. 17	8	1
		Sept. 18	5	1
		Sept. 19	6	2
		Sept. 20	*18	.....
		Sept. 21	9	.....
		Sept. 22	12	2
		Sept. 23	9	3
		Sept. 24	10	4
		Sept. 25	23	2
		Sept. 26	17	.....
		Sept. 27	22	2
		Sept. 28	19	2
		Sept. 29	25	4
		Sept. 30	24	3
		Oct. 1	30	2
		Oct. 2	28	4
		Oct. 3	31	2
		Oct. 4	24	0
		Oct. 5	38	2
		Oct. 6	46	5
Mississippi	Barkley	Sept. 13	8	4
		Sept. 14	1	.....
		Sept. 18	1	.....
	Biloxi	(†)	22	.....
		Sept. 19	.....	1
		Sept. 20	1	1
		Sept. 21	.....	1
		Sept. 22	5	1
		Sept. 24	15	.....
		Sept. 25	10	.....
		Sept. 26	10	.....
		Sept. 27	17	1
		Sept. 28	13	1
		Sept. 29	15	.....
		Sept. 30	24	1
		Oct. 1	28	0
		Oct. 2	16	0
		Oct. 3	22	2
		Oct. 4	11	0
		Oct. 5	6	0
		Oct. 6	7	1
	Edwards	Sept. 15	12	1
		Sept. 19	4	.....
		Sept. 20	2	.....
		Sept. 21	12	.....
		Sept. 22	13	2
		Sept. 23	23	.....
		Sept. 24	29	.....
		Sept. 25	9	2
		Sept. 26	24	.....
		Sept. 28	21	1
		Sept. 29	24	.....
		Sept. 30	29	0
		Oct. 1	19	1
		Oct. 2	19	1
		Oct. 3	14	1
		Oct. 4	18	2
		Oct. 5	9	1
		Oct. 6	16	1
	McHenry	Sept. 30	2	0
		Oct. 1	2	0
		Oct. 5	2	0
	Nitta Yuma	Oct. 3	*4	0
		Oct. 4	2	0
		Oct. 5	1	0
		Oct. 6	1	0
	Ocean Springs	Sept. 8	4	2
		Sept. 13	1	.....
		Sept. 18	2	3
		Sept. 22	4	.....
		Sept. 23	6	.....
		Sept. 24	1	.....
		Sept. 25	2	.....
		Sept. 26	1	1
		Sept. 27	0	0
		Sept. 28	1	.....
		Sept. 29	1	.....
		Sept. 30	0	0
	Scranton	Sept. 10	1	.....

* Nine of these cases should have been reported before.

† To September 15.

TABLE—*Résumé to October 6*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Mississippi	Scranton	Sept. 14	1	
		Sept. 19	1	
		Sept. 20	15	
		Sept. 22	4	
		Sept. 23	6	
		Sept. 26	1	1
		Sept. 27	2	1
		Sept. 28	5	
		Sept. 29	3	1
		Oct. 1	30	
		Oct. 2		
		Oct. 3		2
		Oct. 4	2	0
		Oct. 6	18	0
	Perkinston	Sept. 10	1	
Texas	Beaumont	Sept. 22	1	

Since the last report yellow fever has been determined as existing to a limited degree in Clinton and Nitta Yuma, points in Mississippi, in the general vicinity of Edwards, and at McHenry and Hendersons Point, in southern Mississippi.

Five cases have been reported in Algiers, opposite New Orleans.

Surg. R. D. Murray has established train-inspection service on the Gulf and Ship Island Railroad.

P. A. Surg. Eugene Wasdin, who made the first diagnosis, confirmed by necropsy, at Ocean Springs, and subsequently contracted the fever, has recovered, and has been ordered to New Orleans to continue his investigations.

P. A. Surg. H. D. Geddings has also been ordered to New Orleans for the same purpose.

During the week a detention camp has been opened by P. A. Surg. A. H. Glennan at Mount Vernon Barracks, 25 miles north of Mobile.

Train inspection service has been extended by P. A. Surg. G. B. Young to cover the whole southern boundary of Tennessee.

Acting Asst. Surg. S. D. Robbins has established a supplemental steamboat-inspection service in the vicinity of Vicksburg, Miss., using the steamer *Florence*, kindly lent for that purpose by Major Willard, of the Engineer Corps of the Army.

Acting Asst. Surg. John Guitéras, having completed his investigations in northern Louisiana, has announced his arrival at Galveston, Tex., where he is examining into the epidemic of dengue at that city.

It is with deep regret that announcement is made of the death by accident of P. A. Surg. W. D. Bratton, at Sabine Pass quarantine, Texas, October 3, while in the performance of duty.

WEEK ENDED OCTOBER 13, 1897.

TABLE—*Résumé to October 13.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Mobile	Sept. 13–Sept. 30	63	10
		Oct. 1–Oct. 6	18	4
		Oct. 7	4	0
		Oct. 8	6	0
		Oct. 9	5	2
		Oct. 10	7	2
		Oct. 11	5	0
		Oct. 12	3	0
		Oct. 13	13	0
	Wagar	Oct. 11	1	.....
Georgia	Atlanta	Sept. 23	1	.....
Illinois	Cairo	Sept. 19	2	.....
		Sept. 20	2	.....
Kentucky	Louisville	Sept. 23	1	1
Louisiana	New Orleans	Sept. 8–Sept. 30	226	27
		Oct. 1–Oct. 6	197	15
		Oct. 7	31	2
		Oct. 8	49	5
		Oct. 9	35	6
		Oct. 10	37	5
		Oct. 11	39	4
		Oct. 12	38	3
		Oct. 13	31	9
Mississippi	Alco	Oct. 8	1	0
	Barkley	Sept. 13–Sept. 18	10	4
	Biloxi	Sept. 1–Sept. 30	132	7
		Oct. 1–Oct. 6	90	3
		Oct. 7	10	1
		Oct. 8	11	1
		Oct. 9	15	0
		Oct. 10	9	1
		Oct. 11	12	0
		Oct. 12	12	0
		Oct. 13	17	0
	Clinton	Oct. 7	10	1
		Oct. 9	0	0
		Oct. 10	1	0
		Oct. 12	1	0
	Edwards	Sept. 15–Sept. 30	212	6
		Oct. 1–Oct. 6	95	7
		Oct. 7	10	0
		Oct. 8	13	4
		Oct. 9	16	1
		Oct. 10	9	1
		Oct. 11	5	2
		Oct. 12	10	0
		Oct. 13	7	1
	Hendersons Point	Oct. 7	3	0
	McHenry	Sept. 30	2	0
		Oct. 1	2	0
		Oct. 5	2	0
		Oct. 12	5	0
		Oct. 13	1	1
	Nita Yuma	Oct. 3–Oct. 6	8	0
		Oct. 7	0	0
		Oct. 8	1	0
		Oct. 11	0	1
	Ocean Springs	Sept. 8–Sept. 30	23	6
	Scranton	Sept. 10–Sept. 30	39	3
		Oct. 1–Oct. 6	50	2
		Oct. 7	7	0
		Oct. 8	11	0
		Oct. 9	7	0
		Oct. 10	10	0
		Oct. 11	9	0
		Oct. 12	0	0
		Oct. 13	9	1
	Perkinston	Sept. 10	1	0
Texas	Beaumont	Sept. 22	1	0
	Galveston	Oct. 9	5	0
		Oct. 10	2	0
		Oct. 11	5	0
	Houston	.....do	3	0

October 8.—P. A. Surg. G. B. Young, stationed at Memphis, Tenn., was authorized to appoint inspectors for and guard the Tennessee River. This action was taken at the request of the State board of health of Tennessee. State Health Officer Dr. W. H. Sanders reported 1 case of yellow fever at Alco, Ala., a small hamlet about 1 mile distant from Brewton. He stated there was no exposure to any person outside the patient's family and that all necessary precautions had been taken.

October 9.—Acting Asst. Surg. John Guitéras, at Galveston, Tex., reported, after a thorough investigation, 5 cases of yellow fever under treatment and 3 recovered, with an extensive epidemic of dengue, causing much confusion. Surg. H. R. Carter, who had been instructed to obtain a site for a detention camp for persons desiring to work in the cane fields of Louisiana, reported he had, with Passed Assistant Surgeon Geddings, selected a point about 15 miles from Algiers, on the lines of the Southern Pacific and Texas Pacific railroads, near Avondale, and Steward S. W. Richardson (on duty at Camp Fontainebleau, Mississippi) was ordered to report to Surgeon Carter for duty in connection with the establishment of the camp.

October 10.—Acting Asst. Surg. John Guitéras wired that, in company with State Health Officer Dr. R. M. Swearingen, he intended visiting Houston, Tex., where much dengue was reported. Surgeon Carter, at the request of Drs. Hunter and Kiger, president and secretary State board of health, Mississippi, investigated several cases of fever at Terry, 10 miles south of Jackson, and found them to be simple malarial fever. The reported cases of fever at Patterson, La., were investigated by Surgeon Carter, who, with Drs. Sanders and Smith and two local physicians, agreed there was not even a suspicion of yellow fever.

October 11.—Acting Asst. Surg. John Guitéras reported 3 cases of yellow fever at Houston, Tex. Passed Assistant Surgeon Young was authorized to discontinue the Chattanooga train service, but to place inspectors on the roads connecting middle and west Tennessee. Acting Assistant Surgeon Booth reported an outbreak of dengue at Shreveport, La. Passed Assistant Surgeon White was ordered from Camp Fontainebleau to report to Surgeon Carter for duty at the camp for sugar-cane laborers—"Camp Hutton"—leaving P. A. Surg. J. O. Cobb in command of Camp Fontainebleau.

October 12.—Daily reports of cases of yellow fever and deaths were requested by the Bureau from the health physicians of Houston and Galveston, Tex. Similar request was made of Dr. McHenry concerning the town of McHenry, Miss. Acting Asst. Surg. John Guitéras was authorized to visit Beaumont, Tex., where Passed Assistant Surgeon Magruder reported suspicious cases.

October 13.—The governor of Texas and the State health officer were informed that the Bureau was ready to aid the State officers in enforcing regulations for preventing the spread of disease in his State, employ-

ing at the same time such measures as might also relieve the embargo upon traffic. The disinfection of mails from infected districts in Texas was inaugurated. Camp Hutton, near Avondale, La., open for reception of sugar-cane laborers.

October 14.—Surgeon Carter reported 1 fatal case occurring in Franklin, La., and that exposed had been removed to Camp Hutton.

WEEK ENDED OCTOBER 20, 1897.

TABLE—*Résumé to October 20.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Alco	Oct. 8	1	0
	Bayminette	Oct. 14	1	1
	Flomaton	do	4	0
	Mobile	Sept. 13–Sept. 30	74	11
		Oct. 1–Oct. 13	68	9
		Oct. 14	5	1
		Oct. 15	5	0
		Oct. 16	7	0
		Oct. 17	5	0
		Oct. 18	6	1
		Oct. 19	*7	0
		Oct. 20	8	1
	Montgomery	Oct. 18	4	0
		Oct. 20	5	1
	Wagar	Oct. 11	1	.....
Georgia	Atlanta	Sept. 23	1	.....
Illinois	Cairo	Sept. 19	2	.....
		Sept. 20	2	.....
Kentucky	Louisville	Sept. 23	1	1
Louisiana	Baton Rouge	Oct. 18	1	0
	Franklin	Oct. 14	1	1
		Oct. 20	1	0
	New Orleans	Sept. 8–Sept. 30	226	27
		Oct. 1–Oct. 13	457	49
		Oct. 14	41	4
		Oct. 15	48	3
		Oct. 16	30	4
		Oct. 17	24	5
		Oct. 18	37	7
		Oct. 19	56	4
		Oct. 20	60	.....
Mississippi	Barkley	Sept. 13–Sept. 18	10	4
	Bay St. Louis	Oct. 17	7	0
		Oct. 19	0	1
	Biloxi	Sept. 1–Sept. 30	132	7
		Oct. 1–Oct. 13	176	.....
		Oct. 14	13	.....
		Oct. 15	19	0
		Oct. 16	18	0
		Oct. 17	2	0
		Oct. 18	16	.....
		Oct. 19	21	1
		Oct. 20	17	3
	Cayuga	Oct. 16	4	0
		Oct. 18	3	1
		Oct. 19	2	0
	Clinton	Oct. 7–Oct. 13	12	1
		Oct. 14	0	1
		Oct. 17	3	0
		Oct. 18	0	0
		Oct. 19	4	0
	Edwards	Sept. 15–Sept. 30	212	6
		Oct. 1–Oct. 13	165	16
		Oct. 14	6	0
		Oct. 15	8	0
		Oct. 16	5	1
		Oct. 17	3	1
		Oct. 18	2	3
		Oct. 19	4	0
		Oct. 20	7	0
	Hendersons Point	Oct. 7	3	.....
		Oct. 12	0	0
	McHenry	Sept. 30–Oct. 13	12	1
		Oct. 14	6	0
		Oct. 15	4	0
		Oct. 16	1	0

* Two in vicinity.

TABLE—*Résumé to October 20*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Mississippi	Nitta Yuma	Oct. 3–Oct. 12	9	1
		Oct. 16	1	0
	Ocean Springs	Sept. 8–Sept. 30	23	6
	Pascagoula	Oct. 14	2	0
		Oct. 18	2	0
		Oct. 19	1	0
		Oct. 20	3	1
	Perkinston	Sept. 10	1	0
	Scranton	Sept. 10–Sept. 30	39	3
		Oct. 1–Oct. 13	103	3
		Oct. 14	10	1
		Oct. 15	9	0
		Oct. 16	9	0
		Oct. 18	12	0
		Oct. 19	7	0
		Oct. 20	16	1
	Waveland	To Oct. 18	2	.....
		Oct. 19	2	0
Texas	Beaumont	Sept. 22	1	0
	Galveston	Oct. 9	5	0
		Oct. 10	2	0
		Oct. 11	5	0
	Houston	....do	3	0

Continuing the report of yellow fever in the South from October 14, one case was reported from Wagar, Ala., as having occurred several days previously. State Health Officer Sanders reported 4 cases of yellow fever at Flomaton, Ala., and stated there were a number of other sick persons requiring examination. One death from yellow fever was officially reported as having occurred at Bayminette, Ala. Reports having been received of suspicious cases at various points in Texas, the mayor of Corpus Christi, county judge, and health officer requested the Service, through Acting Assistant Surgeon Spohn, to supervise the quarantine matters at that place. This request was subsequently withdrawn and the Bureau notified that quarantine would be raised the following day. Health Physician Fisher, of Galveston, stated that no suspicious cases had been reported for the past two days and no death from any heretofore reported. City Health Officer McElroy, at Houston, reported no cases of yellow fever on that date, but that one of the cases of suspects was still under observation. A tender of aid was made by the Bureau to Governor Culberson and the State health officer of Texas. Yellow fever was reported at Pascagoula, Miss., and one fatal case at Franklin, La.

October 15.—State Health Officer Swearingen wired his unqualified indorsement of Acting Assistant Surgeon Guitéras's work. Dr. Seelye, president State board of health of Alabama, requested the presence of Acting Assistant Surgeon Guitéras at Montgomery, Ala., but subsequently withdrew his request.

October 16.—Health Physician Fisher, at Galveston, reported no suspicious cases for several days. Acting Assistant Surgeon Cunningham was ordered to Flomaton, Ala., to keep the Bureau advised in regard to cases at that place. Yellow fever was reported by Dr. J. F. Hunter, secretary of the State board of health, at Cayuga, Miss.

October 17.—Passed Assistant Surgeon Magruder, at Galveston, reported no cases of yellow fever since the 11th instant and no deaths. He also stated that the board of health and advisory board (two members having resigned) declared unanimously that no yellow fever existed in the city, and that quarantine had been raised by State Health Officer Swearingen. Dr. Sanders, State health officer of Alabama, reported that after thorough investigation no yellow fever was found in Montgomery, but that two cases of sickness required further observation, one of the said persons having been in Flomaton just before that place was known to be infected. Yellow fever was reported at Bay St. Louis, Miss., by Surgeon Murray, Marine-Hospital Service, and Drs. Haralson and Gant, members State board of health.

October 18.—Health Officer Dupree, of Baton Rouge, La., reported 1 case of yellow fever at that place. Surgeon Carter, Marine-Hospital Service, investigated this case and wired that he believed the disease was contracted outside of town from dunnage from Edwards. All needed precautions were taken. State Health Officer Sanders reported 4 known cases of yellow fever at Montgomery, Ala., and stated that he would like a camp of detention near there. Passed Assistant Surgeon Cobb, Marine-Hospital Service, was directed to receive no more guests at Fontainebleau detention camp after Thursday, the 21st instant, the camp having served its purpose.

October 19.—Yellow fever was reported at Waveland, Miss., by Surgeon Murray, Marine-Hospital Service. Arrangements for admission of refugees from Montgomery were made at Mount Vernon Barracks detention camp, Passed Assistant Surgeon Glennan reporting that he was prepared to admit 200 at once and 100 daily thereafter. State Health Officer Sanders was advised of this arrangement, and also informed that a detention camp could be established near Montgomery if it became necessary later on, the intention being to utilize the Fontainebleau camp equipage for this purpose. Surgeon Sawtelle, Marine-Hospital Service, reported special train of refugees arriving at Atlanta from Montgomery. Acting Assistant Surgeon Krauss having investigated Texarkana, by order of the Bureau, reported the existence of dengue, but no symptom of yellow fever in that place. Passed Assistant Surgeon Magruder reported no new developments at Galveston, Tex. Surgeon Carter, Marine-Hospital Service, reported 420 guests at Camp Hutton, the new detention camp for sugar-cane laborers. Four yellow fever convalescents were reported at St. Elmo, Ala.

October 20.—A telegram was received from Dr. W. H. Sanders, State health officer, John H. Clisby, mayor, and S. D. Seelye, president board of health, Montgomery, Ala., requesting the services of Acting Asst. Surg. John Guitéras at once to confirm the diagnosis of the board of health.

October 21.—Acting Asst. Surg. John Guitéras left for Montgomery this morning in compliance with request of Montgomery authorities.

Circular concerning post-epidemic disinfection.

[Circular letter.]

WASHINGTON, D. C., *October 11, 1897.*

To the medical officers of the Marine-Hospital Service, acting assistant surgeons, and State and municipal health officers:

Anticipating the work of post-epidemic disinfection, which will be necessary to prevent the recurrence of yellow fever next season, your attention is called to the importance of keeping a record of the name of each person contracting yellow fever, and the street number of each house where the fever occurs.

WALTER WYMAN,
Supervising Surgeon-General U. S. M. H. S.

WEEK ENDED OCTOBER 27, 1897.

TABLE—*Résumé to October 27.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Alco	Oct. 8	1	0
	Bayminette	Oct. 14	1	1
	Flomaton	do	4	0
	Mobile	Sept. 13–Sept. 30	74	11
		Oct. 1–Oct. 20	*111	12
		Oct. 21	5	3
		Oct. 22	11	2
		Oct. 23	4	1
		Oct. 24	8	0
		Oct. 25	7	0
		Oct. 26	5	0
		Oct. 27	5	1
	Montgomery	Oct. 18	4	0
		Oct. 20	5	1
		Oct. 26	10	0
	Notasulga	Oct. 25	1	0
	Sandy Ridge	do	1	0
	Selma	Oct. 23	7	0
	Wagar	Oct. 11	1	.....
Georgia	Atlanta	Sept. 23	†1	0
		Oct. 24	†1	0
Illinois	Cairo	Sept. 19	2	0
		Sept. 20	2	0
Kentucky	Louisville	Sept. 23	1	1
Louisiana	Baton Rouge	Oct. 18	1	0
		Oct. 21	0	1
		Oct. 22	1	0
		Oct. 25	1	0
	Franklin	Oct. 14	1	1
		Oct. 20	1	0
		Oct. 21	1	0
	New Orleans	Sept. 8–Sept. 30	226	27
		Oct. 1–Oct. 20	753	76
		Oct. 21	43	2
		Oct. 22	50	5
		Oct. 23	49	7
		Oct. 24	31	3
		Oct. 25	57	11
		Oct. 26	59	7
		Oct. 27	52	11
	Patterson	Oct. 21	1	0
Mississippi	Barkley	Sept. 13–Sept. 18	10	4
	Bay St. Louis	Oct. 17–Oct. 20	7	1
		Oct. 23	7	0
		Oct. 24	8	1
		Oct. 25	6	2
	Biloxi	Sept. 1–Sept. 30	132	7
		Oct. 1–Oct. 20	282	10
		Oct. 21	18	1
		Oct. 22	18	1
		Oct. 23	9	0
		Oct. 24	18	0
		Oct. 25	14	1
		Oct. 26	14	0
		Oct. 27	12	
	Cayuga	Oct. 16–Oct. 20	13	1
		Oct. 21	5	0
		Oct. 22	1	0

* Two in vicinity.

† Refugees.

TABLE—*Résumé to October 27*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Mississippi	Cayuga	Oct. 23	1	0
		Oct. 26	1	0
		Oct. 27	2	0
	Clinton	Oct. 7–Oct. 20	19	2
		Oct. 21	4	0
		Oct. 22	5	0
		Oct. 23	2	0
		Oct. 26	1	0
	County Farm	Oct. 25	1	0
	Edwards	Sept. 15–Sept. 30	212	6
		Oct. 1–Oct. 20	200	21
		Oct. 21	5	0
		Oct. 22	4	0
		Oct. 23	2	1
		Oct. 24	1	0
		Oct. 25	1	0
		Oct. 26	3	0
	Hendersons Point	Oct. 7–Oct. 20	3	0
	Hinds County Convict Camp, near Raymond.	Oct. 23	5	0
		Oct. 27	1	0
	McHenry	Sept. 30–Oct. 20	23	1
		Oct. 23	5	0
	Nitta Yuma	Oct. 3–Oct. 20	10	1
		Oct. 21	2	0
		Oct. 23	6	0
	Ocean Springs	Sept. 8–Sept. 30	23	6
	Pascagoula	Oct. 14–Oct. 20	8	1
		Oct. 21	3	0
		Oct. 22	4	0
		Oct. 23	1	0
		Oct. 24	2	0
		Oct. 25	1	0
		Oct. 26	1	0
		Oct. 27	2	0
	Perkinston	Sept. 10	1	0
	Scranton	Sept. 10–Sept. 30	39	3
		Oct. 1–Oct. 20	166	5
		Oct. 21	21	0
		Oct. 22	12	1
		Oct. 23	13	0
		Oct. 24	9	0
		Oct. 25	12	0
		Oct. 26	12	3
		Oct. 27	9	1
	Waveland	To Oct. 20	4	0
Tennessee	Memphis	Oct. 22	1	0
		Oct. 24	4	0
		Oct. 25	1	0
		Oct. 26	7	0
		Oct. 27	5	1
Texas	Beaumont	Sept. 22	1	0
	Galveston	Oct. 9–Oct. 20	12	0
		Oct. 27	*0	0
	Houston	Oct. 11	3	0

* Yellow fever reported; cases not given.

October 22.—Dr. G. B. Thornton, president of the board of health at Memphis, Tenn., makes official report of the presence of yellow fever at that place. Actg. Asst. Surg. John Guitéras wires from Montgomery that he confirms the diagnosis of the local physicians, and reports that he has seen 15 cases of yellow fever in Montgomery. Upon request of Dr. John A. McKinnon, president board of health, Dr. Guitéras was ordered to Selma, Ala., to investigate suspicious cases there.

October 23.—Actg. Assistant Surgeon Guitéras reports that he has seen 7 cases of yellow fever in Selma, Ala. Passed Assistant Surgeon Young was authorized to take charge of the disinfection of all mail from Memphis.

October 24.—President Seelye, of the Montgomery, Ala., board of health, and Dr. Glen Andrews, city physician, request the Surgeon-General Marine-Hospital Service to send a force and take charge of disinfection, etc. In response to this request, Surgeon Carter was ordered from New Orleans to Montgomery to confer with the authorities, make recommendations, and take immediate action if necessary.

October 25.—The Tennessee board of health having forbidden refugees from Memphis stopping in west Tennessee and requested the enforcement of said order by the Marine-Hospital Service, Passed Assistant Surgeon Young, in charge of train-inspection service in that district, was directed to enforce the order.

October 26.—Surgeon Carter, having reported upon the necessities of the situation at Montgomery, was authorized to employ necessary help and take charge of the disinfection, etc.

October 27.—Passed Assistant Surgeon Magruder reports yellow fever present in Galveston, Tex.; number of cases not stated. A telegram from Dr. John A. McKinnon, president of the Selma, Ala., board of health, states that there have been no new cases of yellow fever and no deaths in Selma for three days past, and that light frosts have occurred. Dr. McKinnon requests the Service to take charge of disinfection at Selma. Apparatus was shipped at once by express.

October 28.—Passed Assistant Surgeon Young authorized, upon request from Memphis authorities and railroads interested, to assume charge of the disinfection of freight from Memphis.

Killing frosts and temperatures.

DEPARTMENT OF AGRICULTURE, WEATHER BUREAU,
Washington, D. C., October 22, 1897.

SIR: I beg to inclose herewith, in response to your inquiry of the 20th instant, a table of dates of first killing frost and minimum temperatures during November and December at Mobile and Montgomery, Ala., and Galveston, Tex.; also, at Memphis, Tenn., New Orleans, La., and Vicksburg, Miss.

Very respectfully,

WILLIS L. MOORE, *Chief of Bureau.*

Dates of first killing frost in the cities of Mobile and Montgomery, Ala.

Year.	Mobile. *a*			Montgomery. *b*		
	Killing frost.	Minimum temperatures.		Killing frost.	Minimum temperatures.	
		November.	December.		November.	December.
		Degrees.	*Degrees.*		*Degrees.*	*Degrees.*
1873	Nov. 20	30	28	Oct. 29	26	23
1874	Nov. 2	32	34	Dec. 15	31	32
1875	Dec. 18	41	30	Dec. 9	36	23
1876	Nov. 9	35	21	Nov. 10	32.5	20
1877	Nov. 12	27	26	Nov. 4	26.5	24
1878	Nov. 2	36	26	Nov. 1	33	22
1879	Nov. 22	33	24	Nov. 22	29	20
1880	Dec. 8	(*c*)	14	Nov. 7	26	8
1881	Nov. 25	27	36.8	Nov. 26	24.6	33.2
1882	Nov. 15	29.5	24	Nov. 15	28.8	19.2
1883	Dec. 16	33.4	28.5	Nov. 3	29	26.9
1884	Nov. 25	34.1	20.3	Nov. 7	32.1	16
1885	....do ...	32	26	Nov. 14	31	25
1886	Nov. 18	30.5	22.9	Nov. 7	31.3	22.1
1887	Nov. 22	25.2	25.4	Nov. 21	21.4	22
1888	Nov. 28	33.5	25	Nov. 26	29.7	24.2
1889	Nov. 29	30	32	Nov. 29	27	29
1890	Nov. 4	36	31	Oct. 31	33	29
1891	Nov. 18	28	30	Oct. 21	23	28
1892	Dec. 23	36	20	Oct. 28	30	20
1893	Nov. 16	32	26	Oct. 31	27	24
1894	Nov. 7	29	16	Nov. 7	26	13
1895	Nov. 27	31	27	Nov. 12	27	22
1896	Dec. 3	33	31	Nov. 9	32	24

a Average date, November 22. *b* Average date, November 12. *c* No record.

Dates of first killing frost in the city of Galveston, Tex.

Year.	Frost. *a*	Minimum temperatures, F.		Year.	Frost. *a*	Minimum temperatures, F.	
		November.	December.			November.	December.
		Degrees.	*Degrees.*			*Degrees.*	*Degrees.*
1876	Dec. 25	39	26	1887	Dec. 18	37	29
1877	Dec. 7	30	35	1888	(*b*)	42	40
1878	Dec. 25	37	29	1889	(*b*)	39	47
1879	....do ...	43	24	1890	(*b*)	49	37
1880	Nov. 18	29	18	1891	(*b*)	36	39
1881	(*b*)	36	42	1892	Dec. 27	44	25
1882	(*b*)	39	34	1893	Dec. 16	43	37
1883	(*b*)	43	41	1894	Dec. 28	41	21
1884	Dec. 18	44	29	1895	Dec. 30	37	32
1885	(*b*)	46	34	1896	Nov. 30	35	34
1886	Dec. 5	34	25				

a Average date, December 18. *b* None reported.

Dates of first killing frost in the cities of Memphis, Tenn., and New Orleans, La.

Year.	Memphis. *a*			New Orleans. *b*		
	Killing frost.	Minimum temperatures.		Killing frost.	Minimum temperatures.	
		November.	December.		November.	December.
		Degrees.	*Degrees.*		*Degrees.*	*Degrees.*
1873	Oct. 28	25	24	Nov. 20	39	35
1874	Oct. 13	25	29	Dec. 21	40.5	41
1875	Oct. 12	27	21	Dec. 9	48	36
1876	Oct. 2	25	3	Nov. 21	39	28
1877	Nov. 3	16	20	Nov. 11	38	34
1878	Oct. 28	30	11	Dec. 16	41	27
1879	Nov. 4	27	14	Dec. 26	38	32
1880	Nov. 2	16	3	Nov. 19	34	20
1881	Oct. 20	22	31	Nov. 25	31.5	40.3
1882	Nov. 13	29	12	Dec. 8	36.8	29.5
1883	Nov. 2	20	22	.....	36.8	37
1884	Oct. 24	24	8	Dec. 19	42.2	28.8
1885	Oct. 22	30	18	Dec. 15	40	30.4
1886	Oct. 28	30	17	Nov. 18	34.4	27
1887	Oct. 12	18	14	Dec. 29	34	29.4
1888	Nov. 11	31	23	Dec. 20	41	30.7
1889	Nov. 29	24	28	.....	38	39
1890	Oct. 31	36	23	Dec. 10	44	35
1891	Oct. 23	20	27	Nov. 30	30	36
1892	Oct. 26	25	13	Dec. 27	41	23
1893	Oct. 16	24	18	.....	36	33
1894	Nov. 3	24	5	.....	36	21
1895	Oct. 9	27	20	.....	37	34
1896	Nov. 8	19	21	Dec. 25	35	32

a Average date, October 26. *b* Average date, December 7.

Dates of first killing frost in the city of Vicksburg, Miss.

Year.	Killing frost. *a*	Minimum temperatures, F.		Year.	Killing frost. *a*	Minimum temperatures, F.	
		November.	December.			November.	December.
		Degrees.	*Degrees.*			*Degrees.*	*Degrees.*
1873	Oct. 20	28	28	1885	Nov. 24	31.2	22.5
1874	Nov. 1	31	33	1886	Nov. 18	27.8	19.2
1875	Dec. 18	33	25	1887	Oct. 31	27.1	21.5
1876	Nov. 20	32	13.5	1888	Nov. 11	35.3	24.2
1877	Nov. 7	23	23	1889	Nov. 18	30	34
1878	Nov. 1	33	20	1890	Nov. 4	35	27
1879	Nov. 19	31	19	1891	Oct. 19	22	28
1880	Nov. 7	23	12	1892	Nov. 11	34	16
1881	Nov. 4	25	33	1893	Nov. 15	30	24
1882	Nov. 14	31.3	18.6	1894	Nov. 11	30	15
1883	Nov. 16	28.3	29.8	1895	...do...	31	25
1884	Nov. 6	32.2	18.1	1896	Nov. 9	27	30

a Average date, November 10.

NOTE.—This furnishes a fair indication for Edwards and vicinity.

WEEK ENDED NOVEMBER 3, 1897.

TABLE—*Résumé to November 3.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Alco	Oct. 8	1	0
	Bayminette	Oct. 14	1	1
	Flomaton	....do	4	0
	Greensboro	To Nov. 3	65	0
		Nov. 2	1	1
	Mobile	Sept. 13–Sept. 30	74	11
		Oct. 1–Oct. 27	a 156	19
		Oct. 28	6	1
		Oct. 29	5	3
		Oct. 30	9	2
		Oct. 31	11	0
		Nov. 1	9	0
		Nov. 2	12	0
		Nov. 3	11	1
	Montgomery	Oct. 18–Oct. 27	70	5
		Oct. 28	12	0
		Oct. 29	7	1
		Oct. 30	9	1
		Oct. 31	6	1
		Nov. 1	1	1
		Nov. 2	2	0
		Nov. 3	7	1
	Notasulga	Oct. 25	1	0
	Sandy Ridge	....do	1	0
	Selma	Oct. 23–Oct. 27	10	1
		Oct. 30	1	0
		Nov. 3	0	1
	Wagar	Oct. 11	1	0
		To Nov. 3	45	3
	Whistler	Oct. 29	.....	2
		To Oct. 30	22	1
		Nov. 1	3	1
		Total to Nov. 3	106	5
Georgia	Atlanta	Oct. 8–Oct. 27	b 3	0
Illinois	Cairo	Sept. 19–Sept. 20	4	0
Kentucky	Louisville	Sept. 23	1	1
Louisiana	Baton Rouge	Oct. 18–Oct. 27	3	1
		Oct. 28	1	0
		Oct. 31	0	1
	Franklin	Oct. 14–Oct. 21	3	1
	New Orleans	Sept. 8–Sept. 30	226	27
		Oct. 1–Oct. 27	1,096	122
		Oct. 28	65	8
		Oct. 29	54	5
		Oct. 30	35	9
		Oct. 31	35	5
		Nov. 1	38	12
		Nov. 2	35	6
		Nov. 3	52	5
	Patterson	Oct. 21	1	0
Mississippi	Barkley	Sept. 13–Sept. 18	10	4
	Bay St. Louis	Oct. 17–Oct. 27	28	4
		Oct. 28	12	0
	Biloxi	Sept. 1–Sept. 30	132	7
		Oct. 1–Oct. 27	385	13
		Oct. 28	14	4
		Oct. 29	10	0
		Oct. 30	6	0
		Oct. 31	3	0
		Nov. 1	5	1
		Nov. 2	6	0
		Nov. 3	4	1
	Cayuga	Oct. 16–Oct. 27	23	1
		Oct. 28	1	0
	Clinton	Oct. 7–Oct. 27	31	2
		Oct. 28	1	0
		Oct. 29	3	0
		Oct. 31	2	0
	County Farm	Oct. 25	1	0
	Durant	Nov. 1	1	1
	Edwards	Sept. 15–Sept. 30	212	6
		Oct. 1–Oct. 27	216	22
		Oct. 28	5	0
		Oct. 29	7	0
		Oct. 30	1	0
		Nov. 2	1	0
	Hendersons Point	Oct. 7	3	0
	Hinds County Convict Camp, near Raymond.	Oct. 23–Oct. 27	6	0

a Two in vicinity.

b Refugees.

TABLE—*Résumé to November 3*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Mississippi	McHenry	Sept. 30-Oct. 27	28	1
		Oct. 29	1	0
		Nov. 2	1	0
	Nitta Yuma	Oct. 3-Oct. 27	18	1
		Oct. 30	3	0
		Nov. 1	3	0
		Nov. 2	1	0
		Nov. 3	1	0
	Ocean Springs	Sept. 8-Sept. 30	23	6
	Pascagoula	Oct. 14-Oct. 27	22	1
		Oct. 28	2	0
		Oct. 29	2	0
		Oct. 30	1	0
		Nov. 1	3	0
		Nov. 2	1	0
		Nov. 3	1	0
	Perkinston	Sept. 10	1	0
	Scranton	Sept. 10-Sept. 30	39	3
		Oct. 1-Oct. 27	254	10
		Oct. 28	7	0
		Oct. 29	13	0
		Oct. 30	7	0
		Nov. 1	6	1
		Nov. 2	11	1
		Nov. 3	9	1
	Waveland	To Oct. 20	4	0
	West	Nov. 2	4	0
		Nov. 3	4	0
Tennessee	Memphis	Oct. 22-Oct. 27	18	1
		Oct. 28	8	2
		Oct. 29	6	0
		Oct. 30	5	1
		Oct. 31	3	1
		Nov. 1	3	1
		Nov. 2	3	2
		Nov. 3	1	3
Texas	Beaumont	Sept. 22	1	0
	Galveston	Oct. 12	12	0
		Oct. 27	(*a*)	.....
	Houston	Oct. 11	3	0

a Yellow fever reported; cases not given.

October 29.—Acting Assistant Surgeon Geddings ordered to Selma, Ala., to superintend disinfection. Passed Assistant Surgeon Glennan reports the existence of yellow fever at Whistler, Ala. (6 miles distant from Mobile), with 2 deaths. Acting Assistant Surgeon Goldthwaite ordered to Whistler to disinfect premises and assist in caring for the sick.

October 30.—Acting Assistant Surgeon Goldthwaite reports total cases to date at Whistler 22, with 3 deaths.

November 2.—Dr. McKinnon, president Selma (Ala.) board of health, reports a fatal case of yellow fever at Greensboro, Ala.

November 3.—Arkansas board of health removes all quarantine restrictions against freight and passengers. Tennessee State board of health raises all State quarantine. Camp Fontainbleau closed. Passed Assistant Surgeon Cobb ordered to rejoin station at New York. Frost reported generally in Lower Mississippi Valley this morning. Corrected report for Whistler, Ala.: After careful investigation, Acting Assistant Surgeon Goldthwaite reports total cases to this date 106; total deaths, 5.

Yellow fever in Mobile County outside the city.

MOBILE, ALA., *October 26, 1897.*

SIR: I have the honor to forward a table showing the status of yellow fever in Mobile County outside of the city of Mobile up to and including to-day.

These cases are at places from which you are not liable to receive advices, and as they are all reported to the county health officer here I can and will report them to you by mail as they are recorded each day unless you wish to make other arrangements.

Some of these cases I have reported under the head of "outskirts;" they are located just outside of the city limits, which makes them belong to the county. All the other places named are recognized as such.

I have the honor to be, very respectfully,

IRA W. PORTER,
Acting Assistant Surgeon, U. S. M. H. S.

[Inclosure.]

Yellow fever in Mobile County, outside of the city, to and including October 26.

	Cases.	Recoveries.	Deaths.	Remaining.		Cases.	Recoveries.	Deaths.	Remaining.
St. Elmo	5	4	.....	1	Sarritz	3	.....	.....	3
Magazine Point	2	1	1	0	Pritchard	1	.....	.....	1
Pleasant Valley	1	1	0	0	Outskirts	7	6	.....	1
Toulminsville	2	1	.....	1					
Cottage Hill	1	.....	.....	1	Total	22	13	1	8

Case of yellow fever in Cincinnati—Refugee.

CINCINNATI, OHIO, *October 27, 1897.*

SIR: I have the honor to report that I am officially informed by the local health officer of a case of yellow fever in this city. The patient, a white man, arrived in this city October 25, coming direct from Montgomery, Ala. He was taken sick upon his arrival, and several physicians made a diagnosis of yellow fever. He was removed at once to the hospital for contagious diseases, and all precautions have been taken to prevent further infection. His condition is considered grave.

Very respectfully,

J. W. STEVENSON,
Acting Assistant Surgeon, U. S. M. H. S.

WEEK ENDED NOVEMBER 10, 1897.

TABLE—*Résumé to November 10.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Alco	Oct. 8	1	0
	Bayminette	Oct. 14	1	1
	Flomaton	.....do	4	0
	Greensboro	To Nov. 3	65	0
		Nov. 2	1	1
	Mobile	Sept. 13–Sept. 30	74	11
		Oct. 1–Oct. 31	*a* 187	25
		Nov. 1–Nov. 3	32	1
		Nov. 4	11	1
		Nov. 5	11	1
		Nov. 6	6	1
		Nov. 7	4	0
		Nov. 8	4	0
		Nov. 9	7	2
		Nov. 10	4	2
	Montgomery	Oct. 18–Oct. 27	104	8
		Nov. 1–Nov. 3	10	2
		Nov. 6	3	0
		Nov. 7	0	1
		Nov. 8	1	0

a Two in vicinity.

TABLE—*Résumé to November 10*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Montgomery	Nov. 9	1	0
		Nov. 10	1	0
	Notasulga	Oct. 25	1	0
	Sandy Ridge	....do	1	0
	Selma	Oct. 23–Oct. 31	11	1
		Nov. 3	0	1
	Wagar	To Nov. 3	45	3
	Whistler	Oct. 29–Nov. 3	106	5
		Nov. 6	6	1
		Nov. 8	7	0
Georgia	Atlanta	Oct. 8–Oct. 27	a 3	0
Illinois	Cairo	Sept. 19–Sept. 20	4	0
Kentucky	Louisville	Sept. 23	1	1
Louisiana	Baton Rouge	Oct. 18–Oct. 31	4	2
	Franklin	Oct. 14–Oct. 21	3	1
	New Orleans	Sept. 8–Sept. 30	226	27
		Oct. 1–Oct. 31	1,285	149
		Nov. 1–Nov. 3	125	23
		Nov. 4	40	7
		Nov. 5	31	10
		Nov. 6	23	5
		Nov. 7	13	8
		Nov. 8	14	7
		Nov. 9	8	4
		Nov. 10	7	4
	Patterson	Oct. 21	1	0
Mississippi	Barkley	Sept. 13–Sept. 18	10	4
	Bay St. Louis	Oct. 17–Oct. 28	40	4
	Biloxi	Sept. 1–Sept. 30	132	7
		Oct. 1–Oct. 31	418	17
		Nov. 1–Nov. 3	15	2
		Nov. 4	6	0
		Nov. 5	2	0
		Nov. 6	4	0
		Nov. 7	3	0
		Nov. 8	1	0
	Cayuga	Oct. 16–Oct. 28	24	1
		Nov. 5	1	0
	Clinton	Oct. 7–Oct. 31	37	2
	County Farm	Oct. 25	1	0
		Nov. 5	1	0
	Durant	Nov. 1	1	1
	Edwards	Sept. 15–Sept. 30	212	6
		Oct. 1–Oct. 31	229	22
		Nov. 2	1	0
		Nov. 4	2	0
		Nov. 8	4	0
	Hendersons Point	Oct. 7	3	0
	Hinds County Convict Camp, near Raymond.	Oct. 23–Oct. 27	6	0
	McHenry	Sept. 30–Oct. 31	29	1
		Nov. 2	1	0
	Nitta Yuma	Oct. 3–Oct. 31	21	1
		Nov. 1–Nov. 3	5	0
		Nov. 4	1	0
	Ocean Springs	Sept. 8–Sept. 30	23	6
	Pascagoula	Oct. 14–Oct. 31	27	1
		Nov. 1–Nov. 3	5	0
		Nov. 8	2	1
		Nov. 10	1	0
	Perkinston	Sept. 10	1	0
	Scranton	Sept. 10–Sept. 30	39	3
		Oct. 1–Oct. 31	281	10
		Nov. 1–Nov 3	26	3
		Nov. 4	2	0
		Nov. 8	3	1
		Nov. 10	1	0
	Waveland	To Oct. 20	4	0
	West Pascagoula	Nov. 2–Nov. 3	8	0
Tennessee	Memphis	Oct. 22–Oct. 31	40	5
		Nov. 1–Nov. 3	7	6
		Nov. 4	3	1
		Nov. 5	1	1
		Nov. 6	1	0
		Nov. 7	0	1
Texas	Beaumont	Sept. 22	1	0
	Galveston	Oct. 12	12	0
		Oct. 27	.....	.....
	Houston	Oct. 11	3	0

a Refugees.

During the week ended November 11 frosts have been reported generally in the Gulf States and the Mississippi Valley, and there has been a marked decrease in the number of cases reported daily from the various infected cities.

November 9.—The disinfection of mails for points not quarantined against freights from New Orleans and Mobile is discontinued, and the discontinuance of train inspectors out of Mobile authorized.

November 10.—Refugees remaining in Camp Hutton at this date discharged, and camp closed. Camp equipage stored and left in charge of custodian. Passed Assistant Surgeon White, who commanded Camp Hutton, directed to supervise disinfection at Franklin, La., under direction of Surgeon Carter. During the continuance of Camp Hutton over 1,000 guests were received and detained ten days, all their baggage and personal effects being disinfected, and several hundred freight and passenger cars disinfected.

November 11.—P. A. Surg. Eugene Wasdin and P. A. Surg. H. D. Geddings, who have been engaged in a bacteriological study of yellow fever at New Orleans, have been detailed by the President to continue their investigations at Havana into the cause of yellow fever. Dr. Wasdin has made a special study of bacteriology, and was professor of pathology for four years in the Charleston, S. C., medical college. He made the first diagnosis of yellow fever at Ocean Springs in September last.

Dr. Geddings is an expert in bacteriology and biological chemistry, and is attached to the hygienic laboratory of the service. He was a technical delegate on the part of the United States to the International Sanitary Conference held in Venice during the months of February and March, 1897, and was subsequently engaged in special laboratory work in the Pasteur Institute in Paris, and in Koch's laboratory in Berlin, paying special attention to the discoveries of Sanarelli. Both of these officers have had yellow fever.

WEEK ENDED NOVEMBER 27, 1897.

TABLE—*Résumé to November 17.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Alco	Oct. 8	1	0
	Bay Minette	Oct. 14	1	1
	Flomaton	do	4	0
		To Nov. 3	65	0
		Nov. 17	1	0
	Greensboro	Nov. 2	1	1
	Mobile	Sept. 13–Sept. 30	74	11
		Oct. 1–Oct. 31	a187	25
		Nov. 1–Nov. 10	79	8
		Nov. 11	1	0
		Nov. 12	3	1
		Nov. 14	1	0
		Nov. 15	3	0
		Nov. 16	4	0
		Nov. 17	3	0
	Montgomery	Oct. 18–Oct. 27	104	8
		Nov. 1–Nov. 10	16	3

a Two in vicinity.

TABLE—*Résumé to November 17*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Notasulga	Oct. 25	1	0
	Sandyridge	....do	1	0
	Selma	Oct. 23–Oct. 31	11	1
		Nov. 3	0	1
		Nov. 10	1	0
	Wagar	To Nov. 3	45	3
	Whistler	Oct. 29–Nov. 10	119	6
		Nov. 12	3	1
Florida	Pensacola	Nov. 15	1	1
Georgia	Atlanta	Oct. 8–Oct. 27	*a* 3	0
Illinois	Cairo	Sept. 19–Sept. 20	4	0
Kentucky	Louisville	Sept. 23	1	1
Louisiana	Baton Rouge	Oct. 18–Oct. 31	4	2
		Nov. 11	1	0
	Franklin	Oct. 14–Oct. 21	3	1
	New Orleans	Sept. 8–Sept. 30	226	27
		Oct. 1–Oct. 31	1,285	149
		Nov. 1–Nov. 10	261	68
		Nov. 11	12	6
		Nov. 12	7	2
		Nov. 13	11	2
		Nov. 14	8	3
		Nov. 15	11	2
		Nov. 16	11	2
		Nov. 17	7	3
	Patterson	Oct. 21	1	0
Mississippi	Barkley	Sept. 13–Sept. 18	10	4
	Bay St. Louis	Oct. 17–Oct. 28	40	4
	Biloxi	Sept. 1–Sept. 30	132	7
		Oct. 1–Oct. 31	418	17
		Nov. 1–Nov. 10	31	2
		Nov. 11	1	0
		Nov. 14	0	1
		Nov. 16	1	0
		Nov. 17	1	0
	Cayuga	Oct. 16–Oct. 28	24	1
		Nov. 5	1	0
	Clinton	Oct. 7–Oct. 31	37	2
		Nov. 12	2	0
		Nov. 13	2	0
		Nov. 15	1	0
	County Farm	Oct. 25	1	0
		Nov. 5	1	0
	Durant	Nov. 1	1	1
	Edwards	Sept. 15–Sept. 30	212	6
		Oct. 1–Oct. 31	229	22
		Nov. 1–Nov. 10	7	0
		Nov. 12	2	0
		Nov. 13	2	0
		Nov. 15	3	1
		Nov. 16	.....	.....
		Nov. 17	.....	.....
	Hendersons Point	Oct. 7	3	0
	Hinds County Convict Camp, near Raymond.	Oct. 23–Oct. 27	6	0
	McHenry	Sept. 30–Oct. 31	29	1
		Nov. 2	1	0
	Nittayuma	Oct. 3–Oct. 31	21	1
		Nov. 1–Nov. 10	6	0
	Ocean Springs	Sept. 8–Sept. 30	23	6
	Pascagoula	Oct. 14–Oct. 31	27	1
		Nov. 1–Nov. 10	8	1
	Perkinston	Sept. 10	1	0
	Scranton	Sept. 10–Sept. 30	39	3
		Oct. 1–Oct. 31	281	10
		Nov. 1–Nov. 10	32	4
		Nov. 13	3	1
		Nov. 17	5	0
	Waveland	To Oct. 20	4	0
	West Pascagoula	Nov. 2–Nov. 3	8	0
Tennessee	Memphis	Oct. 22–Oct. 31	40	5
		Nov. 1–Nov. 10	12	9
Texas	Beaumont	Sept. 22	1	0
	Galveston	Oct. 12	12	0
		Oct. 27	(*b*)	.....
	Houston	Oct. 11	3	0

a Refugees.

b Yellow fever reported; cases not given.

November 12.—All quarantine restrictions removed by the Memphis (Tenn.) board of health. Surgeon Carter ordered to visit Montgomery and Selma, Ala., and arrange for careful post epidemic disinfection. Inspection of river vessels at Vicksburg, Miss., discontinued.

November 13.—Mount Vernon Barracks Detention Camp closed, and the camp equipage stored, by permission of Governor Johnson, in the barracks buildings.

November 15.—One case of yellow fever reported in Pensacola, Fla.; the source of contagion in this case is in doubt.

November 17.—All disinfection (mails, baggage, etc.) at Atlanta, Ga., discontinued.

November 17 and 18.—Heavy frosts reported in the South Atlantic and eastern Gulf States, a minimum temperature of 40° F. being reported at New Orleans. Arrangements are being made for careful post epidemic disinfection in all infected places.

WEEK ENDED NOVEMBER 24, 1897.

TABLE—*Résumé to November 24.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Alco	Oct. 8	1	0
	Bay Minette	Oct. 14	1	1
	Flomaton	do	4	0
		To Nov. 17	66	0
		Nov. 22	1	0
		Nov. 23	1	0
	Greensboro	Nov. 2	1	1
	Mobile	Sept. 13–Sept. 30	74	11
		Oct. 1–Oct. 31	a 187	25
		Nov. 1–Nov. 17	94	9
		Nov. 19	2	1
		Nov. 20	1	1
		Nov. 21	2	1
		Nov. 23	1	0
	Montgomery	Oct. 18–Oct. 27	104	8
		Nov. 1–Nov. 10	16	3
	Notasulga	Oct. 25	1	0
	Sandyridge	do	1	0
	Selma	Oct. 23–Oct. 31	11	1
		Nov. 3	0	1
		Nov. 10	1	0
	Wagar	To Nov. 3	45	3
	Whistler	Oct. 29–Nov. 10	119	6
		Nov. 12	3	1
Florida	Fort Barrancas	Nov. 18	1	1
		Nov. 21	1	0
		Nov. 22	2	0
	Pensacola	Nov. 15	1	1
Georgia	Atlanta	Oct. 8–Oct. 27	b 3	0
Illinois	Cairo	Sept. 19–Sept. 20	4	0
Kentucky	Louisville	Sept. 23	1	1
Louisiana	Baton Rouge	Oct. 18–Oct. 31	4	2
		Nov. 11	1	0
	Franklin	Oct. 14–Oct. 21	3	1
	New Orleans	Sept. 8–Sept. 30	226	27
		Oct. 1–Oct. 31	1,285	149
		Nov. 1–Nov. 17	328	88
		Nov. 18	6	2
		Nov. 19	6	0
		Nov. 20	10	4
		Nov. 21	8	3
		Nov. 22	6	1
		Nov. 23	3	0
		Nov. 24	4	1
	Patterson	Oct. 21	1	0
Mississippi	Barkley	Sept. 13–Sept. 18	10	4
	Bay St. Louis	Oct. 17–Oct. 28	40	4
	Biloxi	Sept. 1–Sept. 30	132	7
		Oct. 1–Oct. 31	418	17

a Two in vicinity.

b Refugees.

TABLE—*Résumé to November 24*—Continued.

States.	Cities.	Date.	Cases.	Deaths.
Mississippi	Biloxi	Nov. 1-Nov. 17	34	3
		Nov. 19	4	0
		Nov. 20	1	0
		Nov. 22	3	0
	Cayuga	Oct. 16-Oct. 28	24	1
		Nov. 5	1	0
	Clinton	Oct. 7-Oct. 31	37	2
		Nov. 12	2	0
		Nov. 13	2	0
		Nov. 15	1	0
	County Farm	Oct. 25	1	0
		Nov. 5	1	0
	Durant	Nov. 1	1	1
	Edwards	Sept. 15-Sept. 30	212	6
		Oct. 1-Oct. 31	229	23
		Nov. 1-Nov. 17	14	1
	Hendersons Point	Oct. 7	3	0
	Hinds County Convict Camp, near Raymond.	Oct. 23-Oct. 27	6	0
	McHenry	Sept. 30-Oct. 31	29	1
		Nov. 2	1	0
	Nittayuma	Oct. 3-Oct. 31	21	1
		Nov. 1-Nov. 10	6	0
	Ocean Springs	Sept. 8-Sept. 30	23	6
	Pascagoula	Oct. 14-Oct. 31	27	1
		Nov. 1-Nov. 10	8	1
	Perkinston	Sept. 10	1	0
	Scranton	Sept. 10-Sept. 30	39	3
		Oct. 1-Oct. 31	281	10
		Nov. 1-Nov. 17	40	5
		Nov. 18	3	0
	Waveland	To Oct. 20	4	0
	West Pascagoula	Nov. 2-Nov. 3	8	9
Tennessee	Memphis	Oct. 22-Oct. 31	40	5
		Nov. 1-Nov. 10	12	9
Texas	Beaumont	Sept. 22	1	0
	Galveston	Oct. 12	12	0
		Oct. 27	.....	.....
	Houston	Oct. 11	3	0

November 18.—A fatal case of yellow fever reported at Fort Barrancas, Fla., 8 miles from Pensacola.

November 21.—State Health Officer Sanders, of Alabama, wires that all quarantines are removed.

November 24.—The Florida State health authorities still requiring disinfection of merchandise from Mobile and New Orleans. Surgeon Murray is authorized to supervise such disinfection at Mobile.

In response to a request of Mayor Randolph, Acting Assistant Surgeon Geddings ordered to Greensboro, Ala., to supervise post epidemic disinfection.

November 25.—The issuance of public bulletins by the Louisiana State board of health discontinued and all house quarantines in New Orleans removed.

End of yellow fever at Pensacola, Fla.

[Telegram.]

PENSACOLA, FLA., *November 22, 1897.*

No further manifestation disease at Pensacola, and nine days since Goldberg died; 14 since first taken sick; none who were exposed during sickness have been or are now sick from any cause; house-to-house inspection completed Saturday noon; shows no suspicious fever here. Barrancas has now 3 cases; advised moving entire command into camp 2 miles from post, which has been done.

JOS. Y. PORTER, *State Health Officer.*

MONTH ENDED DECEMBER 25, 1897.

TABLE—*Résumé to December 25, 1897.*

States.	Cities.	Date.	Cases.	Deaths.
Alabama	Alco	Oct. 8	1	0
	Bayminette	Oct. 14	1	1
	Flomaton	To Dec. 13	98	5
	Greensboro	Nov. 2	1	1
	Mobile	Sept. 13–Sept. 30	74	11
		Oct. 1–Oct. 31	a 187	25
		Nov. 1–Nov. 27	102	12
	Montgomery	Oct. 18–Oct. 27	104	8
		Nov. 1–Nov. 10	16	3
	Notasulga	Oct. 25	1	0
	Sandy Ridge	do	1	0
	Selma	Oct. 23–Oct. 31	11	1
		Nov. 3–Nov. 10	1	1
	Wagar	To Nov. 3	45	3
	Whistler	Oct. 29–Nov. 12	122	7
Florida	Fort Barrancas	Nov. 18–Nov. 22	4	1
	Pensacola	Nov. 15	1	1
Georgia	Atlanta	Oct. 8–Oct. 27	b 3	0
Illinois	Cairo	Sept. 19–Sept. 20	4	0
Kentucky	Louisville	Sept. 23	1	1
Louisiana	Baton Rouge	Oct. 18–Oct. 31	4	2
		Nov. 11	1	0
	Franklin	Oct. 14–Oct. 21	3	1
	New Orleans	Sept. 8–Sept. 30	226	27
		Oct. 1–Oct. 31	1,285	149
		Nov. 1–Dec. 4	386	109
		Dec. 5–Dec. 25	10	5
	Patterson	Oct. 21	1	0
Mississippi	Barkley	Sept. 13–Sept. 18	10	4
	Bay St. Louis	Oct. 17–Oct. 28	40	4
	Biloxi	Sept. 1–Sept. 30	132	7
		Oct. 1–Oct. 31	418	17
		Nov. 1–Nov. 24	42	3
	Cayuga	Oct. 16–Oct. 28	24	1
		Nov. 5	1	0
	Clinton	Oct. 7–Oct. 31	37	2
		Nov. 12–Nov. 15	5	0
	County Farm	Oct. 25	1	0
		Nov. 5	1	0
	Durant	Nov. 1	1	1
	Edwards	Sept. 15–Sept. 30	212	6
		Oct. 1–Oct. 31	229	22
		Nov. 1–Nov. 17	14	1
	Hendersons Point	Oct. 7	3	0
	Hinds County Convict Camp, near Raymond.	Oct. 23–Oct. 27	6	0
	McHenry	Sept. 30–Oct. 31	29	1
		Nov. 2	1	0
	Nitta Yuma	Oct. 3–Oct. 31	21	1
		Nov. 1–Nov. 10	6	0
	Ocean Springs	Sept. 8–Sept. 30	23	6
	Pascagoula	Oct. 14–Oct. 31	27	1
		Nov. 1–Nov. 10	8	1
	Perkinston	Sept. 10	1	0
	Scranton	Sept. 10–Sept. 30	39	3
		Oct. 1–Oct. 31	281	10
		Nov. 1–Nov. 18	43	5
	Waveland	To Oct. 20	4	0
	West Pascagoula	Nov. 2–Nov. 3	8	0
Tennessee	Memphis	Oct. 22–Oct. 31	40	5
		Nov. 1–Nov. 10	12	9
Texas	Beaumont	Sept. 22	1	0
	Galveston	Oct. 12	12	0
		Oct. 27	(c)	.....
	Houston	Oct. 11	3	0

a Two in vicinity. *b* Refugees. *c* Yellow fever reported; cases not given.

Report of Sanitary Work of Marine-Hospital Service in Southern Louisiana and in Montgomery, Ala.—Epidemic of 1897.

By Surg. H. R. Carter.

The first case of yellow fever reported in the United States in 1897 was by Dr. Holloway, of Louisville, in a letter to the Louisiana State board, of August 16, stating that the patient was from New Orleans. Subsequently he stated that he was immediately from Ocean Springs.

This report of Dr. Holloway was a definite diagnosis of yellow fever, the patient dying but no autopsy being held. This physician was an interne of the Touro Infirmary during the epidemic of 1853, and was familiar, at least in his early professional life, with yellow fever.

Following this and a report of a large number of cases of sickness at Ocean Springs, the Louisiana State board, in conjunction with representatives of the Mississippi and Alabama State boards, made an investigation of the nature of the disease on August 22 and 23. The decision was that the disease prevailing there was dengue.

On September 4 another investigation of Ocean Springs was made by Dr. Sanders, State officer of Alabama, with Dr. Wasdin, Marine-Hospital Service, and Dr. Goode, of Mobile. Dr. Haralson, of the Mississippi State board, was also present. An autopsy was held, one of the patients dying the evening before, and these gentlemen (at least the first two) agreed that this case (the one on which the autopsy was held) was yellow fever, and so announced Alabama and Mobile quarantined.

Dr. Goode[1] had returned to Mobile before the autopsy for the purpose of making a quorum of the Mobile board of health should the finding of the autopsy, to be reported by telegram, require the imposition of quarantine.

The next day representatives from the Louisiana State board arrived in Ocean Springs, and after a very considerable controversy they, on the results of a second autopsy obtained that day, concurred in the opinion previously expressed, as did Dr. Haralson on the part of the Mississippi board.

The secretary of the Mississippi State board then visited Ocean Springs. Drs. Gant and Dunn, members of that board, were ordered there, as were Drs. Guitéras, Murray, Wasdin, and myself on the part of the Marine-Hospital Service.

Dr. Guitéras, on his arrival, September 8, pronounced some cases dengue and held some for further observation.

On September 9 an autopsy on one of the suspicious cases seen by Dr. Guitéras the day before was agreed by all present to be that of yellow fever. The same diagnosis was made this day for a number of other cases at Ocean Springs.

At Ocean Springs, then, at this date, yellow fever existed in an indefinite number of foci, and for an undetermined time there also existed a fever here which we have seen diagnosed as "dengue" and "prevailing" fever, which was general in the town, and indeed beginning to exhaust itself for lack of material, and which had been here all summer. There was no evidence of introduction of either; either at what time or from what place into Ocean Springs.

It was reasonable to believe, then, and we did believe, that a number of places in communication with Ocean Springs were already infected by one or the other of these diseases, and an investigation to determine to what extent this was so was immediately begun.

To understand this matter, we must premise that Ocean Springs was not a business place, simply a health resort or watering place. Its communication, then, with

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[1] Dr. Goode has informed me that he was convinced, as he believes were Drs. Sanders and Wasdin, that the disease was yellow fever before he returned to Mobile, but all three judged it best to wait a few hours for the autopsy to prove their diagnosis.

other places was almost entirely by persons (pleasure seekers) and the effects of such persons; and while, of course, these people came and went between it and the other towns, especially health resorts on the coast nearby, yet it had much communication also with somewhat distant places: New Orleans, Mobile, and at a number of places in Mississippi and some in Alabama and Louisiana. If yellow fever existed here to any extent and for a somewhat long time, many of these places must have already been infected, and a somewhat widespread epidemic was impending.

An inquiry of the origin of yellow fever at Ocean Springs has, I believe, been made separately and on different lines by the Mississippi board of health, a committee of the Mississippi legislature, and an officer of this Service. On it, then, I do not propose to speak. I would say, however, that subsequent developments lead me to believe that all of the fever reported generally as "prevailing fever" on the Mississippi coast was yellow fever and that it was introduced early.

(1) Certainly there was much yellow fever at Ocean Springs, Scranton, Biloxi, Bay St. Louis, McHenry, and Barkley, and at Edwards and other places in north Mississippi.

(2) At Ocean Springs, the local practitioners claim that none of the symptoms differentiating dengue from yellow fever: eruptions, double paroxysms, painful convalescence, arthralgia, etc., were observed by them in about 700 cases. They recognized only one kind of fever.

(3) At the places infected from Ocean Springs yellow fever was invariably observed, and at most of them no claim was made of the existence of any other disease save yellow fever.

(4) I have made a careful inquiry of a number of physicians on this coast, and the places infected from this coast, for which unusual opportunities were given in the post-epidemic work, and they say, without exception, that no one had the "prevailing fever" a second time. This to me is very strong evidence, almost proof (unless an attack of some other disease gives a temporary immunity to yellow fever) that the "prevailing fever" was one disease, and that disease yellow fever.[1]

As to the time it had existed at Ocean Springs, a number of cases, generally estimated at 600, had occurred in Ocean Springs before it was announced and guarded against. This would imply that it had been in this place a long time. Independently of this, a large number of physicians, and such laymen as I have had an opportunity to speak with, say this disease existed in Ocean Springs in the early summer. Dr. Bailey, of Ocean Springs, from a record, fixes one case in a resident of that place on May 19, which would bring its introduction (if introduced by a person sick with the fever) not later than the first part of May; how much earlier this does not determine. There was little hope then that this disease was confined to Ocean Springs.

FEVER AT OTHER PLACES.

The same day, September 9, Surgeon Murray, Dr. Gant, and myself visited Biloxi, where yellow fever had been announced (I think the day previous) by Dr. Haralson, and concurred in his diagnosis. Before this date (September 6, I think) the Gelpi case, clearly imported from Ocean Springs, was reported in New Orleans.[2] On the

[1] There was unquestionably an epidemic of dengue in Texas, and in west and northwest Louisiana alleged to have come from Texas. The writer saw a few cases of it on the Teche while there was yellow fever at Franklin, and was able to compare the two diseases side by side. These cases frequently had eruptions, swoolen joints, etc. (the three I saw had all these symptoms). The serum from the cases of "dengue with eruptions" from San Antonio, Galveston, and Houston failed to give any reaction with *B. Ictheroides*, while that from the "dengue with hemorrhagic symptoms" from Galveston gave this reaction typically in every case. Specimens from but few (I think four) cases could be obtained, however. I quote Archinard on this.

[2] This case had been reported as "suspicious" on September 2 or 3.

10th I visited Perkinston in company with Dr. Gill, and found there one case of yellow fever, contracted at Ocean Springs, which had already been diagnosed by Dr. Gill, of New Orleans, and (I believe) Dr. Tackett, of Biloxi. This case was isolated and put under guard and the strictest antiseptic precautions instituted to prevent infection of premises, under charge of Mr. (now Dr.) Champenois (a medical student), of Perkinston, by whom the directions were most carefully and intelligently carried out.[1]

The next day I visited Barkley, and an epidemic of yellow fever was found to exist there traceable to Ocean Springs. On the same day yellow fever was announced by Guiteras at Scranton and in a few days at Mobile.

On the 12th a number (7) of cases were reported in one neighborhood (St. Claude street) in New Orleans, and soon after at Edwards, Miss., and at California, La., by Guiteras, the first clearly traceable to Ocean Springs, and the second to Edwards.

At the time of first announcement, as we afterwards found out, this disease had been already introduced into Montgomery, Ala., Bay St. Louis, McHenry, and Clinton, Miss., and very soon afterwards, before the conditions of its spread were well appreciated, other points in north Mississippi (Cayuga and Nittayuma, etc.). As usual, the infection was received from places not known to be infected.[2]

A detention camp was immediately begun by Surgeon Murray at Fontainbleau, and put in command of Passed Assistant Surgeon White. This was begun prior to the announcement of yellow fever in Mobile, for which place a camp at Mount Vernon Barracks was opened in charge of Passed Assistant Surgeon Glennan.

At the request of the Mississippi State board of health, this service assumed charge of all measures of quarantine in Jackson County, Ocean Springs, Pascagoula, Scranton, and Barkley. Surgeon Murray was put in charge, the State, county, and municipal authorities remaining in charge of the two other coast counties, Hancock and Harrison, although such cooperation as they asked was rendered them by this service.

On September 14 the writer was ordered to New Orleans, and although working in conjunction with the work in southern Mississippi and the north, ceased to have direct knowledge of it. The remainder of this paper, then, is confined to the operation of the service in Louisiana.

CONDITIONS AT NEW ORLEANS.

Few foci had been declared in New Orleans at this date; but considering the communication which had existed with Ocean Springs the probability that there were many amounted to a certainty; and, indeed, the writer is assured on testimony that compels belief that yellow fever had existed in this city prior to the announcement of the Gelpi case. Dr. Capdau had had one death from yellow fever (Sarah Cochran), developing about the 18th of August. Dr. Shepard had reported a case about the same time in another part of the town. Dr. Bland himself had yellow fever August 13, and a number of other cases could be cited, ranging from the early part of August. The three above quoted were directly traceable to Ocean Springs, but some had also occurred due to foci in the city.

In addition to the ordinary communication between New Orleans and Ocean Springs, which had been close since the beginning of the summer, a large number

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[1] This case is somewhat remarkable as being the only reported case of yellow fever this season from which no spread took place. Doubtless others did occur which failed to infect. I hear that there was probably such a case at Hattiesburg.

[2] At what time fever was introduced into Memphis I do not know, but it was announced October 22, and as within the next six days 24 cases are reported at several distinct foci, it was obviously not of recent introduction. Under ordinary conditions of spread this number of cases (and it is hardly possible that it should have been all) would correspond to introduction somewhat over a month. It is probable, then, that Memphis received her infection not long after the middle of September.

of people left Ocean Springs when the investigation of that place for yellow fever was held, returning to New Orleans and scattering to other resorts on the coast.

When, on September 6, the Louisiana board concurred in the diagnosis of yellow fever, and quarantined against Ocean Springs, a large number of people—estimated at 2,000, although this is probably excessive—returned with their effects to New Orleans from the Mississippi coast. These people did not come directly from Ocean Springs, the trains not stopping there. Numbers, however, had gone from Ocean Springs to Biloxi by boat, etc., and took the cars there. This place (Biloxi) was also infected, but at this time slightly, not more so than New Orleans. These people inevitably introduced infection into New Orleans, both by fomites and in their persons (in the incubative stage), into a large additional number of places, and thus established a number of other foci greatly increasing the rapidity of spread in New Orleans.

There was no attempt on the part of the board of health to conceal these cases. Of most of them they were not informed. Of some cases the physicians did not make the diagnosis at the time, and in the case which was reported to them (Shepard's) an error (in good faith) was made by the experts detailed by the board of health to examine it. I am sure that this board reported publicly the first case—the Gelpi case—which they believed to be yellow fever.

Believing, as they did, that there were few points of infection in the city, the board began very vigorous efforts to suppress ("stamp out") the fever. This consisted of isolation of the cases of fever in their houses, confining with them in the same house every inmate of the house found there when the guard arrived. This was accomplished by guarding the houses and forbidding anyone save physicians and priests (and these under certain restrictions) from leaving the house or premises. After death or recovery of the patient the house and premises were required to be disinfected and the inmates confined thereto for five days longer. Later, this detention after disinfection was done away with. No arrangements were made for the support of the inmates, whose egress from houses was thus prevented, and much complaint of loss of employment was made.

To avoid the continual exposure of the healthy inmates, a detention camp for inmates of such houses was also established by the board of health, as well as an isolation hospital, as a branch of Charity Hospital, for yellow fever. But a small number of persons availed themselves of the camp, which did good, however. A considerable number of cases of yellow fever were cared for at the isolation hospital, and the results obtained here were distinctly good—202 cases and 45 deaths, a number of the deaths occurring in those moribund on entrance.

At first, to about September 15, the weather in New Orleans was wet, a condition very favorable for the formation of foci of infection by cases of fever introduced, but unfavorable for its spread aerially from house to house, i. e., the spread of outdoor infection, and hence of rapid spread. Soon afterwards it became dry and dusty, and the fever, being well established, spread rapidly from house to house.

These measures of the board of health failed to prevent the spread of the disease. In the beginning it is probable that they were literally carried out, and that the guarding was complete, and disinfection as complete as disinfection of premises could be made. Later on there is no question that the guarding was in many cases simply perfunctory, and that ingress and egress into and from the houses was not prevented by the guards. I saw the disinfection of a considerable number of premises toward the end of the epidemic (about 24), and it varied in efficiency for the different gangs, some of it being very well done and some decidedly imperfectly. As I have stated, the early disinfection, done mainly under the supervision of Dr. Metz, chemist of the board of health, was very carefully and systematically performed.

In the beginning, say up to or nearly up to October 1, I think there is no question but that this house quarantine lessened the rapidity of the spread of the fever. After a little while longer, it being exceedingly unpopular, it induced the nonreport of cases to the board of health, and thus to the neglect of all sanitary precautions

for these nonreported foci. It then did harm, and I believe assisted the spread of the fever. It was unquestionably a hardship to the people in the house and increased their risk of infection.

In many cases patients would not send for a physician, fearing the case would be reported to the board of health and the house be quarantined; and in a large number of cases the physicians did not, for the same reason, report to the board of health cases of yellow fever in their practice. This house quarantine was continued, with slight modifications throughout the epidemic. Its general effect on the epidemic was bad.

Measures to prevent further introduction and infection were also instituted by the board of health. A strict quarantine was put on against Mobile and the Misisssippi coast, a station being established at the Rigolets for the inspection of passengers from these points, and operated in conjunction with the Service train inspection. Later this quarantine was extended against Franklin and Baton Rouge when fever was reported at these places. This, of course, was consistent with the action of the board of health in the house quarantine, but, except in the beginning, added nothing to safety and greatly increased the annoyance to New Orleans people who were on the Mississippi coast when quarantine was instituted and who wanted to come home. Mobile reciprocated, as did the other infected places on the coast, although later on in the epidemic these latter removed restrictions. Thus a remarkable spectacle was presented of places thoroughly infected quarantining against other places infected in a greater or less degree, and allowing no entrance save to those who had passed through the detention camp.

MEASURES TO PREVENT THE SPREAD OF YELLOW FEVER FROM THE CITY TO THE SURROUNDING PARISHES AND TO OTHER STATES.

There was no uniformity in this matter; every locality, State, parish, and town having their own rules of quarantine, which varied from that of places like the parish of Plaquemine, which allowed direct daylight communication with New Orleans, to places like Baton Rouge, which was surrounded by an armed guard and allowed entrance to no one, or even as the parishes in western Louisiana, forbidding the passage of trains through them bound to points beyond. Very generally the places quarantined not only against the infected places but against everywhere, and would not allow persons or things from any place outside of its own limits to enter it. Mails were very generally refused; freight, independently of its character, from New Orleans or through New Orleans, almost universally so, and not a few refused freight from anywhere. A few places in Louisiana forbid the passage of trains, freight or passenger, made up in New Orleans, through them, as did the State of Texas.

In this State (Louisiana) commerce was paralyzed; that from and through New Orleans ceased to exist, and local traffic between points outside of the city very seriously interfered with.

Yet with all this stringency of quarantine there were some important safeguards, especially for places in Louisiana, omitted, which it was very advisable to institute. There were no relays of train crews within reasonable distance of the city. There was no train inspection, and persons leaving New Orleans could, and did, reach places quarantined and guarded against it by going beyond to unguarded sidings and returning by rail if passengers from the North were received, or by private conveyance if they were not. It was to meet these last conditions that some places laid quarantine against the world and established cordons around themselves.

It is worthy of note here that Baton Rouge, surrounded by a cordon of military cadets, was one of the only two towns in Louisiana outside of New Orleans in which yellow fever developed, the first case reported being in a quarantine guard.

It was apparent, then, (1) that the restrictions of quarantine, as onerous as they were, furnished insufficient protection; (2) that they unnecessarily interfered with commerce; and (3) that their very stringency well-nigh compelled their violation.

For instance, illustrating this last, in the matter of freight, the country along the Southern Pacific and the Mississippi Valley railroads, being practically dependent on New Orleans for their provisions, it was certain that these people would not long forego receiving their necessary supplies from this place, and were it attempted to enforce regulations prohibiting the reception of any freight, either there would be considerable smuggling without any sanitary supervision or else all restrictions would be repealed.

Another problem of equal or greater importance was the sugar industry. An enormous amount of capital is invested in this in Louisiana, and the value of the crop is very great. During the grinding season a large number of hands beyond those employed throughout the year are required. The majority of these are received from Mississippi, Alabama, and northern Louisiana, and are unskilled laborers. These usually pass through New Orleans. In addition to these there are a smaller number of "sugarhouse mechanics," as they are called—engineers and skilled laborers—who are necessary in the sugarhouse. These are found only in New Orleans; working at other trades during most of the year, they go out to the plantations about the early part of October.

It seemed certain that this (the sugar) interest, wielding great influence in the parishes, rather than lose the crops, to save which this labor was necessary, would take very considerable risks of introducing fever, and, in short, would have this labor, even if at considerable hazard, abrogating all restrictions, if necessary, to obtain it.

It was necessary, then, for sanitary reasons, (1) to establish proper relays for train crews and train inspection and arrange generally for safer transportation; (2) to obtain such a relaxation of the restrictions against the receipt of merchandise at places dependent on New Orleans for their supplies as to allow the receipt from New Orleans of sundry classes of articles which could be received without risk of introducing infection; (3) to provide some means by which the skilled labor needed at the sugarhouses could be obtained from New Orleans without introducing fever into the uninfected parishes of the State, and to make provision for getting the unskilled labor by some means so as to prevent it receiving infection by passing through New Orleans. This also required that there be for most parishes a radical relaxation in the restriction against the admission of persons.

Another problem was the mails. That from New Orleans and that which had come via New Orleans were generally refused, independently of class. Some places, however, took all classes.

Whether there was appreciable risk in the letter mail or newspapers fresh from the publishers in the condition of infection New Orleans presented, the writer profoundly doubts. It is hard to believe that a letter would retain infection, or that a fresh newspaper would be exposed to it. Later these might be a source of danger. Packages of merchandise might, however, convey some risk.

At any rate, whether disinfection of the mails was needed to prevent conveyance of infection or not, it was certain that very little would be received without it, and it was believed that in many places it would be received if disinfected.

This work was then taken up at once under the following rules:

"(1) All package mail was excluded.

"(2) All letter mail perforated and exposed—well scattered—for not less than three hours to formaldehyde gas 6 per cent.

"(3) All newspapers to be exposed to steam (in Kinyoun Francis steam chamber) for not less than forty minutes after 212° F. is reached.

"(4) Sacks to be steamed, or treated with formaldehyde, according as of cloth or leather."

Two vacuums were used and papers properly arranged for penetration. The papers of the newsboys on the trains were thus treated.

Later on certain classes of packages were allowed shipment under inspection and the proper disinfection, but 90 or 95 per cent had to be rejected.

This work looks simple, but it was enormous and decidedly expensive, and gave me more trouble than any other one thing during the epidemic. It was satisfactory, however, as it led to a fairly general acceptance of the mails—not by any means universal—but fairly general, and I think laid the foundation of the well-nigh universal acceptance of the disinfected mail in 1898.[1]

To facilitate the movement of the mails a camp was established outside of the city for their disinfection a second time in clean territory. This was located at the "Dirt Hole," some miles above Ponchatoula, La., at an isolated siding in the pine woods. Here a second disinfection was given mail for certain sections of territory. There was no sanitary advantage in this measure. It was done simply to facilitate the movement of mail. Surgeon Kallock was immediately in charge of this station.

It was a subject of congratulation that these measures so important from a sanitary standpoint would be of considerable commercial advantage also, both to places receiving freight and labor and to New Orleans.

One of the hardships of an epidemic is the commercial distress from the quarantine restrictions. So much work stops, and so many men—laborers, mechanics, and clerks, etc.—are thrown out of employment when they most need it that this trouble is sometimes comparable to that of the epidemic itself. It is also a decided annoyance, sometimes a hardship, to the places which have been doing business with the infected place. To reestablish, then, as far as was safe, commerce in this part of the South was a consideration by no means to be neglected in the institution of the measures outlined above.

This seems to be the proper place to call attention to what were known as "commercial quarantines." In the beginning, I think, all or mainly all of the quarantine restrictions, no matter how unnecessary they might be, were established solely for the purpose of preventing infection. In a short time, however, they were seen to be a potent factor in affecting the commerce of places, and the commercial element entered into not a few. I know personally of a number of cases in which commercial advantage was obviously the determining cause of certain restrictions, in some openly alleged. There were places in west Louisiana having communication through lines running directly north that found the nonintercourse quarantine very profitable, and used every exertion to continue it in their own parishes and to induce neighboring parishes to continue it also. It was used also to get rid of large and old stocks of goods. In general the weaker places were compelled to impose this quarantine by the more important places on which they were partly dependent; becoming now wholly dependent, the trade was increased and prices raised to suit the conditions of no competition.

There were other purposes not legitimate for which quarantine was laid. A place in northwest Louisiana which had been quarantined against by another, which alleged a sanitary reason, quarantined the second one "until the present unjust quarantine against this town is removed." There were a number of other instances of "quarantining back," of quarantining to prevent laborers passing out of the parish, temporary raising of quarantines to stock up with certain classes of goods, etc., until one regretted the simple, honest, ignorant fear that had originally instituted the nonintercourse quarantine.

With this one could always reason, and I at least never found those who had a quarantine put on in good faith to prevent the introduction of yellow fever wholly unreasonable. Indeed, I was surprised at the fairness with which I have been treated by such people and the trust they were willing to repose in my word and judgment. With the others there was no ground for argument. Quarantine was not put on for a sanitary reason, and arguments based on sanitary reasons did not influence it.[2]

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[1] It is worthy of note that no single person employed in handling the mail in the New Orleans post-office contracted yellow fever, although several letter carriers did.

[2] Much has been said and written about the "shotgun" quarantine. As I understand it, this is a quarantine established without the authority of the law, i. e., by

It seemed to be advisable, then, for the Service to undertake, by agreement with the local authorities, supervision of the traffic, passenger, freight, and mail, through and from New Orleans. To render it safe, which with all of its restrictions it was not, and to impose as few restrictions as were compatible with safety and the fears of the outside communities; and especially to do away with such restrictions which would lead to illicit communication without supervision, or by the hardships which they imposed (by reaction) to an abrogation of necessary restrictions. And the Service was well fitted to undertake this work. It was known to be neutral in commercial matters, to have no local jealousies, and thus inspired a general confidence which would have been lacking in an organization believed to be influenced by local interests. Its first, practically its only, object was to prevent the spread of infection, although desiring secondarily to do so with as little hardship as possible to the country both inside and outside the quarantine lines. In addition, its officers were more or less familiar with the conditions of epidemics, and apparently understood better how to meet them, than anyone who was at this time engaged in solving this problem of epidemic work here. The first, that it was not a party at interest and was fair, was very generally recognized and was an inestimable advantage.

Indeed it will be found that much of the work done by the Service in this problem of transportation was really done as if it were the trusted agent of the communities. Without this trust, which we tried to deserve, nothing could have been accomplished.

RELAYS AND TRAIN INSPECTIONS.

At the same time that the disinfection of the mail was organized (September 16), arrangements were made and proper relays put on all the roads running from New Orleans. There seemed no reason why the Louisville and Nashville, running through territory generally infected to Mobile, should be relayed until after it had passed that city, and no relay was established in Louisiana.

Those for the other roads were established at the best places we could get. But we were so hampered by the quarantine restrictions of different localities that only one (that near Slidell, on the Queen and Crescent) was established in the place of election. As a result of this, it was necessary to require two relays for some of the roads, the Illinois Central relaying both at Kenner and McComb, and the Mississippi Valley at Kenner and Laplace. This was of no sanitary advantage and involved expense to the railroad, but as things existed they were disposed to make any concessions to run at all. There were a number of other relays put on by various towns in Mississippi.

Before beginning the "passenger-train inspection" I judged it necessary to confer with the health authorities through whose jurisdiction this traffic should pass, and I accordingly visited Vicksburg September 18 and conferred with Drs. Hunter and Kiger, of the Mississippi board of health, and the next day Memphis, where I conferred with Dr. Albright, health officer of Tennessee, and Dr. Thornton, a sanitarian of national reputation, the health officer of Memphis. The results of both conferences were exceedingly satisfactory, and we were able to work in harmony with their boards without misunderstanding or clash during the whole epidemic.

Passed Assistant Surgeon Young was to supervise this inspection north of Vicksburg, and on the Mobile and Ohio and the Illinois Central systems north of the first

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some community or persons having no right to establish a quarantine, and enforcing it, or prepared to enforce it, simply by right of the strongest. It has no relation to its stringency.

A "nonintercourse quarantine," on the other hand, where a community shuts itself up from the world, if this action be taken by those having legal authority to quarantine, is not a "shotgun" quarantine. It may, of course, go beyond the legal right of this authority to lay quarantine, and to that extent be illegal, but it professes to have warrant of law, and to be enforced lawfully.

tier of inspectors. These ran from New Orleans, and with the inspection from Vicksburg south and on the Queen and Crescent system were to be under my direct supervision. I will say that the work of the northern tier of inspectors was rendered difficult by the Nashville Exposition, which required the handling of an unusual large number of people, and as this place after a while received people from New Orleans, it was very difficult to keep them from coming here and passing by the inspectors with the crowd of passengers to places which had quarantined.

Inspection, previously arranged for, was put on those roads by telegrams from Vicksburg and Memphis, and also on the Louisville and Nashville to the Alabama line. Returning to New Orleans, the two roads leading west were taken up. They obviously could not carry passengers (nor could the Mississippi Valley) from New Orleans, as they did not run to noninfectable territory.[1]

Before going to Memphis and Vicksburg I had been in telegraphic communication with Dr. Swearingen, health officer of Texas, and we planned a conference on the line of the Southern Pacific in western Louisiana or eastern Texas, to take place as soon as possible, and to try to establish a system which would give his State the maximum protection (not less than it now enjoyed) with a minimum obstruction of commerce. This meeting never took place. The report of a case of yellow fever at Beaumont, Tex. (I believe now that this is generally agreed to have been an erroneous diagnosis), prevented him coming through the parish of Calcasieu, through which also I could not go from New Orleans after the report of the Beaumont fever. I doubt if it would have resulted in anything.

From my correspondence with Dr. Swearingen I know that his views on the situation were wise and conservative and that he believed that many of the restrictions then in force in his own State could be removed without any increase of sanitary risk. He stated that he "had the authority (I do not know whether he meant 'de jure' or 'de facto') to do only what the situation required."

The commercial element in quarantine unquestionably was active in western Louisiana and, it is alleged, in Texas also.

MERCHANDISE FROM AND THROUGH INFECTED PLACES.

To meet the sanitary dangers indicated before and to remove unnecessary restrictions on commerce, a system of certification of such articles of freight which could be shipped from New Orleans was now inaugurated. This involved both inspection and disinfection. The following are the original rules under which this work was undertaken:

Notice to inspectors of freight.

Freight of the following kinds, under the following conditions, can be received from New Orleans:

1. All new and dry material, unpacked—such as brick, lumber, machinery, ties, agricultural machinery, without textile material, new furniture (not upholstered), hardware, etc.—requires no disinfection.

2. Goods in original wooden or metal packages, unbroken in New Orleans, require disinfection of outside of container only.

3. Goods in original packages of textiles, not broken in New Orleans, require disinfection of container only.

4. Goods known to have been packed in New Orleans prior to September 1, shall be under same rule as 2 and 3.

5. Fruit taken directly from vessel to car, when not in bags, and in good order, from noninfected vessels, can be shipped.

6. Goods packed in New Orleans will not be certified to unless they can be disinfected, unpacked, or the container is so arranged that they can be disinfected in it.

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[1] The Southern Pacific runs, indeed, to noninfectable territory, but its through passenger traffic at this season would not justify running a special train, and for other reasons passenger traffic from and through New Orleans by this route seemed inadvisable.

7. Through freight from noninfected points, in cars, not opened in New Orleans, to be certified as "inspected and passed."

H. R. CARTER,
Surgeon, U. S. M. H. S.

It must be premised that, save Memphis (I had talked this matter over with Dr. Thornton), no place had agreed to take any goods under these conditions or any others from New Orleans, but I felt certain that quarantine restrictions imposed in good faith to prevent the introduction of infection would be modified so as to receive some (the most needed) goods as indicated in this circular if only the matter could be clearly presented to the proper health authorities.

The restrictions imposed for commercial purposes I had no hope of influencing save by changing popular sentiment.

A conference of the parishes along the Southern Pacific and branch roads had been called by the various health officers, and I was asked to attend. Although Calcasieu and (through its pressure) Arcadia declined to attend, and Lafayette withdrew, the result was most satisfactory.

All of the parishes west of Lafayette agreed to allow trains, freight and passenger, to run within their borders, under restrictions agreed on, which were the same in principle as those established for traffic on the roads running from Brunswick, Ga., in 1893 and the same as those (changing only the names of places) under which the Mississippi Valley road was now operating. The Service was asked to take charge of the inspection, relays, etc., and all agreed to receive disinfected mail.

A motion to receive freight under the circular could have been carried, but not unanimously, and I asked that its consideration be postponed until a conference to be held after consultation with the people of the places represented. At this (the Franklin) conference, a few days later, these rules were adopted and the Service asked to undertake this work.

A few places, however, in the parishes which accepted the rules of the Franklin conference imposed extra restrictions, or refused to receive freight under any conditions. This last condition, however, was only temporary.

Later these rules were modified by five rulings (by the writer), all of importance:

(1) That no goods should be shipped without disinfection from the neighborhood of residences.

This was done because the wholesale district was believed to be slightly, if at all, infected, and we wished to have the added safeguard of not having been exposed to infection on some of the members of class 1.

(2) That certain other goods, transferred under the same conditions as fruit, may shipped as under class 5.

(3) Goods, even if put up in New Orleans, which, from their nature or manner of packing, are incapable of being infected and which sterilize the inside of the container, may be passed, like class 2, with disinfection of the outside of the container—such as coal oil barreled here, creosote, acids, refined sugar (packed at 230° to 250°), roasted coffee, etc.

(4) All cars used for merchandise not disinfected "in situ" to be disinfected.

This was made especially obligatory for fruit cars.

(5) That the inspector shall not certify to anything, independently of its class or treatment, unless he be convinced that it will not carry infection.

This last was to prevent perfunctory work and to guard against my own possible errors in drawing up the rules.

It will be seen that this is practically the "freight regulations" of the Atlanta conference, although the circular issued after consultation with the board of trade (see Appendix) is still more like these rules, on which they were founded.[1]

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[1] The other regulations of this (the Atlanta) conference, save those for opening and repacking original packages and manufacturing. Articles 59 to 78, inclusive, are simply the rules this Service was working under, or trying to work under, in 1888, 1893, and 1897. From 59 to 78 is new matter, mainly by Dr. Souchon.

It was thus the beginning of a most important move, both from a sanitary and a commercial standpoint.

These rules, in the condition of infection that prevailed, were overstringent. Class 2, for instance, could be placed in class 1. Yet there were reasons for this:

(1) It was desired to ship nothing save what was perfectly safe; not to ship everything that was safe.

(2) It was especially desired to relieve the most pressing necessities of the people in the parishes, to obviate smuggling, etc.

(3) This was about all that would have been granted, and indeed all the modifications made by different places were in the imposition of further restrictions.

As was implied by these rules, a very close watch was kept on the fruit wharves, to determine if they were free from infection. This was extended to the wholesale, i. e., the shipping district of the city, and I was unable to find any evidence that this district was infected, and I do not believe that this district became infected during this year nor in 1898.

In the meantime and soon afterwards Tennessee, Florida, the Mississippi coast, the Mississippi State board, and a large number of parishes (including Lafayette), in Louisiana, and some places in Mississippi, adopted the above rules, with various modifications (suggested by their fears or needs), and the more pressing needs of the parishes being provided for by legitimate traffic under close supervision, the danger from merchandise as fomites, whether by smuggling or by abrogation of necessary restrictions, was removed.

Freight was also received under the same rules and rulings by the State of Florida and by some points in Alabama and Arkansas, and this same work of inspection and disinfection was also carried on by the service under these rules, to some extent, at Mobile and (later) at Memphis.

These rules worked smoothly, although not much business was done in 1897. In the beginning effort was mainly confined to shipping such freight as could go without disinfection, requiring inspection only, and the amount which required disinfection was increased as the inspectors and their assistants became familiar with the work. This was done to prevent the inefficient disinfection, which would unquestionably have been done had any large or even considerable amount been undertaken with unskilled assistants. This work was under the direct supervision of Passed Assistant Surgeon Guitéras, although much personal supervision was given to it by myself and Assistant Surgeon Norman. Every inspector kept a book of queries, which he presented to me at 8 p. m. each day, at which time I met them all for discussion of the problems, etc., which had come up during the day.

Later on considerable careful disinfection was done. A large amount of filter-press clothes, manufactured in New Orleans and possibly infected, were disinfected by steam in the Francis Kinyoun chamber and sent out to plantations. This method was over troublesome for general use on fabrics (the disinfection of which should not be undertaken during an epidemic), but these articles were absolutely necessary for certain sugarhouses, and their disinfection was necessary.

This inspection and disinfection of freight was quite an extensive part of the work of the service. It was little costly. The record shows that in all 4,626 cars of freight were inspected or disinfected and sent out.

In 1898 the "Atlanta rules" for freight, which were practically the same, were very extensively adopted; in Alabama (with unimportant modifications), Mississippi, and practically all of Louisiana and Arkansas. Florida in 1898 received all freight from the wholesale district independent of character. A large amount of work was done in 1898, many times more than in 1897. In 1898 merchandise was handled under these rules and the certificate of this service in Baton Rouge, Alexandria, and to a small extent in Jackson, Miss.

All the railroads were now running out of New Orleans; all carrying mails and more or less local freight; the Southern Pacific the most, the Texas Pacific the least, the Southern Pacific, the Mississippi Valley, the Illinois Central, and the Queen and Cres-

cent doing local passenger business, although the last two very little. The Louisville and Nashville, the Illinois Central, the Queen and Crescent doing a large through passenger traffic to northern noninfectible points, and carrying through freight and empty cars, as did the Valley road, without let or hindrance. The railroad superintendents here were seen, and the cars going empty to points south for cotton were not allowed to be parked in the city. Most of them were taken back as soon as they were unloaded (especially true on the Illinois Central), and the others parked (as short a time as possible) outside of the city. Every empty car leaving the city was examined for tramps at the relay stations (McComb and Laplace, as well as Kenner). The Southern Pacific ran only as far as Lafayette on the main line, and could carry no through freight, on account of not being able to pass through Calcasieu Parish or Texas. Later on, when empty cars were allowed to enter Texas, in November, they were required to be disinfected, and this was done with bichloride of mercury spray, by this service at Avondale about 1,600 or 1,700 being thus treated. This was done under formal protest, as being unnecessary for any sanitary reason, and simply in aid of commerce. It was, however, done as thoroughly as if we had believed it necessary.

The Texas and Pacific ran no passenger trains during the epidemic, and began to do business of all kinds later than the other roads. As it was able to supply the country along its road directly from the north (via Shreveport and Alexandria) and the country near New Orleans could be reached by river this was of little sanitary importance.

Later in the season arrangements for disinfecting empty cars—bringing cotton and grain into New Orleans—had to be made to allow them to return. This was done at Goldsboro, across the river from New Orleans. It was unnecessary. An enormous export business was done by this road.

All the roads were relayed and the relays under guard, and while some of the stations, notably those on the Illinois Central and the Mississippi Valley, were not in the places of election, yet none of them became infected; even Kenner, 11 miles from New Orleans, stayed clear to the end. For this place however, the importance of which will be seen later on, no end of precautions were taken, and never a week passed without the writer inspecting it, still it was a matter of congratulation, that of seven relay stations none became infected.

Inspectors for passenger traffic were on each train leaving the city save on the Southern Pacific, for which he boarded at Avondale, the relay station. For the Illinois Central and the Queen and Crescent they went by relays to noninfectible territory, only the lower tier reporting to me. On the Louisville and Nashville I had the inspection to the Alabama line. These inspectors were physicians and immune to yellow fever. That they should be physicians was necessary, because cases of yellow fever were liable to occur among the refugees. Indeed some did occur, and were either stopped at the detention camp or transferred from the north-bound train to the south bound, and either returned to the city or taken back to the detention camp. Physicians were not less needed to pronounce definitely that other cases of sickness on the train were *not* yellow fever. A panic from "train-sick" women was narrowly averted in several instances, which I believe would have resulted in closing the route north to us had it taken place. As some of them must sleep in clean territory—Slidell and at the Alabama line—immunes were required.

After the very beginning, when there seemed danger that the passage of trains carrying people from an infected town through certain places would be forbidden by them, there was no hindrance to travel going north from New Orleans. No one was allowed to leave, however, without taking an affidavit "that he would not return to any place quarantined against New Orleans" or "that he would not return to such place for ten days." The latter was for people who went north, as to a detention camp, to spend their period of incubation, and return south.

For these, then, disinfection of baggage was required. This baggage was labeled with thin paper pasted on, with date and certificate of disinfection.

In addition, until nearly the middle of October, all baggage passing through Atlanta was required to be disinfected. Why I do not know, only it was not allowed to go else. I caused this disinfection to be done here until we were able to have this rule rescinded.

Baggage for Atlanta and Nashville, distributing points for passenger traffic south, was also disinfected and certified. These passengers went on special trains, doing no local business in infectible territory, or if so, having a separate coach for it.

A small amount of express matter, which it was important to deliver, was also disinfected and delivered on the certificate of this service. This work, however, was not of a kind that could be generally done with the means at our disposal. The express companies did very little business then from the city of New Orleans, the most important being the shipment of money disinfected as above. In 1898 arrangements were perfected by which a very fair express business was carried on.

No "reception camps" were established. The state of public feeling would have rendered it difficult and the need for them was met in other ways. On the Mississippi Valley and the Southern Pacific roads the "suspects" were transferred across with the inspectors and returned to the place where they boarded the train, or to the detention camps as they desired and were allowed by the local authorities. In most cases they preferred the camp. On the Louisville and Nashville, the Rigolets acted as a reception camp, those stopped there going back to Fontainebleau. On the lines going north through Mississippi and Alabama, suspects were carried on through to noninfectible territory, local regulations preventing their stopping at either of the States. This was perfectly satisfactory from a sanitary standpoint, but an unnecessary hardship on the individual. There was very little local passenger traffic on the roads in Mississippi and Alabama.

There was no regular inspection of territory in Louisiana, but the object of this inspection was attained by other means. I "investigated" the sanitary situation of Kenner (very frequently), Patterson, Calumet, Perry, Franklin, Grammercy, Laplace, and other places in Louisiana. In addition, I was in close touch with almost every health officer in the especially threatened portion of Louisiana, and was besides able to get much useful information on this matter from my train inspectors.

An inspector in north Mississippi and on the coast had probably saved some spread of infection, but the many quarantines would have made his work difficult. Louisiana was fairly well covered by what we had. Dr. Guitéras investigated at a considerable number of places, but only after suspicious disease was reported there. I think his announcement of fever at California saved Vicksburg—the key of the middle valley and northern Louisiana. Dr. Murray, too, did similar and valuable work on the coast.

INSPECTION OF WATER CRAFT.

In the very beginning of the epidemic an inspection of the water craft leaving New Orleans had been undertaken by this Service. This was kept up until the end.

All vessels that we could reach on the river, lakes, or canals were inspected and such sanitary measures as were practicable enforced. No passengers were carried; the freight was all under the rules given before. The hold and living apartments disinfected; deck washed with bichloride, and the crew was seen to be well when they went on board. The vessel was then given certificate. It was obviously impossible to relay the crew or to be positive that they would not develop fever en route.

This last difficulty was met to some extent by having a floating inspection station between Vicksburg and New Orleans, where the crew was again inspected, and in many cases by making arrangements with the local authorities at the landing to see that no one from the shore came aboard the boat, and that none of the crew left the

boat to remain ashore. But little was done, however, by boats during the epidemic. No infection was conveyed to any place by any boat that we had passed.

In 1898 the business done by the boats was very good—save for those running up about Natchez or Vicksburg—almost as great in freight as it usually is. But for a misunderstanding the up-river lines could, by taking inspectors aboard each one to see that no communication liable to convey infection was held with any landing, have done a fair business. The plan is perfectly feasible. No fever was ascribed to boat traffic; indeed, in neither year was there much infection on the water front. Five hundred and ninety vessels were inspected and disinfected in 1897, nearly all of them with more or less cargo, which, of course, was disinfected also, when requiring it.

MECHANICS AND LABORERS FOR SUGAR GRINDING.

At the same time that the matter of transportation was being arranged, as just set forth, the problem of getting skilled labor from New Orleans and laborers to the sugar plantations had to be met. For the first it was necessary (1) to provide some safe way by which they could go from New Orleans to uninfected places, and (2) to get the parish health authorities to agree to admit them when they would be free from danger of conveying infection.

For the first a detention camp was the natural solution, and it was proposed either (*a*) to use the camp already established at Fontainebleau, and bring the people who had served their quarantine there through the city in closed cars under guard and transfer them to other roads leading to their destination; or, (*b*) to establish a camp elsewhere on the other side of New Orleans and escape the transfer through the city. The first was most economical; the latter was found to be necessary.

For the laborers as they came, or could be obtained, from entirely noninfected territory in Mississippi, Alabama, Tennessee, and north Louisiana, the only problem was to prevent their exposure to infection while passing through New Orleans, which was their usual route. (They came by the Louisville and Nashville, the Queen and Crescent, and the Illinois Central, and went out on the Southern Pacific, the Texas and Pacific, and the Mississippi Valley, and the river.) This was met by making arrangements with the railroads by which the majority were transferred from one road to another without coming into the city. A steam ferry was established across the Mississippi just above Kenner Junction, and all coming down the Illinois Central were able, after a short walk—or, rather, two short walks—to reach the lines of the Southern Pacific and the Texas and Pacific. At the same place transfer was made to boats on the river and to the Mississippi Valley road. Those coming by the other routes were taken across the city in closed cars under guards of this Service.

To get the health authorities of the parishes to admit people coming as aforesaid, correspondence was entered into, and personal interviews held with a number of them, and the following circular issued:

OFFICE OF MEDICAL OFFICER IN COMMAND MARINE-HOSPITAL SERVICE,
New Orleans, La., September 30, 1897.

To the health authorities of ——— Parish, La.:

GENTLEMEN: I have been approached by a number of sugar planters, stating that unless some method of getting hands be devised the loss of cane would be very great.

I have, then, to ask if your parish is willing to receive laborers and mechanics sent under the following conditions:

(1) People from noninfected places, i. e., places where there has been no yellow fever this year, in Georgia, Alabama, Tennessee, Mississippi, etc., brought through New Orleans in closed cars, doors and windows shut, not stopping in the city, and no person or thing allowed to enter the car while so doing.

I am willing to place United States guards on the platform of each car and to promise that this arrangement will be carried out. Each passenger so passing will receive a certificate from a United States inspector so that he may be known.

(2) People (mechanics) from an infected district (New Orleans), after staying ten days in a United States detention camp, under medical supervision, their clothing being disinfected on arrival.

Past experience has shown that both of these methods are absolutely safe.

At the Jacksonville and Brunswick epidemics detention camps were used, and out of some thousands who passed through, and scattered over the Southern States, no fever ever appeared.

During the cholera epidemic in 1893 in Europe, large numbers, probably 50,000 people, were carried through infected towns, under the supervision of the United States Marine-Hospital Service, without any case of cholera arising among them.

I will be glad to have any suggestions on this matter you may be pleased to make and will cheerfully carry them out, provided I am able to retain such safeguards as are necessary for the preservation of the noninfected districts from the introduction of yellow fever.

An early answer will greatly oblige me, as I would be glad to be of service to your parish in any way agreeable to your health authorities.

H. R. CARTER,
Surgeon, U. S. M. H. S.

I had little doubt of the result. The interests of the planters and the object lesson presented by the resumption of traffic (very partial, it is true) without the admission of infection into places permitting it would, I thought, certainly lead to the admission of these people so badly needed.

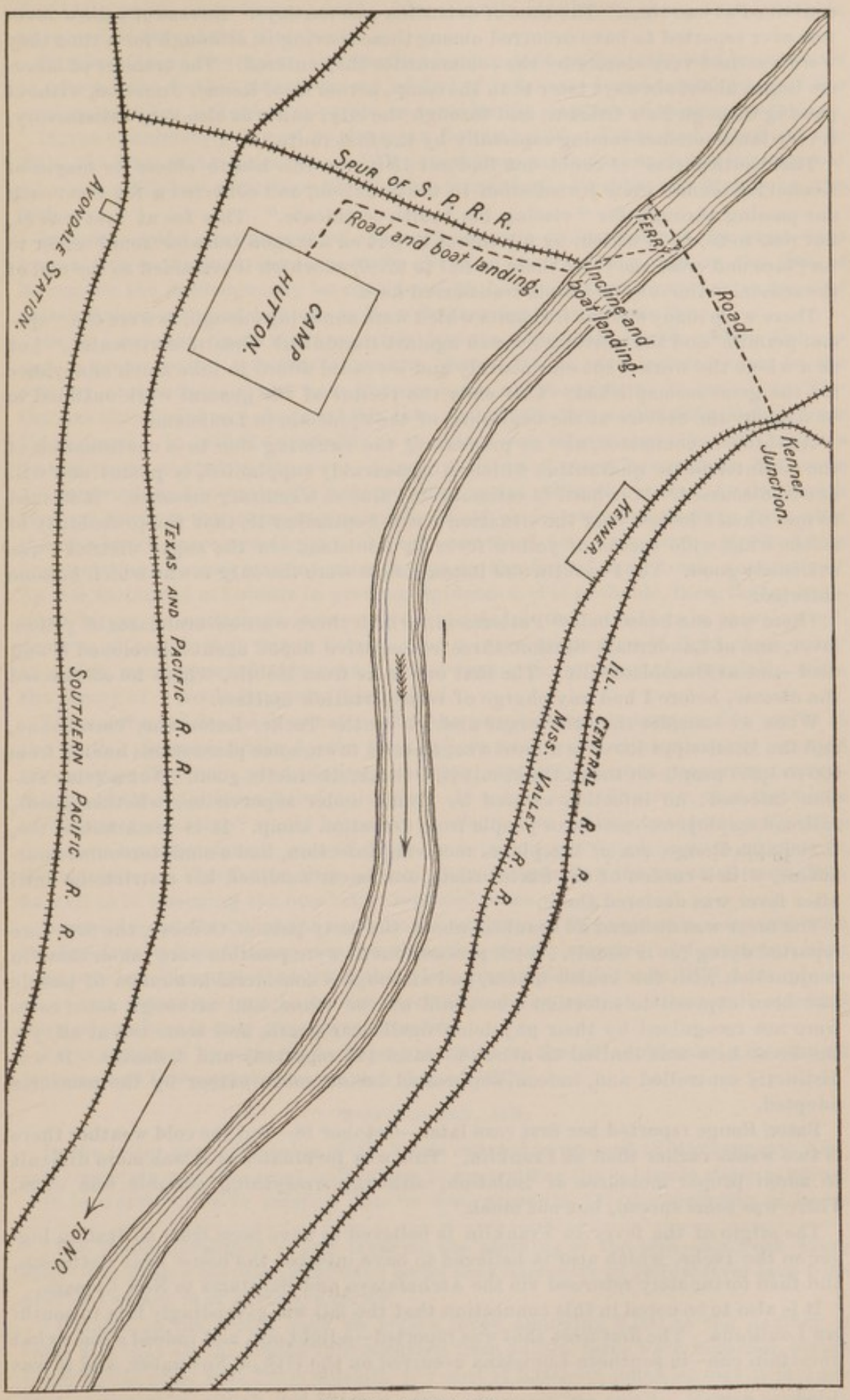
Indeed, about this time in some parishes, the health authorities passed resolutions authorizing "private detention camps" of mechanics, from New Orleans, conducted by the planter on his own plantation, without any restrictions specified.

This was full of danger, and would have spread infection to a number of places. And there were other indications that the restrictions against people from New Orleans were on the point of being abrogated, so far as mechanics and laborers needed on the sugar plantations were concerned. For instance, one gang of 73 Italians were stopped, leaving New Orleans with health certificates, 4 of whom had just come from a house in which one man was dead, and another sick with yellow fever—75 being the number allowed for in the "special permit" of the health officer.

It was very hard to get a suitable place for a detention camp. It was a new thing, and was objected to vehemently by every neighborhood in which it was proposed to place it.

In the meantime, to obviate the need of "private camps," a considerable number (160) of mechanics for sugarhouses were sent over to Fontainebleau. These were afterwards passed through New Orleans under guard and reached their destination.

At length, through the superintendent of the Southern Pacific Railroad, permission was obtained to locate the camp at Avondale on land owned by the railroad. This place is located on the Southern Pacific and the Texas and Pacific and is close enough to the river, where the ferry from Kenner Junction landed, to give us access to the river and the Mississippi Valley road. Permission was given to occupy this place October 9 at 9 p. m. Work was begun October 10, and people were received October 13, in the morning, I think the shortest time ever intervening between the selection of a site and the opening of a camp. It was built by the Southern Pacific Railroad Company, Passed Assistant Surgeon Geddings and, later, Dr. White directing its construction. This camp was under charge of Passed Assistant Surgeon White and was well managed and a success in every respect. It was, of course, a less elaborate camp than those in which women and children are received—like Fontainbleau, Camp Perry, etc.—but it served its purpose. A large number of mechanics for the sugarhouses passed through it, together with a number of other men anxious to get out of New Orleans to the parishes, including several relays of postal clerks for west Louisiana and Texas. All reached their destination, the pratique of the camp being universally accepted. One thousand and eight was the largest number the camp



CAMP HUTTON, LA.

contained at one time. The time of detention was ten days. No case of yellow fever was ever reported to have occurred among those leaving it, although for a time they were watched very closely by the communities they entered. The transfer of laborers began about six days later than the camp, across from Kenner Junction, without passing through New Orleans, and through the city, and was also very satisfactory, a very large number coming especially by the first route.

The "authorities" (I could not find out if it was the health officer or mayor of Kenner) extended their jurisdiction to the Junction, and collected a fee from each one passing through for "viséing his health certificate." This fee at first was $1, but rose to $5, from which, by my threat to put on a wagon transfer from Frenier to La Place and cross the river there, it fell to $2.50, at which it remained to the end of the season. About 8,000 people transferred here.

There were many similar incidents which were annoying enough, as were the "special permits" and the continual watch against fraudulent "health certificates;" but as a whole the work went on smoothly and we could afford to take much annoyance for the good accomplished. This ends the recital of the general work outlined to be done by the Service at the beginning of the epidemic in Louisiana.

Its value to commerce, and as preventing the suffering due to a continuation of the nonintercourse quarantine which it measurably supplanted, is patent and will not be discussed. It is hard to estimate its value as a sanitary measure. It seemed to me, when I looked over the situation about September 18, that the probability of a somewhat wide spread of yellow fever in Louisiana—in the sugar district—was extremely good. Yet Franklin and Baton Rouge were the only towns which became infected.

There was one house below Patterson in which there were several cases of yellow fever, and at Lauderdale Station three consecutive depot agents developed it and died—one at Donaldsonville. The first one came from Mobile, where he contracted the disease, before I had any charge of transportation matters.

When we consider that the sugar district on the Teche, Lafourche, Terrebonne, and the Mississippi River is almost a continuous town, some plantations having from 800 to 1,200 people on them, the result is, I think, distinctly good. Not a relay station infected; no infection carried by traffic under supervision, whether goods, railroad employees, vessels, or people from detention camp. It is remarkable, too, that Baton Rouge, one of the places receiving infection, had a nonintercourse quarantine, with a cordon of the State cadets, and never modified her restrictions until after fever was declared there.

The fever was declared at Franklin about the early part of October, the first case reported dying (as is usual). Such precautions as were possible were taken there in conjunction with the health officer, and although a considerable number of people had been exposed to infection who could not be found, and although some cases were not recognized by their physician until near death, and some not at all, yet the fever here was limited to about 13 cases (10 reported) and 4 deaths. It was distinctly controlled and, indeed, suppressed before cold weather by the measures adopted.

Baton Rouge reported her first case later—October 18—and the cold weather there is two weeks earlier than at Franklin. This was fortunate, as it was more difficult to adopt proper measures of isolation, although everything possible was done. There was some spread, but not much.[1]

The origin of the fever in Franklin is believed to have been from an Italian lugger on the Teche, which also is believed to have infected the house near Patterson, and then fortunately returned via the Atchafalaya and Barataria to New Orleans.

It is also to be noted in this connection that the fall was exceedingly late in southern Louisiana. The first frost that was reported—a light one, and indeed a somewhat uncertain one—in southern Louisiana occurred on the 17th of November, and it was

[1] It is stated by the health officer that the origin of the fever in Baton Rouge was from north Mississippi. The first reported case was in a quarantine guard.

decidedly warm up to November 15. The climatic conditions, then, were favorable to spread of fever later than usual.

On the 17th of November, the weather having been sufficiently cold everywhere to prevent the further establishment of foci of infection, I met a conference of the western parishes, called at Lafayette, to consider the question of raising quarantine.

It was unanimously agreed to do so on November 25. Texas had raised on the 20th; the State of Alabama removed all quarantines on November 20, having removed all north of Calera some time previously; Mississippi, Florida, and Mobile on the 30th.

In spite of the continuance of quarantines, more or less relaxed, for some days longer, yet notice had been generally given of their raising, and on the 18th of November the epidemic may be considered to have closed, although some cases of yellow fever continued to occur in New Orleans for an indefinite time.[1]

As we have seen, there was very little fever in Louisiana outside of New Orleans and communicating territory—Franklin, Baton Rouge, and isolated cases in the country at Lauderdale and near Patterson—in all about 20 to 25 cases. In New Orleans the official records give 1,908 cases and 295 deaths, a mortality slightly over 15⅝ per cent. In 1878 the mortality in the State was 16⅝ per cent (Bemiss), but this was in excess of that in the city. A large number of cases, however, in 1897 were not reported, and some deaths were reported under other diagnoses. At the Parish Medical Society the estimate was made, based on no very satisfactory data, that the number of cases was about 6,000, only one-third being reported. Much of this nonreporting of cases was intentional, due to the fear of the "house quarantine." As this factor did not obtain in previous epidemics, it is probable, then, that a somewhat larger proportion of cases were unreported during this than in previous epidemics; although it is fair to believe that a large proportion of light cases, many of which were reported this year, have always gone unreported, especially when the theory of "creole immunity" prevailed.

The number of deaths does not need to be proportionately increased to arrive at the truth. Because while deaths from yellow fever were unquestionably reported under other diagnosis, yet no large proportion, certainly no such proportion as two-thirds, of the fatal cases failed to report. It would seem, however, that the factor of "house quarantine" would be nearly as effective in leading to intentionally false diagnosis by physicians in case of death as to nonreport by physicians of cases in their practice. This factor, then, should show in lessening the reported mortality, as well as in lessening the number of reported cases.

It would seem, then, that the exceptional mildness of this epidemic compared with the last two in New Orleans was less than was usually asserted. Of course we must take into consideration that when there is a great epidemic, as in 1878, both physicians and nurses are apt to be overworked, and the patient is less well attended than when there is only a moderate number.

I was informed by some of the older practitioners that this epidemic in its clinical features and low mortality resembled that of 1867.[2]

MONTGOMERY, ALA.

In the latter part of October (24th) I was ordered to proceed to Montgomery, Ala., and cooperate with the local authorities in controlling the epidemic there existing.

It is worth while to mention this on two accounts, (1) the measures of house

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[1] The writer developed yellow fever on the morning of the 18th—his work being done—confirming his often-expressed belief that immunity to yellow fever save from previous attack is of excessive rarity.

[2] Touatre, in his recent book on yellow fever, assuming 6,000 as the number of cases and that all the deaths that occurred from yellow fever were reported, makes the singular error that 300 is one-half per cent of 6,000—in point of fact it is 5 per cent, a mortality which, for reasons given above, is too small. It was probably about 7 per cent.

quarantine adopted and (2) the influence of cold or sewerage and drainage in preventing a place becoming infected by yellow fever imported there.

In Montgomery there was a quarter of the town where there was much fever, probably 100 infected houses. New cases were occurring rapidly, although the weather was quite cool. There were so many infected premises in this part of the town that we could not determine whether new foci were being established here or not. Fever was introduced in this part of town—naturally isolated, socially and by position, from the remainder—on September 4 (or 7), but was not announced until October 18. The remainder of the town, the uninfected part, had had no fever in it until October 14, when some people leaving the infected portion moved into the noninfected portion and developed yellow fever there. After the 18th and 20th a considerable number of people who had been exposed to infection moved into the clean quarter of the town, both to avoid the fever and because a number of houses were left vacant in this part of town by the exodus which occurred when fever was announced. A number of people then developed yellow fever there.

In this part of town a regular "house quarantine" was instituted, with guards, flags, etc., which was soon modified to prohibiting ingress only, and directing that those who left a house in which sickness existed should not enter any house in this quarter of the town, there being no bar of egress from the houses. In the infected quarter the town was flagged and unnecessary ingress forbidden. No guard was used. All houses were disinfected as quickly as possible, those in the uninfected quarter completely and the others as far as it could be done without too great inconvenience to the family. This work of disinfection was taken up by the service and supervised in every detail by myself for two weeks, until Acting Assistant Surgeon Pollard, of Montgomery, whom I had associated with me from the beginning, was sufficiently familiar with it to continue it.

The prohibition of the board of health against ingress into infected places I found was very generally observed, as was the order against the entry of the inmates of houses where sickness existed into clean houses in the noninfected district of the town. This, then, gave an almost ideal "house quarantine" under the conditions which here obtained—the maximum of safety and the minimum of restraint and expense.

It was soon apparent to me that there were no foci of infection being established in the "uninfected quarter"—i. e., no one living there, even in houses in which yellow fever existed, developed yellow fever—and every case could be traced to exposure in the infected section of the town. About November 8, sufficient time having elapsed for foci, if established by the earlier cases, I presented to the board of health a memorandum of a series of houses in this part of the town in which yellow fever had been introduced not less than twenty days before, treated to death or convalescence, and in which no case had arisen in any of the inmates, and drew the deduction that this part of Montgomery, at least, "was, and from October 14 had been, uninfectible territory." Quarantine restrictions were accordingly modified.

I found out afterwards that the limits of the "infected" and the "uninfected" quarters of the city very nearly corresponded to the areas which had no sanitary sewerage and that which had, and the point was raised if this were not the cause of the difference of their behavior to yellow fever.

It is greatly to be regretted that the fever was not introduced into both the sewered and unsewered portions of the city at the same time—early enough for the temperature to be suitable for spread—because it is not possible to eliminate the factor of change of temperature in preventing the establishment of foci of infection in the sewered portion. It is a well-known fact that a degree of cold far less than necessary to destroy a focus already existing will prevent the formation of a new one.[1]

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[1] I am informed that exactly the same condition of things obtained at Memphis, i. e., that there was no spread in the sewered portion of the town, but that cases were introduced in this part of town some time after they had existed and established foci of infection in the unsewered portion. I have no personal knowledge of the Memphis fever, however.

In Montgomery, then, the influence of sewerage on the ability of the yellow fever to establish itself is not proven.

I would state here that Montgomery was the cleanest city I ever saw.

APPENDIX I.

In addition to the "Freight circular" (page 643) and the "Sugar circular" (page 643), the following (and possibly some other) circulars were issued by the Service in this district in 1897:

SUPPLEMENTARY.

Regulations governing shipments of merchandise from New Orleans under supervision of United States Marine-Hospital Service.

When the original regulations (promulgated September 17, 1897), concerning the transportation of merchandise, were adopted, it was deemed unnecessary to enumerate all the articles embraced in the several classifications, but experience has shown that a complete list of goods belonging to each class will be of great assistance to all concerned.

With this view the following classification is presented:

Class No. 1.—All new and dry material unpacked, such as lumber, machinery, brick, bar and sheet iron, tin, steel, agricultural implements, iron ties, stoves, saddlery, wagons, new furniture, new trunks, hardware without packing, lime, etc., being incapable of conveying infection, require no disinfection.

Class No. 2.—All goods in original wooden or metal packages, not put up or broken in New Orleans, do not require disinfection except outside of container. This class embraces boots and shoes in original packages, cotton dry goods in original cases, leather goods, saddlery and saddlery hardware put up, holstered in cloth, drugs and chemicals in solid cases or packages, rubber and oiled clothing, sugar in boxes or barrels, rice in barrels, canned fruits, vegetables, meats and oysters, also condensed milk in solid unbroken boxes, stone, iron, and tin ware if not packed in straw or excelsior (except under restrictions noted below), tobacco and cigars, wines and liquors, cheese in original boxes, flour, grits, and meal in barrels, woodenware, butter, tea in caddies, candles in boxes, lard, pork, bacon, oils, and paints in tin cans and barrels, soap in boxes, axle grease, iron roofing, saddle trees, matches, raisins, salted fish, potatoes, onions, and apples.

Class No. 3.—Goods packed in textile material, not broken in New Orleans and kept perfectly dry, do not require disinfection, except the container. This includes cotton piece goods in solid unbroken bales, coffee, grain, and spices in sacks, as also cured hams in canvas.

Class No. 4.—Fruits, sound, and taken directly from the vessel and transferred immediately to the cars for shipment, require no disinfection.

Articles not in these classes will be disinfected before they are shipped, and the efficiency of said disinfection shall be certified to.

Articles mentioned above that can be packed in excelsior in perforated container or crates, rendering the excelsior and contents capable of disinfection, will be disinfected and passed.

All certificates and disinfection are subject to inspection and approval by authorized agents, who may be sent by the various health authorities.

October 26, 1897.

H. R. CARTER, *Surgeon, M. H. S.*

SEPTEMBER 20, 1897.

Notice to passengers leaving New Orleans.

Passengers going north must present an affidavit pledge of one of the annexed forms before boarding any train passing into quarantining territory.

If the passenger intends to return into quarantining territory after ten days, which is allowable, he must take the second form, and his baggage will be required to be disinfected before going on the train. Arrangements have been made to do this at all passenger depots.

If the passenger does not intend to return south until after frost, the first form of affidavit should be taken. The baggage of such passengers will not require to be disinfected unless they are bound for Atlanta, points in middle Tennessee, Nashville, or points west of Nashville.

H. R. CARTER, *Surgeon, M. H. S.*

[Form I.]

STATE OF LOUISIANA, *Parish of Orleans, City of New Orleans:*

Before me, a notary public in and for the parish of Orleans, State of Louisiana, duly commissioned and qualified, personally came and appeared ——— ———, who, upon being duly sworn, deposes and says that he will not go to any place quarantined against New Orleans.[1]

———— ————.

[Signature of affiant.]

Sworn to and subscribed before me this —— day of ———, 1897.

———— ————, *Notary Public.*

[Form II.]

STATE OF LOUISIANA, *Parish of Orleans, City of New Orleans:*

Before me, a notary public in and for the parish of Orleans, State of Louisiana, duly commissioned and qualified, personally came and appeared ——— ———, who, upon being duly sworn, deposes and says that he will not go to any place quarantined against New Orleans for ten (10) days.

———— ————.

[Signature of affiant.]

Sworn to and subscribed before me this —— day of ———, 1897.

———— ————, *Notary Public.*

OFFICE OF MEDICAL OFFICER IN COMMAND, M. H. S.,
New Orleans, La., September 16, 1897.

[United States postmaster please post this in a conspicuous place.]

On and after September 16 all mail leaving the post-office at New Orleans, La., will be disinfected under the direction of the United States Marine-Hospital Service by medical inspectors of that Service by approved methods which will render it incapable of conveying infection. Such articles as can not be efficiently disinfected will not be allowed to be mailed.

H. R. CARTER, *Surgeon, M. H. S.*

OFFICE OF MEDICAL OFFICER IN COMMAND, M. H. S.,
New Orleans, La., September 26, 1898.

To the UNITED STATES POSTMASTERS:

All mail leaving New Orleans is being disinfected by the following process:

(1) Package mail is excluded;

(2) Letter mail is perforated and exposed, well scattered, for not less than three hours to 6 per cent formaldehyde gas from a generator;

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[1] "For ten days" to be added if this affiant intends to return south.

(3) Newspapers are exposed to steam in a steam chamber for not less than forty minutes;

(4) Sacks are treated, empty, as letters or newspapers, according to circumstances.

These methods of disinfection are the same as are in use at the maritime quarantine stations of the United States and are held sufficient, and experience has shown that they are sufficient for goods, bedding, clothing, etc., infected with yellow fever (for which steam is used, as for newspapers), which have been freely received everywhere in the United States after this treatment without introducing infection.

This work is undertaken by the United States (Marine-Hospital Service) and is done under the personal supervision of a medical inspector of this Service.

H. R. CARTER, *Surgeon, M. H. S.*

Notice to inspectors of freight, United States Marine-Hospital Service.

Freight of the following kinds, under the following conditions, can be received from New Orleans:

(1) All new and dry material unpacked, such as brick, lumber, machinery, ties, agricultural machinery, without textile material, new furniture (not upholstered), hardware, etc., require no disinfection.

(2) Goods in original wooden or metal packages, unbroken in New Orleans, require disinfection of outside of container only.

(3) Goods in original packages of textiles, not broken in New Orleans, require disinfection of container only.

(4) Goods known to have been packed in New Orleans prior to September 1 shall be under same rule as 2 and 3.

(5) Fruit taken directly from vessel to car, when not in bags and in good order, from noninfected vessels, can be handled.

(6) Goods packed in New Orleans will not be certified to unless they can be disinfected unpacked or the container is so arranged that they can be disinfected in it.

(7) Through freight from noninfected points, in cars not opened in New Orleans, to be certified as "inspected and passed."

H. R. CARTER, *Surgeon, M. H. S.*

OFFICE OF MEDICAL OFFICER IN COMMAND, M. H. S.,
New Orleans, La., September 30, 1897.

To the health authorities of ——— Parish, La.

GENTLEMEN: I have been approached by a number of sugar planters, stating that unless some method of getting hands be devised that the loss of cane would be very great.

I have, then, to ask if your parish is willing to receive laborers and mechanics sent under the following conditions:

(1) People from noninfected places, i. e., places where there has been no yellow fever this year, in Georgia, Alabama, Tennessee, Mississippi, etc., brought through New Orleans in closed cars, doors and windows shut, not stopping in the city, and no person or thing allowed to enter the car while so doing.

I am willing to place United States guards on the platform of each car, and to promise that this arrangement will be carried out.

Each passenger so passing will receive a certificate from a United States inspector so that he may be known.

(2) People (mechanics) from an infected district (New Orleans), after staying ten days in a United States detention camp, under medical supervision, their clothing being disinfected on arrival.

Past experience has shown that both of these methods are absolutely safe.

At the Jacksonville and Brunswick epidemics detention camps were used, and out of some thousands who passed through and scattered over the Southern States, no fever ever appeared.

During the cholera epidemic in 1893 in Europe, large numbers, probably 50,000 people, were carried through infected towns under the supervision of the United States Marine-Hospital Service without any case of cholera arising among them.

I will be glad to have any suggestions on this matter you may be pleased to make, and will cheerfully carry them out, provided I am able to retain such safeguards as are necessary for the preservation of the noninfected districts from the introduction of yellow fever.

An early answer will greatly oblige me, as I would be glad to be of service to your parish in any way agreeable to your health authorities.

——— ———, *Surgeon, M. H. S.*

APPENDIX II.

Findings of Lafayette conference.

PREAMBLE.

This conference for consultation and the formulation of a uniform plan of quarantine which will be (1) safe; (2) as little obstructive to commerce as is compatible with security.

Its conclusions will be submitted to the different corporate bodies represented for consideration, and its findings in no wise bind the action of those corporate bodies or even the recommendation of their representatives here.

This plan of quarantine may be formulated on the general lines of the maritime quarantine enforced against places infected with yellow fever (Havana, etc.) under the regulations of the United States and Southern States, with such modifications as the different conditions which obtain may require.

I. Places in this State with unrestricted communication with any place where yellow fever prevails shall be considered as in the same category with that place.

II. Places having restricted communication with places where yellow fever prevails under less safeguards than is required by this conference—i. e., daylight communication—shall be considered as places in previous section.

III. No person from a district where yellow fever prevails shall be allowed to go into any of these parishes until ten days after leaving said district and last exposure to possible infection, and since the disinfection of his effects; provided that persons known to be immune to yellow fever do not require detention longer than to complete disinfection of effects.

IV. Passenger coaches for local travel between places quarantined against yellow fever: (*a*) Shall not enter New Orleans, but be attached to the train at the place where the crew is shifted (or beyond that place); (*b*) train crews, mail agents, express messengers, and train boys should be shifted at such place as Dr. Carter may select, under proper supervision, so that none of them leaving New Orleans stop over in a quarantining district; (*c*) medical inspectors of the Marine-Hospital Service shall accompany such trains from New Orleans, or from the place where crews are shifted, and shall have sanitary charge of the train, and their duties shall be to see that the regulations adopted there are observed; (*d*) sanitary guards of the Marine-Hospital Service, as many as may be necessary, to be stationed at every point of crew shifting to see that it is properly carried out.

V. Mail matter disinfected at the post-office may be received, the mail agents being changed as required in IV. No merchandise to be allowed in the mail, which is to consist of letters, circulars, and newspapers in small, loose bundles.

VI. No article capable of conveying infection shall be allowed from places where yellow fever prevails into any place quarantined against it.

VII. There shall be no restrictions on local traffic, passenger, freight, or mail from any noninfected place, only that health certificates or other evidence showing that the holder has not been in any place which is quarantined against within the past ten days, and has no baggage capable of conveying infection, shall be required of every such passenger.

Report upon the Establishment and Management of Camp Fontainebleau, a Detention Camp at Fontainebleau, Miss.

By P. A. Surg. J. H. White.

Pursuant to orders contained in Bureau telegram of September 8, 1897, received at New York, I reached Fontainebleau, Miss., on September 11, via New Orleans. I found upon my arrival that Surg. R. D. Murray and Acting Asst. Surg. John Guitéras were already at Fontainebleau. Surgeon Murray had engaged a corps of some 30 railroad laborers to unload the camp train of 40 cars which had arrived from Waynesville, Ga., that morning. Surgeon Murray transferred the management of the camp to be established thereafter to my care and returned to Ocean Springs. The remainder of the afternoon, the following night, and the next day (Sunday, the 12th) were spent in unloading cars, in which work great difficulty was encountered on account of inconvenient sidings and of a heavy rain, which set in about the time of my arrival and continued incessantly until Sunday noon. Despite this rain, however, the work was continued without any rest on the part of men or officers for twenty-four hours, it being impossible to obtain a relay of laborers, so stringent were the local quarantine restrictions. Steward S. W. Richardson reported for duty Saturday night, September 11, and assisted me in preparing the specifications for lumber and other building materials required for the erection of the dining rooms, kitchen, etc. Surgeon Murray had made arrangements with Supt. Charles Marshal to provide lumber and other building materials, but upon opening telegraphic communication with Superintendent Marshal I found that he could not carry out his agreement, and therefore had to improvise measures. A special train had been chartered by Surg. R. D. Murray for bringing the refugees to and removing them from the camp, this train running from Bay St. Louis on the west to Scranton on the east when needed. This train was on hand Sunday, the 12th, and deeming the necessity to be sufficient to justify this irregularity, I took the engine from this train, and going to Scranton, 10 miles east of Fontainebleau, I found some 20 flat cars on a siding, which cars I appropriated to our use, after notifying Superintendent Marshal. This train was then taken to the Scranton Mills, and such lumber as they had already sawed which was suitable for use was loaded on the cars (employing all the available men in Scranton for the purpose), and taken immediately to Fontainebleau. I had meantime ordered builders' hardware from Mobile by wire. A corps of about 40 carpenters was finally obtained on Tuesday morning, the 14th, from Ocean Springs, and these, being placed under sanitary restrictions, were immediately put to work upon the erection of the necessary buildings, as follows: Four dining rooms, 25 by 90; 1 kitchen, 25 by 40; quartermaster's house, 12 by 15; guardhouse, 12 by 15; disinfecting house, 25 by 50; 75 feet of railroad platform, connecting disinfecting house with railroad; 2 small buildings, 12 by 15, for hospital purposes; about 100 tent floors, 12 by 14; about 100 frames for 12 by 14 tents.

By gradual accretion of laborers and carpenters wherever they could be found, and taking good, bad, and indifferent, the force of workmen was increased to such an extent as to allow of the full completion of the camp on September 20. At that time there were 300 tents in place, all with board floors and framework, and the camp was ready to accommodate 1,200 people, including employees, without the least degree of crowding. It was intended that the camp should be able to care for

1,000 persons. In order to prevent any possible disagreeable contingencies, matters were so arranged in the four large dining rooms, which were at the disposal of the officer in charge after the first ten days, that white and colored guests and employees were provided for in separate dining rooms.

The work of the cooks was much facilitated by the putting up of a large range, which, by extraordinary efficiency on the part of the superintendent of the Louisville and Nashville Railroad, was placed at Fontainebleau from Cincinnati within forty-eight hours of the time at which it was ordered by telegram. Guests were received on the 14th, and from then forward at the rate of about 30 per day.

The official personnel of the camp was as follows: P. A. Surg. J. H. White, Acting Asst. Surg. M. T. Gaines, Acting Asst. Surg. H. Shannon, Acting Asst. Surg. R. M. Geddings, Hospital Stewards Cragg, Goodman, and Richardson, Quartermaster Sceals, Commissary Allen, Clerks Pabst, Jackson, and Pleasants, Disinfector Halstead, guards, cooks, waiters, roustabouts, scavengers.

Acting Assistant Surgeon Gaines was assigned to the command of the yellow-fever hospital and the intermediate camp, being immune to yellow fever; Acting Assistant Surgeons Shannon and Geddings were assigned to the morning and evening inspection of the personnel of the camp (guests and employees); Steward Richardson was placed in control of the quartermaster and commissary work, and all attendants, except those assigned to Steward Goodman as chief disinfector, were ordered to report to Steward Richardson. Because of the fact that yellow fever became epidemic in the towns and villages on all sides of the camp, communities at a distance, not knowing that the camp itself was entirely free from suspicion, declined to accept the pratique of the officer in charge, and thus materially interfered with the usefulness of the camp. It should be borne in mind that no camp ever established for the depopulation of yellow-fever infected towns has ever been put to the severe test to which Camp Fontainebleau was subjected. The towns which were partially depopulated through this camp were more fully and more generally infected than any other towns or cities in the United States which have ever come within my knowledge at any time. Consequently it was the rule rather than the exception to find a case of yellow fever in each group arriving at the camp from any one of these towns within the first six hours after their arrival. So common were these developments that they became a source of grave apprehension to the officer in command and necessitated more than the double daily inspection ordinarily accorded to the personnel of such a camp. With but one exception, these cases developed within four days of their entry into camp, thus clearly showing their extraneous origin. The vast majority of them developed within the first twenty-four hours, the one case showing a longer period of incubation, namely, seven and three-quarter days, was that of a noncommissioned officer of the camp, who had opportunity to go outside the bounds of the camp, and while I believe the man to be honest, it is impossible to draw scientific deductions on belief alone, and it is a positive fact that the camp was the safest place from a sanitary standpoint on the coast of Mississippi. The custom established at this camp and subsequently perfected at Camp Hutton was to provide an intermediate camp, with hospital accommodations, between the camp proper and the yellow-fever hospital, this being for the purpose of keeping suspects under observation without either exposing them to positive yellow fever or the clean camp to them. In practice as well as in theory this was a success. The water supply of the camp was of necessity derived from driven wells and consequently could not be, in the nature of things, entirely above suspicion, but it was reasonably good, as was attested by the general good health of the occupants of the camp. The sinks were dug at a distance of 200 feet outside the lines of the tents and just inside the outer-guard line. They were deodorized as far as possible by the plentiful use of lime and copperas twice daily. The camp was provisioned from Mobile, care being taken to destroy packing materials by fire upon the arrival of supplies, Mobile itself being under suspicion, and that suspicion subsequently proven to be just. The disinfection of the effects of incoming guests was done by means of formaldehyd gas, six hours' exposure, or,

where there was no necessity for hurry, twelve hours. In some few instances sulphur dioxide was used in cases where this gas would not damage the materials to be disinfected. One in a thousand solution of bichloride of mercury was also used in similar cases. Whenever a case of yellow fever was discovered and removed to the hospital, and there were 20 such, the total contents of the tent occupied by the patient was also removed to the hospital, the tent itself was saturated with bichloride of mercury solution, both sides of the flooring wetted therewith, and the ground beneath the flooring either wetted with bichloride solution or exposed to the midday sun. These measures were continued up to the night of October 11, when, by order of the Surgeon-General, I transferred the command of the camp and the care of its 211 guests to P. A. Surg. J. O. Cobb, and reported to Surgeon Carter at New Orleans. The total number of guests admitted to Camp Fontainebleau was 1,174.

Report of Establishment and Management of Camp Hutton, a Detention Camp at Avondale, La.

By P. A. Surg. J. H. White.

In obedience to Bureau telegram received at Fontainebleau, Miss., midnight October 11, 1887, I reported to Surg. H. R. Carter, medical officer in charge of epidemic measures, at 8 a. m. October 12, at the St. Charles Hotel in New Orleans, and was instructed by him to immediately relieve Passed Assistant Surgeon Geddings, who had begun the previous day the clearing of the ground for the installation of a detention camp at Avondale, La., on the Southern Pacific Railroad, some 17 miles west of the city of New Orleans. When I reached Avondale, on the morning of the 11th, I found the ground cleared over the rather restricted space available for camp purposes and one dining room and kitchen half completed, and a clearing made a half mile away, in the thick woods, for the site of the hospital. Another clearing was subsequently made some 300 yards nearer to the detention camp, as a site for the intermediate camp hospital. More laborers were available here than in Mississippi, and consequently the work could be pushed with more vigor and rapidity, the result being that on the morning of October 14, three days after the first ground was broken for this camp, both the dining rooms, 90 by 25; a kitchen, 40 by 25; an executive building and storehouse, 40 by 25, were completed; the steam cooking apparatus brought from Fontainebleau set up and in working order, and some 50 tents for guests, in addition to those for guards and employees, were erected, the number of tents subsequently reaching 225. An immigrant sleeping car was provided as temporary quarters for the officers of the camp, a refrigerator car as a storehouse for meats, an ordinary box car as a guardhouse, and three refrigerator cars as formaldehyde disinfecting chambers. The hospital, consisting of 5 detached buildings, 12 tents, and the intermediate camp of 12 other tents, had been fully established.

The labor involved in the establishment of this camp was stupendous, because of the impossibility of providing additional side tracks for handling cars at Avondale station, the topography of the place forbidding it. Nearly all of the supplies had to be carried by men for considerable distances.

The steam cooking outfit, consisting of a 60-gallon soup kettle, 40-gallon coffee boiler, and an upright 12-horsepower steam boiler, was brought from Fontainebleau camp, which was being at that time (October 13) rapidly brought to a conclusion. That camp also supplied about 150 tents with frames and floors, and the beds and bedding for 4 men to each tent, as well as tinware, camp stools, etc. A fine large range from Fontainebleau was also delivered at Camp Hutton, but too late to be of practical use there. Over half of the quartermaster's supplies at Camp Hutton, in fact, were from Camp Fontainebleau, the remainder being purchased in New Orleans and Memphis.

Each guest was provided with a good substantial spring cot, mattress of excelsior or moss, 2 sheets, 1 pillow and 1 pillowcase, 2 blankets, 1 towel, and 1 mosquito net. Four persons were assigned to a tent, and each tent provided with 4 camp stools, 1 tin basin, 1 galvanized-iron bucket, and 1 tin dipper. Upon departure, each man was required to present his quartermaster's supplies to the quartermaster before receiving his personal pratique. All bed linen, towels, etc., were then turned over to the laundresses by the quartermaster, and when returned either packed or reissued

Guests were received at the rate of 50 per day beginning on the 13th, and the number gradually increased until on the 20th 101 were admitted to camp, the total admissions summing up 1,007, and the largest number in camp at anyone time being in round numbers 700.

The personnel of the camp was as follows: P. A. Surg. J. H. White, in command; acting assistant surgeons, M. T. Gaines, Joseph Conn, W. W. Calhoun, and M. W. Reynold; hospital stewards, F. H. Goodman and S. W. Richardson; 2 entry clerks and census takers, Messrs. Pabst and Jackson; 2 disinfectors; 1 quartermaster, Mr. Pleasants; 1 commissary, Mr. Massicot; 2 officers of the guard, a day and a night captain; 40 members of the guard; 25 to 30 cooks, waiters, and outdoor men.

One acting assistant surgeon was detailed at the yellow-fever hospital, and, being an immune, the officer in question, Dr. W. W. Calhoun, was also given charge of the cases simply sick from diseases simulating yellow fever.

Two acting assistant surgeons were detailed for the morning and evening inspection of all the personnel of the camp, and the fourth was placed in charge of car disinfection, something more than 1,300 cars being disinfected under his direction. A portion of the time there were only three acting assistants, as Dr. Gaines only arrived about November 1.

Hospital Steward Goodman was detailed as chief disinfector, with two assistants.

Hospital Steward Richardson had supervision of the quartermaster, the commissary, and the entry clerks, and the policing of the grounds, all employees other than Steward Goodman's disinfectors being ordered to report to Steward Richardson.

All junior medical officers being of equal rank, all were ordered to report direct to the officer in command.

The commanding officer assigned himself the duty of making one daily round of the whole camp in all of its ramifications, and a general inspection thereof, made at irregular hours, with the intent that he should see it at its worst and not on dress parade. A daily visit was made to the hospital camp. An hour was set for hearing and answering complaints. Actg. Asst. Surg. J. T. Scott, stationed in New Orleans, had been instructed to inspect all persons in New Orleans leaving for the camp before giving them a permit to enter, and this precaution prevented several cases of yellow fever from being admitted to camp. This camp received men only, and these men were almost without exception mechanics and laborers belonging to the sugar plantations of the southern Louisiana parishes. While they were in the main a very good class of men, some of them were of a disorderly character, and it became necessary in the interest of good order and safety to remove from each guest, upon admission, all weapons and all liquors. The routine of admission was as follows:

Each man was met by the guard at the railroad station, his permit taken, and he was escorted to the disinfecting cars, where his baggage was taken from him and immediately placed on the racks for proper disinfection. At the end of six hours he returned to the car, was given his disinfected clothing, which he then and there exchanged for that worn by himself, and turned over the worn clothing to the officer in charge for disinfection. He was then entered in the books and his detention considered to have begun from the time that his clothing was turned in for disinfection. A double daily inspection of all the personnel of the camp was made by the medical officers, and any person sick from any disease whatsoever was immediately removed from the camp, his tent disinfected, his mattress burned, and blankets, sheets, etc., soaked in bichloride solution. The tent floor was upturned and washed with

bichloride and the ground whereon the tent stood seared by fire. The result of the possibly excessive precautions herein stated was that only two clear cases of yellow fever developed among the 1,007 men passed through this camp, and that at no time did any shadow of suspicion rest on this camp, nor was any attempt made by any authority or by any private individual to discredit its pratique. After the first week, the camp, which occupied the site of an old sugar plantation, with the ground thrown up in wide and deep furrows, was made much more convenient and comfortable for all parties by the laying of rough plank walks, and a rude shanty was substituted for the immigrant car as officers' quarters. The sinks were a more difficult problem than at Fontainebleau, the space being rather circumscribed, the whole area not exceeding 10 acres, and the sinks necessarily brought nearer to the tent lines. Deodorants were freely used, and with reasonably good results. One advantage, from a health standpoint, at this camp was that the water (rain water) was brought in railroad tank cars from Algiers and might be said to be almost noncontaminable. The only available source of food supply was the infected city of New Orleans, and while at the time I much regretted the necessity of using New Orleans as a base of supplies, the fact that it was so used, and with absolutely no bad results, warrants the statement that there is much less danger of the transmission of the disease, in even this class of clean new merchandise than is ordinarily supposed.

Supplies, both quartermaster and commissary, were loaded on a special car placed at the Southern Pacific New Orleans depot for camp supplies, and this car hauled out to camp each morning at 9 o'clock with the train bringing refugees to camp. The entrance and exit to the camp was barred to all unauthorized persons by a guard of 40 men under the command of a captain, who was vested with the additional authority of a deputy sheriff of Jefferson Parish, La., and his subordinates in most instances had like authority. Only one attempt to break through the lines was ever made, and that was promptly anticipated and prevented by the guard on post at the point attempted.

A daily census, by name, was made of the total personnel of the camp, which enabled the commanding officer to know with certainty that no one was within the lines unauthorized and no one had escaped. The camp was closed on November 10, 1897, and the equipment packed and stored, and Eugene Massicot placed in charge as custodian on November 16.

Report of the Operations of the Service in Alabama during the Epidemic of Yellow Fever in 1897.

By P. A. Surg. A. H. Glennan.

Washington, D. C., *November 30, 1897.*

Sir: In obedience to your instructions of the 26th instant, I have the honor to submit the following report of the operations of the Service at Mobile, and other points in the State of Alabama during the late yellow-fever epidemic.

As directed in your telegram received at Tampa, Fla., September 9, to proceed to Grand Bay, Ala., near the Mississippi State line, and inspect all passenger trains, I proceeded at once to that point. Three miles west of Grand Bay a small detention camp had been established by the Mobile city and county authorities for the detention and observation of Mobile people returning from Ocean Springs and other Gulf-coast points in Mississippi.

The Louisville and Nashville Railroad located box cars on the north and south sides of this camp for housing train crews while waiting exchange and return to their starting points. In this way no liability was incurred in conveying infection into the city of Mobile by means of the train men. No cases of yellow fever developed at this camp. At the south railroad relay I discovered a fireman with fever, headache, etc., with a malarial history. I ordered him returned to Mississippi and the

diagnosis of malarial fever proved, as afterwards ascertained, to be correct. Up to this time no case of yellow fever has been declared in the city of Mobile.

On the afternoon of September 16 I received your telegraphic order to proceed to Mobile and place train inspectors upon all passenger trains leaving that city. On the following day this service was organized and in operation, the inspectors proceeding with their trains as far as the Georgia and Tennessee State lines. Slip lists, with the names, residences, and destinations of all passengers, were made on route, and if any suspicion arose their temperatures were taken or any pertinent facts ascertained were noted upon these slips, and they were handed to the next inspector.

This inspection service was continued until November 10, and accomplished excellent work, although accompanied by vicissitudes and obstructions caused by independent county and country town authorities both in Alabama and Mississippi, as the following extract from the Mobile Register will show:

"The train inspectors of the United States Marine-Hospital Service have been having a hard time of it in their runs out of this city, one of them being carried to Atlanta before he was allowed to get off the train, and another going clear through to Kentucky before he could set his foot on terra firma in order to take a train back home.

"The following order, which has been issued by the Florida board of health, will save them any trouble in that State:

"'[General order.]

"'EXECUTIVE OFFICE, STATE BOARD OF HEALTH,
"'*Pensacola, Fla., September 20, 1897.*

"'*To all State Train Sanitary Inspectors, Sanitary Patrolmen, and Guards:*

"'You are hereby instructed to honor and give full credence to certificates from medical officers of the United States Marine-Hospital Service in charge of quarantine detention camps established by the Federal Government beyond the limit of infection, which certificate must certify to the holder's ten-day detention at such camp of safety, the proper and thorough disinfection of his or her baggage and wearing apparel, and the fact that the said person and his or her baggage or clothing threaten no danger of yellow-fever infection. All certificates must bear the autograph of the holder as an additional means of identification. All certificates of nonresidents in infected or suspected districts must bear date, as heretofore ordered, of fifteen days' absence from such infected or suspected locality.

"'JOSEPH Y. PORTER, M. D.,
"'*State Health Officer of Florida.*'

"All the baggage on the Mobile and Ohio train which left yesterday afternoon and all the baggage on the Louisville and Nashville train which left the city at midnight last night was fumigated by the Marine-Hospital Service, and every piece of baggage bore a tag certifying to that fact. Of course there was a ready acquiescence in the fumigation till it was discovered by the passengers that the trunks, bandboxes, hand satchels, and lunch baskets had to be opened and all subjected to fumigation; then there was a grand and unanimous kick, many of the passengers vowing they were not going to comply with the regulations, while all the time they were doing their level best to find their keys and get their luggage open."

As an additional check I placed a medical inspector at the railroad depot, who required all passengers to present themselves for inspection and baggage disinfection before purchasing their tickets. Shipping tags were attached to all baggage after being marked "Disinfected," signed and stamped with the seal of the Marine-Hospital Service.

The disinfection was carried on in box cars, which were located near the station, upon my telegraphic request to Superintendent Marshall, at New Orleans. The disinfectants were furnished by the railroad companies interested. See Appendices "A" and "B" for form of "Declaration of health" and the report of Dr. Campbell,

as to the number of certificates issued and pieces of baggage and express matter fumigated.

This double-check system worked admirably in this instance; whether it is adaptable to larger cities I am not prepared to say. At any rate, this inspection and declaration of persons taken by an officer who is familiar with a city's localities and infected areas is of great value. In a few instances this certificate was refused to persons from an infected house or neighborhood who developed yellow fever a day or two afterwards, demonstrating the wisdom of the system. In only one case did a case of yellow fever develop in a refugee from Mobile, a young girl, Miss Carrie E. Fleming, who left for Atlanta with her father and several other Mobilians upon September 16, the day before this inspection service was instituted. She sickened upon the 20th, and the disease was officially declared upon the 23d by the board of health of Atlanta. No cases developed in the other members of the party.

FREIGHT DISINFECTION.

At this time the movement of freight at Mobile was practically at a standstill; empty box and flat cars accumulated along the lines of the roads, causing great loss to the various railroads, shipping interests, and commerce of the city. Recognizing these facts, and with your telegraphic approval, I joined with State Health Officer W. H. Sanders and the board of health in a request to Governor Johnston to modify his quarantine proclamation, so as to permit the movement of freight after disinfection and certification by the Marine-Hospital Service.

This was successfully instituted after failure of the local authorities to carry out the measure, as will be seen by the following copies of the correspondence and the report of freight disinfection (Appendix C).

There have been efforts made on the part of the Cotton Exchange and Acting Mayor Kirkbride to have the senseless quarantines that have been put on against this city modified, so that business can be done under certain restrictions, which will be ample to protect the health of any community; but all the efforts so far made have proved fruitless, as will be seen from the following telegrams, which have passed on the subject:

GROVE HILL, ALA., *September 21.*

Hon. E. B. KIRKBRIDE, *Mobile, Ala.:*

Clarke County has only quarantined as to passengers and baggage, hence no modification is needed. Our liberality will, I trust, meet with your hearty cooperation and assistance. Hand this to T. G. Bush, J. D. Clark, and Edward A. Neil.

JOHN M. WILSON, *Probate Judge.*

JACKSON, ALA., *September 20.*

E. B. KIRKBRIDE,

Acting Mayor, Mobile, Ala.:

Have authority to keep any steamboat from landing in Clarke County.

G. S. CHAPMAN, M. D.

GROVE HILL, ALA., *September 20.*

E. B. KIRKBRIDE, *Manager:*

Corporation of Jackson will prevent you landing there. County quarantine applies to passengers, baggage, and dry goods.

JOHN M. WILSON.

JACKSON, ALA., *September 20.*

E. B. KIRKBRIDE:

Boats must not land at Jackson.

S. T. WOODARD, *Mayor.*

GROVE HILL, ALA., *September 20.*

E. B. KIRKBRIDE, *Mobile, Ala.:*

Quarantine applies to passengers, baggage, dry goods only, but opposition so great that it amounts to prohibition itself. Will have no objection to your carrying supplies to McGrew's under strict quarantine.

JOHN M. WILSON, *Probate Judge.*

GROVE HILL, ALA., *September 20.*

E. B. KIRKBRIDE, *Mobile, Ala.:*

Under petitions just filed no boats will be allowed to land in Clarke County.

JOHN M. WILSON.

DEMOPOLIS, ALA., *September 20.*

E. B. KIRKBRIDE, *Mobile:*

We will not allow boats to stop in Marengo County. Advise captains. Wire answer.

J. R. GOODLOE, *County Health Officer.*

NEW YORK, *September 20.*

B. KAHN, *President, Mobile, Ala.:*

Most export cotton moved to Mobile was loaded before quarantine and is time cotton. Am doing my best to arrange movement of local cotton, which depends chiefly on bringing cars out of Mobile under quarantine rules. General freight agent will keep you advised.

T. G. BUSH.

SELMA, ALA., *September 20, 1897.*

B. KAHN, *President Cotton Exchange, Mobile, Ala.:*

Compress cotton for Mobile contracted for and loaded before quarantine established. We can not get these cars, but had to forward cotton or incur serious loss. We have no other cars which we can send factors' cotton to Mobile, and are suffering now for empties to load our merchandise for local stations. Will endeavor to arrange to handle factors' cotton to Mobile by transferring south of Jackson in a few days.

E. A. NEIL.

CAMDEN, ALA., *September 21.*

B. KAHN, *President Cotton Exchange, Mobile, Ala.:*

Board of health will not consent for boat direct from Mobile to land in Wilcox County.

J. T. BECK, *Judge of Probate.*

MOBILE AND OHIO RAILROAD COMPANY,
OFFICE OF COMMERCIAL AGENT,
Mobile, September 20, 1897.

The Mobile and Ohio Railroad will transact all business as usual wherein it is permitted to do so by the various quarantine boards; that all information as to freight matters will be given by me as in the past; that our export business through this point to European points is not and will not be affected; that in the last few days large lots of cotton have been booked from Selma and various Alabama and Mississippi stations for Liverpool for steamers sailing from here in October and November. At present our outbound business to points in the South has been demoralized, but that freight business through Cairo, St. Louis, Louisville, and Cincinnati is still being handled.

Yours, truly,

D. W. BUHL, *Commercial Agent.*

MOBILE, *September 21, 1897.*

Governor JOSEPH P. JOHNSTON, *Montgomery, Ala.:*

The Mobile County board of health, with the approval of Passed Assistant Surgeon Glennan, of the Marine-Hospital Service, has submitted to the State health officer and State board of health, for their approval, a schedule of regulations governing the shipments from Mobile under the interstate quarantine restrictions of the United States. We ask of you to give this matter your attention and approval.

GEORGE A. KETCHUM,
President Board of Health.
RHETT GOODE,
Health Officer.

The following correspondence will explain itself:

MOBILE, *September 21, 1897.*

Dr. W. H. SANDERS, *State Health Officer, Whistler, Ala.:*

The Mobile County board of health, at their meeting held to-day, on a request from the chamber of commerce to adopt regulations to govern shipments under quarantine restrictions, have adopted a schedule which is in accordance with the rules and regulations prescribed by the United States Government, and the full text of which is as follows:

REGULATIONS GOVERNING SHIPMENTS UNDER QUARANTINE RESTRICTIONS.

In response to the request of the joint meeting of the representatives of the industrial, mercantile, health, and transportation interests of Mobile, held September 21, 1897, we beg to advise that merchandise and commodities may be safely handled and transported from Mobile in accordance with the regulations as mentioned below, which are in accord with the State and interstate quarantine regulations adopted by the United States Government, and which are essentially the same as those required for similar articles of merchandise before entry into the United States from places infected with yellow fever, such as Cuba and Rio Janiero:

Class No. 1.—All new and dry material unpacked, such as lumber, machinery, brick, bar and sheet iron, tin, steel, agricultural implements, iron ties, staves, saddlery, wagons, new furniture, new trunks, hardware without packing, lime, etc., being incapable of conveying infection, require no disinfection.

Class No. 2.—All goods in original wooden or metal packages, not broken in Mobile, do not require disinfection except outside of container.

Class No. 3.—Goods packed in textile material, not broken in Mobile, and kept perfectly dry, do not require disinfection except the container.

Class No. 4.—Fruits, sound, and taken directly from the vessel and transferred immediately to the cars for shipment require no disinfection.

Class Nos. 2, 3, 4.—The outside containers must be submitted to disinfection.

Articles not in these classes, if they have been exposed to infection, will be disinfected before they are shipped. The efficiency of said disinfection shall be certified to by the proper health authorities.

All certificates and disinfection are subject to inspection and approval by authorized agents who may be sent by the various health authorities.

GEORGE A. KETCHUM, M. D.,
President Mobile County Board of Health.
RHETT GOODE, M. D.,
Health Officer Mobile County Board of Health.
A. H. GLENNAN, M. D.,
Passed Assistant Surgeon, M. H. S.

We urge this for adoption by the State board of health. Will you act on this matter at once? This action is indorsed by Dr. A. H. Glennan, representing the United States Marine-Hospital Service. Answer soon.

RHETT GOODE, M. D., *Health Officer.*

OFFICE OF THE BOARD OF HEALTH,
Mobile, Ala., September 24, 1897.

DEAR SIR: At a meeting of the Mobile County board of health, held this day, it was unanimously adopted that the State board of health be requested to adopt a schedule of regulations regarding shipments from this city, to be in accordance with the interstate quarantine regulations of the United States Government. This meets with the approval of Passed Assistant Surgeon Glennan, of the Marine-Hospital Service, who is now in this city.

We have wired the full text of the regulations to the State health officer. These regulations show how these shipments can be made, and what disinfection is required. We have also requested the governor to modify his quarantine proclamation accordingly.

Respectfully, yours,

RHETT GOODE, M. D., *Health Officer.*

Mr. A. POPE ST. JOHN,
Secretary of the Chamber of Commerce, Mobile, Ala.

Quarantine proclamations.

A PROCLAMATION.

By the Governor:

Whereas yellow fever exists at Ocean Springs, Miss.; and

Whereas the State board of health recommends quarantine to the extent hereafter stated as necessary to the protection of the health of the people of Alabama: Now, therefore,

I, Joseph F. Johnston, governor of the State of Alabama, pursuant to the authority in me vested by "An act to regulate the practice of quarantine in Alabama," approved February 28, 1887, do hereby proclaim, declare, and establish the following quarantine measures against persons and things in the city of Ocean Springs, Miss., and other places infected with yellow fever, to wit: No person, baggage, goods, or merchandise of any kind from Ocean Springs, Miss., or other places infected with yellow fever shall be permitted to enter the limits of the State of Alabama, except on special through trains destined to points beyond this State. This quarantine shall be conducted through the State board of health, which is charged with the duty of enforcing such measures not inconsistent with the constitution of the State and the laws thereof, as it may deem necessary to that end.

In testimony whereof I have hereunto set my hand and caused the great seal of the State to be hereunto affixed at the capitol, at Montgomery, this the 8th day of September, A. D. 1897, and of the Independence of the United States the one hundred and twenty-second year.

JOSEPH F. JOHNSTON, *Governor.*

By the Governor:

J. K. JACKSON, *Secretary of State.*

MODIFICATION OF QUARANTINE.

GOVERNOR'S OFFICE,
Montgomery, Ala., September 25, 1897.

Passengers from points beyond Atlanta will be permitted to come into the State, if upon arrival at Atlanta, between sunrise and sunset, they are required to remain in the car, or are immediately transferred to another car and not permitted to remain in the station more than fifteen minutes, nor outside the car, but no passenger car from Atlanta will be permitted to enter the State.

We make the following recommendations as to freights:

The following goods may be shipped from infected places in cars that have been thoroughly disinfected, under supervision of the officials of the Marine-Hospital Service at these places, and certified by said officials:

Class No. 1.—New machinery, brick, bar and sheet iron, tin, steel, agricultural implements, iron ties, wagons, hardware without packing, lime, and cement.

Class No. 2.—All goods in original wooden or metal packages, not packed or broken in infected cities, shall be disinfected without breaking package.

Class No. 3.—Goods packed in textile material, not broken or packed in infected cities, and kept perfectly dry, shall be disinfected without breaking packing.

All meats, whether packed or unpacked, except in tin, are excluded.

Adopted by the committee of public health for the State this 25th day of September, 1897.

Present: Drs. Gaston, Seely, Baldwin, and the state health officer.

W. H. SANDERS, M. D., *State Health Officer.*

Approved, and the quarantine proclamation issued by me will be modified in accordance therewith.

[GREAT SEAL.] JOS. F. JOHNSTON.

By the Governor:

J. K. JACKSON, *Secretary of State.*

DISINFECTION OF THE MAILS.

In my personal opinion the danger of infection from ordinary mail matter is a minimum one, but on account of the popular fear and the possibly slight risk from this source, a suitable fumigating box was constructed in the city post-office by Col. John L. Rapier, the postmaster, sulphur fumes being at first used, and later formaldehyde gas. This was instituted about September 18, the post-office building and mail cases standing in an uninfected region of the city. Mail matter was absolutely refused in the northern part of the State of Alabama, especially by the cities of Selma and Montgomery, even after a redisinfection station was established at Hurricane Bayou, a relay station north of the city. Later on, when yellow fever developed in Flomaton and the cities mentioned, this second disinfection of the mail was transferred to Atlanta.

YELLOW FEVER IN WHISTLER, ALA.

This small town is situated upon the Mobile and Ohio Railroad, about 6 miles north of Mobile. Rumors of yellow fever at this place prevailed during the latter part of October, one of the two local physicians being sick.

With your approval I detailed Temporary Acting Asst. Surg. Henry Goldthwaite to make a careful inspection, attend the sick, disinfect houses, etc. His report (Appendix D) is attached, which is in compact form, and I commend it as showing the systematic disinfection of a small town, giving the names of the sick, number of the lot and block, to accompany a town-site map.

I made a personal inspection of Whistler with Health Officer Rhett Goode, of Mobile, and found that the disease prevailed mostly upon one side of the railroad, upon low-lying and marshy ground. With some inexpensive drainage and the planting of eucalypti trees this land could be made healthy for residence purposes.

MOUNT VERNON BARRACKS DETENTION CAMP.

The establishment of a detention camp for Mobile was considered early in your telegraphic instructions, and the proper location was to be at some point north of the city, and within the county of the same name. Locations upon the lines of the Louisville and Nashville and the Mobile and Ohio railroads were objectionable, on account of swamps and malaria along their lines. Mount Vernon Barracks was

mentioned to me by Steward Richardson, of this Service, early in September, as a desirable location. After consultation with City Health Officer Rhett Goode and State Health Officer Sanders, the consent of Governor Johnston was obtained to use the barracks for this purpose, it having been an old army post, but abandoned several years ago and turned over to the State for public purposes. It is said to be 365 feet above the sea level and one of the healthiest and prettiest locations in the State. It is situated on the line of the Mobile and Birmingham Railroad, 29.3 miles north of Mobile and about 2½ miles west of the Alabama River. The site of these barracks was selected by President Andrew Jackson in 1835 to be used as a military post, and is located on a high ridge surrounded by piny woods and plentifully supplied with chalybeate and diuretic springs.

It was used until recently as a military post by the United States Army, and is inclosed by a substantial brick wall which girts an area of about 17 acres.

The buildings, which are of solid masonry, consist of barracks and seven cottages for use of officers and their families, besides the usual outbuildings for servants, live stock, and bakery. These buildings are built in lines forming an octagon surrounding a campus of about 2 acres, which was formerly used as a parade ground. The post is well supplied with good roads and brick pavement. Each building is constructed for use of two families, separate and distinct, and is supplied with bath tubs, running water, and sanitary water closets.

The barracks of three stories gave ample room for storing 300 to 400 single cots, and is also supplied with all modern sanitary improvements. Some minor repairs were necessary in order to reap the full benefit of the property here, and also to provide for the better accommodation of the refugees.

Before opening the camp I endeavored, by means of the Mobile papers, to impress on the public the fact that the camp at Mount Vernon was going to be opened to serve the purpose, not of a refugee camp, but rather as a detention camp, to enable people going from an infected region to stop here a period of ten days and then to pass to noninfected points through which they, without such intermediate stoppage, would not have been allowed to go.

My first act at the barracks was to establish a fumigation and disinfection room. This was situated outside the walls, just by the gate leading into the grounds, where every piece of clothing or material of any kind which might convey infection was thoroughly fumigated before entering the grounds. Thus no clothing or woolen goods of any description, irrespective of whence it came, was allowed inside of the walls before undergoing a thorough and satisfactory fumigation.

My next step was to establish a hospital camp, which was situated about one-half mile outside the walls. This was divided into intermediate and hospital camps. With this there was no communication whatsoever. Any person showing the slightest symptom of any indisposition whatsoever was sent to the intermediate camp and placed under close observation and not discharged until after several days had elapsed since the last signs of any sickness. Before being allowed to reenter the barracks all wearing apparel and baggage were thoroughly disinfected without reference to the nature of the sickness.

After a patient had occupied a tent all bedding and every article used was thoroughly disinfected, and such as could be were dipped in an acid bichloride solution.

After each inhabitant moved out, the rooms used were thoroughly scrubbed; all pieces of paper, cloth, and such were burned, and all woodwork in the rooms thoroughly washed down with bichloride solution. Every one leaving the barracks was provided with a certificate of pratique (Appendix E), properly signed and stamped, and every piece of baggage was first thoroughly disinfected and fumigated at a branch fumigation room established just within the walls, and checked with a disinfection tag before departure. Thus every piece of baggage was disinfected and fumigated; first outside the walls before being allowed to enter, and second inside the inclosure before being allowed to go out.

The discipline of the camp was established as nearly militarily as possible, and

while at first the inclination was to evade the rules, the guests soon came to understand that they would be enforced. Bugle calls were sounded from sunrise to "taps," laying out the day's routine.

Two daily inspection calls were made, one at 9 a. m. and one at 4 p. m.; besides, when necessitated, moonlight and other calls were made.

While this camp could have been filled to its utmost capacity if refugees had been received and retained indefinitely until frost, its full success in point of numbers was marred by the senseless quarantine restrictions of county authorities in the northern part of the State. In some instances railroad trains were not even permitted to pass through at any rate of speed. The Selma board of health required twenty days' detention, "nothing less," before the admission of persons with "free pratique," but before the expiration of that time yellow fever was declared in that city. Even a barrel of carbolic acid was excluded because it was not disinfected, although required for that very purpose.

The following extracts from the Mobile Register show the state of affairs which existed, as well as the ignorance of what a detention camp consisted and its protective effect in gathering in tramps and foot walkers from the surrounding country, disinfecting their clothing, and placing them under surveillance:

STOPS ALL HER TRAINS.—THE MOBILE AND BIRMINGHAM SO HAMPERED BY QUARANTINE THAT SHE QUITS.

Ever since the first case of yellow fever was declared in this city the most quarantine-inflicted railroad entering this city has been the Mobile and Birmingham Railroad. Her officers, from the president down, have done all in their power to keep traffic open, at the same time taking every precaution short of absolute non-intercourse that modern science has evolved for the protection of a community against infection by another community. Her troubles have been frequent and almost continuous. No sooner had the running of the trains and the fumigation of the cars been arranged to suit one little hamlet on the line than another hamlet, not to be left out in the cold in the matter of dictatorial orders, issued her ultimatum. Then there had to be new arrangements made all round, and for about three or four weeks past the officers of the road have not been able to call their time or their souls their own. They have been overwhelmingly at the mercy of the quarantine fiend, and at last the quarantine has been piled on so thick that the road will cease to struggle after to-day, and no more perhaps till frost will the festive snort of the iron horse be heard through the panic-stricken woods of Wilcox, Clarke, and Dallas counties; but when the pangs of hunger begin to gnaw at the vitals of the board of health, and they ascertain that even the remote chance of a little "Yallah Jack" is preferable to slow starvation, perhaps they will relent in some small degree and once more allow traffic to resume her uninterrupted way.

The first official notice of the latest action of the frightened board of health of Selma came on Friday in the shape of the following telegram to Mr. Hungerford:

SELMA, *October 15, 1897*—12.55 p. m.

H. L. HUNGERFORD:

The following resolution was passed by the board of health to-day:

"*Resolved*, That trains on the Mobile and Birmingham Railroad operate between Thomasville and Selma, provided that trains from Mobile come no nearer to Thomasville than Whatley."

J. D. CLARKE.

Upon receipt of this action Mr. Clarke immediately wired from Selma the following telegram to Judge Beck, of Wilcox, and Judge Wilson, of Clarke County:

"Action of the Dallas County board to-day prevents our operating trains from Selma beyond Thomasville; also prevents our handling trains or cars from Mobile farther north than Whatley. This practically prevents all business on our line between points south of Thomasville. Are your people willing to allow us to operate

on the following plan: Trains from Selma to stop at Alberta and operate separate trains between Alberta and Mount Vernon, using fumigated and disinfected cars, not stopping at Wagar or any other point which may become infected in this way; all cotton and other products for Mobile from points north of Selma can be properly hauled; cars to be fumigated and disinfected under the Marine-Hospital Service regulations. Please answer as soon as possible."

The replies received were:

SUGGSVILLE, *October 16, 1897.*

We agree to have freight, express, and mail run in accordance with your proposition. Trust to your carrying your agreement.

J. M. COBB, *President.*

B. M. BARNES, *Health Officer, Clarke County.*

CAMDEN, *October 16, 1897.*

Can not consent for trains coming through infected districts to enter Wilcox County.

J. T. BECK, *Judge of Probate.*
R. H. KILPATRICK, M. D., *Health Officer.*

Then came the order to close up shop, as follows:

SELMA, *October 16, 1897.*

H. L. HUNGERFORD:

I am in receipt of a message from Mr. Bush; unless we can arrange to operate our engines without backing up will cease altogether.

J. D. CLARKE.

Of all the railroads running in or out of Mobile, none, perhaps, deserves more sympathy than the Mobile and Birmingham. They are having their troubles, which seem to be eternal. This road has been tied up so hard by the restrictions placed upon them by the Dallas County health authorities that not a single train has come through from Selma since Sunday a week ago. Dallas County will allow no engines, cars, freight, or anything to come into Selma that had been in Mobile, and no employee is allowed to come into the county who had been in Mobile within twenty days before the outbreak of fever. Trains are run from Selma to Jackson, but no freight has been handled south out of Selma since the quarantine went into effect. All cotton is tied up, but so far not a bale belonging to Mobile has gone to Selma, nor will any go there.

Acting on information from the Dallas County authorities in answer to a request by the Mobile and Birmingham, the latter has commenced work building a large platform at the south end of the Tombigbee River bridge, a mile this side of Jackson. All cotton from above Jackson will be unloaded there and will be reloaded by trains that will come that far north from Mobile and bring the cotton into this city. As soon as the cotton is put on the platform by the train from Selma that train will go north again. Then the Mobile train will back up to the platform and load.

All this will be done under the supervision of Dallas County officials, who will be paid for their services as quarantine officers by the Mobile and Birmingham road. Every precaution will be taken, but still Selma found something to kick on yesterday—the camp of detention at Mount Vernon—and they talked about backing out of their agreement, as the following correspondence between Surgeon Glennan, Master of Trains Hungerford, at this point, and General Agent Niel, in Selma, will show:

SELMA, *September 20.*

H. L. HUNGERFORD,

Trainmaster Mobile and Birmingham Railroad:

Soon as possible have the Surgeon in charge of camp of detention at Mount Vernon advise board of health at Selma exactly what their arrangements will be. These people fear establishment camp at Mount Vernon will be a menace to the safety of

Dallas County, believing that the camp brings the risk nearer to this point. I have tried to convince them the establishment of a camp there adds additional security, but some members of the board are inclined to withdraw permission for our operating our trains between Selma and Jackson if the camp is established at Mount Vernon. Think a full understanding of the Government's arrangement will cause them to change their minds.

E. A. NIEL,
General Freight and Passenger Agent.

The following reply was sent:

MOBILE, *September 20.*

DALLAS COUNTY BOARD OF HEALTH, *Selma, Ala.:*

The detention camp at Mount Vernon Barracks is being established for people in good health, who are first inspected and their baggage disinfected before being admitted to this camp. The United States Government will use every precaution, and is not known at any time to be the means of carrying danger to any section or people.

Dr. A. H. GLENNAN,
United States Marine-Hospital Service.

The people of Mount Vernon have no objection to this camp being established there.

H. A. HUNGERFORD.

It appears to be an effort on the part of the Selma authorities to so restrict the Mobile and Birmingham people that they will be compelled to transact all their business by way of Selma—or, in other words, profit by this city's misfortune.

It is expected that the matter will be amicably arranged to-day.

The camp equipage is packed, marked for easy identification, and stored in the barracks with the permission of Governor Johnston, where it is in readiness for any future emergency.

I am indebted for valuable professional aid to Temporary Actg. Asst. Surg. R.W. Geddings and Fleetwood Gruver at this camp while my attention was directed to multifarious duties in the different parts of the State; and also to Steward Frank H. Pack, in helping to organize the camp.

In conclusion, I wish to invite your attention to the fact that the system of placing guards to infected houses in Mobile, as well as simply affixing a yellow flag to the premises, undoubtedly restrained the spread of the disease in this city, even if this method proved of less value in other places.

In addition to this, every house was disinfected by Assistant City Health Officer Herman Mohr as early as possible.

The Mobile city and county board of health are worthy of praise for their steady and systematic labor in this late campaign of sanitary education, facing, as they did at times, some opposition to the methods instituted, but which at all times were rational and worthy of the approval of this Service as proper scientific procedures.

REPORT OF STEAMBOAT AND TRAIN INSPECTION SERVICE, MEMPHIS, TENN.

By P. A. Surg. GEORGE B. YOUNG.

UNITED STATES MARINE-HOSPITAL SERVICE,
Memphis, October 5, 1897.

SIR: I have the honor to transmit the following partial report of the operation of the service under my charge since September 16. This is not a complete report of the transactions, but is simply intended to inform the Bureau in a general way of what has been done.

Upon the receipt of your telegram, about 6 p. m. on the evening of September 16, directing the purchase of bedding, etc., I at once made the necessary arrangements.

It was necessary to secure the services of two mattress factories, as it was impossible to purchase the requisite number of mattresses of the kind desired in the city. These factories put all their hands at work by daylight the following morning, so that the mattresses were ready for delivery at 5 o'clock in the afternoon. I could not find any sheets of the desired size, and, as we could make a saving of about one-third by purchasing the single instead of the double sheets, I purchased the materials and put all the seamstresses in a large shirt factory to work on the sheets, turning out the four hundred in about six hours.

The cots had to be collected from all over town, but I arranged it so that only one bill would be rendered for them all. In order to make up the number we had to take some of a little better quality than was necessary; but, on the whole, the prices charged were very reasonable.

I secured from the Illinois Central Railroad Company a baggage car and a mail car, and, taking the steward and attendants from the hospital, loaded the goods as fast as delivered, so that the cars went forward attached to the mail train the evening of the 17th. Expecting the arrival of the tents that night, I arranged with the Illinois Central people to have an engine at the Iron Mountain junction to take the car upon the arrival of the train and transfer it to the Illinois Central yard, where the road had retained on duty a foreman and assistants to get out the hundred tents when forwarded, and transfer them to an Illinois Central car. We held the freight train and this force of men—or at least the road did without expense to the Service—from about midnight until 4 o'clock in the morning, but as the tents failed to arrive we had to let the train go forward without them. They were duly shipped, however, on the following night.

On September 17 I made arrangements to begin the inspection of boats from points below Memphis. As I wired you, I found it more convenient and very much cheaper to make the inspection just before the boat landed at the wharf boat than to do so below the city. I established on the river bank, at a point about 3½ miles below the levee, and just at the foot of the bluff on which the hospital stands, pending the arrival of the barges a post, consisting of two boatmen, whose duty it was to speak all boats coming up the river. If the boats reported all well, they were allowed to proceed to the levee and be inspected; if they had any sickness on board they were given orders to lie to while the boatman proceeded to the hospital and notified me by telephone, whereupon I could visit and inspect the boat, and decide on the nature of the sickness present.

This was supplemented in a few days by the establishment on two large barges of a camp, consisting of 4 tents equipped with cots, etc., placed at a point in the river about three-quarters of a mile distant from the bank at the entrance of the cut-off channel which goes around President's Island. The barges were out of the channel, but in 12 feet of water, so that it is possible for boats to come alongside and drop a stage upon the barge. The station for the boatmen was then shifted to the barge.

Subsequently, we began the inspection of boats from Cairo, as well as those from points below Memphis. There was some little friction at first, due to the inherent inability of those who follow the water for a livelihood to understand that they have to obey the orders of anyone except themselves, and some misunderstanding of the regulations, although the agent of each line was personally served with a copy and considerable pains taken to instruct the captains. This soon passed off, however, and the service has been and is now working very smoothly. The inspection of boats from Cairo was discontinued yesterday, October 4.

The inspection of trains was assumed in compliance with your telegram of September 19. I began the arrangements on Monday, the 20th, and had the service completely established by the evening of the 22d, covering seven lines of railroad, and operating some 1,800 miles of road in the States of Tennessee, Mississippi, and Alabama. I furnished each inspector with a metal badge and a general letter of instructions, of which a copy is inclosed, marked "Exhibit A." In addition, each inspector was furnished with a letter of special instructions covering his particular run. The inclosed Exhibit B represents a type of such special letters. As the

conditions on the different roads differed in accordance with the territory through which they ran and the connections which they made, there was necessarily considerable diversity in these special instructions; and from time to time since the establishment of the service the inspectors have been furnished with circulars informing them of the changes made in the State regulations.

Each inspector was furnished with transportation order over his particular line, and with a letter from the superintendent of his particular road directing agents and train crews to give him all the assistance in their power and to recognize him as being in complete charge of sanitary questions on the train. He was also furnished with a memorandum showing the points at which the train crews, express messengers, mail agents, and Pullman crews were changed. I also secured from the Pullman Company a general order entitling our inspectors to Pullman accommodations without charge. This was a great assistance, since, owing to the stringency of the local quarantine at many points, it was difficult for the men to find places to eat and sleep, and by using the Pullman they were enabled in such cases to get their meals and obtain some rest on their south-bound runs.

It is very difficult for anyone not on the ground to understand the difficulties occasioned by the multitude of local quarantines, with their diverse and frequently utterly absurd regulations. For instance, at Memphis Junction, a point on the Illinois Central road, 2 miles north of Grenada, where the line via Grand Junction separates from the line going to Memphis, there were no accommodations, and for the first forty-eight hours men on the main line service had no place to sleep at all. I visited this point and conferred with the local authorities, and made arrangements to place cots in an unused baggage car, and contracted with a family living near the junction to supply the inspectors with meals. But two days later the authorities refused permission for the inspectors to lay over, although permitting the train crews, from the trains on which the inspectors ran, to stop over five or six hours between trains. I have at last succeeded in getting this restriction removed, and in many other places the local conditions have gradually been ameliorated; but there still remain a good many difficulties to contend with. I am glad to report that the service has given very general satisfaction, and has led in many instances to the local authorities taking a more reasonable view of the situation.

I receive a report from each inspector at the end of his run, and in that way we are enabled, if the occasion arises, to trace passengers from point to point, and have several times been enabled to prevent refugees from infected places from evading the quarantine.

In compliance with your telegram of September 26 I visited Chattanooga. I arranged for service on the lines entering that point. There was at first a disposition on the part of some of the local authorities to resent what they considered to be an infringement on their prerogative. I therefore engaged the necessary inspectors, supplied them with badges and letters of instruction, of which the inclosed Exhibit C is a copy, and then wired you as to the situation and returned to Memphis. The local and county boards met the next day, and with only one dissenting vote—that of the mayor, who objected to the displacement by physicians of the police then employed as inspectors—decided to request the establishment of our service, and sent me a telegram and a formal letter to that effect. I therefore, after receiving your approval by wire, set the inspection to work and I understand that it is working satisfactorily. I expect to visit Chattanooga in a day or two and see for myself how matters are going.

I am glad to report that the State and local authorities in Mississippi and Tennessee seem to appreciate the value of the inspection service established in accordance with your orders.

Very respectfully,

G. B YOUNG,
Passed Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

EXHIBIT A.

General instructions to train inspectors.

UNITED STATES MARINE-HOSPITAL SERVICE,
Memphis, Tenn., September 23, 1897.

The following general instructions are for the information of the United States sanitary inspectors operating on trains between Mississippi, Tennessee, and Kentucky points:

(1) You will each receive in addition to these instructions a special letter of instructions covering the particular runs to which you may be assigned.

(2) You are directed to take care to familiarize yourselves thoroughly with these instructions.

(3) You will be employed at a compensation of $5 per day from date of employment, and your usual expenses will be allowed you. You will be furnished with transportation orders over the runs to which you may be assigned. In making disbursements on account of expenses, you will, wherever possible, take receipts, which receipts should show the date, object for which expenses are incurred, and amount. For small expenditures, such as car fare, etc., it is not necessary to take vouchers. You must understand, however, that these actual expenses are not to include expenditures of a purely personal nature, outside of board and lodging and similar necessities. Should it become necessary to telegraph, you will direct your message to me at Memphis, simply addressing them "Young, Marine Hospital." You will write at the foot of each message, "Official business, Government rates, collect," and sign your name, omitting initials.

(4) Passengers who are on the trains when you board them to return north will already have been examined by the inspector who has come up on the train from the south. You need not, therefore, critically examine said passengers, but you are directed, however, to go through the train from end to end and observe, without unnecessarily annoying or interfering with passengers, their condition as to health. On night trains it will not, however, be necessary to disturb passengers in the sleepers, further than to require the presentation of their tickets or passes; but you will under no circumstances permit the disembarkation of those passengers until you have seen them; and in all cases where your run ends before 7 o'clock a. m. you will turn over to your successor a memorandum of the number of people in the sleepers whom you have not personally seen. It should be understood, of course, that these passengers have already been seen by the inspector on the southern end of the inspection service. This duty is to be performed conscientiously and carefully, and a mere rapid and cursory glance as you pass through trains is not what is contemplated. Passengers who may board the trains while in your charge are to be carefully examined, their history as to recent movements and whereabouts investigated, and such papers or passes as they possess examined. If passengers are destined to points in Tennessee they will be required to present either a certificate signed by an officer of the United States Marine-Hospital Service that they are immune, or that they are from a noninfected locality, or that they have passed through the proper period of detention, under the supervision of the Service, or they must present certificates signed by their county or municipal health officers, the genuineness of whose signature must be properly certified to before some officer authorized to administer oaths. This last now only applies to Alabama and Louisiana. (This latter clause, however, does not apply to those whose points of origin are located south of the line of Jackson, amended by saying any point in Mississippi and east of Mobile.) Passengers coming from that State (Mississippi) will not be allowed to stop in Tennessee at all unless they have the marine-hospital certificate as provided for above. Passengers who are bound through for points north of the Tennessee-Kentucky line, and have tickets to such destination, can be passed without regard to their points of origin, unless the rules issued by the Tennessee State board of health prohibits this. Of this you will be advised as soon as the information can be obtained from the State board.

(5) You are to understand that it is your duty to enforce Mississippi regulations

in Mississippi and Tennessee regulations in Tennessee, in addition to the national regulations.

(6) You will stamp your acceptance on the face of the certificates of passengers destined to points in Tennessee. Pending receipt of stamp for this purpose you will sign your name legibly, appending to the signature "United States sanitary inspector."

(7) Should you encounter a case of yellow fever on the train, or a case of sickness of a suspicious nature, you will at once advise this office by wire, and the patient will be disembarked at a point to be indicated to you in special orders covering each particular run. You will accompany patient and will be required to remain with him until you have served your proper period of detention.

(8) I will endeavor to inform you what the Tennessee and Mississippi regulations are, as they may be changed from time to time. For the present, instructions already given to you in regard to Tennessee are sufficient. For Mississippi you will, until further orders, not permit the disembarkation of any passengers from the South at any point whatsoever unless they possess certificates signed by an officer of the Marine-Hospital Service, the State board of health of Mississippi having agreed to accept certificates of the Marine-Hospital Service.

(9) You will understand, however, that there are a number of localities over which the authority of the board of health is not at the present time complete, and that many of such communities refuse to accept passengers from anywhere. You will in all such cases permit the local authorities to decide. You are urged to use every effort to allay anxiety, induce local health officers to take a more reasonable view of the situation, and do everything possible to remove the present unnecessary interference with traffic.

EXHIBIT B.

Special instructions to train inspectors.

UNITED STATES MARINE-HOSPITAL SERVICE,
Memphis, Tenn., September 31, 1897.

Inspector Illinois Central Train No. 1:

You are hereby assigned to duty on Illinois Central train No. 1, leaving Memphis 7.45 p. m. daily. You will accompany said train to Grenada, Miss., and return to Memphis on No. 2, which leaves Grenada at 4.23 a. m. and arrives at Memphis 7.30 a. m.

You will critically inspect all passengers on this train and be governed in the approval of their passes by the instructions contained in general letter. The train crew on No. 2 originates at Ways Bluff. It will therefore be sufficient for you to see that they are well. You will, however, carefully examine the Pullman porter and conductor. If these have come through from New Orleans you will not permit them to leave the train at any point in Tennessee, no matter what may be the customs or regulations of the Pullman service, and will report the facts as to them to the local inspectors upon your arrival at Memphis.

Upon the completion of your run you will make a brief report in writing, giving date, your name, number of your train, and brief memorandum of any facts that may have occurred of interest. Inclose same in an envelope and send to my office.

EXHIBIT C.

General instructions train-inspection service, Chattanooga.

UNITED STATES MARINE-HOSPITAL SERVICE,
Chattanooga, Tenn., September 29, 1897.

The following general instructions are for the information of the United States sanitary inspectors operating on trains entering Chattanooga:

(1) You will receive in addition to these general instructions special instructions

covering the particular run to which you may be assigned. These latter will be given you by Dr. Hunt.

(2) You will be employed at a compensation of $5 per day from date of employment, and your actual expenses will be allowed you. You will be furnished with transportation orders over the roads to which you may be assigned. In making disbursements on account of expenses, you will, whenever possible, take receipts, which receipts should show the date, object for which expense was incurred, and amount. For small expenditures, such as car fare, etc., it is not necessary to take receipts. You must understand, however, that you are not to include expenditures of a purely personal nature outside of board and lodging, car fare, and similar necessities. Upon the completion of your service you will be furnished blanks upon which to make out your expense accounts, and said accounts will then have to be sworn to before a notary.

(3) Upon boarding trains for your return run, you will critically examine all passengers and inquire as to their destination, examining tickets and other evidence that may be presented by them in confirmation of their statement.

(4) Passengers will not be allowed to disembark at points in Alabama, Georgia, or Tennessee unless they present certificates from an officer of the United States Marine-Hospital Service certifying that they are immune, that they have not been exposed to infection, or that they have served out the proper period of detention in a camp under the control of the service, or from a county or municipal health officer at their point of embarkation. These certificates must certify that the bearer has not been exposed to infection by yellow fever within ten days last previous to the date of issuance, and the genuineness of the signatures must be certified to by some officer authorized to administer oaths—as a notary public, justice of the peace, clerk of the court, etc.

(5) Passengers holding such certificates can be permitted to disembark at any point in the States of Alabama, Georgia, and Tennessee. Should the State board of health of either of these States make any change in this regulation you will be promptly advised through Dr. Hunt.

(6) Passengers from infected points can not be permitted to disembark in Alabama. They can be permitted to disembark at any point in Tennessee east of the Tennessee river, but in all such cases you must take the names and addresses of such passengers and report them promptly to Dr. Hunt for transmission to the Tennessee State board of health. You will write or stamp your acceptance on the face of all certificates found to be in proper form, appending to the signature the words, "United States sanitary inspector."

(7) You are to understand that it is your duty to enforce Alabama regulations in Alabama, Georgia regulations in Georgia, and Tennessee regulations in Tennessee, but this refers to the regulations promulgated by State boards only, and not to regulations of counties and municipalities.

(8) Should you encounter a case of yellow fever on the train, or a case of sickness of suspicious nature, you will at once advise me by wire, at Memphis, addressing your message, "Young, Memphis," and after your signature writing the words, "Official business, Government rates, collect." The patient will be disembarked at some point, the location of which is not yet determined, but of which you will be informed in due course by Dr. Hunt. You will accompany patient, and will be required to remain with him until you have served your proper period of detention, your salary being continued during said period.

(9) You will understand that there are a number of localities over which the authority of the boards of health is not complete at the present time, and that many of such communities refuse to accept passengers from anywhere. In all such cases you will permit the local authorities to decide, but must make it plain to them that they are acting in violation of the orders of their own State board. You are urged to use every effort to allay anxiety, induce local health officers to take a more

reasonable view of the situation, and to do everything possible to remove the present unnecessary interference with traffic.

G. B. YOUNG,
Passed Assistant Surgeon, Marine-Hospital Service.

EXHIBIT.—*Report of an inspector.*

OCTOBER 18, 1897.

SIR: In regard to conditions of quarantine in the towns on my route, viz, Memphis to Guthrie, Ky., when I made first trip, as compared to present conditions, I have to state that the local quarantines at Paris, Milan, Humboldt, and Brownsville were very rigid. At all the above-named places they required the car windows closed and doors locked and only allowed passengers to disembark as they produced health certificates.

After my first trip Paris withdrew her regulations and does not even send an officer to meet the trains. Milan, Humboldt, and Brownsville still have officers at the station, but do not require car doors and windows closed, and allow passengers to disembark on my assurance. The Memphis officers on my first trip made a tour of inspection, but since that time have been withdrawn. Most passengers have proper health certificates and those who do not are easily accounted for.

Respectfully submitted.

W. S. EMBREY, M. D.,
Acting U. S. Sanitary Inspector.

Dr. G. B. YOUNG,
Passed Assistant Surgeon, Marine-Hospital Service.

REPORT OF MEASURES TAKEN AT ATLANTA, GA., IN CONNECTION WITH THE YELLOW-FEVER EPIDEMIC OF 1897, UNDER THE DIRECTION OF THE SURGEON-GENERAL.

By Surg. HENRY W. SAWTELLE.

By Bureau letter of September 15, 1897, I was assigned to special duty at Atlanta to supervise the work deemed necessary at that point to prevent the introduction and spread of yellow fever from its original limits in the South to the States beyond. I arrived at my station September 16, and in the evening held a conference with the mayor, the secretary and several members of the board of health, together with the principal officials of the great trunk lines operating trains in and out of the State of Georgia. At this conference I ascertained that, through the press, Atlanta had invited the refugees from the stricken South to the city without restrictions, by reason of the views of the president of the board of health, who assured the people that there need be no fear of danger, as yellow fever could not spread in the city, though his views were not in accord with those of the other physicians of the board. A large number of persons had already arrived from the Gulf coast towns, and there appeared to be a manifest feeling of uneasiness among the citizens, many of whom considered that the action of the authorities in respect to the admission of the refugees as guests, without regulations or provision for the care or detention of suspicious cases at some place remote from the city limits, jeopardized the health of the community. Atlanta had therefore become practically a distributing point for those bound for the North and East. The sanitary condition of the city was not altogether up to the standard, and the mayor issued orders for a general cleaning, including the flushing of all sewers nightly. The suggestions offered by myself in connection with the sanitary work, made in accordance with the request of the city authorities, were promptly acted upon and carried out. An inspection of incoming

trains was inaugurated, the work being performed by local physicians, who were directed by the secretary of the board of health to report to me daily for instructions. Any person found on board from an infected place, if apparently ill with symptoms denoting a rise of temperature, was considered to be suspicious and was at once sent to the temporary detention camp, located outside of the city, together with all baggage. The railway officials, at my request, declined to sell tickets to those hailing from the infected districts and bound to points south of Atlanta, and also volunteered to cooperate in all matters deemed necessary and calculated to prevent the spread of infection. Several towns soon quarantined against Atlanta because of her action in receiving the refugees, and health certificates were issued by the local officials to all persons desiring to leave after a residence in Atlanta for either ten, fifteen, twenty, or thirty days, varying according to the requirements of the different local authorities who received them. As time passed the panicky feeling before mentioned disappeared and confidence was again restored.

The following circular letter was issued regarding the disinfection of baggage:

"*To all railroad officials operating trains in and out of Atlanta.*

"GENTLEMEN: As a precautionary measure, it is proposed to commence the fumigation of all baggage arriving on trains from infected points to-morrow with formaldehyd gas.

"Dr. C. M. Drake will superintend this work. A certificate will be attached to each package or trunk fumigated, duly certified by the undersigned. Arrangements have been effected to fumigate such baggage without detention of passengers bound to other points, by placing seals on unlocked trunks and valises and attaching keys under seal belonging thereto.

"All baggage of through passengers will be forwarded to destination as soon as possible after fumigation.

"Your cooperation in this important work is solicited during the present exigency, in the interest of the public health."

A room was secured in which air-tight compartments were constructed for the reception and disinfection of packages and baggage not disinfected at points of departure from infected localities, and the work was commenced September 23.

The outfit for the detention camp at Mount Vernon, Ala., was purchased in Atlanta by authority of a telegram from the Surgeon-General, and was forwarded by a special train September 28.

The following refugees were stricken with yellow fever, viz:

Miss C. F., aged 14 years, a refugee from Mobile, arrived September 16 with her parents, and was taken sick September 20 at 119 Auburn avenue, and on the 23d the case was diagnosed yellow fever by Dr. J. C. Olmsted, the physician in attendance. The patient recovered, after an illness of fifteen days, though convalescence was delayed by an intercurrent attack of malaria, which yielded to quinine.

On October 24, H. H. C., aged 35 years, a locomotive fireman running on the Atlanta and West Point Railroad between Montgomery, Ala., and West Point, Ga., was reported sick at 179 Hayne street, and upon examination the case was pronounced yellow fever by Drs. Stockard and Kennedy. This man was a refugee from Montgomery, and had been in Atlanta about one week. He was discharged recovered November 3, 1897. The houses occupied by these fever cases were quarantined until the patients recovered, after which the houses, clothing, and bedding were thoroughly disinfected by formaldehyd gas.

Several suspicious cases were found on incoming trains and in the city, all of which were removed to the detention camp; but only one, R. A. H., aged 25 years, a refugee from Montgomery, proved to be suffering from yellow fever. This man was sent to the camp October 24, and was considered a mild case. He was discharged November 1. No unusual symptoms were observed in either of the patients. The disease was limited to three refugees, mainly due, probably, to the lateness of the season and the precautionary measures taken. The claim having been made by some that it is impossible for yellow fever to spread in the city, it will be of interest in

this connection to note the climatological data of Atlanta, as shown in the appended tables, which form a part of this report. These tables were kindly prepared for me from the official records of the local forecast official of the Weather Bureau,[1] and show (1) that the normal rainfall for nineteen years from 1879 for the month of September was 3.58 inches and for October 2.18 inches, while for September, 1897, it was 0.14 of an inch, a deficiency of 3.44 inches, and for October 1.80 inches, a deficiency of 0.38 of an inch, and (2) the normal humidity for the same period was for September 72 per cent and for October 69 per cent, while for September, 1897, it was 64 per cent and for October 68 per cent, thus showing that the mean relative humidity for September, 1897, was 8 per cent below the normal and the mean for October, 1897, was 1 per cent below the normal.

The normal temperature for the past nineteen years for the months of September and October was 72° and 62°, respectively, while the temperature for September, 1897, was 74°, or 2° above the normal, and for October, 1897, 66°, or 4° above the normal. Thus it will be observed that the local conditions were particularly favorable to meet the yellow-fever exigency of 1897. It will be further observed that the atmospheric conditions vary considerably from year to year. A certain temperature, humidity, and insanitary conditions appear to be the important factors necessary in connection with the development and spread of yellow fever.

The geographical position of Atlanta, with an elevation of 1,100 feet above the sea level, naturally places her among the most healthful cities on the continent, and though she has heretofore escaped a visitation, yet, with the rapid growth of the city and with the laxity in the enforcement of improved methods of sanitation too often observed, it is possible and indeed even probable that under certain atmospheric conditions as to temperature and humidity, as shown in the accompanying tables, the disease may sometime gain a foothold in the "Gate City" of the South. Therefore, modern sanitary regulations, constantly enforced directly under medical supervision, are the measures best calculated to afford protection for the emergencies liable to arise in the future.

Besides the influx of refugees from New Orleans, Mobile, Montgomery, and Selma by the regular trains, several specials brought in large numbers, and increased vigilance on the part of train inspectors was enjoined to prevent suspects from entering the city, and additional inspectors were required for several days.

The railroads were greatly crippled, and travel and freight traffic was almost entirely suspended on many of the roads, and some of the trains were altogether tied up for a month and over on account of the various conflicting regulations enforced by State, county, and municipal officials. In some instances the "shotgun inspector" appeared as an independent guardian to stop trains at State and county lines.

To keep the public advised of the frequent changes of regulations, similar notices to the following might have been seen in the daily papers of Atlanta during the threatened visitation:

NOTICE TO THE TRAVELING PUBLIC—MODIFICATION OF ALABAMA STATE QUARANTINE LAW.

Effective this date, passengers from Atlanta will be permitted to enter the State of Alabama, provided they hold proper health certificate to the effect that they have not been in any infected district within the past twenty (20) days, Atlanta not being considered infected. Personal baggage, valises, trunks, etc., must bear certificate of disinfection, signed by an officer of the Marine-Hospital Service.

GEO. C. SMITH,
President and General Manager.
JOHN A. GEE,
General Passenger Agent
Atlanta and West Point Railroad and the Western Railway of Alabama.

[1] Mr. J. B. Marbury.

Early in October a disinfection station was established at Hurricane Bayou, Alabama, 17 miles north of Mobile, upon request of the local health officials, and Acting Asst. Surg. J. M. Cunningham was detached from Atlanta on the 8th instant for duty in fumigating the large amount of mail from the south that had accumulated there, as the local authorities stopped the United States postal cars at that point and declined to allow them to proceed to Montgomery until the mail was disinfected.

The station was located in a swamp, and there being no adequate accommodations, the work could not be successfully carried on, and besides the so-called "swamp fever" prevailed extensively. Indeed 9 out of the 11 persons constantly employed thereat suffered with remittent fever of a severe type, one man, a local quarantine guard, dying of the disease. The station was in operation fourteen days when, on account of the continued sickness of the employees, including Dr. Cunningham, who was in charge, the fumigating car was moved to Atlanta October 22, by order of the Surgeon-General, not only to hasten the delivery of mail, but to protect the health of the employees.

The inspection of trains was discontinued November 5, but the disinfection of baggage and mail was continued up to November 16, to meet the requirements of the Alabama quarantine in connection with the baggage of returning refugees.

Recapitulation of baggage and mail disinfected.

Trunks	1,496
Valises	1,268
Miscellaneous packages	478
Total	3,242
Number of mail cars disinfected	46
Edition of Atlanta Constitution	17
Edition of Atlanta Journal	15

In concluding this report I am pleased to commend Drs. Hal Moncrief, J. P. Kennedy, Clarence Johnson, and C. P. Ward, the inspectors of incoming trains, for efficient service; also Acting Asst. Surgs. C. M. Drake and J. M. Cunningham for valuable work in connection with the disinfection of baggage and mail.

Report of Cases of Yellow Fever Occurring at Cairo, Ill.

By Surg. P. C. Kalloch.

Office of Medical Officer in Command, M. H. S.,
Cairo,, Ill., November 11, 1897.

Sir: I have the honor to inclose the clinical histories of cases of yellow fever which came under my care and supervision at this port during the epidemic now closing.

Reynolds and Ryan, admitted to hospital on September 14 and 15, respectively, presented symptoms sufficiently diagnostic of yellow fever to warrant a report of them to the Surgeon-General on the evening of September 16.

The president and secretary of the State board of health were invited to see the cases and concurred in the opinion that the cases were at least suspicious.

On the evening of the 17th the mayor, state attorney, sheriff, the secretary of the State board of health, Drs. Neely, Doane, and Passed Assistant Surgeon Kalloch met at the Halliday House, and after consultation the secretary of the State board of health ordered a guard around the Marine Hospital to prevent the escape of the patients and attendants from the hospital until such time as was deemed safe to the community. This was, therefore, placed at 11 a. m. of the 18th. Dr. Guitéras arrived at noon on the 19th and confirmed the diagnosis in the cases of Ryan and

Reynolds, and stated that owing to the isolation of the patients and other sanitary measures taken there would be no danger of spread from these cases. He also found on the following day a mild case of yellow fever at St. Mary's Infirmary, which was at once isolated by the city authorities. Another case, in Nick Stevens, was found on the dredge *Alpha*, from which boat Ryan had come. This dredge had been about Cairo for some time. A flatboat was hired for the isolation of this patient, and tied to a sunken barge a little distance below the *Alpha*. An old tent was erected on one of the flatboats attached to the *Alpha*, for the use of the deck hands during the disinfection of their quarters. Two new tents were ordered from St. Louis, and one of them erected as soon as it arrived. The deck hands, after having their clothing disinfected by steam and their persons bathed, moved into this tent. Twenty new mattresses were purchased and 38 blankets furnished from the hospital, a large supply of these being on hand. Fumigation with sulphur was started on the dredge on the 20th, and with general scrubbing with lye and water, and application of $HgCL_2$, was kept up during the several succeeding days. The old bedding was burned.

Passed Assistant Surgeon Cobb arrived on the 21st, in compliance with official orders, and was at once placed in charge of the disinfecting. He was quartered on the *Alpha*, and daily inspected the men and directed the sanitary measures. Passed Assistant Surgeon Kalloch visited the dredge every day, and consulted with Passed Assistant Surgeon Cobb in regard to the work and examined any cases reported sick.

On September 24 one suspicious case, a man named Bogle, isolated in old tent and reported to Surgeon-General as suspicious.

On the 25th two other cases put aside for observation, one of these apparently yellow fever. Passed Assistant Surgeon Kalloch visited freight cars on the Kentucky shore, occupied by negroes. This visit was made at the request of Dr. Bell, representing the Kentucky board of health. There were several sick children on these cars and two negro men confined to bed with rather indefinite symptoms.

Last cases attached to the *Alpha* discharged September 29, 1897. September 30 patient Nick Stevens on isolated flatboat discharged to shore after a bath and change of clothing.

The flatboat was reported to owner as being free from infection and subject to his order October 3, 1897.

The dredge *Alpha* released from quarantine October 4, 1897.

List of cases: Reynolds, from dredge *Gamma*, Point Pleasant, treated Marine Hospital; Ryan, from dredge *Alpha*, Cairo, treated Marine Hospital; Stevens, from dredge *Alpha*, Cairo, treated on flatboat; Bogle, McKenna, Oden, Brown—very light or suspicious cases—treated in tent. One case occurred at St. Mary's Hospital, not under care of writer.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF SERVICES AT CAIRO AND CAMP FONTAINEBLEAU AND EXPERIENCES WITH LOCAL QUARANTINES.

By P. A. Surg. J. O. COBB.

OFFICE OF THE MEDICAL OFFICER IN COMMAND, M. H. S.,
New York, N. Y., December 11, 1897.

SIR: I have the honor to report that, in accordance with telegraphic orders, September 20, I proceeded from St. Louis to Cairo, reporting to Surg. P. C. Kalloch for duty in connection with yellow-fever cases aboard the United States dredge boat *Alpha*, then lying in the river opposite Cairo, near the Kentucky shore. I went aboard the boat with Surgeon Kalloch and immediately began the work of disinfection, which was found to be no easy matter on the ordinary Mississippi River steamboat. The boat being so open, very little work could be done with sulphur dioxide.

The personnel of the boat was the captain, the chief engineer, the clerk, and the crew; all told, 32.

Dr. Guitéras had the day before found 1 case of yellow fever in stateroom No. 10, and this case had been removed to a small barge, which was anchored several hundred yards down the river.

Room No. 10 was washed down by hand with 1-800 bichloride, then all cracks were sealed and room and contents exposed to sulphur dioxide for forty-eight hours. All the cabin rooms were washed down with 1-800 bichloride, all hangings sterilized by boiling, and bedding disinfected by sulphur dioxide. The quarters in which the men slept were washed down with the same solution, all cracks stopped, and contents of room exposed to sulphur dioxide for five days. All cotton clothing and hangings had been previously removed. All mattresses, pillows, and blankets were destroyed by fire. All clothing was sterilized by boiling in barrels into which live steam was carried, the clothing being dried by hanging over the boilers. After the men had destroyed the bedding they were stripped and each given a thorough bath under my immediate supervision. Especial pains was taken to make them wash the hair. Sterile clothing was furnished them, and they were isolated on a barge under new tents, and with new bedding furnished by the Service. Sterile water for drinking and culinary purposes was already being obtained by condensation. Pipes were dropped under water and run the length of the boat.

The officers of the boat were very kind and assisted all in their power in carrying out the details of the work.

These cases have never been traced, and probably the source of infection will never be known. The day before I left the boat one of the men told me that nearly every case of fever had originated in a certain bunk in the men's quarters. He went with me and pointed out the particular bunk. On further inquiry several of the men confirmed the man's story. It is claimed that five of the Cairo cases had occupied this particular bunk, and all the others but one had slept near this bunk. The cook, the most pronounced case, occupied a room in a different part of the boat, but went into the men's quarters every morning to get potatoes. On inquiry it was learned that the potato sacks were kept right near this bunk. In the midst of this investigation I was ordered to Jackson, Miss.

Probably not all these cases had yellow fever; nevertheless the conditions mentioned are enough, with the men running the set of symptoms they had (see report of Surgeon Kallock), to pronounce the presence of a contagious fever, a fever of one paroxysm, a fever which Dr. Guiteras thought to be yellow fever without a doubt.

One of these cases went away sick from this suspicious bunk nearly a week before the boat was quarantined. This man finally came into the marine hospital at St. Louis on the afternoon of the day I left that station for Cairo. I never saw the man, but the interne got me a specimen of his blood. In that blood was free pigment, broken-up cells, crescents, and beautiful moving organisms. I was so certain of the diagnosis of malaria that I had the man put in the general wards. Later he was seen and taken in charge by the city health officers, who pronounced it malaria—rightly, too. But I have often wondered since if that man had not also had yellow fever. If my eye retained the clinical picture (and I was certainly on the alert) then the Cairo cases were exactly like other mild cases that I saw at Camp Fontainebleau, which were diagnosticated yellow fever by experts.

On September 28 I received orders to proceed to Jackson, Miss., for special duty. When nearly to Jackson I was directed to proceed to Nashville before going to Jackson. My mission in Nashville was to inspect the sterilizing plant on exhibition at the Centennial Building. This apparatus was found in good working order and was so reported. October 5 I started again for Jackson for special duty, to be near the headquarters of the State, to be ready, as a representative of the Service, to offer aid, supplies, camp equipage—to offer any aid that the Service could give to the State in any emergency that might arise.

To this end I made several ineffectual attempts to reach Jackson, but at no time was allowed to leave the train. A few miles out of the city all trains were stopped,

and there I had an interview at shotgun range with the captain of the guards. He was polite, but firm in the determination not to let me in. I proposed that he arrest me and put me in jail the incubation period. Nothing that I proposed was entertained.

I was then on the south-bound train, at night, and it became a serious question with me of a final destination. Several attempts were made by the kindly conductor to put me off at a number of little stations. The efforts of my good friend were not appreciated by the local authorities, and we were told to move on, as they were quarantining against the world and did not care who knew it. The conductor had been nagged considerably on the trip by a number of petty interferences, and especially by the authorities preventing him from ever communicating orders to the engineer. And through all this excitement the shotgun protectors stood there in the weird, dusty night, shotgun thrown across arms, stolid, firm, set—not revengeful, without malice, but with a fixed purpose to protect the lives, to protect the homes of near and dear ones, even though it were necessary to commit a crime, to shoot a fellow-man in cold deliberation. With terror about them, with travel suspended, with exaggeration of all news received, how can one blame the poor, frightened people in these little towns? These towns were isolated, but there is no excuse for cities to become panic-stricken and resort to such foolish methods as were seen in many places in the South.

I finally was allowed to leave the train at Manchac, a flag station in the State of Louisiana, and there awaited the coming of the north-bound train. Again I renewed my attempts to reach Jackson, but without avail, and had to continue on to Memphis, where I was directed to await orders.

It may be of interest to note some of the things I saw in connection with the traveling public and the country through which we were passing.

It had not rained in that part of the South for months, and in some portions of Tennessee not since spring. It became very dusty, so dusty that one can not understand or comprehend it who did not experience it. To be able to breathe with any degree of comfort, it was necessary to have the car windows raised. To put the windows down, even with the train in rapid motion, was to cause considerable discomfort, and even suffering with some. At all the stations windows were shut down, the doors locked, and there we were left sometimes for 10 minutes.

On my north-bound trip there were five families in the car. One lady had an infant, and I fully expected to see that child suffocated during the day.

During my rides I had commingled with the passengers without making my position known. I questioned the passengers as to their treatment, and not once did I hear a word of complaint against the United States sanitary inspectors or against any railroad official. If the will of the people—the persons who actually suffered and had experience with shotgun quarantine—as expressed by them, were put in force, there would certainly be national control of quarantine.

It was interesting to see these travelers as they pushed for the North to be out of harm's way. The north-bound trains carried loads of people, many of them probably who never intended to return South. There were cages of birds, parrots, an occasional dog, and many belongings, showing the intentions of the passengers never to return.

I remained in Memphis until October 10, and then proceeded to Camp Fontainebleau, Mississippi, via Birmingham and Mobile. The agents in Memphis refused to sell me a ticket to Birmingham, and to overcome the difficulty I had to use a Marine-Hospital Service sanitary inspector's badge as a right to travel. I had some difficulty in Birmingham, but finally I was allowed to proceed as far as Mobile. At Birmingham I boarded the Cincinnati sleeper at 4 p. m. and rode in that sleeper until some time in the evening—9 or 10 o'clock—with the passengers, freely commingling with them. When a short way out of Montgomery two sanitary inspectors for the city of Montgomery came through and demanded my health certificate. I had none, and they compelled me to subscribe to an ironclad oath that I had not been in a great many places which were designated on the card. I stated frankly that I had been

to Cairo twenty days before, and that, technically, I had been in the State of Mississippi, which was my greatest crime. I was told that I would have to leave the train at a station just north of Montgomery and wait there until the train ran into Montgomery drawing the sleeper on which I had been riding part of the day. Part of the passengers in this sleeper were to leave at Montgomery. After running the train into the city the plan was to back out for me, put down the windows, lock the doors, and with bells clanging go through the town at full speed. Can anyone conceive that sensible men can act so foolishly? Did the medical authorities give such orders to these men, who were not doctors?

I told these men that they were acting foolishly as well as unlawfully, and that I had no intention to submit to such foolishness and hardship for their pleasure. There were three ladies in the car, and I took pains to learn where the ladies were going, and, finding they were bound for Montgomery, and that any stubbornness on my part would in no way inconvenience them, I prepared myself to see to what extent of foolishness these men would resort. I asked the conductor if I would cause him any trouble, and his evasive reply was plainly interpreted that he would be delighted if I maintained my rights as a traveler.

Consequently, just before reaching the little station mentioned above, the inspectors came to me and wanted to know if I was going to get off. I told them no, and that they had no rights in the matter whatsoever, and that I had not the slightest intention of leaving the car at their caprice. They moved aside and consulted, and one of the men took the trouble to handle a revolver in such a manner that I could see it, his motive being clearly to intimidate me. The men then came back and threatened to remove me from the car by force and detain me in a camp which the city had somewhere near there. I remained in the car; the doors were locked, and the car side-tracked. I promptly went to bed, awakening in Mobile, proceeding to Camp Fontainebleau from there without further molestation.

With such farcical quarantine, done probably for effect and commercial reasons, it is most hard to believe that at that time, October 11, the city of Montgomery was already controlling her cases of yellow fever.

I arrived at Camp Fontainebleau October 12, relieving Passed Assistant Surgeon White, then under orders to Camp Hutton, in Louisiana.

The camp at this time only had 211 refugees, and the number began to fall off daily. The storing and packing of camp equipage was begun at once, as much of the material would be needed at Camp Hutton. As a tent was vacated, it and its contents were stored ready for shipping or housing. This method was followed to the end, and when orders were finally received closing the camp very little remained to be done. The camp was officially closed October 21, no refugees being received after that date. On November 1 the camp had ceased to exist—the last vestige being stored, except the kitchens and dining rooms, which were built of wood and were permanent. November 3 I turned over the property to Custodian Sceals and rejoined my station in New York.

During the period that the camp was in operation 506 packages, 598 valises, 229 trunks, 2 carloads material, 16 sets of infected wearing apparel, and 1 box were sterilized. All mattresses and pillows used in either of the hospitals were destroyed by fire.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF PERSONAL SERVICES AS EXPERT.

By Acting Asst. Surg. JOHN GUITERAS, *Professor of Pathology, University of Pennsylvania.*

PHILADELPHIA, *October 28, 1897.*

SIR: In obedience to telegraphic instructions received on the 5th of September, I arrived at Ocean Springs, Miss., on the 8th of September. I examined on that day 28 cases of acute febrile diseases. The prevailing disease in Ocean Springs was

undoubtedly an epidemic of dengue fever, and such was the diagnosis I gave of 25 of the cases examined; 3 other cases, however, I was convinced were cases of yellow fever. As one of these was likely to die within the next twenty-four hours, it was deemed advisable to wait for the post-mortem examination before pronouncing the disease officially to be yellow fever. The autopsy performed by Dr. Wasdin subsequently confirmed this opinion.

The history of cases that had occurred in Ocean Springs for several weeks, the results of post-mortems made by Passed Assistant Surgeon Wasdin, together with his opinion of cases previously seen by him, led me to conclude that cases of yellow fever had existed in Ocean Springs in the midst of an epidemic of dengue during an uncertain period of about four weeks.

The population of Ocean Springs was formed mainly of summer excursionists from the cities of New Orleans and Mobile and the interior country. As yellow fever is usually imported through our large seaport towns, it is quite reasonable to suppose that in the present instance the disease had been introduced through one or the other of these commercial centers. After discovering a few other cases of yellow fever in Ocean Springs, I proceeded, on September 10, to a study of suspicious cases in Scranton. I found here, also, a very large number of cases of dengue, some suspicious mild cases of fever that could not be positively classified as either yellow fever or dengue, and one unmistakable case of the former disease. The existence of very mild cases of fever at the same time, and often in the same house with a case of yellow fever, began to be a prominent feature of the present epidemic, and one which has led to many mistakes during the present outbreak

On the 12th I was directed to proceed to Mobile and investigate suspicious cases of fever that were supposed to exist there. I found in Mobile the same conditions existing elsewhere. On the first day of my investigation I found after visiting a considerable number of cases of mild fever without special characteristic features, 2 cases that presented the facies of yellow fever and had albumen in the urine. The physicians, who kindly invited me to visit their patients, mentioned similar cases in which albumen had been found in the urine. I had meanwhile examined the mortuary records of the city of Mobile for the twelve first days in September, comparing them with the same record for the previous year. I found that the total number of deaths for 1896 was 28, 23 of these were colored and 5 white; the total during 1897 was 33, 20 colored and 13 while. Among the latter I found 1 death from uræmic convulsions in a man 41 years of age and a native of Kentucky; 1 of congestion of the brain in a male 27 years of age, native of Alabama; 1 of purpura hæmorrhagica, aged 29, native of Mississippi; and 1 of ulcer of the stomach, aged 58, native of Sweden.

On the 14th of September I was shown the case of a Norwegian sailor in the city hospital. This case had been considered suspicious by the health authorities of the city and had been carefully isolated. The case was unquestionably one of yellow fever approaching a fatal termination. Another case was discovered on the same day. Taking together the mortuary record, the history of previous cases given by the physicians, and the fact that no connection could be found between the cases discovered, I was led to the conclusion that several foci of infection must exist in the city, and I reported to you accordingly that I apprehended a serious outbreak. Subsequent events have confirmed this opinion.

Under instructions from your Bureau, I visited the city of Edwards, Miss., on the 15th of September. Here I was shown 6 cases considered suspicious by Dr. Purnell of the State board of health of Mississippi. These were found to be all cases of yellow fever. As they were scattered over different portions of the city, I became convinced that there were also here separate foci of infection and that it would be impossible to stamp out the disease. The cases in Edwards seemed to be traceable to the family of Mr. Anderson. Two members of this family were taken sick on the day after their arrival from Ocean Springs. All the members of the household were subsequently attacked, and though they were not diagnosed yellow fever, the

history of the case of Mr. Champion, who visited the house, points unmistakably to the diagnosis of yellow fever.

This case of Mr. Champion, who was a prominent member of the community, became the distributing center for the disease throughout the city. Mrs. Anderson arrived from Ocean Springs and was taken sick on the 8th of August.

I returned to Mobile on the 16th. During the second visit to Mobile I visited but few patients on account of the erroneous impression that prevailed that my visit to Edwards might have infected my clothing. This was, of course, absurd when we consider that there were at the time very probably more cases of yellow fever in Mobile than in Edwards. I wish here to call attention to the fact that none of the persons who came in contact with me contracted the disease. In particular we must include Passed Assistant Surgeon Glennan, who was constantly with me, and the employees of the Windsor Hotel. This place remains still uninfected. The short visit of a physician in an infected room is not sufficient to infect his clothing. There is not a single instance of transmission of the disease through my visits to patients. Were this more generally understood a great obstacle to my investigations would be removed.

Following your instructions, I arrived in Cairo, Ill., on the 19th of September and was able to confirm at once the diagnosis of 2 cases of yellow fever in the marine hospital made by Surgeon Kallock, of the Marine-Hospital Service. Another case was found on the same day in the city hospital, and another on the following day in one of the Government boats lying at East Cairo, across the river. A study of the mortuary records of the city and the histories of cases reported by attending physicians showed no evidence of foci of infection in the city of Cairo. The 4 cases observed were more or less connected with the dredges across the river or with other Government dredges working farther down the Mississippi River.

These cases, then, were the first to appear in the city of Cairo, and as proper precautions were taken with them I was convinced that the disease would not spread. It became necessary, however, to investigate the Government boats to find out the possible source of infection. This was done on the 21st and the 22d.

On the barge *Alpha* and its outfit 61 men were examined; on the barge *Beta*, 87; on the dispatch boat *Minnatonka*, 29; on the barge *Gamma*, 59; on the survey boat *Search*, 16; making a total of 253. Of these only one case, from the *Alpha* examined at East Cairo, proved to be a case of yellow fever. There was no evidence of infection of these boats, and it is probable that the disease was contracted by this man through contact with some infected locality on shore or baggage from an infected locality. With the exception of the *Alpha* the other barges were examined at Point Pleasant. The sinking of the boat *Minnatonka* made it necessary for me to land at Memphis on the 22d. No attempt at investigation was made at this place, as the usual unfounded fears prevailed of the possibility that I might carry the contagion of the disease with me. I returned to Cairo on the 23d and received there orders to proceed to northern Louisiana and investigate rumors of yellow fever at California, Tallulah, and Delhi. I arrived in Vicksburg on September 24. No investigation was attempted here and I had every reason to believe from the reports of physicians that it was not necessary. Facilities, however, were given me and a special train provided to visit the stations on the Vicksburg and Shreveport road. These were inspected on September 25. Delhi and Tallulah were found to be free from the disease. At California, however, the wife of the local physician, Dr. Greaves, was found to be suffering from yellow fever. She was a refugee from Edwards, having arrived in California on the 24th of August with some baggage. I found her children convalescing from what appeared to have been an attack of yellow fever. Dr. Wiiliam Kelly, of Tallulah, had diagnosed these cases yellow fever. My report of these cases on September 29 made it impossible for me to return to Vicksburg. I was sent around the city on a special train to New Orleans, where I arrived on the 27th. My reports of yellow fever at Edwards and at California had twice saved the city of Vicksburg from the infection of yellow fever. The city had been in commu-

nication with these localities up to the time of my announcement of the existence of yellow fever in them. In New Orleans I received orders to proceed to Texas and investigate the prevailing epidemic of dengue fever in that State. An attempt was made to do this over the Southern Pacific Railway, the State health officer of Texas having proceeded to the State line to accompany me to Houston and Galveston. Local quarantines, however, interfered with the carrying out of this plan. I was obliged, therefore, to proceed from New Orleans to St. Louis on September 30 in order to remain out of the infected district a sufficient time to comply with the health regulations of the State of Texas.

During my stay in New Orleans I had remained in the St. Charles Hotel, which was uninfected. In the city of St. Louis I examined a large number of cases of acute malaria in the city hospital, with a view to determine the presence or absence of albumin in the urine. Albumin was found in only one of these cases, in a man suffering with the remittent type of fever of two weeks' duration.

On my way from St. Louis to Galveston I was detained at the quarantine station of Houston, and I did not reach Galveston until the evening of the 4th.

Before my arrival in Texas I had heard the reports of 1 case of fatal illness at Beaumont and another at Houston. I had seen in New Orleans a detailed history of the case in Beaumont and was convinced that the case was one of yellow fever. At the same time, as the disease had not spread, I was inclined to believe that Texas was not this year within the area of conditions favoring the spread of the disease. I was surprised, therefore, upon my arrival in Galveston, to find that the physicians in that city spoke of several cases in the extensive epidemic of dengue that presented the symptoms of jaundice—albumin in the urine and slow pulse. I found that at Galveston two deaths, at least, had occurred recently under suspicious circumstances. In one of them the post-mortem examination had been discontinued by Professor Smith because his suspicions became aroused as to the possibility of yellow fever.

In the mortuary records for the month of September in Galveston I find the following diagnoses given as causes of death in the white population: One case of heart disease, aged 22; 1 case of chronic disease of the kidney and dengue in a female aged 24; 1 case of purpura hemorrhagica, aged 7. I found, also, in Galveston that the suspicions of Dr. Hamilton West, former professor of the practice of medicine in the Galveston Medical School, had been aroused in connection with some cases occurring in his practice. On October 6 he showed me 2 cases that convinced me at once of the existence of the disease in Galveston and I wired you in cipher to that effect. The cases were, first, Mr. Neinaber, living at the corner of Thirteenth and Mechanic streets. He was taken sick on October 2 and at the date of my examination had the characteristic facies of yellow fever and albumin and casts in the urine. Mr. Neinaber was a perfectly healthy man previous to the sudden onset of the acute febrile attack from which he was suffering. The albumin was rapidly disappearing from the urine on October 7, when last examined by me. The highest temperature recorded in his case was 103°, with a pulse of 111. In the evening of October 7 his temperature was 101⅘, with a pulse of 98. The other case was that of James Sewall, a mulatto, aged 21, who was taken sick on September 30. When first seen by Dr. West on October 1 the temperature was 103°, and during the examination the patient fell suddenly to the floor in an attack of syncope. He recovered consciousness soon afterwards and complained of pain in the head and a cramping pain in the stomach. The urine examined on the 2d was decidedly albuminous and appeared to contain blood. When seen by me on the 7th the temperature was normal, the pulse was 60, and an examination of the urine revealed a considerable amount of albumin, casts, and no blood. The albumin had disappeared from the urine at a subsequent examination. Other cases presenting the characteristic facies of yellow fever, in which albumin in the urine was found, were those of Cecil Nichols, aged 15, with a pulse of 78 and a temperature of 101⅘; Thomas Warren, colored; 1 patient with dysenteric symptoms at the Seely Hospital; 1 patient in the marine hospital. The records of temperature, pulse, and examination of urine in

these cases is kept at the respective hospitals; another case, residing at 4202 Avenue I, with a temperature of 102½ and a pulse of 88. These cases were officially reported by me as cases of yellow fever. I subsequently saw two other cases, one in the person of the health officer of the city of Galveston, Dr. William Fisher, and the other in a newspaper reporter whose name and address I have not noted.

Another case was seen on the same day by Dr. Charles W. Truehcart, practicing physician of the city, and Dr. Swearingen, State health officer of Texas, who agreed that the case was unmistakably one of yellow fever. These cases were apparently not connected with each other. This fact led me to the conclusion that there were several foci of infection in the city and that there was no probability of the disease being stamped out during the present summer.

On the 11th I visited Houston, Tex. Dr. Richard G. Turner, of that city, who believed that yellow fever had existed in Houston for some time back, showed me during the afternoon 3 well-pronounced cases of yellow fever, one of them in the person of Dr. Mason, a practicing physician of the city; another, a walking case, was also found in the office of Dr. McElroy, city health officer.

Dr. Turner also called my attention to the history of Eva Duncan, reported some weeks previously as a suspicious case of yellow fever. From the history of this case one can only conclude that it was also a case of yellow fever. Both in Galveston and Houston several cases were reported by the practicing physicians in which albumin had been found in the urine during a supposed attack of dengue fever. Many of the cases of dengue fever that I saw presented the characteristic eruption of that disease, but I found in some cases that the minute hemorrhages of the skin resulting from a probable attack of yellow fever had been looked upon as the eruptive manifestations of dengue.

After reporting to you the existence of yellow fever, with a tendency to spread, in Houston and Galveston, I had to return to Philadelphia to my duties in the University of Pennsylvania.

On October 20 I received through you a call from the city of Montgomery to repert upon suspicious cases there; immediately acceded to, and an investigation during two hours of the afternoon led to the discovery of 6 cases of yellow fever of a rather mild type.

EXPERT COMMISSION TO INVESTIGATE THE NATURE OF YELLOW FEVER.

Taking advantage of this epidemic of yellow fever, I detached P. A. Surg. H. D. Geddings from the hygienic laboratory and directed him to proceed to New Orleans for the purpose of conducting experiments into the nature and cause of yellow fever at a point where abundant clinical material was to be obtained. Passed Assistant Surgeon Geddings had but lately returned from Europe, where he had made some special studies in the laboratories of Professor Roux in testing Sanarelli's discovery of the supposed germ of yellow fever, and he was therefore especially well fitted for this detail. He was joined later by P. A. Surg. Eugene Wasdin, who had recently recovered from an attack of yellow fever, and by the courtesy of Dr. E. E. Archinard, of New Orleans, they were given the facilities of the laboratory under his charge, and for a number of weeks worked upon the material which was at hand in such profusion.

I had determined early in the summer, with your approval, to send Passed Assistant Surgeon Geddings, upon his return from Europe, to Rio for the purpose of establishing an experimental laboratory with a

view to adding to our knowledge of the specific cause of this disease, but on the appearance of yellow fever this plan was temporarily abandoned.

As the number of cases declined in New Orleans, I determined to submit to yourself and the President the recommendation that these two officers be detailed as a special commission to go to Havana, where material is available throughout the year.

This detail was approved, and the officers proceeded at once to Havana, having been furnished with a complete working bacteriological outfit. They were given the necessary credentials through the State Department, and entered upon their work under the official cognizance of the government of Cuba, and at the date of this report have secured necessary quarters for establishing their apparatus, and are at work on the plan outlined.

DIVISION OF SANITARY REPORTS AND STATISTICS.

The regular work of editing and preparing for publication the Public Health Reports has been carried on as outlined in my last annual report, in the Division of Sanitary Reports and Statistics. The statistical arrangement and tabulation of weekly and monthly sanitary reports has been continued, about the same number of cities reporting as during the year 1896.

In all other respects, however, the amount of statistical information received by the Bureau has increased somewhat, as will be seen from a perusal of the Public Health Reports.

Investigation by letter or telegraph, when considered necessary, has been made of press reports of the existence of cholera, yellow fever, smallpox, or plague, and the facts obtained in response published.

Weekly reports are received from all the important quarantine stations, with the exception of New York and those on the coast of Louisiana.

The table prepared forms a valuable record of quarantine transactions. The reports from the national quarantine stations are also published in tabular form, and include not only the national quarantines where disinfection can be practiced, but the national inspection stations as well.

The tables showing the prevalence of smallpox in the United States and of cholera and yellow fever throughout the world have been continued; and, when taken together with those previously published, make a continuous tabular record, in the case of smallpox since October 10, 1894, and in the case of cholera and yellow fever since August 24, 1894.

MORTALITY STATISTICS—CALENDAR YEAR 1896.

In order to obtain as accurate an estimate as possible of the mortality—and morbidity where reported—throughout the United States during the calendar year 1896 the following letter was again addressed to all cities and towns in the United States having a population, according to the United States census of 1890, of 1,000 or more:

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., March 6, 1897.

To the secretary of the local board of health or local health officer.

SIR: I have to request that you will furnish this office, at your earliest convenience, with the following information relative to the mortality and (as far as possible) the morbidity statistics of ——— during the year 1896:

Estimated population.....
Total number of deaths from all causes (stillbirths excluded).....
Death rate per 1,000 of the estimated population.....

Disease.	Cases.	Deaths.	Disease.	Cases.	Deaths.
Phthisis pulmonalis			Measles		
Smallpox			Scarlet fever		
Varioloid			Diphtheria		
Typhus fever			Membranous croup		
Typhoid fever			Whooping cough		

A penalty envelope, addressed to this office, is inclosed for the return of this circular letter, and you are further requested to return the letter in case it is found impossible to make the desired entries in the above table, with a statement to that effect.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Name of city or town, ———.
Reported by ———.

Three thousand seven hundred and fifteen of these circular letters were sent out addressed as above, and to these 1,416 replies were received, of which number but 1,164 could be utilized in the preparation of statistics. From these replies the table of "mortality statistics of 1,164 cities and towns in the United States for the twelve months ended December 31, 1896," was prepared and published as a supplemental issue to the regular issue of date of July 16, 1897. The table shows the total mortality of each city and town, the mortality rate per 1,000 population, based upon the population reported in the United States Census Bulletin No. 165 (February 19, 1892) as being the population in 1890, the mortality rate based upon the estimated population of the city in 1896 as reported by the one to whom the letter was addressed, and the total mortality from the following infectious diseases: Phthisis pulmonalis, smallpox, enteric fever, typhus fever, measles, scarlet fever, diphtheria, membranous croup, and whooping cough.

In the preparation of this table the populations of the various cities, towns, and villages are in almost every instance given in two columns. One containing the population according to the United States census of 1890, and the other that reported as the estimated population. The first, being now seven years old, is manifestly an underestimate, and as such is not capable of being used alone with any degree of accuracy in the compilation of the mortality rates, and the second, the estimated, while in the majority of cases probably an approximately correct estimate, leaves much to be desired. It must, therefore, be taken merely for what it is stated to be—an estimate, the liability of which to error (and error usually in excess), is manifest and natural.

The table shows at a glance the great dissimilarity in the attention paid to the collection of mortality statistics in the various States, the reports from some of the States being very full, and from others amounting to virtually nothing.

ANNUAL MORTALITY RATE IN THE UNITED STATES.

The total number of deaths reported was 363,546, among an estimated population of 22,185,277 (United States census, 18,498,482), this number corresponding to an annual mortality rate of 15.93 (19.43 if estimated on the basis of the United States census) per 1,000 of the population reporting.

Twenty-eight thousand seven hundred and eight deaths were reported from phthisis pulmonalis, or 7.89 per cent of the total number of deaths, a percentage 2.1 less than that reported for the year 1895 from the same disease. Infectious diseases caused 15.75 per cent of the total number of deaths.

The following is the table, arranged alphabetically and by States:

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS IN THE UNITED STATES DURING THE CALENDAR YEAR 1896.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Alabama:												
Attala	24	1,254	19.13	1,500	16.00	2	....	2	1	....	....	...
Avondale	23	1,642	14.00	2,500	9.20	2	....	2	....	....	....	1
Bessemer	125	4,544	27.50	10,000	12.50	18	....	8	....	....	4	...
Evergreen	20	1,783	11.21	1,037	19.28	4	....	2	1	....	....	...
Fort Payne	15	2,698	5.56	1,275	11.76	2	....	3	2	....	1	...
Greensboro	22	1,759	12.50	2,500	8.80	.....	....	2	1	....	....	...
Greenville	36	2,806	12.82	3,000	12.00	8	....	3	....	....	....	...
Mobile	872	31,076	28.06	37,817	23.07	142	....	16	1	....	8	3
Total	1,137	47,562	23.90	59,629	19.06	178	....	38	6	....	13	4
Arizona:												
Bisbee	12	1,535	7.82	3,000	4.00	.....	....	....	....	....	....	...
Total	12	1,535	7.82	3,000	4.00	.....	....	....	....	....	....	...
Arkansas:												
Batesville	44	2,150	20.46	2,600	16.92	7	....	2	3	....	....	...
Fort Smith	265	11,311	22.98	16,000	16.56	28	....	10	....	1	1	4
Total	309	13,461	22.94	18,600	16.61	35	....	12	3	1	1	4
California:												
Bakersfield	120	2,626	45.69	4,000	30.00	7	....	....	....	....	2	...
Berkeley	119	5,101	23.32	11,200	10.62	17	....	2	....	....	....	...
Chico	58	2,894	20.04	3,500	16.57	8	....	2	....	....	....	...
Colusa	29	1,336	21.70	2,000	14.50	.....	....	4	....	....	....	...
Eureka	124	4,858	25.31	8,000	15.50	8	....	1	....	....	....	...
Los Angeles	1,363	50,395	27.04	100,000	13.63	228	....	28	10	3	25	...
Marysville	103	3,991	25.80	5,000	20.60	34	....	....	....	1	....	...
National City	6	1,353	4.43	1,400	4.28	4	....	....	....	....	....	...
Oakland	736	48,682	15.11	60,000	12.26	121	....	15	....	....	4	4
Pasadena	146	4,882	33.59	10,000	14.60	65	....	1	....	....	....	...
Redlands	63	1,904	33.08	4,000	15.75	23	....	3	....	....	1	1
Redwood	6	1,572	38.16	2,500	24.00	.....	....	....	....	....	....	...
Sacramento	468	26,386	17.73	30,000	15.60	73	....	2	....	....	5	...
San Francisco	6,036	298,997	20.06	360,000	16.76	967	....	85	1	6	74	24
San José	352	18,060	19.49	25,000	14.08	53	....	5	....	2	....	...
San Luis Obispo	73	2,995	24.37	3,700	19.73	13	....	....	....	....	....	...
Santa Ana	137	3,628	37.76	10,000	13.70	20	....	4	....	....	1	...
Santa Barbara	107	5,864	18.24	8,695	12.30	27	....	4	....	....	....	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
California—Continued.												
Stockton	222	14,424	15.25	17,000	13.05	41	....	5	....	....	1	...
Truckee	16	1,350	11.85	1,300	12.30	2	....	1	....	....	....	...
Willows	17	1,176	14.45	2,000	8.50	3	....	1	....	1	....	...
Total	10,301	502,474	20.30	669,295	15.38	1,714	....	163	11	13	113	29
Colorado:												
Central City	123	2,480	49.55	7,000	17.57	28	....	4	....	6	13	...
Colorado Springs	355	11,140	31.86	20,000	17.75	98	....	20	3	9	13	...
Denver	1,571	106,713	14.68	150,000	10.48	324	....	91	10	22	21	13
Greeley	35	2,395	14.61	3,000	10.50	10	....	2	....	5	1	...
Lajunta	20	1,439	13.89	3,500	5.71	4	....	1	....	....	1	...
Manitou	7	1,439	4.86	1,200	5.83	.....	....	2	....	....	....	...
Montrose	9	1,330	6.68	1,500	6.00	.....	....	1	....	....	....	...
Pueblo	603	24,558	24.15	40,000	15.07	63	....	25	4	9	30	21
Total	2,723	151,494	17.91	226,200	12.03	527	....	146	17	51	89	34
Connecticut:												
Ansonia	254	10,342	24.54	12,000	21.16	15	....	1	2	1	18	1
Avon	18	1,182	15.22	1,200	15.00	1	....	....	....	....	....	...
Barkhamsted	16	1,130	14.15	1,100	14.54	1	....	1	....	....	....	...
Berlin	41	2,600	15.00	3,000	13.66	3	....	1	....	2	....	...
Bethel	61	3,401	17.93	3,500	17.42	2	....	2	....	....	....	...
Bloomfield	21	1,308	16.05	1,264	16.61	.....	....	....	....	....	....	...
Bozrah	12	1,005	11.94	1,050	11.42	.....	....	....	....	....	....	...
Branford	94	4,460	21.07	5,500	17.08	.....	....	....	....	....	....	...
Bridgeport	1,144	48,866	19.06	60,000	18.50	99	....	11	16	4	74	5
Bristol	128	7,382	17.33	8,500	15.05	7	....	3	3	4	6	...
Brooklyn	52	2,628	19.78	2,675	19.40	7	....	....	....	3	....	...
Burlington	16	1,302	12.28	1,200	13.33	.....	....	....	2	....	....	...
Canton	51	2,500	20.40	2,500	20.40	4	....	....	1	....	....	...
Chatham	25	1,949	12.82	2,000	12.50	1	....	....	1	....	....	...
Cheshire	34	1,929	17.59	1,900	17.89	5	....	....	....	....	1	...
Chester	19	1,301	14.60	1,230	15.44	.....	....	1	....	....	....	1
Clinton	25	1,384	18.06	1,384	18.06	.....	....	....	1	....	1	...
Colchester	56	2,988	18.73	2,500	22.40	7	....	....	....	....	1	...
Colebrook	5	1,098	4.55	1,020	4.90	1	....	....	....	....	....	...
Cornwall	21	1,283	16.37	1,200	17.50	1	....	....	....	....	1	...
Coventry	36	1,875	19.20	1,875	19.20	6	....	....	....	....	....	...
Cromwell	40	1,987	21.04	2,000	20.00	2	....	1	3	....	1	...
Danbury	304	16,552	18.36	20,000	15.20	30	....	9	3	....	11	...
Darien	70	2,276	29.16	2,400	15.20	4	....	1	....	....	1	...
Derby	119	5,969	29.93	7,125	16.70	12	....	2	....	1	2	1
East Haddam	46	2,599	17.69	2,600	17.68	3	....	....	....	1	....	...
East Hartford	88	4,455	19.53	5,300	16.60	4	....	1	1	....	1	...
East Haven	14	1,000	14.00	1,010	13.86	.....	....	1	....	....	....	...
East Lyme	32	2,048	15.62	2,300	13.91	1	....	1	....	....	....	...
Easton	16	1,001	15.98	1,000	16.00	2	....	....	....	....	....	...
East Windsor	48	2,890	16.60	2,850	16.84	5	....	....	....	....	2	...
Ellington	38	1,539	24.69	1,650	23.03	2	....	....	....	....	....	...
Enfield	123	7,199	17.08	7,250	16.95	7	....	1	1	1	2	...
Essex	42	2,035	26.38	2,000	21.00	2	....	....	....	1	....	...
Fairfield	75	3,868	19.39	3,928	19.09	5	....	....	....	4	....	...
Farmington	47	3,179	14.78	3,100	15.16	3	....	....	....	3	....	...
Glastonbury	45	3,457	13.01	3,500	12.85	4	....	....	....	1	....	...
Granby	18	1,251	14.39	1,200	15.00	.....	....	....	....	....	....	...
Greenwich	171	10,131	16.87	11,000	15.54	10	....	....	1	1	6	...
Griswold	84	3,113	26.98	3,600	23.33	6	....	2	1	....	2	...
Groton	103	5,539	18.59	5,550	18.56	4	....	1	....	....	2	...
Guilford	39	2,780	14.02	2,900	13.44	4	....	....	....	....	....	...
Haddam	40	2,095	19.09	2,000	20.00	5	....	....	....	....	....	...
Hamden	59	3,882	15.19	4,100	14.39	2	....	1	3	1	....	...
Hartford	1,328	53,230	24.94	70,000	18.97	111	....	30	76	13	40	8
Hebron	10	1,039	9.62	1,000	10.00	2	....	1	....	....	....	...
Huntington	69	4,006	17.22	5,500	12.54	5	....	1	....	....	....	1
Kent	27	1,383	19.52	1,200	22.50	1	....	....	....	1	....	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Connecticut—Continued.												
Killingly	141	7,027	20.06	7,200	19.58	13	....	2	3	4	2	...
Lebanon	31	1,670	18.55	1,700	18.23	2	....	....	....	....	1	...
Ledyard	20	1,183	16.90	1,624	12.31	.....	....	1	....	....	....	...
Litchfield	51	3,304	15.43	3,480	14.65	1	....	1	....	....	....	2
Madison	31	1,429	21.69	1,500	20.66	1	....	....	....	....	1	...
Manchester	118	8,222	14.64	8,500	13.85	8	....	1	2	....	3	...
Mansfield	45	1,911	23.54	1,900	23.68	1	....	....	....	....	....	...
Meriden	436	21,652	20.13	28,500	15.29	34	....	2	13	5	8	4
Middlefield	15	1,002	14.97	1,000	15.00	.....	....	....	....	....	1	...
Middletown	352	9,013	39.05	20,000	17.60	41	....	5	6	1	4	1
Milford	58	3,811	15.19	4,000	14.50	.....	....	....	....	....	....	...
Montville	40	2,344	17.06	2,650	15.09	1	....	....	....	....	4	...
Naugatuck	155	6,218	24.92	9,500	16.31	9	....	3	....	1	6	...
New Britain	443	16,519	26.81	23,500	18.85	38	....	2	7	1	21	5
New Canaan	50	2,701	18.51	2,820	17.70	5	....	1	....	....	....	...
New Hartford	57	3,160	18.03	3,150	18.09	5	....	1	....	....	....	...
New Haven	2,019	81,298	24.71	112,000	18.02	194	....	28	28	12	98	4
New London	289	13,757	21.00	15,000	19.26	32	....	3	2	....	10	...
New Milford	69	3,917	17.61	4,000	17.25	7	....	....	2	....	..	...
Newtown	51	3,539	14.41	3,400	15.00	7	....	....	....	....	....	...
Norfolk	35	1,546	21.98	1,450	24.13	.....	....	1	....	....	....	...
North Canaan	28	1,683	16.63	1,700	16.47	3	....	....	1	1	....	...
North Haven	31	1,862	16.64	1,900	16.31	.....	....	....	....	....	....	...
North Stonington	22	1,463	15.03	1,500	14.66	.....	....	1	....	....	....	...
Norwalk	327	17,747	18.42	22,465	14.55	33	....	....	9	....	18	...
Norwich	436	16,156	26.98	24,340	17.91	35	....	8	....	3	12	1
Old Lyme	16	1,319	12.13	1,238	12.92	.....	....	....	....	....	....	...
Old Saybrook	25	1,484	16.84	1,450	17.24	3	....	1	....	....	1	...
Orange	92	4,537	20.27	5,080	18.11	4	....	....	1	....	2	...
Oxford	14	1,000	14.00	1,000	14.00	3	....	....	....	....	....	1
Plainfield	94	4,582	20.51	5,000	18.80	7	....	2	....	....	....	...
Plainville	35	1,993	17.56	2,000	17.50	2	....	....	....	....	2	...
Plymouth	41	2,147	19.09	2,350	17.40	2	....	....	....	....	2	1
Pomfret	14	1,471	9.51	1,470	9.52	.....	....	....	....	....	....	...
Portland	72	4,687	15.36	4,687	15.36	.....	....	....	....	1	....	...
Preston	47	2,555	18.39	2,600	18.07	5	....	....	....	1	....	...
Putnam	115	6,512	17.65	6,500	17.69	9	....	6	....	3	4	...
Redding	31	1,546	20.05	1,550	20.00	1	....	....	....	....	1	...
Ridgefield	46	2,235	20.53	2,300	20.00	5	....	....	....	1	....	...
Rocky Hill	11	1,069	10.29	1,050	10.47	.....	....	1	....	....	....	..
Salisbury	68	3,420	19.59	3,300	20.60	....	....	1	....	....	....	...
Saybrook	25	1,484	16.84	1,400	17.85	2	....	....	....	....	....	...
Seymour	51	3,300	15.45	3,100	16.45	4	....	....	....	....	....	...
Sharon	31	2,149	14.42	2,129	14.56	.....	....	....	....	....	....	...
Simsbury	33	1,874	17.60	2,100	15.72	2	....	....	2	....	....	...
Somers	25	1,407	17.77	1,425	17.54	3	....	....	....	....	....	...
Southampton	72	3,500	22.00	5,500	13.09	9	....	1	....	....	3	...
Southbury	25	1,089	22.95	1,200	20.83	4	....	....	2	....	....	...
South Windsor	36	1,736	20.73	1,700	21.17	.....	....	....	....	....	....	...
Sprague	12	1,106	10.84	1,000	12.00	.....	....	....	....	....	....	...
Stafford	77	4,535	16.95	4,625	16.64	2	....	2	....	4	2	1
Stamford	374	15,700	21.84	18,500	20.21	21	....	5	3	2	13	3
Sterling	19	1,051	18.07	1,100	17.27	2	....	....	....	....	2	...
Stonington	142	7,184	19.48	7,500	18.93	20	....	3	1	1	2	...
Stratford	80	2,608	30.67	3,300	24.24	14	....	....	....	1	6	...
Suffield	41	3,169	12.93	3,500	11.71	1	....	1	....	....	1	...
Thomaston	44	3,278	12.57	3,500	12.50	6	....	2	....	....	1	1
Thompson	110	5,580	21.50	5,600	19.64	5	....	1	5	....	6	...
Tolland	18	1,037	17.35	1,200	15.00	.....	....	....	....	....	....	...
Torrington	122	6,048	20.17	10,000	12.20	11	....	3	9	1	2	...
Trumbull	16	1,453	11.01	1,500	10.66	1	....	....	....	....	....	...
Vernon	128	8,808	14.53	9,000	14.22	10	....	....	1	....	1	2
Voluntown	13	1,060	12.26	1,060	12.26	2	....	....	....	....	....	...
Wallingford	133	6,584	20.20	8,000	16.62	10	....	2	1	....	3	...
Washington	23	1,633	14.08	1,850	12.43	.....	....	....	1	....	....	...
Waterbury	789	28,646	27.54	40,000	19.72	77	....	19	33	3	45	6
Waterford	44	2,661	16.53	3,000	14.66	3	....	1	....	....	....	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Connecticut—Continued.												
Watertown	29	2,323	12.48	2,800	10.35	.....	....	2	....	....	....	...
West Hartford	34	1,930	17.61	2,300	14.78	.....	....	1	....	1	....	...
Westport	81	3,715	21.80	4,000	20.22	2	....	....	2	....	....	...
Wethersfield	42	2,271	18.49	2,300	18.06	7	....	....	....	....	2	...
Wilton	16	1,722	9.29	1,700	9.41	.....	....	....	1	....	....	...
Winchester	113	6,183	15.04	7,200	15.69	13	....	3	3	1	3	...
Windham	201	9,000	22.33	9,820	20.46	25	....	6	....	....	1	1
Windsor	61	2,954	20.64	3,300	18.48	6	....	2	1	....	1	...
Windsor Locks	57	2,758	20.66	2,800	20.35	7	....	....	....	....	4	...
Woodbury	23	1,815	12.67	1,950	11.79	.....	....	1	....	....	....	...
Woodstock	45	2,309	19.92	2,300	19.56	5	....	1	....	....	....	...
Total	14,470	682,777	20.89	826,224	17.51	1,221	....	200	254	90	464	50
Delaware:												
Wilmington	1,204	61,431	19.59	72,500	16.60	115	....	15	2	6	42	8
Total	1,204	61,431	19.59	72,500	16.60	115	....	15	2	6	42	8
District of Columbia:												
Washington	5,831	230,392	25.30	278,150	20.96	784	....	141	69	6	96	116
Total	5,831	230,392	25.30	278,150	20.96	784	....	141	69	6	96	116
Florida:												
Apalachicola	42	2,727	15.40	3,500	12.00	.....	....	1	1	....	....	2
Ocala	79	2,904	27.23	5,000	15.80	4	....	3	....	....	....	...
Pensacola	268	11,750	22.80	15,000	17.86	32	2	12	5	....	....	...
Sanford	20	2,016	9.92	2,000	10.00	3	....	1	....	....	....	...
Warrington	25	1,301	19.21	1,000	25.00	5	....	....	....	....	....	...
Total	434	20,798	20.87	26,500	16.37	44	2	17	6	....	....	2
Georgia:												
Atlanta	1,861	65,533	28.39	110,000	16.91	226	....	66	16	7	12	12
Carrollton	20	1,451	13.78	2,000	10.00	1	....	4	....	....	1	...
Cartersville	50	3,171	15.77	3,200	15.62	.....	....	....	....	....	....	...
Columbus {W.	121	17,303	18.95	10,276	11.77	37	....	6	12	9	9	4
Columbus {C.	207			9,027	22.93							
Dawson	42	2,284	18.39	3,000	14.00	.....	....	1	....	....	....	...
Macon	544	22,746	23.91	28,000	19.43	70	....	5	5	1	3	8
Savannah	1,332	43,189	30.84	55,500	24.00	212	....	....	14	....	...	27
Total	4,177	155,677	26.83	221,003	18.90	546	....	82	47	17	25	51
Illinois:												
Ashland	12	1,045	11.48	1,300	9.23	.....	....	....	....	....	....	...
Ashley	10	1,035	9.66	1,200	8.33	.....	....	....	....	....	....	...
Belleville	269	15,361	17.51	20,000	13.45	26	....	12	3	1	11	4
Bloomington	242	20,484	11.81	25,000	9.68	.....	....	....	....	2	7	...
Bunker Hill	30	1,269	23.64	1,500	20.00	2	....	....	....	....	1	...
Carmi	47	3,500	13.42	3,500	13.42	7	...	2	5	....	2	3
Chicago	23,257	1,099,850	21.19	1,619,226	14.36	2,310	....	751	73	54	956	187
Colchester	22	1,643	13.39	1,800	12.22	2	....	....	....	....	....	...
Delavan	16	1,176	13.59	1,600	10.00	1	....	....	....	....	....	...
Earleville	26	1,058	24.57	1,500	17.33	5	....	....	....	....	1	...
East St. Louis	285	15,169	18.77	30,000	9.50	13	....	5	4	....	9	...
Elgin	312	17,823	19.50	22,000	14.18	11	1	8	....	....	10	...
Eureka	32	1,481	21.60	1,800	17.77	3	....	....	....	....	8	...
Galesburg	205	15,264	13.43	21,400	9.58	17	....	5	4	....	23	...
Galva	43	2,409	17.85	3,000	14.33	9	....	....	....	....	2	...
Gibson	21	1,803	11.64	2,500	8.40	4	....	1	....	....	....	...
Gilman	17	1,112	15.28	1,400	12.14	2	....	1	....	....	....	...
Girard	9	1,524	5.90	2,024	4.44	.....	....	1	....	....	2	...
La Salle	126	9,855	12.78	15,000	8.40	13	....	2	....	....	....	5
Nauvoo	23	1,208	19.04	1,300	17.67	2	....	....	....	....	....	...
Nokomis	51	1,305	39.07	1,400	36.44	3	....	1	1	....	3	...
Quincy	521	31,494	16.54	40,000	13.02	41	....	17	3	....	32	1

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonali	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Illinois—Continued.												
Svannaa	36	3,097	8.60	4,000	9.00	4	....	4	2	....	6	...
Sterling	27	5,824	4.63	6,745	4.03	.....	....	1	....	....	1	...
Total	25,639	1,255,789	24.01	1,829,191	14.01	2,475	1	811	95	57	1074	200
Indiana:												
Aurora	25	3,929	6.36	3,900	6.41	.....	....	....	....	....	1	...
Brightwood	21	1,387	15.14	2,500	8.40	5	....	2	....	....	2	2
Brookville	39	2,028	19.23	2,000	19.50	6	....	2	....	....	3	...
Columbus	147	6,719	21.80	9,000	16.33	33	....	7	....	....	29	...
Connersville	69	4,548	6.61	7,000	9.85	14	....	7	....	....	3	...
Covington	40	1,891	21.15	2,000	20.00	.....	....	....	....	....	....	...
Danville	22	1,569	14.02	3,000	7.33	3	....	1	....	....	....	...
Delphi	90	1,923	46.74	3,000	30.00	7	....	7	....	2	5	...
Edinburg	20	2,031	9.84	2,500	8.00	2	....	....	....	....	....	...
Evansville	740	50,756	14.57	65,000	11.38	82	....	21	4	....	20	5
Fort Wayne	395	35,393	11.18	45,000	8.77	50	....	9	....	....	26	...
Fowler	14	1,285	10,89	1,800	7.77	4	....	....	....	....	....	...
Goshen	60	6,033	9.94	10,000	6.00	4	....	6	3	4	3	...
Greencastle	41	4,390	9.34	4,380	9.33	3	....	1	....	....	1	...
Hammond	146	5,428	26.89	15,500	9.42	7	....	....	1	....	22	1
Harmony	30	1,020	29.41	2,000	15.00	3	....	....	1	2	2	...
Haughville	66	2,144	30.78	4,200	15.71	6	....	....	1	1	3	...
Huntingburg	27	3,167	8.52	3,200	8.43	3	....	1	....	....	....	...
Huntington	151	7,328	20.60	10,000	15.10	14	....	8	....	....	20	...
Indianapolis	2,057	105,436	19.51	165,000	12.46	262	....	68	3	4	50	13
Knightstown	25	1,867	13.39	2,000	12.50	3	....	....	....	....	....	...
Lafayette	177	16,243	10.89	30,000	5.90	26	....	7	....	1	8	...
Laporte	81	7,126	11.36	8,000	10.12	6	....	....	....	1	....	2
Madison	225	8,936	25.17	12,000	18.75	12	....	4	....	6	....	...
Marion	280	8,769	31.93	20,000	14.00	20	....	40	4	2	18	1
Michigan City	150	10,776	13.91	14,000	10.71	22	....	2	4	8	6	...
Muncie	207	11,345	18.24	26,000	7.95	25	....	11	....	....	13	...
New Albany	210	21,059	9.81	30,000	7.00	23	....	8	4	8	4	...
Newcastle	28	2,697	10.34	3,500	8.00	2	....	1	....	1	....	...
New Haven	12	1,079	11.12	1,375	8.74	2	....	....	1	....	....	...
Noblesville	43	3,054	14.08	6,000	7.16	8	....	....	....	....	....	...
Princeton	68	3,076	22.10	7,000	9.71	11	....	2	....	....	....	...
Richmond	248	16,608	14,93	30,000	8.26	13	....	6	....	....	3	...
Rising Sun	11	1,689	6.50	1,800	6.11	4	....	1	3	....	3	...
Rock Island	150	13,634	11.00	25,000	6.00	10	....	11	....	....	9	6
Shelbyville	98	5,451	17.98	8,000	12.25	14	....	4	....	....	....	1
Spencer	19	1,868	10.16	2,400	7.91	3	....	....	....	....	....	...
Tell City	42	2,094	20.01	3,500	12.00	3	....	....	....	....	1	4
Valparaiso	113	5,090	22.20	7,000	16.14	11	....	3	2	....	12	1
Vevay	20	1,663	12.01	2,000	10.00	4	....	....	....	....	1	...
Washington	64	6,064	10.55	10,000	6.40	11	....	....	....	15	6	...
Winamac	44	1,215	36.21	2,000	22.00	2	....	9	....	....	3	...
Winchester	28	3,014	9.25	3,500	8.00	3	....	2	....	....	....	...
Total	6,593	402,822	16.36	616,055	10.70	746	....	251	31	55	277	36
Iowa:												
Belleville	16	1,394	11.48	1,600	10.00	.....	....	....	....	....	....	...
Clinton	255	13,619	18.72	25,000	10.20	18	....	....	....	....	18	1
Davenport	406	26,872	15.10	35,000	11.60	35	....	3	....	....	6	8
Fairfield	60	3,391	17.61	5,000	12.00	9	....	1	....	....	4	...
Fort Dodge	79	4,871	16.42	9,000	8.77	.....	....	2	....	....	4	1
Grinnell	29	3,332	8.10	4,000	7.25	2	....	....	....	....	1	...
Iowa City	93	7,016	13.25	11,000	8.45	10	....	3	....	....	3	...
Lansing	22	1,668	13.18	1,800	12.22	4	....	....	1	....	....	...
Lisbon	11	1,079	10.19	1,000	11.00	1	....	....	....	....	1	...
Lucas	12	1,320	9.09	800	15.00	2	....	....	....	....	....	...
Mason	78	4,007	19.46	6,000	13.00	.....	....	3	....	....	1	4
Monticello	19	1,938	9.80	2,500	7.60	.....	....	....	....	....	....	...
Mount Ayr	16	1,265	12.60	1,600	10.00	.....	....	....	....	....	....	...
Odebolt	10	1,122	8.02	1,500	6.66	3	....	....	....	....	2	...
Pella	35	2,408	14.53	3,000	11.66	1	....	1	....	....	....	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Iowa—Continued.												
Sac City	9	1,249	7.29	1,550	5.80	1	....	1	....	....	....	...
Seymour	12	1,058	11.34	2,000	6.00	2	....	....	....	....	....	...
Traer	7	1,014	6.90	1,300	5.38	1	....	....	....	....	....	...
Total	1,169	78,623	14.87	113,650	12.38	89	....	14	1	....	40	14
Kansas:												
Coffeyville	43	2,282	18.84	4,000	10.75	6	....	4	....	....	2	2
Emporia	115	7,551	15.23	8,000	14.37	20	....	6	3	....	5	1
Herington	10	1,353	7.39	2,000	5.00	.....	....	2	....	....	....	...
Hutchinson	74	8,682	8.52	8,500	8.70	8	....	1	....	1	4	...
Kingman	50	2,390	20.92	5,000	10.00	3	....	4	....	3	2	...
Leavenworth	311	19,768	15.73	22,000	14.13	25	....	4	4	....	17	...
Lyons	84	1,754	47.89	15,000	5.60	10	....	....	2	....	1	5
Minneapolis	88	1,756	50.11	14,000	6.28	3	....	1	....	1	....	...
Pratt	34	1,418	23.97	6,126	5.54	5	....	....	....	....	3	...
Seneca	51	2,032	25.09	20,000	2.55	3	....	....	....	....	....	...
Topeka	429	31,007	13.51	32,000	13.40	57	1	6	1	1	24	...
Washington	85	1,613	52.69	3,600	23.61	6	....	2	....	....	2	...
Yates Center	31	1,305	23.75	1,800	17.22	.....	....	....	....	....	2	...
Total	1,405	82,911	16.94	142,026	9.89	146	1	30	10	6	62	8
Kentucky:												
Bardstown	33	1,524	21.65	1,500	22.00	1	....	2	....	....	....	...
Covington	704	37,371	18.83	44,000	16.00	88	....	15	....	3	58	...
Flemingsburg	27	1,977	13.65	2,000	13.50	3	....	1	....	....	....	...
Louisville	3,295	161,129	20.45	211,100	15.60	370	....	131	5	4	72	11
Ludlow	17	2,469	6.88	3,500	4.85	5	....	....	....	....	2	...
Madisonville	54	2,212	24.41	3,500	15.42	10	....	8	4	....	4	...
Nicholasville	23	2,157	10.66	3,300	6.96	3	....	6	1	....	....	...
Vanceburg	15	1,110	13.51	1,500	10.00	1	....	....	....	....	....	...
Total	4,168	209,949	19.85	370,400	11.25	481	....	163	10	7	136	11
Louisiana:												
New Orleans	7,594	242,039	31.37	275,000	27.25	859	238	90	10	1	53	32
Shreveport ..... W.	67	11,979	22.37	7,500	8.93	27	11	3	....	....	....	...
Shreveport ..... C.	211			7,500	28.13							
Total	7,872	254,018	30.99	290,000	27.14	886	249	93	10	1	53	32
Maine:												
Appleton	27	1,080	25.00	1,080	25.00	2	....	....	....	....	2	...
Auburn	140	11,250	12.44	11,000	12.72	15	....	1	....	1	....	...
Bangor	404	19,103	22.30	25,000	16.16	.....	....	10	....	2	2	...
Belfast	74	5,294	13.97	5,294	13.97	3	....	1	....	....	....	...
Berwick	30	2,294	13.08	2,300	13.04	5	....	1	....	....	....	1
Boothbay	29	1,718	16.88	1,750	16.57	1	....	1	....	....	....	...
Boothbay Harbor	20	1,699	11.77	2,000	10.00	3	....	1	....	....	1	...
Bradford	18	1,215	14.81	1,300	13.84	.....	....	....	1	....	....	...
Bristol	36	2,821	12.76	3,000	12.00	.....	....	....	....	....	....	...
Brooklin	9	1,046	8.56	1,100	8.09	1	....	....	....	....	....	...
Brooksville	16	1,310	12.21	1,350	11.85	.....	....	....	....	....	....	...
Brownfield	15	1,134	13.22	1,100	13.63	.....	....	....	....	....	....	...
Brownville	15	1,074	13.95	1,200	12.50	1	....	2	....	....	....	...
Canton	8	1,303	6.13	1,325	6.03	.....	....	....	....	1	....	...
Cape Elizabeth	12	5,459	21.96	1,000	12.00	3	....	....	....	....	....	...
Carmel	15	1,066	14.07	1,066	14.07	4	....	1	....	....	....	...
Chelsea	16	2,356	6.79	950	16.84	2	....	....	....	....	....	..
Deering	115	5,353	21.44	6,700	17.16	3	....	4	....	1	...	1
Dover	27	1,942	13.90	2,100	12 85	2	....	1	....	....	....	...
East Livermore	33	1,506	21.91	2,000	16.50	1	....	....	....	....	....	...
Eastport	95	4,908	19.35	5,000	19.00	.....	....	....	....	....	....	...
Farmington	60	3,207	18.67	3,207	18.67	3	....	2	....	....	....	1
Franklin	20	1,264	15.82	1,254	15.96	2	....	1	....	....	....	3
Fryeburg	22	1,418	15.51	1,418	15.51	1	....	....	....	....	....	...
Gorham	63	2,888	21.82	4,000	15.75	2	....	....	....	....	....	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Maine—Continued.												
Gray	29	1,517	19.11	1,600	18.12	2	....	....	....	....	....	...
Harrington	15	1,150	13.04	1,150	13.04	2	....	1	....	....	....	...
Harrison	15	1,071	14.01	1,071	14.01	.....	....	....	....	....	....	...
Hermon	14	1,282	10.92	1,200	11.66	1	....	....	....	....	1	...
Hollis	18	1,278	14.08	1,000	18.00	.....	....	....	....	....	....	...
Jefferson	29	1,391	20.89	1,300	22.30	.....	....	....	....	....	....	...
Lebanon	16	1,263	12.90	1,263	12.90	2	....	....	....	....	....	1
Limington	8	1,092	7.32	1,000	8.00	1	....	....	....	....	....	...
Litchfield	20	1,126	17.76	1,126	17.76	.....	....	....	....	....	....	...
Machiasport	16	1,437	11.13	1,427	11.21	.....	....	....	....	....	....	...
Madison	38	1,815	20.93	2,800	13.57	10	....	....	....	....	....	...
Milo	18	1,029	17.49	1,500	12.00	.....	....	....	....	....	....	...
Monmouth	25	1,362	18.35	1,300	19.23	3	....	....	....	....	....	...
Monticello	19	1,132	16.78	1,250	15.20	5	....	....	....	....	....	1
New Gloucester	23	1,234	18.63	1,200	19.16	1	....	....	....	....	....	1
Newport	25	1,188	21.04	1,400	17.85	2	....	....	....	....	....	...
Norridgewock	22	1,656	13.29	1,656	13.29	2	....	....	....	....	....	...
Norway	40	2,665	15.01	3,000	13.33	1	....	....	....	1	....	...
Oakland	35	2,044	10.71	1,800	19.44	4	....	....	....	....	2	...
Oldtown	70	5,312	13.17	7,000	10.00	2	....	3	....	....	2	3
Orono	43	2,790	15.41	2,950	14.58	1	....	2	....	....	....	1
Palmyra	20	1,004	19.92	1,004	19.92	2	....	....	....	....	....	...
Pembroke	26	1,514	17.17	1,514	17.17	1	....	....	....	....	....	...
Penobscot	13	1,313	9.90	1,300	10.00	4	....	1	....	....	....	...
Portland	725	36,425	19.90	41,500	17.47	70	....	11	....	....	22	3
Readfield	12	1,176	10.20	1,200	10.00	3	....	....	....	....	1	...
St. Albans	15	1,206	12.43	1,206	12.43	4	....	....	....	....	....	...
St. George	53	2,491	21.27	2,800	18.92	7	....	....	....	1	3	...
Sanford	85	4,201	20.23	5,000	17.00	7	....	1	....	1	1	...
Scarboro	29	1,794	17.21	1,900	15.25	2	....	....	....	1	....	...
Searsport	30	1,693	17.71	1,693	17.71	2	....	....	....	....	....	...
Sedgwick	20	1,012	19.66	1,000	20.00	.....	....	1	....	....	....	...
South Berwick	68	3,434	30.39	3,334	20.40	5	....	3	....	....	1	1
Stockton Springs	13	1,149	11.31	1,000	13.00	3	....	....	....	....	....	...
Topsham	41	1,394	29.41	1,394	29.41	1	....	2	....	....	....	...
Turner	33	2,016	16.36	2,000	16.50	1	....	....	....	....	....	...
Washington	22	1,230	17.88	1,230	17.88	2	....	1	....	2	1	...
Westbrook	121	6,632	16.73	7,000	17.28	8	....	2	....	....	3	...
Whitefield	28	1,215	23.04	1,215	23.04	7	....	1	....	1	....	..
Winthrop	30	2,111	14.21	2,111	14.21	.....	....	....	....	....	....	...
Total	3,241	191,552	16.91	204,888	15.81	222	....	55	1	11	42	17
Maryland:												
Baltimore	9,919	434,439	22.83	506,378	19.58	1,122	....	188	27	31	281	87
Elkton	63	2,318	27.09	3,000	21.00	6	....	3	....	....	3	...
Snow Hill	23	1,483	15.51	1,800	12.77	.....	....	....	....	....	....	...
Total	10,005	438,340	22.82	511,178	19.57	1,128	....	191	27	31	284	87
Massachusetts:												
Abington	75	4,260	17.60	4,200	17.85	11	....	2	....	1	....	...
Agawan	57	2,352	24.23	2,425	23.50	7	....	1	....	....	....	1
Amesbury	176	9,798	17.96	10,000	17.60	25	....	....	....	....	2	...
Amherst	73	4,512	16.17	5,000	14.60	8	....	....	3	....	1	...
Arlington	119	5,629	21.14	6,515	18.26	11	....	1	....	....	....	...
Ashland	40	2,532	15.79	2,090	19.13	4	....	1	....	....	....	2
Avon	35	1,384	25.29	1,650	21.21	3	....	....	....	....	1	...
Ayer	28	2,148	13.03	2,100	13.33	.....	....	....	....	....	2	...
Barre	43	2,239	19.20	2,278	18.87	1	....	....	....	....	....	...
Bedford	22	1,092	20.14	1,300	16.92	2	....	....	....	....	....	...
Belchertown	42	2,120	19.81	2,164	19.40	10	....	3	....	....	....	...
Belmont	54	2,198	24.56	2,843	18.99	.....	....	....	....	....	....	...
Beverly	213	10,821	19.68	13,000	16.14	18	....	7	....	1	12	...
Billerica	46	2,380	19.32	2,600	17.69	8	....	....	....	....	....	2
Boston	11,634	448,477	25.94	516,305	22.53	1,328	....	162	27	121	572	67
Bradford	76	3,720	20.43	4,376	17.37	5	....	....	....	....	1	...
Brewster	22	1,003	21.93	990	22.22	2	....	....	....	....	....	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Massachusetts—Cont'd.												
Bridgewater	73	4,249	17.18	4,686	15.58	4	....	....	....	....	2	...
Brimfield	26	1,096	23.72	963	27.20	.....	....	....	....	....	1	...
Brockton	605	27,294	22.16	33,165	18.24	73	....	6	1	1	15	1
Brookfield	60	3,352	17.89	3,400	17.64	7	....	2	....	....	1	...
Cambridge	1,577	70,028	22.52	84,188	18.73	194	....	30	5	6	62	18
Charlton	35	1,847	18.94	1,872	18.69	3	....	....	....	....	1	...
Chatham	31	1,954	15.86	1,800	17.22	3	....	....	....	....	....	...
Chelmsford	56	2,695	20.77	3,162	17.71	.....	....	....	....	....	1	...
Chelsea	638	27,909	22.84	32,716	19.50	19	....	5	1	2	24	1
Chicopee	396	14,050	28.18	18,000	22.00	28	....	6	....	4	25	5
Clinton	170	10,424	16.30	11,497	14.78	24	....	....	....	2	4	...
Cohasset	35	2,448	14.29	2,474	14.18	2	....	1	....	....	....	...
Colerain	14	1,671	8.38	1,650	8.48	1	....	....	....	....	....	...
Concord	62	4,427	14.00	5,175	11.98	8	....	1	....	....	....	...
Cottage City	10	1,080	9.25	1,037	9.64	.....	....	....	....	....	....	...
Danvers	115	7,454	15.42	7,300	15.75	23	....	....	....	....	3	...
Dartmouth	59	3,122	18.89	3,200	18.43	5	....	2	....	....	1	...
Dedham	128	7,123	17.96	7,300	17.53	9	....	2	....	....	3	...
Deerfield	59	2,910	20.27	3,000	19.66	.....	....	1	....	....	1	...
Dighton	21	1,889	11.11	1,750	12.00	3	....	1	....	....	....	...
Douglass	46	1,908	24.11	2,100	21.91	5	....	....	....	....	....	...
Dracut	45	1,996	22.54	2,500	18.00	3	....	....	....	....	....	...
East Bridgewater	56	2,911	19.23	3,000	18.66	2	....	....	....	1	....	...
East Hampton	75	4,395	17.06	5,000	15.00	.....	....	....	....	....	....	...
Edgartown	33	1,156	28.54	1,150	28.69	1	....	....	....	....	1	...
Essex	29	1,713	16.98	1,600	18.12	3	....	1	....	....	....	...
Everett	317	11,068	28.65	20,500	15.46	40	....	6	4	....	7	4
Fairhaven	79	4,076	19.38	3,338	23.67	10	....	....	....	....	....	...
Fall River	2,202	74,398	29.59	98,000	22.46	168	....	25	12	20	50	7
Fitchburg	430	22,037	19.50	28,392	15.14	59	....	4	....	2	18	2
Gloucester	405	24,651	14.13	30,000	13.50	36	....	9	2	5	14	8
Granville	15	1,061	14.13	1,005	14.72	.....	....	....	....	....	1	...
Groton	26	2,057	12.63	2,200	11.82	5	....	....	....	....	1	...
Hadley	24	1,669	14.38	1,700	14.11	1	....	....	....	17	....	...
Hanson	26	1,267	20.52	1,375	18.91	2	....	....	....	....	....	...
Hardwick	31	2,922	10.61	3,100	10.00	2	....	....	....	....	1	...
Harwich	55	2,734	20.11	2,734	20.11	5	....	1	....	....	1	...
Hatfield	16	1,246	12.83	1,300	12.30	.....	....	1	....	....	....	...
Haverhill	558	27,412	20.35	30,209	18.47	50	....	18	....	4	8	...
Hingham	107	4,564	23.44	4,500	23.77	8	....	....	....	....	2	1
Hinsdale	30	1,739	17.25	1,650	18.18	7	....	....	1	....	1	...
Holliston	47	2,619	17.56	2,718	17.29	5	....	....	....	....	1	...
Hopedale	22	1,176	18.71	1,500	14.66	1	....	2	....	3	....	...
Hubbardston	21	1,346	15.60	1,300	16.15	.....	....	....	....	....	....	...
Hyde Park	216	10,193	21.18	11,826	18.27	10	....	5	....	1	10	1
Ipswich	105	4,439	23.65	4,720	22.24	3	....	....	....	....	8	...
Kingston	18	1,659	10.85	1,600	11.25	3	....	1	....	....	....	...
Lanesboro	13	1,018	12.77	848	15.33	1	....	....	1	....	....	...
Lawrence	1,017	44,654	22.77	55,000	18.49	26	....	8	1	3	18	11
Lee	61	3,785	16.11	4,066	15.00	3	....	....	1	....	1	2
Leicester	65	3,120	20.96	3,239	20.06	4	....	....	....	....	....	...
Lenox	40	2,889	13.84	3,000	13.33	2	....	2	....	1	1	1
Lexington	78	3,197	24.39	3,500	22.28	9	....	1	....	....	....	...
Littleton	20	1,025	19.52	1,135	17.63	2	....	....	....	....	....	...
Lowell	1,901	77,696	24.46	87,000	21.85	266	....	36	5	1	47	17
Lynn	1,130	55,727	20.27	64,000	17.65	115	....	27	5	4	62	7
Malden	481	23,031	20.88	38,000	12.65	65	....	6	1	3	6	...
Manchester	24	1,789	13.41	1,876	12.78	1	....	....	....	....	2	...
Marblehead	123	8,202	14.99	7,600	16.18	10	....	2	....	....	8	...
Mattapoisett	22	1,148	19.16	1,100	20.00	.....	....	....	....	1	....	...
Medford	253	11,079	22.84	15,800	16.01	26	....	3	1	....	11	3
Melrose	195	8,519	22.88	12,000	16.25	13	....	2	....	1	2	1
Merrimac	34	2,633	12.87	2,301	14.73	1	....	....	....	....	....	...
Methuen	103	4,814	21.39	6,000	17.16	10	....	2	....	....	1	...
Middleboro	100	6,065	17.97	6,689	16.29	5	....	1	....	....	2	...
Milbury	96	4,428	21.68	5,222	18.38	9	....	....	....	1	1	...
Milton	66	4,278	15.40	5,518	11.99	5	....	3	....	....	3	...
Nantucket	87	3,268	26.62	3,000	29.00	3	....	....	....	....	1	1

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Massachusetts—Cont'd.												
New Bedford	1,192	40,733	29.26	55,251	21.57	109	....	14	1	3	33	10
Newburyport	253	13,947	18.20	15,000	16.86	16	....	8	1	....	10	...
Newton	496	24,379	20.34	28,280	17.53	44	....	7	....	1	21	1
Northampton	322	14,990	21.48	17,000	18.94	39	....	2	....	....	4	...
Norton	20	1,785	11.20	1,614	12.38	.....	....	....	....	....	....	...
Orange	81	4,568	17.73	5,500	14.72	10	....	....	....	....	....	...
Orleans	28	1,219	22.96	1,198	23.37	.....	....	....	....	....	....	...
Palmer	117	6,520	17.94	6,858	17.06	19	....	2	....	....	10	...
Petersham	24	1,050	22.85	1,050	22.85	1	....	....	....	....	1	...
Pittsfield	345	17,281	19.96	21,000	16.42	31	....	10	1	....	14	...
Plymouth	166	7,314	22.69	8,000	20.75	4	....	3	....	2	....	1
Quincy	340	16,723	20.32	22,000	15.45	41	....	9	....	3	13	2
Randolph	87	3,946	22.04	3,694	23.55	14	....	1	....	....	1	...
Reading	68	4,088	16.63	4,717	14.41	3	....	3	....	....	1	...
Rochester	19	1,012	18.77	1,000	19.00	1	....	....	....	....	....	1
Rockland	75	5,213	14.38	5,600	13.38	14	....	1	....	....	....	...
Rowley	29	1,248	23.23	1,270	22.75	1	....	....	....	....	....	...
Salem	746	30,801	24.22	34,473	21.63	52	....	4	3	3	30	5
Salisbury	23	1,316	17.25	1,350	17.11	.....	....	....	....	1	....	...
Sandwich	24	1,819	13.18	1,580	15.12	.....	....	....	....	....	....	...
Saugus	87	3,673	23.68	4,664	18.65	6	....	....	....	....	1	...
Scituate	58	2,318	25.02	2,350	24.68	4	....	2	....	1	2	...
Seekonk	24	1,317	18.22	1,465	16.38	3	....	....	....	....	1	...
Sharon	45	1,634	27.47	2,000	22.50	4	....	1	....	....	....	...
Sheffield	35	1,954	17.91	1,887	18.54	.....	....	....	....	....	....	...
Shelburne	25	1,553	16.09	1,500	16.66	.....	....	....	....	....	....	...
Sherborn	20	1,381	14.48	1,440	13.88	2	....	....	....	....	....	...
Shrewsbury	26	1,449	10.78	1,524	17.06	4	....	....	....	....	....	...
Somerset	43	2,106	20.41	1,900	22.63	1	....	....	....	....	2	...
Somerville	924	40,152	23.01	56,000	16.50	70	....	26	6	5	65	5
Southampton	11	3,434	3.20	1,054	10.43	1	....	....	....	....	....	...
Southboro	48	2,114	22.70	2,200	21.81	2	....	....	....	....	....	...
Southbridge	154	7,655	20.11	8,250	18.66	21	....	....	....	....	2	...
Sterling	28	1,244	22.50	1,300	21.53	3	....	....	....	....	....	...
Sutton	65	3,180	20.44	3,500	18.57	8	....	2	....	1	3	...
Swampscott	60	3,198	18.76	3,200	18.75	5	....	....	1	....	4	...
Swansea	35	1,456	24.03	1,650	21.21	4	....	....	....	....	1	...
Taunton	583	25,448	22.90	27,115	21.50	69	....	6	....	....	11	2
Tewksbury	43	2,515	17.09	2,200	19.50	.....	....	1	....	....	....	...
Tisbury	26	1,506	17.26	1,000	26.00	.....	....	....	....	1	....	...
Topsfield	23	1,022	22.50	1,000	23.00	1	....	....	....	....	....	...
Townsend	34	1,750	19.42	1,700	20.00	2	....	2	....	....	....	...
Upton	36	1,878	19.16	2,200	16.36	5	....	....	....	....	....	...
Uxbridge	85	3,408	24.94	3,550	23.94	3	....	2	....	....	....	1
Wakefield	158	6,982	22.62	8,300	19.03	10	....	3	....	....	1	...
Waltham	345	18,707	18.44	21,812	15.81	51	....	4	....	4	8	4
Warren	67	4,681	14.31	4,500	14.88	3	....	1	....	....	3	...
Watertown	114	7,073	16.11	7,919	14.39	12	....	4	....	....	7	...
Webster	129	7,031	18.34	7,000	18.42	9	....	3	....	....	6	1
Westfield	163	9,805	16.62	10,663	15.28	16	....	3	....	....	6	...
Westford	51	2,250	22.62	2,418	21.50	6	....	....	....	....	1	...
Westminster	16	1,688	9.48	1,315	12.16	.....	....	....	....	....	....	...
Weston	21	1,664	12.62	1,710	12.28	.....	....	1	....	....	....	...
Westport	61	2,599	23.47	2,678	22.77	4	....	....	....	....	2	1
Weymouth	186	10,866	17.11	11,300	16.46	25	....	6	....	....	4	1
Whitman	86	4,441	21.61	6,000	14.33	6	....	1	....	....	....	...
Williamsburg	27	2,057	13.12	1,900	14.21	6	....	1	....	....	....	...
Woburn	233	13,499	17.26	14,178	16.43	24	....	....	1	2	2	...
Worcester	1,796	84,655	16.85	103,086	17.42	264	....	14	7	6	70	3
Wrentham	42	2,566	16.36	3,000	14.00	1	....	1	....	....	1	...
Total	38,387	1,692,325	22.67	1,982,945	19.35	3,908	....	548	92	239	1365	201
Michigan:												
Alma	12	1,655	750	1,800	6.66	2	....	....	....	....	....	...
Alpena	214	11,283	18.97	15,000	14.26	3	....	3	3	....	....	...
Bay City	381	27,839	13.68	33,000	11.54	51	....	5	40	....	3	...
Belding	26	1,730	11.56	3,000	6.67	2	....	3	....	....	....	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Michigan—Continued.												
Benton Harbor	92	3,692	24.91	6,810	13.51	6	....	1	....	....	10	...
Bessemer	36	2,566	14.03	3,000	12.28	3	....	3	....	....	....	...
Big Rapids	56	5,303	10.56	5,500	10.18	6	....	....	....	....	....	...
Buchanan	20	1,994	10.03	2,000	10.00	2	....	1	....	....	....	...
Cardillac	64	4,461	14.34	5,500	11.63	6	....	....	....	....	....	...
Cassopolis	22	1,369	16.07	1,500	14.66	2	....	....	....	....	....	1
Chesaning	17	1,056	16.09	2,800	6.07	1	....	....	....	....	....	...
Cold Water	63	5,247	12.00	5,286	11.91	14	....	3	....	....	3	...
Decatur	10	1,109	9.01	1,300	7.68	.....	....	....	....	....	....	...
Detroit	3,927	205,876	19.07	275,000	14.28	415	11	54	1	25	214	13
Essexville	20	1,545	12.94	2,000	10.00	.....	....	....	6	....	....	...
Flint	186	9,803	18.97	10,045	18.51	15	....	3	3	....	....	...
Frankfort	10	1,175	8.51	2,500	4.00	2	....	....	....	....	....	...
Fremont	7	1,097	6.35	1,500	4.66	1	....	2	1	....	....	...
Grand Haven	115	5,023	22.89	6,000	19.16	2	....	3	....	1	....	...
Grand Rapids	926	60,278	15.36	90,000	10.26	117	....	9	1	2	9	4
Greenville	36	3,056	11.78	3,500	10.28	.....	....	....	....	....	....	...
Harbor Springs	21	1,052	19.96	1,500	14.00	6	....	....	....	....	....	...
Hartford	43	1,044	4.18	1,200	3.66	1	....	....	....	....	....	...
Hastings	12	2,972	4.03	3,000	4.00	.....	....	....	....	....	....	...
Hillsdale	48	3,915	12.26	4,200	11.43	6	....	1	....	....	....	...
Holland	30	3,945	7.60	8,000	3.75	5	....	....	....	....	3	...
Howard	16	1,137	14.07	1,500	10.66	2	....	....	....	....	....	...
Hudson	20	2,178	19.41	3,000	6.67	4	....	....	....	....	....	...
Ionia	103	4,482	22.92	6,000	17.16	.....	....	1	....	....	1	...
Ishpeming	117	11,197	10.44	12,000	9.75	12	....	2	....	....	17	...
Ithaca	31	1,627	18.43	3,000	10.33	7	....	....	....	....	....	...
Jonesville	15	1,288	11.64	1,200	12.50	.....	....	1	....	....	....	...
Kalamazoo	337	17,853	18.87	22,000	15.32	50	....	7	2	....	3	1
Kalkaska	15	1,161	12.92	1,400	10.71	2	....	....	....	....	3	1
Lake View	14	1,024	13.67	1,100	12.72	2	....	....	....	....	3	1
Lansing	170	13,102	12.97	17,000	10.00	2	....	5	....	....	....	...
Lapeer	15	2,753	5.45	3,500	4.29	1	....	....	....	....	....	...
Mancelona	35	1,205	29.04	3,000	11.66	.....	....	....	....	....	....	...
Marine City	45	3,268	13.77	3,850	11.68	.....	1	....	....	4	1	...
Marquette	150	9,093	16.49	10,000	15.00	2	....	2	1	....	4	...
Mason	16	1,875	8.53	2,000	8.00	.....	....	....	....	....	....	1
Monroe	50	5,258	9.51	5,280	9.47	.....	....	....	....	....	1	1
Mount Clemens	65	4,748	13.69	6,000	10.83	5	....	....	....	....	5	...
Muskegon	300	22,702	13.83	20,000	15.00	6	....	3	2	....	12	...
Negaunee	75	6,078	12.33	6,000	12.50	5	....	5	....	2	6	...
North Muskegon	7	1,590	4.43	700	10.00	.....	....	1	....	....	....	...
Owosso	92	6,564	11.13	11,000	8.36	.....	....	3	....	....	3	...
Oxford	14	1,128	12.41	1,400	10.00	2	....	....	....	....	....	...
Palmer	5	1,011	4.94	500	10.00	1	....	....	....	....	....	...
Port Huron	251	13,543	18.53	20,000	12.55	20	....	3	....	5	4	1
Romeo	14	1,687	8.29	1,700	8.23	.....	....	....	....	....	....	...
Saginaw*	225	16,000	14.06	18,000	12.50	10	....	1	1	....	6	...
St. Ignace	8	2,704	2.95	2,000	4.00	2	....	....	....	....	....	...
St. Joseph	34	3,733	9.10	5,000	6.80	5	....	....	....	....	....	...
St. Louis	38	2,246	16.91	2,500	15.20	3	....	3	....	....	....	...
Sand Beach	9	1,046	8.60	1,400	6.42	3	....	....	....	....	....	...
Stanton	7	1,352	5.17	1,400	4.99	.....	....	....	....	....	....	...
Sturgis	28	2,489	11.34	3,500	8.00	1	....	....	....	....	....	...
Tawas	8	1,544	5.18	1,800	4.44	.....	....	1	....	....	....	...
Tecumseh	29	2,310	12.26	2,300	12.60	1	....	1	....	....	....	...
Three Rivers	28	3,131	8.73	3,300	8.48	2	....	1	....	....	....	...
Union	7	1,156	6.05	300	23.33	2	....	....	....	....	2	...
West Bay City	253	12,981	18.46	13,000	18.46	18	....	4	6	....	20	...
Wyandotte	100	3,817	26.19	4,000	25.00	1	....	3	....	1	7	...
Total	9,184	567,404	14.59	711,751	12.93	839	12	138	67	40	341	25
Minnesota:												
Alexandria	23	2,118	10.85	2,813	8.17	2	....	....	....	....	1	...
Cannon Falls	15	1,078	14.01	1,500	10.00	3	....	4	....	....	....	...
Chaska	20	2,210	9.05	2,500	8.00	.....	....	....	....	....	....	..
Chatfield	25	1,335	18.72	1,500	16.66	2	....	1	1	....	1	1

* West side.

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Minnesota—Continued.												
Cloquet	15	2,530	5.92	3,000	5.00	2	....	....	....	....	....	...
Crystal	3	1,074	27.93	900	3.33	.....	....	....	....	....	....	...
Detroit	22	1,510	14.57	1,300	16.92	.....	....	....	....	....	1	...
Duluth	634	33,115	19.14	60,000	10.56	45	....	153	5	5	9	1
Jordan	10	1,233	8.11	1,500	6.66	.....	....	....	....	....	4	...
Lake City	37	2,128	17.38	2,700	13.70	5	....	....	....	....	....	...
Luverne	17	1,466	11.59	2,200	7.72	1	....	1	....	....	....	...
Minneapolis	2,044	164,738	12.40	223,700	9.13	215	....	60	18	8	105	19
New Ulm	55	3,741	14.70	5,000	11.00	6	....	....	....	....	....	...
North St. Paul	9	1,099	8.18	1,000	9.00	3	....	....	....	....	....	...
Owatonna	40	3,849	10.39	6,000	6.66	5	....	4	....	....	2	1
St. Charles	12	1,178	10.18	1,500	8.00	.....	....	....	....	....	....	1
St. Paul	1,434	133,156	10.76	155,000	9.25	199	....	37	3	5	72	6
Sauk Center	22	1,695	12.97	2,200	10.00	2	....	3	....	....	1	...
Sauk Rapids	8	1,185	6.75	1,400	5.71	3	....	....	....	....	1	...
Sleepy Eye	16	1,513	10.57	2,000	8.00	7	....	....	....	....	....	...
Stillwater	140	11,260	12.43	12,000	11.66	13	....	5	....	4	3	...
South St. Paul	9	2,242	4.01	3,000	3.00	3	....	1	....	....	....	...
South Stillwater	10	1,304	7.66	1,240	8.07	.....	....	....	....	....	....	...
White Bear Lake	12	1,356	8.84	1,500	8.00	.....	....	....	....	....	....	1
Willmar	20	1,825	10.95	2,600	7.69	2	....	....	....	1	3	...
Winona	299	18,208	16.42	22,000	13.59	17	....	1	....	....	7	11
Total	4,951	398,146	12.43	520,053	9.52	535	....	270	27	23	210	41
Mississippi:												
Iuka	6	1,019	5.88	1,000	6.00	1	....	....	....	....	....	...
Total	6	1,019	5.88	1,000	6.00	1	....	....	....	....	....	...
Missouri:												
Boonville	25	4,141	6.03	4,300	5.81	4	....	1	2	....	....	...
Carthage	108	7,981	13.51	10,000	10.80	.....	....	10	....	....	3	...
Chillicothe	70	5,717	12.25	7,000	10.00	6	....	3	....	....	2	..
Clinton	68	4,737	14.35	7,000	9.71	6	....	....	2	....	2	1
Higbee	20	1,093	18.71	1,600	12.50	.....	....	....	....	....	....	...
St. Joseph	682	52,324	13.05	55,000	12.40	58	....	22	6	4	21	15
St. Louis	9,897	451,770	22.38	570,000	17.36	1,026	....	106	17	8	377	53
Webster Groves	9	1,783	5.04	2,019	4.45	3	....	....	....	....	....	...
Wellsville	21	1,138	18.45	1,350	15.55	3	....	....	....	....	....	...
Total	10,900	530,684	20.53	658,269	16.55	1,106	....	142	27	12	405	79
Montana:												
Phillipsburg	14	1,058	13.33	1,400	10.00	.....	....	2	1	....	....	...
Total	14	1,058	13.33	1,400	10.00	.....	....	2	1	....	....	...
Nebraska:												
Chadron	4	1,867	21.42	3,000	13.33	.....	....	....	....	....	....	...
Fairmont	10	1,029	9.71	1,000	10.00	.....	....	....	....	....	....	...
Lincoln	274	55,154	4.96	50,000	5.48	20	....	7	....	....	22	3
Neligh	8	1,209	6.61	1,300	6.15	.....	....	....	....	....	....	...
Omaha	929	140,452	6.61	140,452	6.61	85	....	18	....	6	47	9
O'Neill	5	1,226	4.07	1,500	3.33	3	....	1	....	....	....	...
Sutton	7	1,541	4.54	1,800	3.88	1	....	....	....	1	1	...
Total	1,237	202,478	6.19	199,052	6.21	109	....	26	....	7	70	12
New Hampshire:												
Andover	8	1,090	7.34	1,000	8.00	.....	....	1	....	....	....	...
Antrim	28	1,248	22.35	1,375	20.35	1	....	....	....	....	3	...
Bedford	16	1,102	14.51	1,100	14.54	.....	....	....	....	....	1	...
Belmont	23	1,142	20.14	1,200	19.16	1	....	....	....	....	....	...
Bethlehem	12	1,267	9.47	1,300	9.23	2	....	....	....	....	....	...
Candia	20	1,108	18.05	1,200	16.66	.....	....	1	....	....	....	...
Chesterfield	13	1,046	12.42	1,100	11.81	1	....	....	....	....	....	...
Concord	343	17,004	20.17	19,000	18.05	2	....	5	....	....	8	2

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
New Hampshire—Cont'd.												
Franklin	74	4,085	18.11	5,000	14.80	2	....	2	....	....	....	...
Gilford	16	3,585	4.46	800	20.00	.....	....	....	....	....	....	...
Gilmanton	24	1,211	19.81	1,200	20.00	2	....	....	....	....	....	...
Gorham	26	1,710	15.20	2,000	13.00	.....	....	1	....	....	1	...
Hanover	30	1,817	16.51	1,817	16.51	2	....	1	....	....	....	...
Henniker	21	1,385	15.16	1,300	16.15	1	....	....	....	....	....	...
Hinsdale	25	1,258	10.95	1,900	13.68	1	....	....	....	....	....	...
Jaffrey	23	1,469	15.65	1,500	15.33	5	....	....	....	....	....	...
Jefferson	12	1,062	11.29	1,200	10.00	.....	....	....	....	....	....	...
Keene	121	7,446	16.25	8,000	15.12	11	....	2	....	....	....	...
Kingston	23	1,120	20.53	1,120	20.53	3	....	....	....	....	1	...
Lancaster	54	3,373	13.04	4,500	12.00	3	....	1	....	4	5	...
Littleton	60	3,365	17.82	4,000	15.00	.....	....	....	....	....	....	...
Loudon	14	1,000	14.00	1,000	14.00	.....	....	1	....	....	....	...
Manchester	1,051	44,126	23.81	56,000	18.77	112	....	20	3	1	42	4
Milan	17	1,029	16.52	1,200	14.16	.....	....	....	....	....	....	...
Nashua	426	19,311	22.06	23,000	18.52	.....	....	7	6	1	4	...
New Boston	20	1,067	18.74	1,075	18.64	2	....	....	....	....	....	...
Newton	13	1,064	12.21	1,100	11.81	1	....	....	....	....	....	...
Ossipee	38	1,630	23.31	1,600	23.75	5	....	....	....	....	....	...
Peterboro	44	2,507	17.55	2,500	17.60	3	....	....	1	....	....	...
Plaistow	9	1,085	8.29	1,000	9.00	1	....	....	....	....	....	...
Rollinsford	32	2,003	15.97	2,003	15.97	.....	....	1	....	....	....	...
Salem	22	1,805	12.18	1,800	12.22	3	....	....	....	....	....	...
Sanborntown	15	1,027	14.61	1,100	13.63	2	....	....	....	....	....	...
Seabrook	25	1,672	14.95	1,583	15.79	3	....	....	....	....	....	...
Tilton	37	1,521	24.32	1,520	24.34	2	....	....	....	....	....	...
Wolfboro	43	3,020	14.23	3,030	14.18	2	....	....	....	....	....	...
Total	2,778	142,760	19.47	161,123	17.24	173	....	43	10	6	65	6
New Jersey:												
Bordentown	78	4,232	18.43	4,500	17.55	10	....	1	....	....	1	2
Bound Brook	25	1,462	17.09	2,500	10.00	1	....	....	....	....	4	...
Camden	1,450	58,313	24.86	65,000	22.30	.....	....	21	....	2	89	...
Carlstadt	35	1,549	22.59	3,000	11.66	2	....	....	5	....	1	...
Clayton	11	1,807	6.08	2,000	5.50	1	....	1	....	....	....	...
Egg Harbor	34	1,439	23.62	1,537	22.12	3	....	1	....	....	2	1
Florence	18	1,340	13.43	1,800	10.00	3	....	....	....	1	2	...
Fort Lee	75	1,253	59.85	4,080	18.38	3	*3	1	....	....	....	...
Haddenfield	43	2,502	17.18	2,900	14.82	3	....	....	....	....	....	...
Hoboken	1,347	43,648	30.85	56,000	24.05	152	....	....	8	7	75	7
Jersey City	4,367	163,003	26.79	187,098	23.34	435	....	114	28	10	294	55
Keyport	28	3,411	8.21	3,500	8.00	.....	....	2	....	....	1	...
Newark	4,716	181,830	25.81	230,000	20.50	.....	....	....	....	17	216	...
Perth Amboy	288	9,512	30.27	14,000	20.57	14	....	2	....	1	9	...
Rahway	132	7,105	18.57	8,200	16.09	10	....	6	3	....	2	...
Red Bank	76	4,145	18.33	5,250	14.46	3	....	2	....	....	....	...
Riverside	34	1,340	25.37	2,000	17.00	2	....	3	2	1	3	2
Tenafly	13	1,046	12.52	1,800	7.22	1	....	....	....	....	....	...
Total	12,770	488,937	26.11	595,165	21.13	643	3	154	46	39	699	67
New Mexico:												
Deming	9	1,136	7.92	1,500	6.00	2	....	....	....	....	....	...
East Las Vegas	38	2,312	16.43	3,400	11.17	12	....	3	....	....	1	...
Total	47	3,448	13.60	4,900	9.59	14	....	3	....	....	1	...
New York:												
Adams	24	1,360	17.64	1,400	17.14	2	....	....	....	....	2	...
Akron	26	1,492	17.42	1,200	21.66	.....	....	....	....	....	....	...
Albany	2,101	94,923	22.13	100,000	21.01	298	....	97	12	3	61	24
Albion	72	4,586	15.70	4,536	15.87	2	....	5	3	....	....	...
Alexandria Bay	14	1,123	12.46	1,300	10.76	3	....	....	....	....	....	...
Amherst	45	4,014	11.21	4,000	11.25	3	....	3	....	....	....	4
Amityville	26	2,293	11.34	2,300	11.30	.....	....	....	....	....	....	...
Amsterdam	337	17,336	19.35	18,542	18.17	37	....	5	17	2	17	3

* Varioloid.

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
New York—Continued.												
Athens	25	2,024	12.35	2,500	10.00	2	....	....	....	....	1	....
Auburn	462	25,858	17.86	24,737	18.67	53	....	2	1	12	4	4
Baldwinsville	30	3,040	9.86	3,040	9.86	5	....	....	2	....	.....	....
Ballston Spa	59	3,527	16.72	3,527	16.72	.....	....	1	2	....	.....	2
Batavia	94	7,221	13.01	7,221	13.01	8	....	2	....	....	.....	....
Bath	40	3,261	12.26	3,261	12.26	4	....	2	....	....	.....	....
Binghamton	497	35,005	14.18	34,514	14.40	51	....	9	....	....	15	5
Booneville	43	3,509	12.25	3,512	12.24	1	....	....	....	....	.....	....
Brockport	65	3,742	17.37	3,742	17.37	3	....	3	....	....	1	....
Brookfield	35	3,262	10.73	3,235	10.81	7	....	1	....	....	.....	1
Brookhaven	207	12,772	16.20	13,493	15.34	31	....	2	....	....	4	2
Brooklyn	22,576	806,343	27.90	1,100,100	20.52	2,245	1	163	333	146	1,310	179
Buffalo	4,452	255,664	17.41	335,709	13.26	417	....	68	32	14	272	64
Cambridge	37	1,598	23.15	1,500	24.66	6	....	....	1	....	.....	....
Camden	59	3,391	17.39	3,675	16.05	4	....	1	....	....	.....	....
Canajoharie	71	2,089	33.98	4,500	15.77	1	....	2	3	....	.....	4
Canandaigua	73	5,868	12.44	5,868	12.44	6	....	2	....	....	1	....
Candor	43	3,674	11.70	3,525	12.19	3	1	2	....	....	.....	....
Canton	80	6,096	13.12	6,013	13.30	9	....	....	1	....	.....	....
Cape Vincent	32	3,014	10.61	3,000	10.66	1	....	....	....	1	2	....
Catskill	89	4,920	18.16	5,000	17.39	10	....	1	....	....	.....	....
Cazenovia	43	4,182	10.28	3,803	11.30	3	....	....	....	....	.....	....
Clayton	57	4,411	12.92	4,250	13.41	6	....	....	....	....	.....	....
Clyde	45	2,638	17.05	3,000	15.00	2	....	3	....	....	.....	....
Cobleskill	60	3,443	17.42	3,436	17.45	6	....	....	....	....	1	....
Cohoes	475	22,509	21.09	24,000	19.79	43	....	13	14	2	28	2
College Point	96	6,127	15.65	6,500	14.15	8	....	....	....	....	.....	1
Cooperstown	38	2,657	14.30	3,000	12.66	2	....	2	....	....	.....	....
Corinth	35	1,222	28.64	2,000	17.50	3	....	5	3	1	.....	....
Corning	165	8,550	19.29	10,025	16.45	13	....	15	1	1	1	....
Cortland	115	8,590	13.39	8,600	13.37	14	....	....	....	....	.....	....
Coxsackie	69	3,773	18.28	3,8.4	18.04	12	....	5	1	....	1	....
Dansville	65	3,758	17.29	3,758	17.29	8	....	3	....	....	.....	....
Delhi	52	2,908	17.88	3,000	17.33	2	....	....	....	....	.....	....
De Witt	68	4,560	14.91	5,182	13.12	6	....	....	....	2	3	....
Dobbs Ferry	37	2,083	17.75	2,500	14.80	3	....	....	....	....	2	1
Dunkirk	133	9,416	14.12	10,000	13.30	11	....	3	1	....	2	....
East Syracuse	34	2,231	15.23	3,300	10.30	8	....	1	....	....	1	....
Edgewater	380	14,265	26.63	15,000	25.30	26	....	3	1	3	46	2
Ellenville	58	2,881	20.13	3,000	19.33	4	....	....	....	....	9	....
Ellisburg	60	4,145	14.47	4,223	14.20	5	....	....	....	....	.....	....
Elmira	497	30,893	16.08	30,000	16.56	49	....	45	1	....	5	1
Esopus	55	4,659	11.80	5,035	10.92	2	....	3	....	....	1	....
Fishkill	231	11,840	19.51	11,726	19.70	19	....	5	7	1	3	2
Flushing	426	19,803	21.51	20,816	20.46	41	....	6	2	....	9	8
Fort Edward	75	4,424	16.95	4,382	17.11	11	....	....	1	....	6	....
Fort Plain	55	3,864	19.20	3,000	18.33	3	....	....	1	....	.....	1
Frankfort	63	2,291	27.49	5,000	12.60	3	....	1	....	....	1	....
Fredonia	73	3,399	21.86	3,400	21.47	4	....	1	....	....	1	....
Fulton	69	4,214	16.37	4,214	16.37	10	....	....	....	....	.....	....
Geneva	157	7,557	20.77	7,557	20.77	19	....	2	....	1	3	....
Glens Falls	198	9,509	20.82	10,000	19.80	25	....	4	5	....	9	2
Gloversville	218	13,864	15.72	14,694	14.83	24	....	6	1	....	1	2
Goshen	89	5,021	17.72	4,646	19.15	13	....	....	....	....	1	....
Gouverneur	73	5,851	12.47	6,000	12.16	10	....	....	....	....	.....	....
Granville	38	4,716	8.04	5,281	7.19	6	....	....	2	1	1	1
Greensburg	201	11,613	17.30	12,000	16.75	23	....	1	2	....	12	3
Greenbush	157	7,301	21.51	7,462	21.04	11	....	10	3	1	2	....
Greene	63	1,067	59.04	4,200	15.00	3	....	2	....	....	1	....
Green Island	99	4,463	22.18	4,500	22.00	7	....	....	2	....	1	....
Greenwish	70	4,196	16.68	4,431	15.79	9	....	1	4	2	2	....
Hamilton	73	3,923	18.60	4,110	17.76	3	....	1	1	....	5	....
Hancock	37	4,745	7.78	4,000	9.25	.....	....	....	....	....	1	....
Hastings	23	1,466	15.68	1,800	12.72	4	....	....	....	....	.....	....
Havana	34	1,751	30.60	1,500	22.66	3	....	1	....	....	.....	....
Haverstraw	122	5,070	24.06	7,714	15.81	10	....	1	....	....	2	....
Hector	68	4,443	15.30	4,832	14.07	2	....	3	2	....	.....	....
Hempstead	387	23,756	16.29	24,000	16.08	24	....	3	9	....	15	....

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
New York—Continued.												
Herkimer	71	4,666	15.21	5,150	10.95	9	....	1	1	....	.....	2
Homer	43	4,206	10.22	3,000	13.43	2	....	....	....	....	.....	...
Hoosick Falls	83	7,014	11.83	7,014	11.83	13	....	1	....	2	6	...
Hornellsville	128	10,996	11.64	12,000	10.66	11	....	1	....	1	1	...
Horseheads	53	3,482	15.22	3,319	15.96	6	....	2	....	....	2	...
Hudson	181	9,970	18.15	9,633	18.78	24	....	4	1	....	6	...
Huntington	140	8,277	16.91	8,253	16.96	8	....	2	....	....	1	...
Illion	58	4,057	14.29	4,057	14.29	7	....	....	....	1	.....	2
Ithaca	160	11,079	14.44	13,460	11.88	15	....	2	2	....	.....	6
Jamaica	491	14,441	33.99	17,654	29.48	19	....	3	1	4	21	10
Jamestown	223	16,038	13.90	18,627	11.97	24	....	3	4	....	6	...
Johnstown	124	7,768	15.97	7,768	15.97	15	....	7	....	....	.....	4
Jordon	24	1,271	18.87	1,500	16.00	.....	....	....	....	....	.....	...
Kingsbury	109	4,677	23.30	5,112	23.32	4	....	3	1	....	8	2
Kingston	463	21,261	21.77	21,500	21.53	65	....	8	9	2	17	3
Lansingburg	214	10,551	20.28	10,550	20.28	19	....	6	2	1	5	...
Le Roy	59	2,743	21.50	3,000	19.66	6	....	1	....	....	.....	...
Liberty	63	3,357	18.76	3,500	18.00	17	....	....	....	2	.....	...
Little Falls	172	8,783	19.58	12,000	14.33	24	....	4	6	1	2	2
Lockport	234	16,038	14.59	16,088	14.59	22	....	5	1	....	1	...
Long Island City	987	30,506	32.35	36,000	27.41	92	....	10	9	4	49	11
Lyons	75	4,475	16.76	6,127	12.24	8	....	1	....	1	7	...
Malone	97	4,986	19.45	5,000	19.40	14	....	1	1	....	1	...
Manchester	84	4,439	18.92	4,181	20.09	7	....	4	....	....	5	...
Marathon	18	1,197	15.03	1,197	15.03	.....	....	....	....	....	.....	...
Marbletown	56	3,639	15.38	3,689	15.18	5	....	3	1	....	1	1
Mayville	9	1,164	7.73	1,200	7.50	1	....	....	....	....	.....	...
Mechanicsville	50	2,679	18.66	3,000	16.66	10	....	3	1	....	2	...
Medina	58	4,492	12.91	4,500	12.88	2	....	3	4	....	.....	...
Middletown	219	11,977	18.28	11,612	18.86	25	....	8	1	....	4	1
Minden	103	5,198	19.81	6,200	16.61	11	....	1	2	....	3	1
Mohawk	48	1,806	25.47	2,000	24.00	4	....	1	....	....	.....	...
Montgomery	109	5,061	21.53	5,259	20.72	11	....	1	1	....	1	8
Mount Vernon	298	10,830	27.51	15,513	19.21	25	....	2	6	....	9	4
Newark	59	3,698	15.95	3,000	19.66	8	....	2	....	....	.....	...
New Brighton	346	16,423	21.06	17,261	20.04	30	....	4	....	....	17	5
Newburg	484	23,087	20.96	24,536	19.72	57	....	8	8	....	6	...
New Rochelle	132	8,217	16.06	8,217	16.06	13	....	3	....	....	5	5
Newtown	620	17,549	35.34	20,000	31.00	52	....	....	1	1	43	10
New York City	41,616	1,515,301	27.46	1,995,000	20.86	5,294	1	297	714	402	1,763	435
Niagara Falls	252	10,979	22.95	16,000	15.75	24	....	16	2	1	10	...
North Hempstead	152	8,134	18.68	8,726	17.41	13	....	1	....	1	3	1
North Tonawanda	123	4,793	25.66	9,000	12.66	4	....	10	1	....	4	1
Norwich	112	5,212	21.48	5,212	21.48	11	....	2	....	....	3	3
Nyack	60	4,111	14.59	5,603	10.70	2	....	....	....	....	1	...
Ogdensburg	248	11,662	21.26	12,000	20.66	25	....	5	2	2	22	1
Olean	120	7,358	16.30	8,000	14.96	4	....	5	....	....	.....	...
Oneida	95	6,083	15.61	6,083	15.61	12	....	1	....	2	.....	1
Oneonta	114	6,272	18.17	6,776	16.82	9	....	4	....	....	12	...
Oswego	369	21,842	16.89	22,000	16.79	42	....	6	....	2	10	5
Owego	92	9,008	10.21	6,000	15.33	9	....	4	....	....	.....	...
Oyster Bay	261	13,870	12.81	15,000	17.36	28	....	3	1	1	.....	10
Palmyra	73	4,188	17.43	4,123	17.49	10	....	....	....	....	.....	...
Peekskill	188	9,676	19.43	9,676	19.43	27	....	1	7	....	2	2
Penn Yan	80	4,254	18.80	4,254	18.80	4	....	4	1	1	.....	...
Phelps	72	5,086	14.15	5,150	13.98	5	....	2	....	....	2	...
Plattsburg	125	7,010	17.83	7,010	17.83	16	....	3	12	1	10	1
Port Chester	100	5,274	18.96	5,274	18.96	7	....	1	....	....	5	...
Port Jarvis	173	9,327	18.54	9,327	18.54	17	....	6	4	....	2	...
Port Richmond	122	6,290	19.39	6,390	19.09	16	....	....	....	....	3	8
Potsdam	78	3,961	19.69	4,000	19.50	6	....	....	....	....	2	...
Poughkeepsie	499	22,206	22.47	23,200	21.50	45	....	5	13	1	5	12
Ramapo	92	5,910	15.56	6,600	13.93	12	....	....	....	....	5	...
Richfield Springs	40	1,623	24.63	1,600	25.00	2	....	....	....	....	1	...
Richland	45	3,761	11.96	3,637	12.37	5	....	1	1	....	.....	...
Rochester	2,303	133,896	17.16	170,000	13.51	303	....	27	5	15	78	6
Rome	197	14,991	13.14	13,638	14.44	31	....	2	....	....	1	3
Rosendale	113	6,063	18.63	6,125	18.44	6	....	....	2	1	4	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
New York—Cont'd.												
Sag Harbor	47	2,300	20.43	3,000	15.66	6	....	1	1	....	.....	...
St. Johnsville	30	1,263	23.75	1,800	16.66	3	....	1	.....	....	.....	...
Salamanca	33	3,692	8.93	3,700	8.91	4	....	1	.....	....	3	...
Salem	29	3,127	9.67	3,167	9.15	.....	....	1	.....	....	.....	...
Sandy Hill	66	2,895	22.79	2,500	26.40	2	....	1	1	....	8	...
Saratoga Springs	276	11,975	23.04	12,000	23.53	34	....	2	13	....	8	...
Saugerties	62	4,237	14.63	4,237	14.63	8	....	1	.....	1	.....	...
Schenectady	435	19,102	22.76	22,858	19.03	41	....	23	25	4	2	1
Schuylerville	24	1,387	17.30	2,000	12.00	2	....	1	2	....	.....	...
Seneca Falls	112	6,116	18.30	6,500	17.23	11	....	.....	.....	....	1	...
Sing Sing	131	9,352	14.00	9,500	13.78	18	....	2	.....	....	4	...
Southold	105	7,705	13.62	7,671	13.68	6	....	3	.....	1	.....	1
Syracuse	1,576	88,143	17.88	100,000	15.76	177	....	32	4	26	45	1
Tonawonda	118	7,666	15.38	9,000	10.41	11	....	3	.....	1	7	...
Troy	1,407	60,956	29.05	65,000	21.64	226	....	27	15	3	54	5
Utica	921	44,007	20.92	46,608	19.76	114	....	9	1	4	30	5
Walton	63	4,543	13.86	4,811	13.09	2	....	1	.....	....	9	...
Wappinger Falls	92	3,718	24.74	3,718	24.74	11	....	.....	.....	....	13	1
Warsaw	54	3,120	17.30	4,700	11.48	3	....	3	.....	....	3	...
Warwick	107	6,000	17.83	6,000	17.83	10	....	1	1	....	.....	3
Waterford	93	5,286	17.59	5,522	16.84	5	....	2	.....	1	.....	3
Waterloo	75	4,350	17.24	4,350	17.24	10	....	1	1	....	.....	...
Watertown	312	14,725	21.18	17,000	18.34	34	....	9	.....	4	3	...
Watervliet	260	12,967	20.05	13,000	20.00	26	....	14	.....	1	3	1
Waverly	46	4,123	11.15	4,123	11.15	5	....	2	.....	....	2	1
Wellsville	47	3,435	13.68	5,033	9.33	2	....	2	.....	....	.....	...
Westfield, Chautauqua County	32	3,401	9.41	3,000	10.66	3	....	.....	.....	....	1	...
Westfield, Richmond County	82	3,258	9.92	8,648	9.48	10	....	1	.....	....	3	...
Whitehall	21	4,434	4.73	4,434	4.73	2	....	.....	.....	....	1	...
White Plains	128	4,042	31.66	4,042	31.66	10	....	.....	.....	....	2	...
Whitestown	80	5,155	15.51	5,225	15.31	11	....	3	.....	....	1	3
Worcester	54	2,741	19.72	2,670	20.22	2	....	1	.....	....	1	...
Yonkers	760	32,033	23.72	36,000	21.11	56	....	5	2	2	44	2
Total	99,987	4,188,546	23.87	5,282,599	18.92	11,274	3	1,187	1,365	691	4,298	908
North Carolina:												
Charlotte	360	11,557	31.14	19,651	18.31	36	....	27	27	....	4	4
Durham	80	5,485	14.54	6,000	15.00	11	....	6	14	....	.....	6
Fayetteville	102	4,222	24.15	6,000	17.00	10	....	4	1	1	.....	3
Goldsboro	80	4,017	19.91	5,400	14.81	9	....	2	.....	....	.....	...
Greensboro	146	3,317	44.01	8,000	18.12	18	....	9	.....	8	.....	..
Henderson	68	4,191	16.22	4,250	16.00	10	....	7	.....	....	.....	5
Monroe	27	1,866	14.47	2,400	11.25	4	....	3	5	....	.....	...
Oxford	43	2,907	14.78	2,500	17.20	4	....	5	.....	....	.....	...
Plymouth	36	1,212	29.70	2,500	14.40	5	....	1	.....	....	.....	...
Raleigh	297	12,678	23.42	13,200	22.50	44	....	8	7	....	2	1
Rockingham	40	1,535	26.05	1,750	22.85	1	....	7	.....	....	.....	..
Rocky Mount	16	1,870	8.55	2,400	6.66	1	....	4	.....	....	.....	...
Salem	69	2,711	25.45	4,284	16.10	4	....	4	.....	1	2	...
Salisbury	133	4,418	30.12	5,000	26.60	21	....	8	16	....	.....	13
Southport	19	1,207	15.74	1,200	15.83	2	....	.....	.....	....	.....	...
Tarboro	27	1,924	14.03	2,500	10.80	3	....	1	1	....	.....	...
Washington	114	3,545	32.15	5,500	20.72	9	....	7	.....	8	.....	...
Weldon	34	1,286	26.43	1,450	23.44	2	....	1	.....	1	1	...
Wilmington	469	20,056	23.37	22,000	21.32	67	....	18	12	....	.....	...
Wilson	60	2,126	28.22	4,500	13.33	12	....	1	.....	....	.....	3
Winston	252	8,018	31.41	10,000	25.20	59	....	16	12	....	7	...
Total	2,472	100,148	24.68	130,485	18.94	332	....	139	95	19	16	35
Ohio:												
Ada	31	2,079	14.91	2,700	11.48	7	....	.....	.....	....	3	...
Arcanum	22	1,134	19.39	1,550	14.19	2	....	1	.....	2	2	...
Ashtabula	111	8,338	13.32	10,000	11.10	17	....	2	.....	2	.....	...
Bellaire	155	9,934	15.60	10,000	15.50	26	....	2	2	3	2	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Ohio—Continued.												
Bellefontaine	85	4,245	20.02	7,500	11.33	10	....	4	....	....	5	...
Bryan	47	3,068	15.31	4,000	11.75	8	....	3	....	....	3	...
Bucyrus	89	5,974	14.89	8,000	11.12	15	....	6	....	1	8	...
Carey	30	1,605	18.69	2,000	15.00	2	....	....	....	....	....	...
Carthage	31	2,257	13.73	2,500	12.40	3	....	3	....	....	3	...
Celina	20	2,702	7.40	4,000	5.00	6	....	2	2	3	6	1
Chagrin Falls	4	1,243	3.21	2,000	2.00	1	....	1	....	....	2	...
Cincinnati	5,916	296,908	20.26	350,000	16.90	736	....	164	100	16	172	25
Circleville	142	6,556	21.62	7,000	20.28	11	....	7	....	1	3	...
Cleveland	4,859	261,353	18.58	330,000	14.72	265	....	142	7	4	240	38
Clyde	42	2,327	18.04	3,000	14.00	4	....	4	....	....	....	1
Columbus	1,372	88,150	15.56	100,000	13.72	253	....	49	....	1	45	15
Conneaut	66	3,241	20.36	5,000	13.20	5	....	2	....	4	....	1
Coshocton	50	3,672	36.72	5,000	10.00	.....	....	1	....	....	3	...
Cuyahoga Falls	41	2,614	15.64	3,500	11.71	3	....	....	....	....	....	...
Dayton	1,026	61,220	16.75	85,000	12.07	129	8	21	....	1	75	1
De Graff	23	1,076	21.37	1,400	16.44	.....	....	1	....	1	....	...
Delphos	47	4,516	10.41	5,000	9.40	5	....	2	....	....	7	...
Doylestown	18	1,131	15.91	1,100	16.36	3	....	....	....	....	3	...
East Liverpool	163	10,956	14.87	15,000	10.86	27	....	12	....	....	16	...
East Palestine	19	1,816	10.46	2,400	7.91	2	....	2	....	....	4	...
Findlay	259	18,553	13.97	20,000	12.95	34	....	6	1	....	14	1
Fostoria	60	7,070	8.48	10,000	6.00	3	....	2	....	1	4	...
Franklin	42	2,729	15.36	3,000	14.00	5	....	1	....	1	16	...
Galion	83	6,326	13.12	8,500	9.76	.....	....	2	....	....	13	...
Geneva	41	2,194	18.68	2,500	16.40	3	....	1	....	....	....	...
Glendale	22	1,444	15.23	1,447	15.20	3	....	....	....	....	2	...
Hamilton	297	17,565	16.90	24,000	12.37	39	....	6	....	....	9	...
Hartwell	15	1,507	8.75	2,500	6.00	2	....	....	....	....	....	...
Holgate	25	1,134	22.04	1,200	20.83	4	....	....	....	....	....	...
Ironton	227	10,939	20.75	12,000	18.91	25	....	8	....	....	....	...
Kent	54	3,501	15.42	4,000	13.50	1	....	2	1	1	1	...
Leetonia	40	2,826	14.15	3,500	11.42	3	....	1	....	....	1	...
Lima	264	15,981	16.51	25,000	10.56	42	....	14	3	1	1	3
Lockland	37	2,474	15.02	3,000	12.33	7	....	6	....	....	4	1
Logan	36	3,119	11.22	3,400	10.58	4	....	1	....	1	3	...
Lorain	125	4,863	25.90	10,000	12.50	13	....	9	1	....	14	1
Loudonville	25	1,444	17.38	1,500	16.66	2	....	1	....	....	....	...
McConnellsville	8	1,771	4.51	1,800	4.44	1	....	....	....	1	....	...
Mansfield	173	13,473	12.84	18,000	9.61	.....	....	15	1	....	13	...
Marietta	116	8,273	14.02	15,000	7.73	11	....	4	....	....	11	...
Marion	148	8,327	17.77	12,000	12.33	.....	....	17	2	....	30	...
Marysville	48	2,810	14.23	3,000	13.33	5	....	2	....	2	6	...
Massillon	109	10,092	8.38	13,000	8.38	12	....	6	....	...	10	4
Miamisburg	39	2,952	13.21	4,000	9.75	6	....	2	....	....	2	...
Middletown	120	7,681	15.62	10,000	12.00	22	....	2	....	2	2	...
Millersburg	25	1,923	13.00	2,000	12.50	3	....	1	....	....	....	...
Mingo Junction	18	1,856	9.69	2,200	8.18	1	....	1	....	....	4	...
Montpelier	10	1,293	7.13	2,200	4.54	3	....	2	....	....	....	...
Mount Vernon	85	6,027	14.10	7,000	12.14	9	....	1	1	2	....	2
New London	15	1,096	13.68	1,500	10.00	.....	....	....	....	....	....	...
New Straitsville	31	2,782	11.14	2,800	11.07	.....	....	....	....	2	....	1
Oak Harbor	12	1,681	7.13	1,800	6.66	.....	....	1	....	....	....	...
Oberlin	52	4,376	11.88	4,600	11.30	5	....	3	1	....	....	1
Ottawa	16	1,717	9.31	2,500	6.40	1	....	....	....	....	1	...
Painesville	77	4,755	16.19	6,000	12.43	9	....	....	....	....	....	...
Piketon	7	1,022	6.84	1,000	7.00	2	....	....	....	....	....	...
Piqua	137	9,090	15.07	12,000	11.41	20	....	10	....	1	15	...
Pleasant Ridge	10	1,027	9.73	1,250	8.00	1	....	....	....	....	....	...
Pomeroy	21	4,726	4.44	5,000	4.20	4	....	6	....	....	3	2
Sabina	19	1,080	17.59	1,500	12.66	4	....	1	....	....	....	...
Salem	87	5,780	15.05	8,000	10.87	1	....	4	....	....	4	...
Salineville	64	2,369	27.01	2,400	26.66	1	....	....	....	8	....	...
Springfield	424	31,895	13.29	38,000	11.15	56	....	11	....	2	39	...
Steubenville	45	13,394	3.36	13,000	3.46	6	....	4	....	3	2	2
Tiffin	146	10,801	13.51	14,000	10.43	19	....	9	....	....	5	...
Toledo	1,473	81,434	18.08	137,780	10.69	126	....	40	3	4	56	5
Toronto	28	2,536	11.04	4,000	7.00	6	....	6	....	....	8	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Ohio—Continued.												
Uhricsville	60	3,842	15.51	5,100	11.76	6	....	....	1	....	1	1
Upper Sandusky	50	3,572	13.99	3,500	14.28	5	....	3	....	....	....	...
Urbana	90	6,510	13.67	8,000	11.25	7	....	3	....	2	2	...
Versailles	20	1,385	14.44	1,500	13.33	2	....	1	....	....	....	...
Wapakoneta	73	3,616	20.18	4,500	16.22	8	....	4	....	....	4	...
Warren	62	5,973	10.38	10,000	6.20	9	....	....	....	....	1	...
Waverly	27	1,567	17.22	1,800	15.00	.....	....	....	....	....	....	...
Wellington	28	2,069	13.53	2,500	11.20	.....	....	....	....	....	....	...
Wellsville	104	5,247	19.82	6,000	17.33	.....	....	4	1	....	5	...
Willoughby	21	1,219	17.22	2,500	8.40	8	....	....	....	....	....	...
Woodsfield	14	1,031	13.57	1,500	9.33	2	....	....	....	....	....	...
Wyoming	14	1,454	9.62	2,000	7.00	5	....	....	....	....	....	...
Youngstown	452	33,220	13.60	40,000	11.30	27	....	22	....	13	13	...
Total	20,631	1,210,528	17.04	1,549,427	13.32	2,142	8	676	127	86	921	106
Oregon:												
Oregon City	25	3,062	8.15	3,000	8.33	5	....	4	....	1	5	...
Pendleton	27	2,506	10.77	3,500	7.71	2	....	1	....	....	1	...
Portland	884	46,385	19.05	83,000	10.65	112	....	25	....	2	35	3
Total	936	51,953	18.01	89,500	10.46	119	....	30	....	3	41	3
Pennsylvania:												
Allegheny	1,859	105,287	17.65	125,000	14.87	145	....	59	30	6	48	36
Altoona	544	30,337	17.93	41,700	13.04	47	....	13	3	7	23	2
Ambler	31	1,073	28.88	1,600	19.37	3	....	....	....	....	....	...
Avenue	15	1,453	10.32	1,500	10.00	1	....	3	....	....	2	4
Bedford	35	1,043	33.55	2,500	14.40	4	....	....	....	....	....	...
Bethlehem	96	6,792	14.13	8,000	12.00	9	....	4	....	1	7	...
Birdsboro	39	2,261	17.24	3,000	13.00	4	....	....	....	....	5	...
Bristol	121	6,553	18.46	7,000	17.28	10	....	2	....	....	9	...
Brookville	34	2,478	13.71	2,600	13.66	1	....	2	....	1	....	...
Carbondale	224	10,833	20.67	18,000	12.44	2	....	12	1	....	15	...
Carlisle	166	7,620	21.77	9,781	16.97	23	....	1	....	....	5	...
Catasauqua	59	3,704	15.90	3,700	15.94	4	....	....	....	....	4	...
Catawissa	28	1,809	15.47	2,500	11.20	4	....	....	....	1	1	1
Clarendon	4	1,297	3.08	1,500	2.66	3	....	....	....	....	1	...
Clarion	23	2,164	10.62	2,500	9.20	2	....	1	....	....	4	...
Connellsville	116	5,629	20.60	7,000	16.57	.....	....	3	....	....	9	...
Conshohocken	58	5,470	10.60	6,500	8.92	1	....	....	....	....	1	...
Cressona	36	1,481	24.31	1,600	22.50	.....	....	....	....	....	1	...
Curwensville	20	1,664	12.01	1,800	11.11	.....	....	2	....	....	....	...
Downingtown	45	1,920	23.43	2,000	22.50	7	....	1	....	....	3	...
Dunmore	162	8,315	19.48	10,000	16.20	.....	...	2	....	1	11	...
East Brady	10	1,228	8.14	1,300	7.69	1	....	....	....	....	....	...
East Stroudsburg	16	1,819	8.79	2,200	7.27	2	....	1	....	....	2	...
Ebensburg	12	1,202	9.98	1,500	8.00	.....	....	....	....	1	2	...
Elizabethtown	32	1,218	26.27	2,000	16.00	3	....	....	....	1	6	...
Emlenton	10	1,126	8.88	1,200	8.33	1	....	....	....	....	1	...
Emporium	24	2,147	11.18	2,500	9.60	3	....	....	....	....	....	...
Erie	609	40,634	14.74	56,000	10.87	64	....	19	4	2	....	...
Fairchance	21	1,092	19.23	1,100	19.09	2	....	8	....	....	....	...
Frackville	24	2,520	9.52	3,000	8.00	1	....	1	....	1	....	...
Gordon	18	1,194	15.06	1,200	15.00	.....	....	....	....	....	....	...
Hanover	69	3,746	18.44	5,000	13.80	12	....	....	....	....	1	...
Jenkintown	27	1,609	16.77	2,000	13.50	.....	....	1	....	....	2	...
Jermyn	65	2,650	24.34	3,000	21.66	3	....	3	....	....	15	...
Johnsonberg	22	1,280	17.19	1,280	15.00	.....	....	....	....	....	1	1
Johnstown	413	21,805	15.88	26,000	15.88	25	....	21	4	5	4	3
Kennett Square	23	1,326	17.34	1,500	15.33	3	....	3	....	....	1	...
Kingston	72	2,381	30.23	2,600	27.68	.....	....	2	....	3	1	...
Lancaster	633	32,011	19.77	40,000	15.82	46	....	6	....	5	58	...
Latrobe	66	3,589	18.39	4,000	16.50	7	....	1	....	....	5	...
Lebanon	279	14,664	19.02	15,000	18.60	.....	....	6	....	2	10	...
Lehighton	41	2,959	13.85	5,000	8.20	2	....	1	....	....	1	...
Marysville	25	1,115	22.42	1,300	19.23	2	....	....	....	....	4	...
Meadville	122	9,520	12.81	11,000	11.09	10	....	2	3	....	....	...

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Pennsylvania—Cont'd.												
McKeesport	506	20,741	24.39	30,000	16.86	10	....	13	4	2	8	9
Mechanicsburg	69	3,691	18.69	5,000	13.80	.....	....	....	....	....	2	...
Millersburg	19	1,527	12.44	1,600	11.87	.....	....	....	....	....	....	...
Mount Carmel	344	8,254	41.66	15,000	22.93	6	....	2	75	17	25	...
Mount Holly	8	1,190	6.71	1,462	5.47	.....	....	....	....	....	....	...
Morrellville	40	2,827	14.14	4,000	10.00	16	....	11	....	5	5	1
Morrisville	21	1,203	17.45	1,800	11.66	3	....	3	....	....	6	...
Nazareth	20	1,318	15.17	2,000	10.00	.....	....	....	....	....	1	...
New Brighton	118	5,616	21.01	7,000	16.88	9	....	5	6	2	....	...
New Castle	202	11,600	17.41	21,000	9.61	.....	....	13	....	....	33	2
New Haven	24	1,221	19.49	2,000	12.00	1	....	....	....	....	3	...
Newport	13	1,417	9.17	1,500	8.66	.....	....	....	....	....	....	...
Newtown	21	1,213	17.31	1,500	14.00	.....	....	1	....	....	1	...
Norristown	295	19,791	14.90	22,000	13.41	28	....	4	....	2	2	1
Northumberland	44	2,744	16.03	2,700	16.29	2	....	1	....	....	4	...
North Wales	20	1,060	18.87	1,200	16.66	2	....	1	....	....	2	...
Oil City	156	10,932	14.27	15,000	10.40	15	....	6	1	....	3	2
Orwigsburg	32	1,290	24.80	1,400	22.85	.....	....	....	....	....	....	...
Osceola Mills	20	1,730	11.56	2,500	8.00	1	....	....	....	....	....	...
Parkersburg	21	1,514	13.87	1,800	11.66	.....	....	....	....	....	....	...
Philadelphia	23,982	1,046,964	22.90	1,188,793	20.17	2,514	....	402	191	61	1149	158
Plymouth	263	9,344	18.29	15,000	17.53	14	....	42	3	....	7	...
Pottstown	171	13,285	13.02	16,000	10.68	.....	....	....	....	....	1	...
Quakertown	37	2,169	17.05	3,000	12.33	4	....	1	....	1	1	...
Reading	1,062	58,661	18.17	72,000	14.75	85	....	36	1	7	55	1
Reynoldtown	35	1,379	25.38	2,000	17.50	.....	....	....	....	....	3	2
Ridgway	18	1,903	9.45	4,000	4.50	.....	....	2	....	....	....	...
Scottdale	35	2,693	12.99	3,500	10.00	5	....	1	....	....	1	2
Scranton	1,600	75,215	21.25	103,000	15.53	58	....	24	....	7	90	1
Sharpsville	19	2,330	8.15	3,000	6.33	2	....	1	....	....	....	1
Shenandoah	367	15,944	23.01	18,400	19.94	8	....	4	....	3	23	...
Slatington	57	2,716	20.90	4,000	14.25	6	....	1	....	....	....	...
South Bethlehem	295	10,302	28.63	14,000	21.07	29	....	3	....	1	43	...
South Fork	25	1,295	19.30	2,000	12.50	9	....	1	....	....	....	3
Tamaqua	126	6,054	20.81	7,000	18.00	.....	....	4	....	....	15	...
Tarentum	80	4,627	17.26	5,000	16.00	.....	....	5	....	....	3	...
Tidioute	13	1,328	9.78	1,500	8.66	1	....	1	....	....	....	...
Tremont	29	2,064	14.04	2,300	12.60	.....	....	1	....	....	2	1
Upland	25	2,275	10.98	2,200	11.36	5	....	1	....	....	....	...
Washington	77	7,063	10.90	8,500	9.05	.....	....	1	....	1	3	...
Wellsboro	29	2,961	9.78	2,800	10.35	.....	....	1	....	....	....	...
West Bethlehem	49	2,759	17.76	4,000	12.25	.....	....	4	....	....	2	...
West Chester	155	8,028	19.30	10,000	15.50	12	....	7	1	....	7	...
West Newton	34	2,285	14.88	3,000	11.33	.....	....	....	....	....	5	...
West Pittston	75	3,906	19.19	6,365	11.78	1	....	3	....	....	5	...
Wilkesbarre	686	37,718	18.18	55,000	12.47	2	....	23	....	1	41	...
Williamsport	288	27,132	10.61	35,000	8.22	25	....	3	....	1	7	...
York	364	20,793	17.50	28,000	13.00	30	....	11	....	9	42	5
Total	38,337	1,836,090	20.87	2,209,281	17.32	3,360	....	823	327	157	1857	242
Rhode Island:*												
Barrington	19	1,461	13.00	1,696	11.20	3	....	1	....	....	....	...
Bristol	141	5,478	25.73	6,831	20 34	19	....	4	....	....	4	2
Burrillville	99	5,492	18.02	5,729	17.27	6	....	1	3	1	1	6
Central Falls	329	15,828	20.77	16,354	20.11	24	....	1	2	1	21	...
Coventry	116	5,068	22.88	5,080	22.83	10	....	4	1	....	3	...
Cranston	338	8,099	40.49	11,177	30.24	41	....	6	3	1	8	...
Cumberland	168	8,090	20.76	8,644	19.43	15	....	....	1	....	11	1
East Greenwich	60	3,127	19.18	3,137	19.12	9	....	....	....	....	....	1
East Providence	156	8,422	18.52	10,572	14.75	11	....	1	....	....	6	...
Foster	17	1,252	14.29	1,169	14.54	.....	....	3	....	....	....	...
Glocester	36	2,095	17.18	1,636	22.00	4	....	1	....	....	....	...
Hopkinton	47	2,864	16.41	2,703	17.38	4	....	2	....	2	....	...
Johnston	222	9,778	22.71	11,683	19.11	16	....	....	7	....	7	...
Lincoln	123	8,350	14.73	8,626	14.25	16	....	....	....	....	2	1
Little Compton	22	1,128	19.50	1,116	19.71	.....	....	....	....	....	....	..
Middletown	20	1,154	17.33	1,439	13.89	.....	....	....	....	....	....	...

* Population State census 1895.

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Rhode Island—Continued.												
Newport	380	19,457	19.53	21,734	17.48	54	....	7	3	1	6	6
New Shoreham	23	1,320	17.42	1,302	17.66	1	....	....	....	....	....	1
North Kingston	51	4,193	12.16	4,469	11.41	6	....	....	....	....	....	....
North Providence	31	2,084	14.82	2,561	12.10	3	....	....	....	1	3	....
North Smithfield	54	3,173	17.01	2,800	19.28	7	....	1	....	1	1	1
Pawtucket	617	27,633	22.32	33,704	18.30	53	....	7	....	1	23	3
Portsmouth	29	1,949	14.36	1,815	19.57	2	....	1	....	....	....	....
Providence	2,957	132,146	22.37	148,334	19.93	367	....	43	6	33	140	24
Richmond	20	1,669	11.97	1,645	12.15	2	....	....	....	....	....	....
Scituate	69	3,174	21.73	3,519	19.68	8	....	....	....	....	7	....
Smithfield	45	2,500	18.00	2,337	19.25	6	....	1	....	....	....	....
South Kingston	84	6,231	13.48	5,239	16.03	6	....	1	....	4	1	3
Tiverton	50	2,837	17.62	2,990	16.72	9	....	1	....	....	....	....
Warren	60	4,489	13.36	3,786	15.84	5	....	1	....	....	1	....
Warwick	397	17,761	22.35	22,125	17.94	40	....	4	5	2	15	3
Westerly	115	6,813	16.87	7,774	14.79	15	....	1	....	....	2	....
Woonsocket	529	20,830	25.39	25,466	20.81	53	....	8	12	....	5	5
Total	7,424	345,945	21.46	389,192	19.31	815	....	100	43	48	267	57
South Carolina:												
Florence	112	3,395	32.98	5,500	20.36	22	....	6	1	....	....	....
Graniteville	42	1,791	23.45	2,500	16.80	2	....	4	....	....	....	....
Pelzer	49	1,878	26.09	5,000	9.80	2	....	2	14	....	....	3
Charleston (W.)	521	54,955	34.01	28,870	18.04	45	....	14	5	....	8	4
Charleston (C.)	1,348			36,295	37.02	243	....	30	15	....	2	28
Total	2,072	62,019	33.41	78,165	26.51	314	....	56	35	....	10	33
South Dakota:												
Sioux Falls	88	10,177	8.64	11,000	8.00	12	....	4	....	1	....	8
Vermilion	13	1,496	8.69	2,250	5.82	5	....	....	....	....	2	....
Total	101	11,673	8.65	13,250	7.62	17	....	4	....	1	2	8
Tennessee:												
Clinton	18	1,198	15.44	1,200	15.00	4	....	....	....	....	....	....
Knoxville	455	22,535	20.66	42,704	10.65	70	....	12	1	....	14	1
Memphis	1,348	64,495	20.90	56,134	24.01	198	....	32	2	2	4	26
Murfreesboro	91	3,739	24.33	5,000	18.20	16	....	4	1	....	6	3
Nashville	1,804	76,168	23.68	87,754	20.55	262	....	33	66	10	21	30
Total	3,716	168,135	22.10	192,792	19.21	550	....	81	70	12	45	60
Texas:												
Brackettville	17	1,649	10.31	1,700	10.00	1	....	....	....	....	2	....
Cleburne	55	3,278	16.77	7,000	7.85	10	....	....	....	....	4	....
Georgetown	18	2,447	7.35	3,500	5.11	4	....	....	....	....	1	....
Hempstead	15	1,671	8.97	2,000	7.50	3	....	4	....	....	....	....
Houston	665	27,557	24.13	70,000	9.50	85	....	7	....	....	5	5
Nacogdoches	15	1,138	13.18	3,000	5.00	2	....	....	1	....	....	....
Orange	26	3,173	8.19	4,000	6.50	1	....	2	....	....	....	....
Terrell	20	2,988	6.19	5,000	4.00	.....	....	....	....	....	....	....
Weimar	10	1,443	6.93	1,800	5.55	.....	....	....	....	....	....	....
Total	841	45,344	18.54	98,000	8.58	106	....	13	1	....	12	5
Utah:												
Ogden	319	14,889	21.42	15,828	20.15	7	....	4	....	7	2	....
Salt Lake City	574	44,843	12.80	70,000	8.20	31	....	29	1	5	9	5
Spring City	25	1,044	23.94	1,300	19.23	1	....	....	....	....	....	1
Total	918	60,776	15.10	87,128	10.53	39	....	33	1	12	11	6
Vermont:												
Arlington	28	1,352	20.71	1,352	20.71	3	....	....	....	....	2	....
Barnet	33	1,897	17.39	1,900	17.42	3	....	....	....	....	....	1
Barre	103	6,812	15.12	6,500	15.84	9	....	3	....	4	1	2

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Vermont—Continued.												
Bellows Falls	52	1,700	30.58	3,500	14.85	11	....	....	....	....	1	....
Bennington	119	6,391	18.60	9,000	13.22	11	....	5	1	5	....	2
Berkshire	24	1,421	16.88	1,400	17.14	3	....	....	....	....	2	....
Bethel	18	1,448	11.73	1,800	10.00	.....	....	....	....	....	....	....
Bradford	36	1,429	25.19	1,429	25.19	1	....	....	....	....	....	....
Bridport	18	1,018	17.68	1,000	18.00	2	....	....	....	1	1	....
Brighton	23	2,020	11.38	2,000	11.50	2	....	....	....	....	....	....
Burlington	374	14,590	24.94	18,500	20.21	38	....	1	....	4	2	1
Charlotte	9	1,240	7.25	1,300	6.92	.....	....	....	2	....	....	....
Corinth	23	1,027	22.39	1,027	22.39	3	....	....	....	....	....	....
Danville	26	1,784	14.57	1,800	14.44	1	....	....	....	....	....	....
Fairfax	12	1,523	7.87	1,800	6.66	.....	....	....	....	....	....	....
Georgia	18	1,282	14.04	1,200	15.00	4	....	....	....	....	1	....
Hinesburg	16	1,205	13.27	1,205	13.27	4	....	....	....	....	....	....
Jericho	33	1,461	22.58	1,700	19.41	4	....	....	....	....	1	....
Londonderry	20	1,010	18.81	1,213	16.48	6	....	1	....	....	....	....
Ludlow	33	1,768	18.66	2,000	16.50	1	....	1	....	....	....	1
Lunenberg	11	1,019	10.79	1,020	10.78	.....	....	....	....	....	....	....
Manchester	31	1,907	16.72	2,000	15.50	4	....	....	1	....	1	....
Middlebury	38	2,793	13.60	2,793	13.60	5	....	....	....	....	....	....
New Haven	24	1,224	19.52	1,300	18.46	3	....	1	....	....	2	....
Norwich	24	1,304	18.40	1,400	17.85	3	....	....	....	....	....	....
Orwell	19	1,265	15.01	1,200	12.83	2	....	....	1	....	....	1
Pawlet	26	1,745	14.89	1,840	14.13	1	....	1	....	....	....	....
Sheldon	15	1,365	10.98	1,365	10.98	1	....	....	....	....	....	..
Swanton	48	3,231	14.85	3,500	13.71	3	....	2	6	....	5	....
Topsham	27	1,187	22.74	1,200	22.50	3	....	....	....	....	....	....
Underhill	19	1,301	14.60	1,400	13.57	.....	....	....	....	....	....	....
Wallingford	30	1,733	17.31	1,733	17.31	.....	....	....	....	....	....	....
Windsor	28	1,846	15.16	1,900	14.73	2	....	1	....	....	2	....
Total	1,358	74,298	18.27	84,277	16.10	133	....	16	11	14	21	8
Virginia:												
Abington	26	1,674	15.53	2,500	10.40	17	....	5	2	....	2	..
Alexandria	385	14,339	26.85	15,500	24.83	21	....	7	....	5	3	1
Lynchburg	420	19,709	21.31	30,000	14.00	55	....	12	4	1	4	2
Richmond	1,658	81,388	20.37	100,000	16.58	165	....	12	11	3	16	24
Total	2,489	117,110	21.25	148,000	16.75	258	....	36	17	9	25	27
Washington:												
Colfax	19	1,649	11.52	1,700	11.17	1	....	2	....	....	....	1
Dayton	24	1,880	12.76	2,000	12.00	2	....	....	....	....	....	....
Fairhaven	8	4,076	1.96	2,000	4.00	2	....	1	....	1	....	....
Hoquaim	11	1,302	8.44	1,800	6.11	1	....	....	....	....	....	....
Montesano	8	1,632	4.96	1,200	6.66	2	....	....	1	....	....	....
Port Townsend	15	4,558	3.29	2,000	7.50	2	....	....	....	....	....	....
Spokane	336	19,922	16.81	35,000	9.60	43	....	7	1	....	45	....
Tacoma	351	36,006	9.74	50,000	7.02	41	....	14	....	....	3	....
Walla Walla	120	4,709	25.48	8,000	15.00	13	....	....	....	2	1	1
Total	892	75,734	11.77	103,700	8.60	107	....	24	2	3	49	2
West Virginia:												
Benwood	45	2,934	15.33	4,000	11.25	4	....	1	....	....	1	....
Mason	12	1,029	11.66	1,000	12.00	2	....	....	....	....	3	....
Wheeling	457	34,522	13.23	38,000	12.02	61	....	22	1	2	22	....
Total	514	38,485	13.35	43,000	11.94	67	....	23	1	2	26	....
Wisconsin:												
Ahnapee	5	1,015	4.92	1,700	2.94	1	....	....	....	....	....	....
Ashland	143	9,956	14.36	12,500	11.44	12	....	9	1	....	7	....
Berlin	49	4,149	11.81	4,275	11.40	3	....	....	2	....	....	1
Centralia	25	1,435	17.41	2,000	12.50	1	....	....	....	....	24	....
Cumberland	15	1,219	12.30	1,500	10.00	.....	....	....	....	....	....	....
Depere	75	3,625	20.68	5,000	15.00	6	....	1	2	1	8	4

TABLE OF MORTALITY IN CERTAIN CITIES AND TOWNS, ETC.—Continued.

States and cities or towns.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Wisconsin—Continued.												
Evansville	19	1,523	12.47	1,900	10.00	3	....	....	....	....	....	1
Green Bay	240	9,069	26.57	19,500	12.30	7	....	3	....	....	12	3
Hayward	25	1,349	18.51	2,000	12.50	4	....	....	2	....	1	...
Kaukauna	28	4,667	5.99	6,000	4.66	3	....	1	....	....	....	...
La Crosse	147	25,090	5.85	28,769	5.11	8	....	....	5	....	5	...
Lake Geneva	25	2,297	10.88	3,000	8.33	5	....	1	....	....	3	...
Manitowoc	102	7,710	13.23	11,000	9.27	11	....	1	....	....	7	...
Medford	10	1,193	8.38	2,000	5.00	.....	....	....	....	....	4	...
Milwaukee	3,904	204,468	19.09	260,000	15.00	335	....	46	29	4	254	15
Mineral Point	20	2,694	7.49	3,300	6.06	.....	....	....	....	....	1	...
Platteville	24	2,740	8.75	3,300	7.27	9	....	....	....	....	....	...
Richland Center	10	1,819	5.49	2,300	4.34	.....	....	....	....	....	1	...
Tomahawk	28	1,816	15.41	2,290	12.62	2	....	2	....	....	....	...
Total	4,894	287,834	16.00	372,334	13.14	410	....	64	41	5	327	24

MORTALITY TABLE SHOWING STATE TOTALS FOR UNITED STATES CITIES REPORTING.

State.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Alabama	1,137	47,562	23.90	59,629	19.06	178	...	38	6	.....	13	4
Arizona	12	1,535	7.82	3,000	4	.....	...	.....	.....	.....	.....	.....
Arkansas	309	13,461	22.94	18,600	16.61	35	...	12	3	1	1	4
California	10,301	502,474	20.30	669,295	15.38	1,714	...	163	11	13	113	29
Colorado	2,723	151,494	17.91	226,200	12.03	527	...	146	17	51	89	34
Connecticut	14,470	682,777	20.89	826,224	17.51	1,221	..	200	254	90	464	50
Delaware	1,204	61,431	19.59	72,500	16.60	115	...	15	2	6	42	8
District of Columbia	5,831	230,392	25.30	278,150	20.96	784	...	141	69	6	96	116
Florida	434	20,798	20.87	26,500	16.37	44	2	17	6	.....	.....	2
Georgia	4,177	155,677	26.83	221,003	18.90	546	...	82	47	17	25	51
Illinois	25,639	1,255,789	24.01	1,829,191	14.01	2,475	1	811	95	57	1,074	200
Indiana	6,593	402,822	16.36	616,055	10.70	746	...	251	31	55	277	36
Iowa	1,169	78,623	14.87	113,650	12.38	89	...	14	1	.....	40	14
Kansas	1,405	82,911	16.94	142,026	9.89	146	1	30	10	6	62	8
Kentucky	4,168	209,949	19.85	370,400	11.25	481	...	163	10	7	136	11
Louisiana	7,872	254,018	30.99	290,000	27.14	886	249	93	10	1	53	32
Maine	3,241	191,552	16.91	204,888	15.81	222	...	55	1	11	42	17
Maryland	10,005	438,340	22.82	511,178	19.57	1,128	...	191	27	31	284	87
Massachusetts	33,387	1,692,325	22.67	1,982,945	19.35	3,908	...	548	92	239	1,365	201
Michigan	9,181	567,404	14.59	711,751	12.93	839	12	138	67	40	341	25
Minnesota	4,951	398,146	12.43	520,053	9.52	535	...	270	27	23	210	41
Mississippi	6	1,019	5.88	1,000	6	1	...	.....	.....	.....	.....	.....
Missouri	10,900	520,684	20.53	658,269	16.55	1,106	...	142	27	12	405	79
Montana	14	1,058	13.33	1,400	10	.....	...	2	1	.....	.....	.....
Nebraska	1,237	202,478	6.19	199,052	6.21	109	...	26	.....	7	10	12
New Hampshire	2,778	142,760	19.47	161,123	17.24	173	...	43	10	6	65	6
New Jersey	12,770	488,937	26.11	595,165	21.13	643	3	154	46	39	699	67
New Mexico	47	3,448	13.60	4,900	9.59	14	...	3	.....	.....	1	.....
New York	99,987	4,188,546	23.87	5,282,599	18.92	11,274	3	1,187	1,365	691	4,298	908
North Carolina	2,472	100,148	24.68	130,485	18.94	332	...	139	95	19	16	35
Ohio	20,631	1,210,528	17.04	1,549,427	13.32	2,142	8	676	127	86	921	106

MORTALITY TABLE SHOWING STATE TOTALS, ETC.—Continued.

State.	Total deaths from all causes.	Population, United States census of 1890.	Annual mortality per 1,000 of the population, United States census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
						Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Oregon	936	51,953	18.01	89,500	10.46	119	...	30	.....	3	41	3
Pennsylvania	38,337	1,836,090	20.87	2,209,281	17.32	3,360	...	823	327	157	1,857	242
Rhode Island	7,424	349,945	21.46	389,192	19.31	815	...	100	43	48	267	57
South Carolina	2,072	62,019	33.41	78,165	26.51	314	...	56	35	.....	10	33
South Dakota	101	11,673	8.65	13,250	7.62	17	...	4	.....	1	2	8
Tennessee	3,716	168,135	22.10	192,792	19.21	550	...	81	70	12	45	60
Texas	841	45,344	18.54	98,000	8.58	106	...	13	1	.....	12	5
Utah	918	60,776	15.10	87,128	10.53	39	...	33	1	12	11	6
Vermont	1,358	74,298	18.27	84,277	16.10	133	...	16	11	14	21	8
Virginia	2,489	117,110	21.25	148,000	16.75	258	...	36	17	9	25	27
Washington	892	75,734	11.77	103,700	8.60	107	...	24	2	3	49	2
West Virginia	514	38,485	13.35	43,000	11.94	67	...	23	1	2	26	.....
Wisconsin	4,894	287,834	16	372,334	13.14	410	...	64	41	5	327	24
Total	363,546	18,498,482	19.43	22,185,277	15.93	28,708	279	7,053	3,006	1,770	13,835	2,658

INVESTIGATION WITH REGARD TO PHTHISIS PULMONALIS AS REGARDS ITS GENERAL RECOGNITION AS AN INFECTIOUS DISEASE THROUGHOUT THE UNITED STATES.

As mentioned in my last annual report, an investigation with regard to phthisis pulmonalis was at that time under way. The circular, which was published in full, called for answers to the following questions:

I. Is phthisis pulmonalis regarded throughout the State, especially by those who are not physicians, as an infectious disease?

II. Are there any provisions of State or municipal law intended to prevent the spread of the disease?

III. If so, what are they?

IV. Are there in the State of ——— any public or private hospitals or sanitariums devoted exclusively to the treatment of tuberculous disease, and if so, where are they, and what are their names?

V. Are the consumptives in the general hospitals throughout the State isolated in distinct wards, or allowed to mingle with patients suffering from other diseases?

The replies to these questions, which I had hoped to incorporate in my annual report for 1896, came in but slowly, so that it became impossible to publish them at the date of its publication.

The information obtained is here published by States, and by towns under States, arranged alphabetically, and for convenience and to avoid useless repetition, only the answers to the questions stated above are given, each answer for purposes of reference having the same number as that of the corresponding question.

States, etc.	I.	II.	III.	IV.	V.
Arkansas	Only by physicians and educated persons.	None whatever		None known to board of health.	Isolated to as great an extent as possible by individual physicians.
California	Declared infectious by State board of health. Public opinion uncertain.	No, except as regards pupils and teachers in public schools in San Francisco.		One at Indio, in the desert of southern California, maintained by the Southern Pacific R. R. Co.	Isolated in distinct wards, but allowed to commingle.
Los Angeles	Yes	Yes	An ordinance prohibiting expectorating in public places.	No	Isolated in the general hospitals, and in the majority of private hospitals refused admission.
San Francisco	Those who are not physicians do not realize that the disease is infectious.	Yes	Prohibiting expectoration in public places and conveyances, and requiring report and registration of cases.	No	An attempt was made to isolate in city and county hospital, but it was found to be impracticable on account of the construction of the building. Allowed to commingle.
Colorado	Regarded generally as infectious.	Only as regards authority given to sanitary boards to exterminate infectious diseases.		No sanitoria in the European sense, but resorts where patients may receive treatment. They are: "The Home," at Denver, Colo.; "Glockner Sanatorium," at Colorado Springs, and one at Boulder.	Yes. In all institutions the infectious nature of the disease is taken into account.
Denver	Generally regarded as infectious.	No specific provisions. The health commissioner is authorized to class it among "other infectious diseases" over which the ordinances give him control.	Houses in which consumptives have died are all disinfected.	One: "The Home."	Not isolated, and allowed to commingle.
Connecticut	To about the same extent as in other Eastern States.	No		None known to board of health.	Not isolated.
New Haven	Not by laymen; generally by physicians.	No		No	Not isolated. Allowed to commingle.
Delaware	No	None		None known to board of health.	No.
District of Columbia:					
Washington	Not regarded as infectious by the majority of the laity.	Yes	The sale of milk which is exposed to infection by tuberculosis may be prohibited.	None	Only one hospital provides a distinct ward for cases of tuberculosis.
Georgia:					
Atlanta	Not generally	No		No	Allowed in general wards.

Illinois:					
Chicago	Not regarded as an infectious disease except by the profession and the intelligent classes.	None, except the distribution of circulars of information and advice.	Order prohibiting spitting in public places and conveyances.	No	Little attempt is made to isolate consumptives in general hospitals, public or private. Sputa is promptly collected and destroyed.
Indiana	Generally regarded as infectious.	None, except as regards exclusion of teachers and children so afflicted from public schools, and an ordinance forbidding spitting in cars and public places.		None	Isolated in every hospital in State.
Indianapolis	No	No		No	City hospital has an isolated ward for the treatment of consumption.
Iowa	Not generally, but board is teaching it and the conviction is growing.	None, except the rules and regulations of the board of health.		None known to board of health.	No provision made for isolation as far as known to board of health.
Kansas	Regarded as infectious by very few people outside of the medical profession.	None		None	Not isolated.
Louisiana	Not generally regarded as infectious.	No attempt at such legislation has ever been made.		None	Not isolated and no restrictions laid on patients.
New Orleans	....do	No law of any kind intended to prevent the spread of the disease.		None	Consumptive patients are placed in almost all the wards of the Charity Hospital. Sputa is disinfected. Board gratuitously examines sputa.
Maine	It is generally understood in the State that phthisis pulmonalis is an infectious disease.	Law requires local board of health to be established in every town. Cases shall be reported to the board and treated according to circulars issued by board. Board has power to disinfect.		None devoted exclusively to treatment of tubercular disease.	Not admitted to general hospitals at Bangor and Lewiston, but are admitted at Portland.
Maryland	Not generally regarded as infectious.	No		Home for Consumptives, corner of Hoffman street and Park avenue, Baltimore.	Not admitted to general hospitals except in emergency, temporarily.
Massachusetts	Generally regarded as infectious.	No provisions of State law and no specific municipal regulations.		Consumptives are received at "The Sanitarian," Sharon, Mass., 9 patients; at the "Home for Consumptives," Dorchester, 27 patients; at "Consumptives' Home," Roxbury, for the poor, 80 beds; at Carney Hospital, Boston; at "Chan-	

States, etc.	I.	II.	III.	IV.	V.
Massachusetts	Generally regarded as infectious.	No provisions of State law and no specific municipal regulations.		ning Home," Boston; at "St. Elizabeth's Hospital," Boston, 96 beds, consumptive women. State hospital for consumptives nearly completed at Rutland, Mass.	
Boston	Unable to answer definitely.	No provisions of municipal law.		Several private sanitariums, viz: Consumptives' Home, Grove Hall, Blue Hill avenue; Free Home for Consumptives, Quincy street; Channing Home, 30 McLean street; House of the Good Samaritan, 6 McLean street.	Massachusetts General Hospital does not admit patients suffering from phthisis pulmonalis. Carney Hospital, consumptives in distinct wards. Boston City Hospital as far as possible excludes consumptive patients; when admitted they are not isolated, but are allowed to commingle.
Cambridge	The people seem to have formed no opinion on the subject.	No		No	One hospital in the city takes no consumptives.
Fall River	No	No		No	No system of isolation.
Lowell	Unable to give a decided answer.	No		None	Consumptives in general hospitals not isolated. Health department examines sputa at request of physicians.
Lynn	No	No		No	Not isolated.
Michigan	Coming to be generally recognized as infectious.	State laws same as against diphtheria, smallpox, etc.		None. Board of health recomends State hospital for consumptives.	Isolated in some State institutions; perhaps in all.
Detroit	Recognized as infectious by all physicians, but not by the laity generally.	No municipal laws to prevent the spread of phthisis pulmonalis.		None	Consumptives not isolated. Care taken with regard to disposal of sputa.
Grand Rapids	A large number of people outside of the profession regard it as infectious, but take no precautionary measures.	No provision of municipal law, except that of placing all contagious diseases under care of the board of health.		None	Consumptives are treated in general hospitals and allowed to commingle.
Minnesota:					
Minneapolis	A growing opinion that it is infectious.	No		None	Not isolated, but in general wards.
St. Paul	Yes	No		None in the city of St. Paul.	No.
Mississippi	Generally regarded as contagious.	No		None	Not isolated, except in insane asylum at Jackson.

Missouri	Not generally regarded as infectious.	No provisions of State or municipal law, but a ruling of board of health gives advice as to precautions.		One	Generally admitted and not isolated, except St. Louis hospitals.
Kansas City	Not generally regarded as contagious.	No provision in the municipal law for preventing spread of disease.		No private hospitals or asylums devoted exclusively to treatment of phthisis.	Isolated and not allowed to commingle.
St. Joseph	By the better educated classes and reading public.	None; ordinance regulating spitting in cars, etc., under consideration.		None	Apparently not. Special provision made for their care, but no isolation so far as known.
St. Louis	No	None	Circulars issued by the health commissioner.	One; conducted by Dr. Paul Paquin, 3536 Olive street. Serum treatment.	Isolated: not allowed to commingle, and each patient required to carry cup for sputum.
Nebraska	No	No		None	Not isolated.
Lincoln	Not regarded as infectious except by physicians.	No provisions under municipal law to prevent spread of the disease.		No hospitals or sanitariums devoted to treatment of tuberculous patients.	Not isolated, and allowed to commingle.
Omaha	Not regarded by the laity as an infectious disease.	No provisions under municipal law for preventing spread of the disease.	All that is done to prevent spread is thorough advice of physicians.	No special hospital or sanitarium.	Isolated in general hospitals.
New Hampshire	Regarded as infectious by the more intelligent of the community.	None		None	Not isolated.
Nevada	Not generally	None		None	No. Allowed to commingle.
New Jersey	Generally understood to be infectious.	No special legislation. Some local boards have regulations recommending notification, etc.		At Netherwood, Union County, N. J.	Isolated.
Newark	Not generally regarded by lay members of the community as infectious. No precautions taken in families.	Yes, but so far it has not been made compulsory to report case until after death.	Board of health maintains bacteriological laboratory for use of physician and examination of suspected cases. Free. Circular is sent to household in which case presents itself. After death the premises are disinfected.	No	Admitted and allowed to commingle.
Jersey City	No	None known		None	Do not believe they are isolated.
New York:					
Albany	Can not say to what extent it is so regarded outside of the profession.	None, under the charter or ordinances.	Circular published by board of health. Regulations are being prepared against spitting in street cars, etc. Physicians are to report all cases.	No special hospital	Consumptives are not isolated in separate wards in general hospitals.

States, etc.	I.	II.	III.	IV.	V.
Brooklyn	Unable to say to what extent it is regarded as infectious, but believe that most people think it infectious.	No provisions of municipal law. The health commissioner may, at his discretion, add to the list of infectious diseases, but he has not so far declared phthisis pulmonalis a contagious disease to be reported.	Health commissioner has issued a circular specifying means to prevent the spread of phthisis pulmonalis. Expectoration in street cars is prohibited.	One isolation hospital for consumptives. Free. The average number of inmates is 3. The capacity of the hospital is 100.	No isolation wards, but provision is being made in this direction.
Buffalo	So regarded by the intelligent classes.	No municipal legislation. Cases of consumption are required to be reported, and the circular in regard to consumption is sent to the house in which the case occurs.	An ordinance proposed to the common council relative to spitting in cars and public places.		
New York	The laity probably regard phthisis pulmonalis as an infectious and communicable disease.	Declared by the board of health to be infectious and communicable. Physicians are required to report cases.	Circular of information addressed to consumptives.	Several. St. Joseph's Hospital, Seaton Hospital, and Loomis Dispensary and Hospital.	Treated in the general wards. In the City Hospital, Metropolitan Hospital, and hospital for the almshouse some attempt at isolation has been made.
Rochester	Not regarded as infectious, even by the intelligent people of the city.	No municipal laws	Ordinance prohibiting spitting in public places is proposed.	None	Not isolated. Commingle freely. No precautions are known to be taken against introduction of the disease by sputum.
Syracuse	The majority of intelligent lay people and nearly every physician.	Require all cases to be reported to board of health.	About to issue letters of instructions to families where cases exist.	No special public hospital for consumptives. One private hospital at 141 Lincoln avenue.	Consumptives have separate wards in most of our hospitals.
Troy	No	No		No	Allowed to commingle.
Ohio	Generally regarded as infectious.	No municipal laws in regard to spread of consumption.		None	Not practiced generally.
Cincinnati	I think so	No		None	Isolated in the only general municipal hospital.
Columbus	Yes	No. The superintedent of health issues a circular of information for comsumptives.		One quack pulmonary sanitarium.	I don't think they are.
Dayton	No	No		None	Isolated, but allowed to commingle.
Toledo	There is a division of opinion among both physicians and laymen.	No		None	No.

Oklahoma	Regarded as infectious by all our physicians and most advanced thinkers.	None		None	No.
Pennsylvania	Considered infectious only by the intelligent classes.	No provisions of State or municipal law.		Two private hospitals in Philadelphia.	Decided objection to receiving consumptives in general hospitals. Distinct wards in Philadelphia hospital.
Allegheny	No	No		No	Not isolated; allowed to commingle.
Philadelphia	Regarded by the profession for the most part as infectious.	No special provisions of municipal law. The board of health publishes a circular upon consumption—prevention and restriction. Physicians are requested to report all cases. Disinfection of room and bedding performed by health authorities after death.		No special municipal hospital. Two private hospitals: Home for Consumptives, Chestnut Hill (for women); House of Mercy, 411 Spruce street. Rush Hospital for Consumptives, Thirty-third street and Lancaster avenue.	
Pittsburg	Not generally regarded as infectious. The minority, by whom it is regarded as infectious, is largely increasing.	No. An ordinance is now pending in city council prohibiting expectoration in public conveyances.		None	In some hospitals they are isolated; in others, not. Statements from hospital managers are inclosed with these replies.
Reading	No	No		Not any	Not isolated. Treated in general wards.
Scranton	Regarded as infectious	No provisions of municipal law.		None	Not isolated in general hospitals.
Rhode Island	Regarded as infectious by the thinking part of the community.	No municipal provisions. Dr. Chapin, superintendent of health of the city of Providence, has in process of passage by the board of aldermen an ordinance restricting spitting in public conveyances.		None	No. State board examines sputum. State board of agriculture receives $15,000 annually, mostly for eradication of tuberculosis in cattle.
South Carolina	Not generally regarded as infectious.	Only in Charleston and Columbia by circulars of advisory character.	Distribution of circulars by authority of legislature advising precautions against consumption.	None	Not isolated.
Tennessee:					
Nashville	Not regarded by the public as infectious. Many of our physicians are skeptical.	No provisions of municipal law.		No such institutions, public or private.	Not isolated, and allowed to commingle. This will probably be remedied in the near future.

States, etc.	I.	II.	III.	IV.	V.
Texas	Not regarded as infectious, except by the better class of physicians.	No State or municipal regulation.	Circular letter to county physicians issued by State health officer.	No public hospitals. No private institutions known except at Boeme, in Kendall County, in charge of Dr. F. Herff, of San Antonio.	Not isolated.
Vermont	People of the State are beginning to regard the disease as infectious.	No State provisions other than the powers conferred upon the board of health.	Circular of advisory character issued by board of health.	No such institutions	Can not answer definitely.
Virginia	No	No specific law, but general law against infectious diseases.		None	Very few are treated in hospitals. Can not say how much care is given to segregation.
Richmond	No	None		No	Not isolated. Allowed to commingle.
Washington	Not regarded as infectious	None, except as regards cattle.		None	Little done by way of isolation, each hospital being much crowded.
West Virginia	People but partially educated to this view.	No law, State or municipal		None known as such	No information on the subject.
Wisconsin	Do not know	None, so far as is known to the board.		None so far as known	Not strictly isolated, but care is taken to disinfect sputa.
Milwaukee	Regarded as infectious by many of the better informed. Some, even among physicians, do not so regard it.	No provisions under the municipal law.	Circular issued. In some cases good sanitary precautions have resulted.	None	Some of the hospitals endeavor to isolate consumptives. No rule preventing them from commingling.

HYGIENIC LABORATORY.

REPORT OF THE ACTING DIRECTOR.

HYGIENIC LABORATORY, MARINE-HOSPITAL SERVICE,
Washington, D. C., August 1, 1897.

SIR: Under date of November 1, 1896, I had the honor to submit for your consideration my report for the preceding year. In this report a number of subjects were mentioned which were then just being commenced, or in the stage of completion. At this date I have again to make a report of the progress of the laboratory work. In February of this year my colleague, Passed Assistant Surgeon Geddings, was detailed for special duty abroad, and some of the laboratory investigations were temporarily suspended until another officer was detailed for duty. Passed Assistant Surgeon Sprague reported on April 1, 1897.

One officer has received a course of instruction in bacteriology, pathology, and methods of clinical diagnosis during the past winter. Two physicians from the health boards have been afforded facilities for advanced work during the past year. One was engaged in a special study of malarial fevers, and the other one in an investigation of the bacillus of pseudo-diphtheria. A representative of a foreign government has been given facilities for the study of enteric fever. A summary of the investigations of these gentlemen will be found in the papers accompanying this report.

DISINFECTION BY THE USE OF FORMALDEHYD GAS.

During the past ten months considerable advance has been made in our knowledge of disinfection by the use of formaldehyd gas and its preparations. Over two years ago I was bold enough to say that I believed that we would in the future depend largely upon this agent for the purification of infected materials and compartments. I am glad to say that I have seen no reason to modify the statement; but, on the contrary, the more experience I have had with it the more I am convinced that it will almost entirely supersede our present methods where a gaseous disinfectant is applicable.

I am yet undecided whether the formaldehyd gas is available for the disinfection of the holds of vessels, especially wooden vessels, in which there is a large amount of moisture. I have not had an opportunity to make the necessary experiments to determine this.

The results of observations on the use of formaldehyd gas as a disinfectant have been made the subject of two papers, one entitled "Formaldehyd gas as a disinfecting agent,"[1] and the other, "The disinfection of the railway coach."[2] Both of these papers are submitted and will be found at the end of the report.

MALARIAL FEVERS.

This subject has been under investigation during the past year and has already been referred to. Dr. W. B. French, of the health office, District of Columbia, has embodied the results of his work in a paper entitled, "On the distribution of malarial fevers in the District of Columbia."

This report shows that malarial fevers were prevalent over nearly every section of the city, but more so along the Anacostia River. A larger part of the examinations were conducted on persons in the Washington Asylum, Almshouse, and at the Government Hospital for the Insane (St. Elizabeth's).

There is a prevailing idea among many observers that malaria is not a water-borne disease, but depends upon the air altogether for its distribution and medium of infection. This view is not entirely acceptable to one like myself, who holds that malaria can be, and frequently is, contracted through drinking water. The point was raised whether the water pumped up from the Anacostia flats had not been responsible for the large number of cases of malarial infections which occurred. It is a notable fact that of late years there has been an enormous number of cases, and more, if I am correctly informed, since the water from Anacostia flats has been used about the premises. The point which deserves particular notice is the way in which the water is stored prior to use.

Anacostia water is not used for drinking purposes, only for flushing and bathing, but the tank into which the drinking water is pumped during the day is used at night for storing the Anacostia water for flushing, etc. Sometimes it happens that the water to the extent of a foot or so remains in the tank and is mixed with the artesian supply and is distributed for drinking purposes. If the parasite of malaria is in the water it certainly has a splendid opportunity to be distributed in this way. Instances have come under my observation where all the circumstances point to the water as being the medium of infection.

Two instances may be cited in confirming this view: One was of a sawmill in the cypress swamps of southeastern North Carolina, a place noted for malarial affections, where all the whites were affected with malarial fevers. After boiling the drinking water there were fewer attacks, and it almost ceased after all the water used for drinking purposes, culinary, and ablutions was boiled.

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[1] Published in the Public Health Reports, January 29, 1897.

[2] Read before the Association of Railway Surgeons of the Southern Railroad, June 30, 1897.

The other was a party of men at work on the Lower Tennessee River in 1895, where all the party suffered more or less from intermittent and remittent fever. All the party drank river water.

In 1896 the same party again went to work on the river and the majority drank boiled water. Of those drinking boiled water only a few—two or three—had malarial attacks, and those drinking the raw water all succumbed to the disease.

I could cite other instances which would corroborate the above.

While the data collected concerning the prevalence of the malaria fevers in and around Washington are of great value, they are in nowise intended to convey the idea that the subject is near being exhausted. It was my intention when this subject was taken up to institute a systematic inquiry concerning the etiology, pathology, and prevalence of the fevers of the South, with a view of their classification and differentiation.

It is my hope that this work can be continued until the subjects have been fully covered.

PLAGUE.

In 1894 it was my good fortune to be at the Institute Pasteur soon after Yersin had sent to the institute cultures of the bacillus of the plague. Through the courtesy of Dr. Roux and his assistant, Dr. Borel, I had the privilege accorded me of studying the bacillus and observing the experiments then being made with it. On my departure in October I was given a culture, which I brought with me on my return. Subsequently I made a study of it in order to confirm what had then been written about it. But unfortunately my culture was lost during the next summer, while I was away from the laboratory, and the experiments were brought to a standstill. Not caring to send for another culture, on account of its extreme virulence, I desisted further in experiments in this line. I had no idea at that time that it would be anything more than a laboratory curiosity, and that the danger of its spread to this country was a remote possibility. Since then my views have undergone a decided change. In December, 1896, after a long delay, I received a culture (through the courtesy of Dr. W. F. Arnold, United States Navy, who had just come from the East), which was then thought to be the bacillus of the plague. On studying the organism I was immediately struck with its dissimilarity to my former culture. Its behavior in the culture media was so different that I had doubts from the first that this was the bacillus of the plague. Passed Assistant Surgeon Geddings's observations on the plague bacillus, as studied at the Pasteur Institute, have set the matter at rest, and they are confirmatory of mine made previously.

I would not have gone so much into the details had it not been that certain disinfecting experiments had been made with this bacillus purporting to be plague, which I now wish to correct. We were evidently dealing with another microorganism.

So far, no one has investigated the plague bacillus from a quarantine standpoint, unless Abel's observations would be considered as such. We are still in doubt as to its viability in merchandise. All observers, however, appear to agree that the laboratory experiments made with the bacillus demonstrate it to be short lived.

It is hoped that these points will receive due attention in the near future.

Passed Assistant Surgeon Geddings's observations on the bacillus of bubonic plague[1] as studied at the Institute Pasteur have been added to the list of laboratory papers.

ENTERIC FEVER.

Soon after Wyatt Johnson, of Montreal, gave the results of his study upon Widal's reaction in cases of suspected enteric fever, the laboratory undertook this examination of the blood from cases of enteric or suspicious fevers occuring in the marine hospitals. Accordingly the following circular letter was sent to the several hospitals which is self explanatory:

[Circular letter.]

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL, M. H. S.,
Washington, D. C., September 26, 1896.

SIR: You are directed to send to the hygienic laboratory specimens of blood from cases of enteric fever now under treatment at your port, and from other cases which may be admitted before November 1, proximo.

The specimens to be prepared after the manner of the inclosed sample and duly labeled.

Each specimen should be accompanied by a short clinical history of the case, the temperature chart, and the date on which the specimen was taken.

It is also desired to obtain similar specimens from cases where the diagnoses may be in doubt.

Respectfully yours,

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

MEDICAL OFFICER IN COMMAND.

In response to this letter there were received within the two months specimens of blood from 35 cases.

As Dr. Ede Andrade was at this time engaged in making a study of the bacillus of typhoid fever, these specimens were given over to him for examination.

The results of this study are embodied in his paper entitled "On the clinical diagnosis of enteric fever," which accompanies this report. Owing to a misinterpretation of the letter, or to a disposition of some not to send in specimens of blood from cases until the disease was clinically well defined, the reaction was found present in a larger proportion than has been found by others in the early stages of the disease. It would have been a more crucial test, and at the same time more

[1] Note published in the Public Health Reports, April 2, 1897.

valuable, had it been possible to obtain the blood specimens from suspected cases and from the cases submitted, had they been sent earlier.

The general conclusion of all observers appears to be that the reaction is present in about 95 per cent of the cases, and can, as a rule, be demonstrated during the first week of the disease. So far the attempts to produce a curative serum have not been fraught with success. Pfieffer and Scholl report the treatment of a number of cases by the serum from animals strongly immunized against the typhoid bacillus. These cases, on analysis, appear to present a favorable argument for its use, but the cases are too few to warrant a conclusion.

The knowledge we have already gained concerning enteric fever makes it appear probable that a method will soon be forthcoming by which an artificial immunity can be established against the disease, and moreover our methods for treating the disease will undergo important changes.

INVESTIGATION OF WATER SUPPLIES.

In recent years the subject of water supplies of our large communities has received no little attention from the State and municipal authorities. Several of the States are now doing good work in not only pointing out to their people the dangers arising from the pollution of drinking water, but also by preventing it from becoming contaminated. While it is possible for a State or municipality to protect itself against the dangers of water pollution, provided this arises within the confines of a State, it has no power over it if it originates in another. So far the General Government has not seen fit to take any action in this matter by the enactment of proper laws; but if relief is to be obtained it must come from the General Government.

There are now several streams and lakes from which the people of several States are compelled to obtain their water supply. These sources are believed to be fast becoming diluted sewage, rendering them unfit for use, and some remedy should be forthcoming.

This is a subject regarding which the Government should exercise its prerogatives and cause an examination to be made of all conditions affecting such a water supply, and ascertain, if trouble be present, how best remedied.

Preliminary to anticipated action, there is now being conducted in the hygienic laboratory a bacteriological examination of the Potomac water, which will be continued for a year. This is to be an aid in determining to what extent the water supply of Washington is responsible for the great number of cases of typhoid fever which prevails here annually, and ascertain, if possible, how best this condition can be prevented.

EXAMINATIONS OF SPECIMENS.

A number of officers of the Service have during the year availed themselves of the laboratory for the examination of sputum, blood,

and pathological specimens from cases. Two chemical analyses of well water have been made on request of officers.

LABORATORY INSTRUCTION.

Under the date of February 28, 1897, the detail of the officers of the Service for a course of instruction in bacteriology and in other subjects pertaining to the duties of the Service was approved by the Secretary of the Treasury, and nine officers so far have availed themselves of the privileges of the laboratory.

My experience in work of this character leads me to believe that the laboratory instruction should be given soon after or at the time of the officer's appointment. I think such a course would be both in the interest of the officer and the Service. In connection with this subject a few remarks are offered relative to the after training of the young officer, which are offered with the best intentions and for what they are worth.

In order to facilitate the officers' acquaintance with the special duties of the particular service to which he belongs, it has been the practice for many years of several European governments, particularly of England, France, and Germany, to maintain medical schools, in connection with their military establishments, for the training of the new appointees in their duties. Only a few years have now elapsed since the medical officers of the Army and Navy have received a similar course of instruction, each in their own Department.

After the applicant receives his commission he is detailed to his respective school for a course of instruction before he is assigned to a post or a vessel.

This proceeding is perhaps the best suited for the Army and Navy, but would hardly be practicable to fully instruct our officers in all of the several lines of duty in our service, because of the limited number of the corps.

It is suggested that the Marine-Hospital Service have a school of instruction for those recently appointed, and instead of having the instruction given at any one place, rather have it distributed through the several branches of the Service.

The scheme of instruction which I would suggest would be after the following named order: (1) Laboratory instruction, (2) hospital and dispensary service, (3) immigration inspection service, (4) quarantine service.

1. LABORATORY.

The officer should be first detailed to the hygienic laboratory for a course in the use of the microscope in clinical diagnosis, in the principles of bacteriology, in pathological histology, sanitary and clinical chemistry, and the principles and practice of disinfection.

This course of instruction would require about three months, and would prepare the officer to utilize this knowledge in his hospital work.

2. HOSPITAL AND DISPENSARY SERVICE.

The young officer, after having completed the laboratory course, should be assigned to one of our larger stations (which should be designated as a part of the scheme of instruction), where he should be given at least a year's service in the wards of the hospital. He should be instructed in the methods of sick call, medical and physical examinations, physical diagnosis, application of methods of accurate clinical diagnosis, case-history writing, treatment of cases, post-mortem examinations, and reports.

After a term of service of six months in the medical wards, he should be then given instruction and practice in surgical diagnosis, preparation of patients for an operation, preparation for surgical operations, assisting at operations, surgical dressings, and surgical operations.

In addition to and during the above tour of duty, the officer would be expected to familiarize himself with the regulations governing the Service, the methods of conducting the business of the hospital and dispensary.

After his year of service he should be then assigned to the dispensary for a period of from four to six months, where his hospital service would then prove to be of great advantage in the proper conduct of the dispensary service.

3. IMMIGRATION SERVICE.

Since all alien immigrants are required by law to be inspected by the Marine-Hospital Service, our officers should, after their hospital tour of duty, be assigned to duty at the immigration depot at New York, and under the direction of an experienced officer be given opportunities to observe and make the inspections, and be given ward work in the hospital. This latter, I think, is just as important as the former, on account of the varied classes of diseases encountered in these wards, such as would also be seen at quarantine later on.

4. QUARANTINE SERVICE.

The school of instruction would not be complete without a knowledge of how to manage the contagious diseases and to prevent their spread; therefore a tour of duty at the quarantine stations should follow. There are two ways of viewing this. One is, to consider the quarantine simply as a school, where the officer would be sent to acquire the practical knowledge. If this course be adopted, he should first be assigned to one of the northern stations for a sufficient time—say three months—during which time he would be able to familiarize himself with boarding, inspecting, disinfection of vessels (partial or complete), the detention and isolation of suspects.

To be followed by a tour of duty at one of the southern stations during the active season (summer), where he should board, inspect, and treat vessels, their cargoes and personnel.

Another plan is—and perhaps it is better than the foregoing—to assign the officer to duty at a quarantine station in the fall, and have him assist the officer on duty for six months before assuming charge.

This latter plan would not necessitate the officer completing his quarantine immediately after his hospital and immigration service, but there could be a time intervening before he goes on this duty.

The first plan, if carried out, would require about two and one-half years to complete. At the end of this time the officer would be in a position to discharge any duty of the service independently, should the emergency arise, or be a better qualified assistant.

If a plan like the one adopted should meet with favor, it would require some radical changes in our system of hospital management. There would have to be a more uniform system of hospital administration, or confine the hospital work of the young officer to one station designated for this purpose.

SMALLPOX AND VACCINIA.

Reference has heretofore been made to the investigation of smallpox and vaccinia, which has been the subject of special inquiry during the past two years. Although this subject is by no means finished, I have concluded it would be for the best interests to report what has been accomplished. The report will be found in its appropriate place among the other contributed articles.

THE SANITARY CONDITION OF THE RAILWAY COACH.

The sanitary condition of the railway coach is still under investigation, but it is far from being completed; considerable data have already been collected, but it is not sufficient to base a conclusion. These observations will be continued throughout the year. It is my intention to include the water and ice supplies of the railway service in a future investigation.

NEEDS OF THE LABORATORY.

It has been nearly ten years since the laboratory was established in the marine hospital in New York. From the modest beginning its work has been gradually increasing until it has reached its present proportions. It has now reached a stage where it should be further enlarged in its scope and equipment and placed on an enduring basis.

In the commencement the laboratory investigations were undertaken almost entirely on account of the Marine-Hospital Service proper, but from year to year it has extended more and more into the domain of public health and quarantine. While all the investigations made of the latter subjects have a bearing upon the avocation of the sailor, they have also a much wider bearing.

This brings up the question of the establishment, under the auspices of the Marine-Hospital Service, of a laboratory of public health, by enlarging the present laboratory into one of this character.

There is now a growing sentiment among the health officials and sanitarians that the General Government should do more than it has been doing in the domain of public medicine, and especially that of the investigation into the cause, the prevalence and prevention of disease, and other causes which affect the welfare of communities or individuals.

The desire for the Government to exercise these functions has kept apace with and has principally received its impetus from the health organizations of States and municipalities.

Formerly, when the bodies above mentioned were poorly and imperfectly organized, there was but little desire on their part to have any kind of investigations made by the General Government, because they feared that their individual rights would be encroached upon, and viewed with suspicion any movement directed or originated by the National Government.

Happily this feeling has almost entirely passed away, and there is now a better and harmonious feeling prevailing among the organizations, not only to the Government, but toward each other.

The sole reason for the change of attitude can be ascribed to their more perfect organization, and to the fact that the affairs of the State and city are more than sufficient to keep their whole time and energies employed in bettering the conditions of the people of their respective localities, and there is little time, even if there be inclination, to manifest the former spirit.

By common consent, there are certain prerogatives belonging to the General Government which have from time to time been invoked by the general public when it has been called upon to ascertain the cause and prevention of epidemic diseases. The demands for the exercise of this function by the Government, I am sorry to say, have been "few and far between," and there has been so far no formulated plan by which it could be exercised to the best advantage. As a rule, the investigations relating to medical subjects have been made during or at the close of an epidemic, and as soon as the danger had apparently ceased the inquiry ceased. This, as said before, is believed to have been caused by the antagonism of the local authorities, and not because there was no necessity for inquiry.

The general sentiment prevailing is that the National Government should cause investigations to be made in this country, and if need be in others, into the nature, origin, and prevention of contagious epidemics and other diseases affecting our people, and should also make investigations of other matters relating to the public health.

If I have stated the position correctly, the subject when divested of all other associations means that there should be a laboratory established for the purpose, and I believe that the Marine-Hospital Service

should lose no time in making provisions for its establishment. In outlining the work of such a laboratory, the first should be directed toward the study of the etiology, pathology, and prophylaxis of the acute infectious diseases, viz, yellow fever, cholera, smallpox, and plague, etc.

Yellow fever should engage our attention first. This disease has been one of the greatest disturbers of our body politic. On account of its prevalence in close proximity to shores, we are compelled to maintain and operate an expensive quarantine system, which might be in a great measure abandoned if not for this one disease, whose nature is yet undetermined.

In my report of last year, I said:

> That it was more than unfortunate that this one disease, if no others, had not been made the subject of a continuous inquiry instead of the two attempts made in the last two decades. One epidemic of yellow fever has cost in dollars and cents tenfold more than it would have cost to maintain for the past twenty-five years commissions of experts to inquire into the cause of the disease, not to mention the lives which are sacrificed in such an epidemic. If after twenty-five years of research our knowledge has been increased regarding the etiology of prophylaxis, whereby our people could be better protected from its ravages, our commerce relieved in any way of its present burdens, it would have been worth to us may times the amount expended by the commission. If it is not deemed expedient to institute inquiries concerning the nature and prevention of the infectious diseases as a class, I would most earnestly recommend that a commission of experts be appointed to investigate the cause and prevention of yellow fever. The commission should be a small one, because it is believed that a few competent men working together in harmony and with the same purpose in view will accomplish more than a larger body. The main feature in these investigations is to keep constantly engaged in studying the disease until success crowns their efforts. Such an investigation should not be gauged by time; scientific research is not to be measured in this way, and because the desired result is not forthcoming at a stated time is no reason why its labors should be terminated. I am of the belief that it will be necessary to pursue such a course before the complex problem of yellow fever will be solved.

The commission should be appointed to do this work "under direction of the Marine-Hospital Service."

THE BACILLUS ICTEROIDES.

The alleged discovery of the cause of yellow fever by Dr. Sanarelli, at Montevideo, is now attracting the attention of the scientific world, and this report of his investigation has been published by the medical press, and otherwise made publicly known. His work bears the stamp of thoroughness and of one who is a competent bacteriologist. On this account, if none other, his work must be critically examined and no undue haste made to form a conclusion. So far as his statements go, with reference to the mixed infection they are corroboratory of Sternberg's conclusions, and no doubt the organism described by Sanarelli was also encountered by Sternberg, but not recognized by him at the time.

Had Dr. Sternberg pursued his investigations further he might have

arrived at the same conclusion as Dr. Sanarelli. The biology of the bacillus is strikingly similar to those of the intestinal tract, and has many properties in common with them. On account of its viability in water one would suppose that this would be the principal avenue of infection; perhaps it is, notwithstanding our preformed opinion to the contrary. Regarding its pathogenesis, it is virulent to nearly all the mammalia, especially the domesticated animals, except the cat, and one would be led to suppose that these animals would succumb to the disease. If they do contract the bacillus it must be a mild form of the disease, which is never fatal. The only feature which lends aid to the theory that animals may have yellow fever is alleged that horses shipped from this country to Havana and its environs have a mild form of the fever soon after they are landed, which is termed the "acclimating fever." Whether there is much truth in this or not I am unable to say. If such is the case it is well worth investigating.

The experiments with the bacillus and its toxins upon the mammalia are interesting, the lesions being very much like those of yellow fever, but to my mind are by no means conclusive.

The lesions produced by this bacillus resemble more that of an acute septicæmia. The enlargement of the spleen, thymus and other glands, the punctate hemorrhages, pneumonia, serous effusions, are by no means uncommon in the septicæmias or in certain conditions produced by the toxins.

Notwithstanding these, it does not prove the absence of the bacillus in cases of yellow fever simply because it does not produce exactly the same lesions as those of man. The plague bacillus does not do this to the full extent which we would expect, yet there is an acute septicæmia of animals which we now recognize as the plague septicæmia, which differs in appearance but little from other bacillary septicæmia.

The experiments on man are the most striking of all, and while the lesions produced are not altogether those of yellow fever they bear more weight than all the others put together.

The toxins of diphtheria, however, produce a steatosis—a cell death—which is just as profound and as well marked in the kidney, liver, and spleen as those seen in yellow fever; in other words, there are other organisms which may bring about the same changes, and on this account one must be slow to accept the conclusions as final.

The observation on the symbiosis of the bacillus icteriodes and the moulds is a novel observation, and may explain how this organism infects localities. This theory, if true, carries great weight and may be the explanation of how yellow fever infects and spreads. The following points should be cleared up and explained before one can accept the conclusions of Dr. Sanarelli as final:

(1) The organism resembles the ordinary intestinal bacilli in its behavior in the ordinary culture media, growing well even at a comparatively low temperature, on ordinary culture media, and retaining

all its virulence. This is contrary to what would be expected from the germ of yellow fever, and would be fatal to the theory that yellow fever does not spread in the winter months in the tropics where the temperature never falls below 20°. In other words, it would be epidemic all the year.

(2) The influence of cold or altitude has not been stated, a factor which must be taken into consideration, in the propagation of the cause and the spread of the disease.

(3) That septicæmia and steatosis of the lymph and other glands may and do take place. In other affections produced by micro-organisms, the pictures of the lesions in animals, although resembling the process in man, are different.

(4) That if the domesticated animals are so susceptible as claimed to be there should be deaths among these, and caused by the bacillus when the yellow fever is epidemic, which is not the case.

(5) That if the organism can live in water, it is more than probable that it infects the water supply, and through this agency it would cause epidemics. Yet no one has demonstrated whether there is a causal relation between the water supply of a city and the epidemic of yellow fever.

(6) That there is no causal relation shown between the infection of yellow fever and sewage—a well-established fact.

(7) The studies in comparative pathology should have been carried further, to the extent of determining how far the classes of animals experimented upon would lend themselves to experiments in immunity, and a state of immunity should be produced that would be in all respects similar to that existing in man after an attack of yellow fever.

(8) That it should be possible to demonstrate that an immunizing substance can be produced, and this administered to nonimmune persons will protect against the disease.

These opinions are based on a careful reading of the paper, and may, notwithstanding all the facts, be erroneous. I sincerely hope that my expectations may fall to the ground, and that Dr. Sanarelli has discovered the true cause of yellow fever, but before abandoning my position, I wish the foregoing to be explained.

This can not be done in any other way than to carefully go over Dr. Sanarelli's work and confirm the statements he has made. If on investigation his claims are confirmed, it means that it is one of the greatest discoveries of modern times, a discovery in which the people of the United States are vitally interested.

I would suggest (notwithstanding my own views) that the service take immediate steps to have it investigated.

TUBERCULOSIS.

The Marine-Hospital Service has for nearly one hundred years administered to the wants of the sick and disabled seamen. Tuberculosis has

been recognized as one disease which has caused great mortality. The death rate from the disease has always been unusually large—much greater than the other diseases in proportion. The records of the service from 1879 to 1896 demonstrate that although the general death rate of the cases treated in hospitals has been gradually declining, the specific death rate from tubercular diseases has been slowly and gradually increasing.

Knowing as we do the cause of the disease, it is only necessary to inquire how the disease is contracted. The unsanitary condition of the forecastle, the close, crowded quarters of the sailors' boarding houses, and the association of the tubercular with other cases in the hospital wards suggest the way in which the disease may and probably is spread. Measures should be adopted to eradicate the disease from the forecastle and the boarding house.

The sero-therapy of this disease should be carefully inquired into, and if favorable results are to be obtained by this method of treatment, either by it or in conjunction with climatic or other forms of treatment, it should be tried.

LABORATORY INVESTIGATIONS FOR THE NEAR FUTURE.

WATER SUPPLIES.

At present the resources of the laboratory could not be better employed than to institute an inquiry concerning the public water supplies. This inquiry should embrace the origin, quantity and quality, the distribution of a water, and the disposal of water and sewage.

Watersheds, streams, and lakes in which the interests of one or more States or Territories are involved should be subject of careful inquiry, and to be made with a view of correcting the contaminating influences of such water supplies.

Water analysis made by the Government should be limited as above, or to conditions affecting the public health and general and not local interests; these latter should be left to the States.

The laboratory should not be a public analyst for those possessing a well and an old oaken bucket or mineral spring, which alleges to cure all the ills of the flesh.

There should be instituted investigations concerning the influence of climate upon health and disease, the sanitary condition of the home, of the factory, and workshop, to continue the investigations relating to the etiology, pathology, and prophylaxis of the acute infectious diseases, and especially that of yellow fever.

The foregoing synopsis of the present and proposed work will give an idea what the laboratory is able to accomplish under the present organization, and is an argument in itself for a broader field of work. If a laboratory of public health should be established I would recommend that it be on the following lines:

The laboratory should consist of four divisions: (1) A division of

pathology and bacteriology, (2) a division of hygiene, (3) a division of chemistry, (4) a division of vaccines and biochemistry.

The organization of the laboratories would be one of detail, which under the existing regulations of the Department could easily be accomplished.

My previous recommendations as to the location of the laboratory in its present site are again renewed. The laboratory should be removed from the Bureau as soon as possible, and I would earnestly recommend that in its removal steps be taken to secure an appropriation of at least $50,000, to be made available for the purchase of a site and the erection of the laboratories and other necessary buildings and its removal to a place better suited for carrying on special investigations in the domain of the acute infectious diseases.

Respectfully submitted. J. J. KINYOUN,

Passed Assistant Surgeon, Acting Director.

FORMALDEHYDE AS A DISINTECTING AGENT AND ITS PRACTICAL APPLICATION.

By P. A. Surg. J. J. KINYOUN, M. H. S.

The substance designated as "Formaldehyde" has been known since 1868. It was discovered by Von Hoffman, who obtained it from partially dehydrogenating methyl alcohol by passing the vapor of the alcohol, mixed with air, over hot finely divided platinum or copper.

It was considered more or less a chemical curiosity until a few years ago, when the methods of production were brought to a more perfect state and the cost of methyl alcohol was lessened.

This agent is now produced on a large scale, on practically the same lines as first described by Von Hoffman, and quite a number of apparatuses have been devised for this purpose. Among these is the Trillat system, which is perhaps the best for manufacturing the gas in large quantities for commercial use.

While in Berlin in 1894 my attention was first called to a product known under the trade name of "Formalin," which was manufactured by the firm of E. Schering. This was a 40 per cent solution of formaldehyde gas. It was claimed that this solution possessed disinfecting properties to a wonderful degree, and was equal to bichloride of mercury as a germicide.

During the early part of 1895 preparations were made to take up the subject, with a view to determining the availability of such solutions for preparing specimens for museum purposes as well as for class demonstrations, and the experiments made with it confirm all that has been said concerning it, and it was found to be admirably suited for the purpose. Soon after this experiments were undertaken to determine whether its range of usefulness could not be extended to the domain of practical disinfection. After my former experiences with gaseous disinfectants, I must confess that my confidence was not very great nor my hope strong in the efficacy of the agent, notwithstanding the claims which have been advanced by some regarding it.

FORMALIN AS A GERMICIDE.

The literature on the production of formaldehyde gas and its estimation is quite replete, while the literature of formaldehyde as a disinfectant is not only small, but conflicting. On account of this it has become necessary to review the subject at length, in an attempt to arrive at a conclusion.

As a preliminary, it was necessary to confirm or disprove many of the statements concerning this subject. Thispart of the work has been assigned chiefly to my colleague, Passed Assistant Surgeon Geddings, who has been associated with me in conducting the numerous experiments.

There seems to be little variation in the conclusions of observers on the antiseptic and disinfecting properties of the solution of "formalin" or "formol." The results were fairly constant. The strength of the solutions required to inhibit the growth of microorganisms, notably anthrax spores, has been stated to be 1:15,000 by some, while others place it at 1:2,000.

The following tables are taken as comparisons, one by Miquel and the other by K. Walter:

Results obtained with formaldehyde.

Miquel.		K. Walter.	
Strength of solutions.		Strength of solutions.	
1 : 10,000	Putrified bouillon.	1 : 100,000	Rich growth.
1 : 5,000	Do.	1 : 50,000	Do.
1 : 3,333	Do.	1 : 20,000	Slight growth.
1 : 2,500	Do.	1 : 10,000	No growth.
1 : 2,000	Bouillon unaltered.	1 : 2,000	Do.
1 : 1,666	Do.	1 : 1,000	Do.
1 : 1,430	Do.	1 : 500	Do.
1 : 1,250	Do.	1 : 100	Do.
1 : 1,111	Do.	1 : 50	Do.
1 : 1,000	Do.	Control culture	Rich growth.
1 : 910	Do.		
1 : 833	Do.		

Thus it will be seen that there is a discrepancy in the results which must be reconciled.

In order to determine with some degree of accuracy, experiments were made by exposing certain microorganisms to solutions of different strengths for a given time; and estimating the results in this way the following experiment will show:

Hygienic Laboratory, United States Marine-Hospital Service.

EXPERIMENT I.

[Formaldehyde solution 1–5,000 for the times below indicated.]

Organism.	Control.	1 min.	2 min.	3 min.	5 min.	10 min.	15 min.	30 min.	60 min.
Staph. pyogenes aureus.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth retard.	Growth retard.
Bacillus diphtheria.	Growth.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.

[Formaldehyde solution 1–4,000 for the times named.]

Staph. pyogenes aureus.	Growth.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth retard.	Growth retard.	Growth retard.
Bacillus diphtheria.	Growth.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth normal.	Growth retard.	Growth retard.

[Formaldehyde solution 1–3,000 for the times named.]

Bacillus diphtheria.	Growth.	Growth retard.	Growth retard.	Growth retard.	Growth retard.	Growth retard.	Growth retard.	Growth retard.	Growth retard.

[Formaldehyde solution 1–2,000 for the times named.]

Bacillus anthracis (spores).	Growth.	None.	None.	None.	None.	None.	None.	None.	None.

Hygienic Laboratory, United States Marine-Hospital Service—Continued.

EXPERIMENT I—Continued.

[Formaldehyde solution 1-1,000 for the times named.]

Organism.	Control.	1 min.	2 min.	3 min.	5 min.	10 min.	15 min.	30 min.	60 min.
Bacillus anthracis (spores).	Growth.	None.	None.	None.	None.	None.	None.	None.	None.

[Formaldehyde solution 1-500 for the times named.]

Bacillus anthracis.	Growth.	None.	None.	None.	None.	None.	None.	None.	None.

From the above it will be seen that solutions of 1:5,000 retard the growth of one of the test organisms, but more were killed under a 1:2,000 strength; solutions of this strength readily killed anthrax in the spore state.

Having now determined the germicidal value of a solution of known strength, it became necessary to ascertain the action of the gas, and for this purpose a number of experiments were made by exposing certain of the pathogenic bacteria to the action of the gas by using the solutions in the way as first recommended—that is, to expose a large surface of the liquid to the air and allow the gas to be evolved spontaneously. This method demonstrated beyond question that a sufficient quantity of the gas would be evolved to act as a germicide, and it was inferred from these results that it would behave in the same efficient manner when applied on a large scale for disinfecting a room and its contents. This was not the case, and the reasons therefor will be given later on.

The experiments which gave the results with least variation were those conducted in the following manner:

A large bell jar, to which was attached a vacuum apparatus, was used for this purpose, and a tubulated bottle filled with cotton wool saturated with formalin. A stream of air could be drawn through the formalinated cotton and thence to the bell jar until a saturated atmosphere of the gas was obtained. Cover slips containing an even layer of the microorganism to be tested were prepared and dried and then exposed to this atmosphere, after which the gas was neutralized and the specimen planted over into bouillon or inoculated into animals, as the case required.

The following is a summary of the experiments:

EXPERIMENT II.

RESULTS OF EXPERIMENTS ON THE DISINFECTING AND GERMICIDAL VALUE OF FORMALDEHYDE.

Bouillon cultures of the following organisms were spread on cover slips and allowed to dry, then exposed to the action of a saturated atmosphere of formaldehyde for the time indicated, and the slips then planted into bouillon and kept at a temperature of 37° C. for twenty-four and forty-eight hours.

Organisms.	Control.	1 min.	2 min.	3 min.	5 min.	10 min.	15 min.	30 min.	60 min.
Staph. pyogenes aureus. [Results after forty-eight hours—the same as above.]	Growth.	None.	None.	None.	None.	None.	None.	None.	None.
Spirillum Finkler Prior. [Confirmed by a second series of experiments with identical results.]	Growth.	None.	None.	None.	None.	None.	None.	None.	None.
Spirillum cholera Asiatica. [Similar results after forty-eight hours.]	Growth.	Growth.	None.	None.	None.	None.	None.	None.	None.

Hygienic Laboratory, United States Marine-Hospital Service—Continued.

EXPERIMENT II—Continued.

Organism.	Control.	1 min.	2 min.	3 min.	5 min.	10 min.	15 min.	30 min.	60 min.
Bacillus coli com.. [Similar results after forty-eight hours.]	Growth.	Growth.	Growth.	Growth.	Growth.	None.	None.	None.	None.
Bacillus typhi abdom. [Similar results after forty-eight hours.]	Growth.	Growth.	Growth.	Growth.	Growth.	None.	None.	None.	None.
Bacillus diphtheria. [Similar results in forty-eight hours.]	Growth.	Growth.	Growth.	None.	None.	None.	None.	None.	None.
Bacillus Mallei... [Similar results in forty-eight hours.]	Growth.	Growth.	None.	None.	None.	None.	None.	None.	None.
Diplococcus pneumonia partially dried.	Growth.	Growth.	None.	None.	None.	None.	None.	None.	None.
Diplococcus pneumonia.	Growth.	None.	None.	None.	None.	None.	None.	None.	None.
Bacillus pyocyaneus.	Growth.	Growth.	None.	None.	None.	None.	None.	None.	None.
Bacillus anthracis with spores. [A second series of experiments gave identical results in forty-eight hours.]	Growth.	Growth.	None.	None.	None.	None.	None.	None.	None.
Bacillus tetani fatal to mice.	Death.	None.	None.	None.	None.	None.	None.	None.	None.

The amount of gas evolved by this method is considerably more than when it is evolved by placing a given quantity in a receptacle and allowing it to be diffused by evaporation. It was found that 1.25 volumes per cent was evolved by the former method and about 1 volume per cent by the latter.

Numerous experiments were also made to determine the power of the saturated atmosphere of the gas to sterilize fabrics and other articles infected with pathogenic bacteria. The results were in every way satisfactory, as the germs were readily destroyed, even when they were in the dry state.

Articles containing cultures or specimens of bacteria, having several layers of fabric interposed, were not so readily disinfected. They did not give the constant results of the former experiments, but on the contrary were extremely varying and inconstant.

The cause of this appeared to be due to the inability of the gas to penetrate into the interior of the fabrics, and this was especially noticeable where there was any considerable moisture on the surfaces of the articles. The moisture arrests the gas much after the manner of moisture arresting the penetration of sulphur dioxide, and even to a greater degree.

Another factor which is equally responsible for preventing penetration is the fact that formaldehyde has the peculiar property of being absorbed, or perhaps forming a loose chemical combination with such articles as woolen goods, hair, and feathers. These substances when exposed to the action of the gas will absorb considerable quantities, and for some time after they will slowly evolve formaldehyde, much after the manner of the breaking up of trioxymethylene. When these experiments were repeated on a larger scale—for instance, in a room—the results were even more variable than those of the laboratory, and the arrest of the gas on the surfaces by the moisture, etc., was even more apparent.

Notwithstanding the statements made to the contrary, that all that is required for the disinfection of a room is to saturate cloths with a solution of the gas, or expos-

ing large surfaces of the same and allowing it to evaporate, and that by leaving these in the apartment for a given time will be sufficient, we must radically differ with those who advocate this, because our results have not confirmed these facts.

Now, it is a well-known fact that formaldehyde is hygroscopic and absorbs water with rapidity, and although the substance can and does exist as a gas in its free state, with aqueous vapor, it does not do so for any length of time, but readily takes up the moisture, and becomes again a solution. Further, the gas, even in its dry state, has a tendency to undergo polymerization and is converted into trioxymethylene. This appears to be hastened when there is moisture present.

In this connection it may also be remarked that when solutions of the gas are allowed to evaporate the formaldehyde commences to be polymerized after it has been concentrated to about a half, and when it is converted into this state it evolves the gas very slowly, unless a rather high temperature be applied—a temperature sufficient to break up, or rather disassociate, the three atoms of formaldehyde.

If it were practicable to use formaldehyde solutions in the manner above indicated it would require large quantities of the solution, and would be an expensive measure if it were to be applied on a large scale.

EFFECT OF FORMALDEHYDE ON FABRICS, ETC.

At this juncture it might be well to remark upon the effects of the formaldehyde gas and its solutions upon textile fabrics, hair, fur, leather, and the like. Experiments were made by subjecting samples of wool, cotton, fur, and leather goods of every description to crucial tests, using solutions of various strengths and a saturated atmosphere of the gas. The results obtained were in every way satisfactory. Over 225 different samples of wool, silk, cotton, linen, leather, and hair were experimented upon, and there was no change observed in textile character, even when they were soaked in strong solutions of the gas.

Effect on colors.—Little or no change occurred in the colors of the fabrics; only three of the number showed any change, although over a hundred colored fabrics were under observation. The colors which were changed were red and two shades of violet, all coal-tar colors, and were readily changed by sunlight.

Effect on woods.—No effect was noted.

Effect on metals.—Iron and steel are attacked by the gas, provided there is moisture present. Little if any effect on these if the gas is dry. There is no effect on other metals.

Textile fabrics, when exposed to the gas or its solutions, take up a considerable quantity of it either in a free state or in a combination, and give off the gas slowly, but in sufficient quantities to be objectionable. This appears to be best obviated by neutralizing the gas by ammonia and converting it into a formamide. This is rather a stable body, possessing germicidal properties of no small degree, as the following experiment will show:

EXPERIMENTS WITH FORMAMIDE.

EXPERIMENT III.

To formalin (containing 40 per cent formaldehyde) was added an equal volume of strong ammonia water (26° B. 20 per cent), and the resulting formamide obtained by evaporation to dryness. The salt was dissolved in buillon in the following percentages, and the following organisms subjected to experiment therewith:

Organism.	Control.	1 per cent.	2 per cent.	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.	9 per cent.	10 per cent.
B. Anthrac.....	Growth.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.

Organism.	Control.	0.1 per cent.	0.2 per cent.	0.3 per cent.	0.4 per cent.	0.5 per cent.	0.6 per cent.	0.7 per cent.	0.8 per cent.	0.9 per cent.	1 per cent.
B. Diphth	Growth.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.
B. Anthrac.....	Growth.	Growth.	None.	None.	None.	None.	None.	None.	None.	None.	None.

Not only has the formamide germicidal properties, but those of calcium, sodium, copper, barium, and silver possess decided germicidal properties, as will be seen by the following:

EXPERIMENT IV.

Formides of barium, calcium, sodium, copper, and silver—their effect upon anthrax spores.

[Time, twenty-four hours at 37° C.]

	Control.	1–100.	1–200.	1–300.	1–400.	1–500.	1–600.	1–700.	1–800.	1–900.	1–1000.
Anthrax	Growth.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.

No change in the above results in forty-eight and seventy-two hours at 37° C.

Agent.	Control.	1–1250.	1–1500.	1–2000.	1–2500.	1–3000.
Barium formide.....	Growth.	None.	None.	None.	None.	Growth.
Calcium formide.....	Growth.	None.	None.	None.	None.	Growth.
Sodium formide.....	Growth.	None.	None.	None.	None.	Growth.
Copper formide	Growth.	None.	None.	None.	None.	Growth.
Silver formide	Growth.	None.	None.	None.	Growth.	Growth.

No change in the above results in forty-eight and seventy-two hours at 37° C.

The formamide particularly would be useful in the sterilization and preparation of animal suture materials, and it would serve a double purpose in neutralizing the free formaldehyde, and subsequently act as a preservative.

The action of the formides on the bacteria suggest their application to surgical procedure, as they are much less poisonous than solutions of the same strength of mercuric bichloride.

PENETRATION OF FORMALDEHYDE GAS.

Having observed the variable results attending exposures under ordinary conditions, it became apparent that some other means would have to be devised in order to have the gas penetrate the object readily and thoroughly. To this end the vacuum process was brought into requisition. A small apparatus was arranged after the following manner: A large bell jar was attached to a vacuum pump, which by another opening was attached to a flask containing cotton wool saturated with formalin, or formol.

The jar was charged with articles to be disinfected, and then closed; when a vacuum of half an atmosphere was produced, air was then allowed to pass through the formalinated cotton wool, replacing the air taken out of the bell jar. By this means cultures of pathogenic bacteria were readily killed, even when protected by several layers of woolen cloth.

The only drawback to these experiments was the amount of moisture which necessarily came over with the air, and was precipitated on the surface of the articles. Notwithstanding this objectionable feature, the experiments were of great value and demonstrated how the bulkier objects, especially of upholstered furniture, could be penetrated by the gas.

A method by which the precipitation of moisture can be prevented was brought to notice by Roux and Trillat in a communication published in the Annales de l'Institut Pasteur. By this method it is possible to evolve the gas from the solutions in practically a dry state and in such quantities as desired. This is accomplished by adding to the solutions of formaldehyde calcium chloride, and heating this mixture under pressure. The addition of calcium chloride, or any neutral salt, raises the boiling point of the liquid anywhere from over 100° C. to 115° C., it depending on the quantity of the salt added. Now, formaldehyde gas is best evolved from formalin solutions within the range of from 95° C. to 102° C., and when a sufficient quantity of the salt is added to raise the boiling point above this it can be seen wherein the advan-

tage lies. In heating, nearly all the gas is expelled before the water of the mixture is given off as steam.

As remarked before, that solutions of the gas are prone to undergo polymerization when concentrated, the presence of the calcium chloride in part prevents this, or should this occur, aids in breaking up the trioxymethelene into gas.

APPARATUS FOR EVOLVING FORMALDEHYDE GAS FROM FORMALIN.

Early in August of 1896, with the aid of Mr. J. B. Pratt, of the Coast and Geodetic Survey, plans for a similar boiler to that described by Roux and Trillat were designed, and a boiler soon thereafter constructed. The apparatus is shown in an accompanying cut (fig. 1), and is constructed after the following manner: A small boiler of one-eighth inch copper, 6½ inches in diameter by 17½ inches high, closed at one end by a removable head, which is fastened to the boiler by bolts. It is capable of withstanding a pressure of 200 pounds to the square inch. On the head are the filling funnel, pressure gauge, safety vale, and discharge pipe. A drain pipe is fitted to the lower end of the boiler and connects with the water gauge on the side. The boiler is supported by an iron collar or jacket, and is arranged for applying heat. In the cut gas-burners are shown, but now a kerosene or gasoline lamp has been substituted for these. As this lamp works so admirably, it is recommended instead of the gas attachment. A pair of removable handles are attached near the top for transporting the boiler from place to place.

Method of operating.—The boiler is charged with the mixture of formalin and calcium chloride, all valves and cockstops closed, and heat applied through the opening under the boiler until the pressure registers from 75 to 90 pounds, when a small ⅛-inch pipe is attached and passed through the keyhole of the door of the department. The gas should be liberated rather rapidly. As soon as the pressure falls to about 5 pounds the boiler is again heated to the same degree as formerly, and again discharged. The two heatings set free nearly all the formaldehyde gas.

The amount of formaldehyde gas evolved from a liter of a 40 per cent solution is about 1,450 liters of the gas at ordinary temperature 17° C. It can readily be calculated how much formalin, or formol, will be required to obtain a certain per volume strength.

This apparatus is particularly adapted to the disinfection of rooms and has been of great value in carrying out the experiments in house disinfection.

ROOM DISINFECTION.

Through the courtesy of the health officer of the District of Columbia the wards and rooms of the new smallpox hospital were placed at our disposal for the purpose of making the proposed tests in the disinfection of rooms. The following are some of the experiments:

Room A (capacity, 7,400 cubic feet; percentage of formaldehyde, 0.5; time, twenty-three hours).

Experiment A.—Cultures in Petri dishes, covered with filter paper, and enveloped in 10 layers of blanket. Result: Anthrax, no growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment B.—Cultures spread on cover slips, placed in double envelopes, one sealed with paraffin, and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment C.—Cultures in Petri dishes, covered with filter paper, and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, no growth; diphtheria, no growth.

Experiment D.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

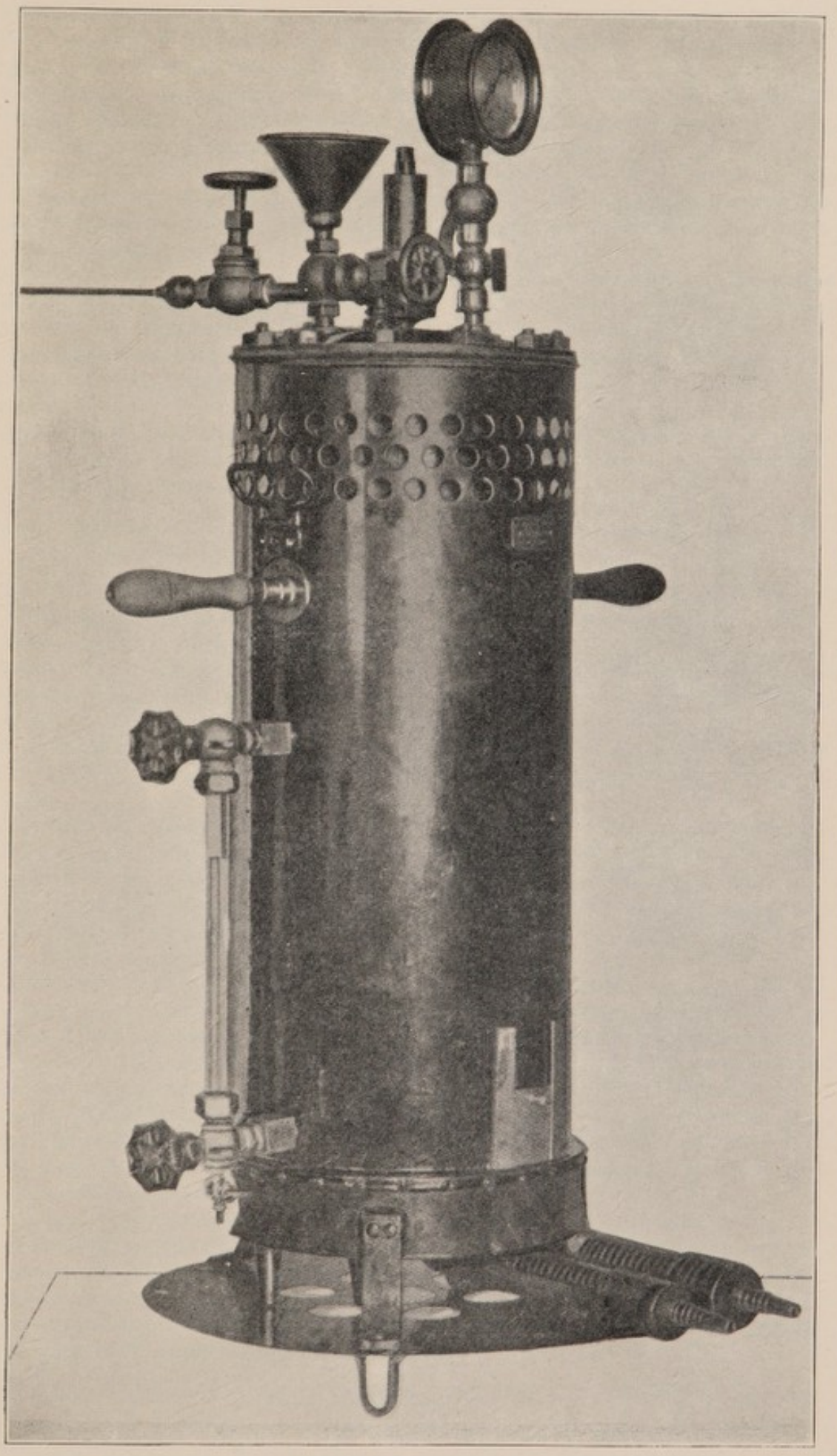


FIG. 1.

Experiment E.—Cultures in Petri dishes, covered with filter paper, and enveloped loosely in a blanket gathered into a bag. Result: Anthrax, no growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment F.—Cultures spread on cover slips, placed in double envelopes, and enveloped loosely in a blanket gathered into a bag. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, growth.

Experiment G.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and enveloped in three sheets gathered loosely into a bag. Result: Anthrax, growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, growth.

Experiment H.—Cultures on cover slips, placed in double envelopes, the inner one sealed with paraffin, and exposed on mantle in room. Result: Anthrax, growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment I.—Cultures in Petri dishes, covered with filter paper, and exposed on mantel in room. Result: Anthrax, no growth; typhoid, no growth; diphtheria, no growth.

Experiment K.—Cultures on cover slips, in double sealed envelopes, placed between the leaves of a book, and exposed in room. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Room B (capacity, 10,500 cubic feet; percentage of formaldehyde, 0.25; time, twenty-three and one-half hours).

Experiment A.—Cultures in Petri dishes, covered with filter paper, and enveloped in 10 layers of blanket. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment B.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment C.—Cultures in Petri dishes, covered with filter paper, and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, no growth; diphtheria, no growth.

Experiment D.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and wrapped in 36 layers of new cotton sheeting. Result: Anthrax, no growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment E.—Cultures in Petri dishes, covered with filter paper, and wrapped in a blanket, loosely gathered into a bag. Result: Anthrax, no growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment F.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and wrapped in a blanket, loosely gathered into a bag. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment G.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and wrapped in three sheets loosely gathered into a bag. Result: Anthrax, no growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment H.—Petri dishes, containing culture and covered with filter paper, and exposed on mantel in room. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment I.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and exposed on mantel in room. Result: Anthrax, no growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment K.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and exposed in the interior of a closed book. Result: Anthrax, growth; diphtheria, growth; S. pyogenes aureus, growth.

Room C (capacity, 3,300 cubic feet; percentage of formaldehyde, 1; time, twenty-two hours).

Experiment A.—Cultures in Petri dishes, covered with filter paper, and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment B.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and enveloped in 10 layers of blanket. Result: Anthrax, no growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment C.—Cultures in Petri dishes, covered with filter paper, and wrapped in 36 layers of new cotton sheeting. Result: Anthrax, growth; diphtheria, no growth.

Experiment D.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and enveloped in 36 layers of new cotton sheeting. Result: Diphtheria, no growth; S. pyogenes aureus, growth.

Experiment E.—Cultures in double envelopes, the inner one sealed with paraffin, and wrapped in folds of three sheets gathered into a bag. Result: Anthrax, no growth; typhoid, no growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment F.—Cultures in Petri dishes, covered with filter paper, and exposed on mantel in room. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth.

Experiment G.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and exposed on mantel in room. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment H.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and exposed between the leaves of a closed book. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Room I (percentage formaldehyde, 2; time, twenty-three hours).

Experiment A.—Cultures in Petri dishes, covered with filter paper, and wrapped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment B.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and wrapped in 10 layers of blanket. Result: Anthrax, no growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment C.—Culture in Petri dishes, covered with filter paper, and wrapped in 36 layers of new cotton sheeting. Result: Anthrax, growth.

Experiment D.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and wrapped in 36 layers of new cotton sheeting. Result: Anthrax, no growth; diphtheria, no growth; typhoid, growth; S. pyogenes aureus, growth.

Experiment E.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and exposed between the leaves of a closed book. Result: Anthrax, growth; diphtheria, growth; typhoid, growth; S. pyogenes aureus, growth.

Room E (capacity, 3,300 cubic feet; percentage of formaldehyde, 1; time, forty-seven and one-half hours).

Experiment A.—Cultures in Petri dishes, covered with filter paper, and enveloped in 10 folds of blanket. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment B.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment C.—Cultures in Petri dishes, covered with filter paper, and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth.

Experiment D.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment E.—Cultures in Petri dishes, covered with filter paper, and exposed on mantel in room. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment F.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and exposed on mantel in room. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment G.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and exposed between the leaves of a closed book. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Room F (capacity, 10,500 cubic feet; percentage of formaldehyde, 0.25; time, forty-eight hours).

Experiment A.—Cultures in Petri dishes, covered with filter paper, and enveloped in 10 layers of blanket. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment B.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, growth; S. pyogenes aureus, growth.

Experiment C.—Cultures in Petri dishes, covered with filter paper, and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, growth; diphtheria, no growth.

Experiment D.—Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment E.—Cultures in Petri dishes, covered with filter paper, and enveloped in the folds of 1 blanket gathered loosely into a bag. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment F.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and enveloped in the folds of a blanket gathered loosely into a bag. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment G.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and enveloped in the folds of 3 sheets gathered loosely into a bag. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment H.—Cultures in Petri dishes, covered with filter paper, and exposed on mantel in room. Result: Anthrax, growth; diphtheria, no growth; typhoid, no growth.

Experiment I.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and exposed on mantel in room. Result: Anthrax, growth; diphtheria, growth; S. pyogenes aureus, no growth.

Experiment K.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and exposed between the leaves of a closed book. Result: Anthrax, growth; diphtheria, growth; S. pyogenes aureus, growth.

Room G (capacity, 7,400 cubic feet; percentage of formaldehyde, 0.50; time, forty-eight hours).

Experiment A.—Cultures in Petri dishes, covered with filter paper, and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment B.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment C.—Cultures in Petri dishes, covered with filter paper, and enveloped

in 36 layers of new cotton sheeting. Result: Anthrax, no growth; diphtheria, no growth.

Experiment D.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

Experiment E.—Cultures in Petri dishes, covered with filter paper, and enveloped in folds of a blanket gathered loosely into a bag. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment F.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and enveloped in the folds of a blanket gathered loosely into a bag. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

Experiment G.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and enveloped in the folds of 3 sheets loosely gathered into a bag. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, growth.

Experiment H.—Cultures in Petri dishes, covered with filter paper, and exposed on mantel in room. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth.

Experiment I.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and exposed on mantel in room. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, growth.

Experiment K.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and exposed between the leaves of a closed book. Result: Anthrax, growth; diphtheria, growth; S. pyogenes aureus, growth.

Room H. (capacity, 930 cubic feet; percentage of formaldehyde, 2; time, forty-seven hours).

Experiment A.—Cultures in Petri dishes, covered with filter paper, and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment B.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin, and enveloped in 10 layers of blanket. Result: Anthrax, growth; diphtheria, growth; S. pyogenes aureus, growth.

Experiment C.—Cultures in Petri dishes and covered with filter paper, and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, no growth; diphtheria, no growth.

Experiment D.—Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin and enveloped in 36 layers of new cotton sheeting. Result: Anthrax, growth; diphtheria, no growth; S. pyogenes aureus, no growth.

Experiment E.—Cultures in Petri dishes, covered with filter paper, and exposed on floor of room. Result: Anthrax, no growth; diphtheria, no growth; typhoid, no growth.

Experiment F.—Cultures in double envelopes, exposed between the leaves of a closed book. Result: Anthrax, growth; diphtheria, growth; S. pyogenes aureus, growth.

SUMMARY.

The conclusions to be drawn from the above experiments would be that the gas is a reliable disinfectant for surfaces, and is admirably adapted for the disinfection of apartments or houses. That its action is certain for disinfecting textile fabrics, such as curtains, hangings, clothing, and bedclothing.

Mattresses, pillows, and upholstered furniture are quite difficult to disinfect, and will require long exposure and a very strong solution of the gas.

Books are the most difficult of all articles to disinfect, and should always be so arranged so as to allow the gas free access to their interiors.

The percentage of gas required will depend largely upon the character of the

article to be disinfected. For room disinfection, that is to say, the room itself and not its contents, a 1 per cent per volume strength will be sufficient.

The contents of the room must be separated into two classes: (1) Curtains, hangings, clothing, leather goods, carpets, and bed clothing; (2) mattresses, pillows, upholstered furniture, and books.

A 1 to 1½ per cent per volume strength will be sufficient for articles of the first class and not less than a 2 per cent per volume strength for articles of the second class.

On account of the difficulties of making an apartment tight enough to prevent the escape of the gas, it is recommended that an excess of the gas be always used.

DURATION OF THE PROCESS.

The time for the fumigation should never be less than twelve hours where a small per volume strength is used. A much shorter time is required when the strength of the gas is proportionately increased. The time, however, should not, under any circumstances, be less than six hours. It is not believed that anything is gained by prolonging the exposure beyond forty-eight hours, for before that time all, or almost all, of the gas will have escaped or be transformed into another state.

DEVICE FOR USING FORMALDEHYDE GAS IN CONNECTION WITH DISINFECTING CHAMBERS.

Taking advantage of our experiences, I am convinced that as a matter of economical application and for absolute certainty of disinfection the following method of applying the gas to the bulkier objects, which are difficult for the gas to penetrate, is a modification of the method which was at first proposed by the writer in 1895 while at Denver, Colo., and later at the meetings of the American Public Health Association at Buffalo, N. Y.

An attachment for this purpose has been devised so that the steam disinfecting chamber can be adapted for the application gas. The scheme of the apparatus is shown in the accompanying diagram.

It consists of two small boilers, one of copper and the other iron, which are provided with coils of steam pipe for heating the liquids. On the top of upper side are placed the filling attachment, pressure gauge, and discharge pipes. On the sides are the water-gauges and drips. The discharge pipes of both boilers are connected with the interior of the disinfecting chambers by a common opening. The copper boiler is intended to be used in the same manner as the portable formalin boiler hereinbefore described (fig. 1), and the one constructed of iron is intended for solutions of ammonia for neutralizing the fomaldehyde gas at the completion of the process.

Compressed ammonia gas can be substituted for the second boiler. The ammonia gas can be let into the chamber by means of a pressure-regulating valve. This method is preferable where a large amount of disinfection is to be carried on.

METHOD OF OPERATION.

The chamber is charged in the same manner as for steam, the doors closed and made fast, and the air exhausted to within an half an atmosphere or over by means of the vacuum apparatus. If the chamber is provided with a steam jacket the steam can be thrown into this and the articles heated during the whole of the process.

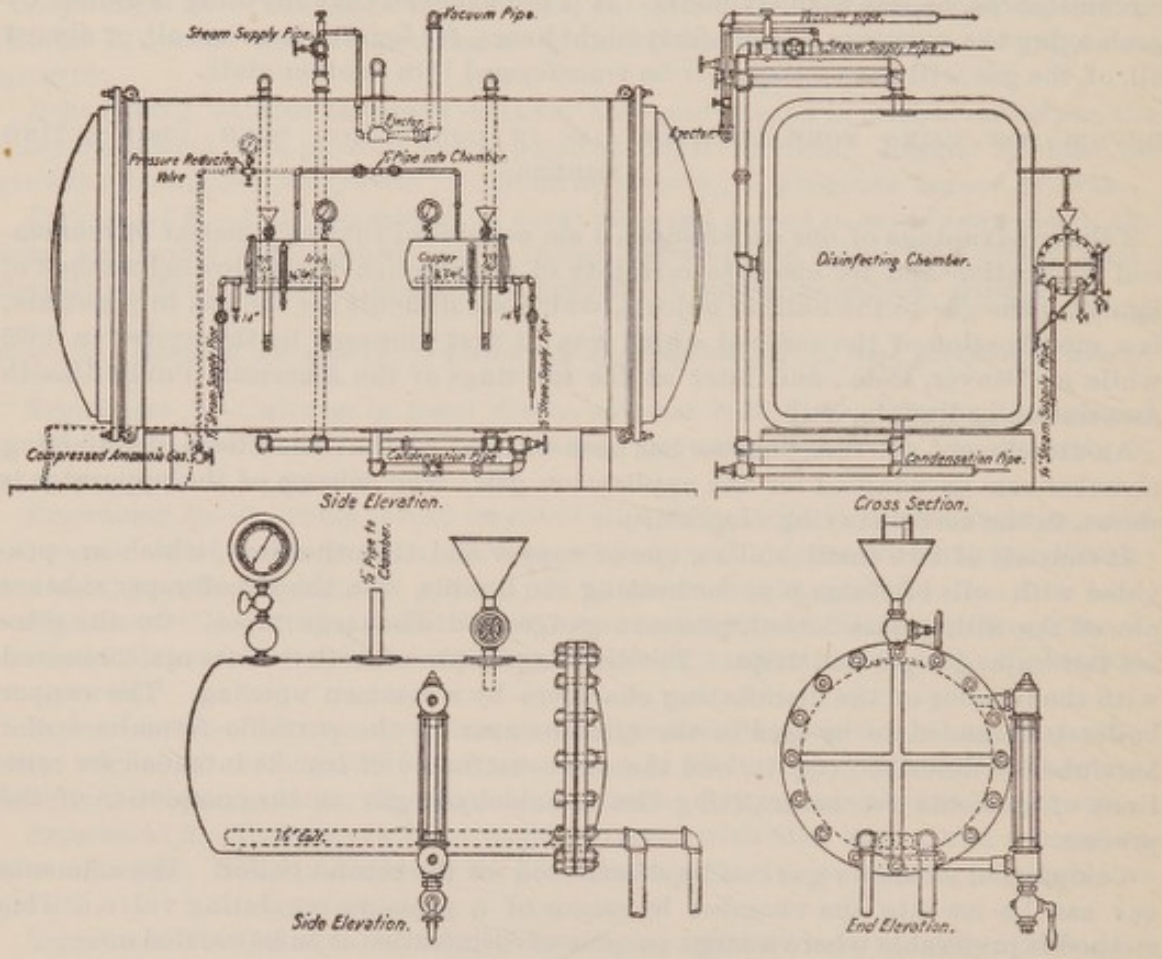
Synchronously with the above-mentioned operation, the mixture of calcium chloride and formalin is prepared and poured into the copper boiler and steam allowed to course through the spiral heating coil, and continued until a pressure of from 75 to 90 pounds is obtained. The gas is then turned into the chamber. If the gauge still shows a vacuum, the process can be repeated until the pressure is zero.

When the time of exposure has been completed a vacuum may be again produced, and instead of using the gas, this time the air is let in. If there is any precipitated moisture, the inrushing of air will carry this along with it and distribute it to the interior of the articles.

After the articles have been subjected to the gas for a sufficient time, the vacuum process is again started and half the atmosphere removed. Ammonia water is poured into the iron boiler and heated by means of the steam coil. It can then be thrown into the chamber, after the same manner as the formalin. The ammonia should be in excess of the quantity of formaldehyde gas.

The time is shorter than required for steam disinfection, and this process is adapted for disinfecting mattresses, pillows, blankets, upholstered furniture, heavy rugs, furs, and books, and the mails; also for the very fine textile fabrics, especially costumes and the like.

Showing attachment of boilers, etc., to steam disinfecting chamber.



Small boiler for evolving formaldehyde gas from formalin, or formol.

The advantages of such an apparatus are:

(1) Certainty of penetration of the articles by the gas.

(2) Reduction of the time of exposure to a minimum, and increasing the working capacity of the chamber.

(3) Accurately gauging the quantity of gas.

(4) Little or no injury to fabrics.

(5) Economy.

Such an attachment can be made to any of the steam disinfecting chambers now in use, without interfering in any way with their usefulness for steam disinfection. If a special chamber for formaldehyde disinfection is desired, it is recommended that a single-walled chamber, circular in form, be substituted for the jacketed steam chambers.

While both the formalin boiler and the apparatus just described are admirably suited for disinfection of houses and their contents, there is considerable expense attached to the use of solutions of formaldehyde, as now all the formaldehyde is imported, and pays a duty of 25 per cent. As none is made in this country, it should be admitted without tax.

LAMPS FOR EVOLVING FORMALDEHYDE GAS FROM METHYL ALCOHOL.

Quite a number of writers have suggested the use of a lamp or some such apparatus for converting methyl alcohol into formaldehyde gas. Several lamps are now to be had for this purpose. As said before, these lamps and apparatus are constructed on the principles of the Von Hoffman process.

Some of the lamps, notably the Bartheil and one constructed by Adnet (Trillat) are claimed to be efficient for disinfection of rooms. Professor Robinson, of Bowdoin College, has recently perfected a similar lamp, which he claims to be quite efficient. So also has Dr. de Schweinetz, of Washington.

The amount of formaldehyde produced by any of these lamps is not believed to be as great as is claimed for them, that is to say, that the amount of alcohol consumed does not represent in proportion the amount of formaldehyde gas. It is believed that only a part of the alcohol is changed; the rest is either converted into a higher state of oxidation or is volatilized by the heat.

If such a lamp will generate a sufficient quantity of formaldehyde gas for disinfection of a room, and it is meant by this simply a surface disinfection, it will be a great improvement over our present methods.

It has been my purpose to study this subject in all its lights, with the hope that a simple apparatus could be devised by which surface disinfection could be reliably performed.

Lamps which contain free alcohol—that is, contain any considerable quantities in reservoirs—may, under certain unlooked-for conditions, ignite or explode.

This is a serious objection, and a lamp to meet the requirements for room (surface) disinfection should be so constructed as to preclude any such accident.

I have recently made several modifications of these lamps, and have devised one which appears to overcome the objectionable features of the others. While this lamp does not consume as much alcohol within a given time as is claimed for others, I believe it does the work more efficiently.

My thanks are again due to the Coast and Geodetic Survey, and especially to Mr. Pratt, for reliable suggestions and for the preparation of drawings and building the experimental lamps.

The lamp, as shown in the accompanying drawings, is the one which has given the best results, and has finally been adopted. This lamp combines safety, simplicity, cheapness, and efficiency. It consists of three parts, a lamp bowl and collar, containing the converter, and a hood. The lamp bowl, for convenience, is made from a 5-quart milk pan inverted and attached to another, which acts as a bottom; the top of the inverted pan is cut out, leaving a flange of about an inch; the bowl is filled with mineral wool, such as is used for insulating pipes.

The collar is made of sheet iron, the lower edge of which is made to fit accurately and snugly over the inclined sides of the bowl, so that it is practically air-tight. The same is made air-tight by what is commonly known as a water seal. The collar is provided with a row of perforations about 8 inches above the lower edge for draft; three-fourths of an inch above these perforations is an asbestus disk, held in place by a groove (inward) and the requisite number of cross wires. The collar is extended sufficiently to act as a chimney, or, for the sake of convenience, can be shortened by narrowing the diameter of the collar at its upper end.

The hood or extinguisher fits down over the collar and extends below the draft holes, where it is caused to impinge on a groove (outward).

For convenience the collar is hinged to the lamp bowl at a point, and opposite thereto is a fastening.

The hood is so arranged as to fasten to the collar by hooks, which permits it to be transported.

The efficiency of the lamp lies first in the character and construction of the platinized asbestus disk, and in the air-tight joint between the lamp bowl and the collar.

Disk.—The disk is made of an extra hand-pressed asbestus mill board, one-eighth inch thick, and is perforated with one-eighth inch holes one-half inch apart. The best quality of asbestus for this purpose is to be had from the H. W. Johns Manufacturing Company, of New York.

Platinizing the disk.—Three-tenths of a grain of platinic chloride is dissolved in about 50 c. c. of water or alcohol, and the solution is applied with a brush to one side of the disk; then it is placed in position in the lamp, platinum side downward, and heated until the platinic chloride is reduced to platinum black. It is then ready for use.

Method of operating.—The hood is removed and the collar turned to one side, the requisite amount of alcohol poured over the mineral wool, and the collar brought back nearly in position, but slightly tilted over to one side so that there is a free ingress of air. Now the alcohol is lighted and allowed to burn until the flame commences to appear above the disk; the collar is then placed in position and the joint between lamp bowl and collar made air-tight.

The alcohol will be observed burning at and above the draft holes. The hood is placed down over the collar and allowed to remain for a short time, say thirty seconds, for the purpose of extinguishing the flame; when this is done the hood is taken off, when the disk should begin to glow and formaldehyde given off. The conical chimney can then be placed in position. Sometimes it happens that the lamp will ignite at the draft holes and burn with a slight flame; this is due to one or two things: First, the lamp may have been too hot, or that it leaks air from below. By replacing the hood and waiting for a minute or so the first may be overcome; the second needs no further comment.

It is intended that this lamp should be filled with the required amount of alcohol, placed in the apartment, started, and allowed to remain for the full time of exposure. The air of the apartment can be neutralized by ammonia fumes and then opened. The results obtained with this lamp have been quite satisfactory, especially with regard to disinfecting apartments affected with diphtheria.

I have not been able, however, at all times to disinfect the interior of pillows and mattresses with certainty, even when a small room was used for the purpose and a large amount of methyl alcohol consumed. The surfaces, dust, etc., were every time rendered sterile.

Quantity of alcohol required.—Not less than 650 c. c. of methyl alcohol should be used for each 1,000 cubic feet of space, and not less than twelve hours' exposure given. For disinfecting clothing and light fabrics, it would be well to put them in as small a space as possible and have the articles so arranged as to have all the surfaces freely exposed to the gas.

It is often required that a preliminary disinfection be given an infected apartment and contents before they are disturbed. This is, of course, a preliminary precaution which will, if properly performed, render the danger of dissemination of the infection less, by sterilizing the surfaces of the articles. Lamps could be used advantageously in such instances for the preliminary disinfection of the surfaces of the articles before they are arranged for a final disinfection in situ or be removed for treatment by other processes.

NEUTRALIZATION OF THE EXCESS OF FORMALDEHYDE GAS.

This is best accomplished by having a small tinned iron boiler, conical in shape, holding about 3 quarts, provided with a filling cock and tube on top. A rubber tube can be attached to this and fed into the apartment through the door, preferably

the keyhole. Ammonia water is poured into the boiler, stopcock closed, and then the boiler set in a bowl of boiling water. This will readily evolve the ammonia gas. A small kerosene lamp can be used instead of the boiling water.

OTHER METHODS OF USING FORMALIN.

Formalin or formol can be used in other ways than in the foregoing, it is believed, with excellent results. Although our experiments are still under way, it may now be said that the infected articles, such as packed effects, can be rendered sterile by the application of one of these solutions. It may be applied to the articles by sprinkling, or by moistening some absorbent substance with these and placing it among the clothing. Due care should be exercised to see that the agent is well distributed among the contents of the package. The packed effects of immigrants, not to be used on the voyage, could be disinfected by subjecting them to an application of formaldehyde. This should be performed under the supervision of the proper officer. The packages could then be sealed and not opened until arrival on this side. This procedure would relieve the quarantine of an enormous work, and reduce the danger of importation of infectious diseases from this source to a minimum.

Personal effects and wearing apparel coming from places or districts where smallpox, yellow fever, plague, or cholera prevails could be easily disinfected in this manner.

MAILS AND BOOKS.

Should be disinfected by the use of a disinfecting chamber and the vacuum process. Bundles of letters and papers should always be untied. Individual letters can be readily disinfected by placing in the envelope a small piece of blotting paper moistened with formalin or formol.

For mails coming from infected districts the disinfection might be accomplished in a similar manner as is recommended for the packed effects of persons. The mail matter could be sprinkled with formaldehyde solutions or placed in contact with some absorbent substance, moistened with formalin, placed in the mailing bags and closed. If allowed to remain in contact with the gas for several days, say the ordinary time of an ocean voyage between Europe and this country, it is believed that they will be incapable of transmitting infection. It might be necessary to neutralize the formaldehyde gas before they could be handled.

DISINFECTION ON SHIPBOARD.

In case of infection on shipboard, especially yellow fever, where it becomes necessary to disinfect all the wearing apparel and upholstered work and hangings with the least possible delay, a small room may be improvised into a formaldehyde disinfector after the following manner: Clothing that may possibly be injured by an excess of moisture can be protected by a cotton cloth. A layer of clothing is spread on the floor, then covered with a cotton cloth, then followed with cloth dipped into or sprinkled with formalin, and another cotton cloth, then another layer of clothing. The whole to be covered with a piece of tarpaulin and the edges weighted down. After an exposure of forty-eight hours the articles will be thoroughly disinfected. While this process is somewhat expensive, it is much cheaper than buying new clothing or having them damaged by other methods.

The formalin solutions for this purpose can be better handled by mixing one part, by weight, of the solution with two parts of fine, dry, nonresinous sawdust; this can be sprinkled over the clothing in the same manner as the formalin.

Containers for clothing.—Packing cases for merchandise can be readily disinfected by formaldehyde lamps. Care should be exercised, however, to use as small a space as possible, and have it tight.

TRIOXYMETHELENE.

Reference has been previously made to the substance known as trioxymethelene, or "paraform." This substance is formed when a 40 per cent solution of the gas is

concentrated. It gives off formaldehyde gas slowly at ordinary temperatures, and when heated it breaks up into formaldehyde and formic acid.

It has been suggested that this substance could be used as a disinfecting powder. Miquel has demonstrated that it possesses germicidal properties sufficient to kill anthrax spores, provided the exposure be prolonged. It might be of value in disinfecting the packed effects of persons and merchandise coming from places where an epidemic prevails. But just how long the articles must be subjected can not now be determined.

DISINFECTION OF HOLDS OF VESSELS.

At present it can not be stated how far formaldehyde gas will be available for the disinfection of holds. In view of the results of our experiments it would appear that its general application was not possible, as moisture prevents the penetration of the gas to a greater degree than with sulphur dioxide, and as there is always more or less moisture present, which would tend to convert it into a surface disinfectant. It may answer well for the disinfection of iron vessels, but it is extremely improbable that it will do so for wooden vessels. However, these are simply opinions. As soon as the experiments on the disinfection of holds are completed, these may be reversed.

In conclusion, I would state that formaldehyde is one of our best disinfecting agents, if not the best, and it is destined to play no small part in our fight against infectious and contagious diseases. While not fulfilling all the requirements of an ideal disinfecting agent, it is equal, if not superior, to our other agents.

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The Disinfection of the Railway Coach.

[Note.—This section of the report was read at the meeting of the Association of Surgeons of the Southern Railway, Chattanooga, Tenn., June 30, 1897.]

[By P. A. Surg. J. J. Kinyoun, M. H. S.]

So far as I know there has been no systematic treatise on the disinfection of the railway coach, although there have been systems devised for applying the principles of disinfection and purification to vessels, houses, and their contents. In this connection I would state that it is not the intention of this paper to define when or where it is necessary to disinfect, but to confine itself to the methods to be employed.

In general it may be said that the same principles govern the purification of the railway coach as those under like conditions are applied to infected houses or vessels.

On account of the many difficulties encountered in dealing with this problem—so many which do not exist to the same extent in domiciliary and maritime sanitation—we are compelled to change our methods of procedure in many particulars.

In the first place, there are no stations or special apparatus for the disinfection of the coaches, as are now supplied for the treatment of infected vessels or houses. These require complete and expensive stations, supplied with modern apparatus and appliances, for the rapid and efficient treatment of the infected articles.

Their absence in the railway service is not to be implied that they are not required. On the contrary, it is believed that the time has now arrived when some kind of a system should be devised and be put into operation.

At present we are still at a loss to know just how far the railway coach in ordinary times is responsible for the dissemination of disease. Until we do know, it would not be proper to say when or where these coaches should be disinfected. It is anticipated that within the near future the writer will be able to throw a little light on this subject—as soon as the experiments and observations which are now being conducted by the hygienic laboratory, conjointly with the Pennsylvania and Southern railway systems, shall have been completed.

Notwithstanding our present lack of definite knowledge on this subject, we do occasionally have to deal with infection in the coach, and in times of epidemics, such as those of smallpox, yellow fever, and cholera, incidents of these occasions are not infrequent. Heretofore, and even now, when such occur, our improvised methods, usually on the spot, have left much to be desired. The methods which have been recommended and put into practice have, as a rule, been efficient to eradicate the disease, but are usually ruinous to the furnishings of the car. It has been the rule, so I am informed, to send the car to the shops for a general overhauling and refurnishing. Such practices, although they may be necessary, are quite expensive, and on that account they will not only meet with criticism on the part of the owners of these vehicles, but our aims as sanitarians will be resisted as well.

Disinfection should not mean destruction, but destruction may mean disinfection. Disinfection does not mean the creation of an odor to mask or change another—burning incense, as it were, before the shrine of the festive bacteria.

Now, if it were known that the processes to which the cars are subjected are ruinous, the railway companies will perform the duties in a way that will least injure their property (whether it be efficient or not) or resist what they might term "measures of unwarranted severity or useless procedure."

From our limited acquaintance with the railway companies they appear to be constructed much after the order of human kind, and are just as jealous of their property as the individual, or perhaps more so. The writer hastens to say that he has never had such an experience so far, but draws this conclusion from experience in other lines where the conditions are parallel.

It may be well, at the present juncture, to inquire into our present methods and see how far they are applicable in cases of emergency in meeting the requirements of disinfection, and whether they are at the same time practicable.

The principles of our methods of disinfection are so well known, that it seems

superfluous to go into details in describing or defining them. Our present methods of disinfection applicable to the railway coach can be classed under the following heads: Gaseous disinfectants, chemical solutions, steam or moist heat.

The gaseous disinfectants have been confined to sulphur dioxide and chlorine. Both these gases have strong reducing properties, and act strongly upon colors, especially so when they are used in a sufficient strength to be efficient. The latter (chlorine) has not only decolorizing properties, but destructive properties as well.

Sulphur dioxide may be and probably is sufficient for the disinfection after the acute exanthems, provided the car is not badly infected. But it has effect upon tuberculosis and diphtheria, and an uncertain effect upon cholera. It is not exceptional to find that after its use the upholstery of the car has to be renovated.

Chemical solutions, such as the mercuric salts and the carbolic-acid series, are only surface disinfectants. They have no penetrating power unless the articles are saturated with it. They are not applicable to the upholstered work, nor to the mattresses or pillows.

Moist heat or steam answers well for textile fabrics, mattresses, and pillows, but it requires a special apparatus for its successful application. Steam-disinfecting chambers, such as are now in use at the national quarantine stations and in many cities, are the best syle of such apparatus.

Steam is not applicable for the upholstered work, even when applied by means of a special chamber. It should never be thrown into the car.

Referring to the above methods, it will be seen that none of these answer the requirements, nor do they when taken altogether fulfill all the conditions.

Now we have about three classes of railway coaches to deal with—the day coach, the immigrant car, and the sleeping car. These are three types of car which do not materially differ in their size, construction, or furnishings on any of the roads of standard gauge. The writer can not speak with certainty of the narrow-gauge roads, as he has no personal knowledge of them, but would infer that in their furnishings they are the same as others. The immigrant coach is either an old day coach or one equipped with cane seats, so that it can be more easily cleansed. The sleeping car is about the same in equipment, whether it be the Pullman, Mann, or Wagner.

The upholstery and furnishings of the day coach are of the standard pattern and quality, and present but little that needs commenting upon. All the seats are made so that they can be removed. The immigrant car is of similar construction, but simpler in all its details.

The sleeping cars present a more complex problem. They are replete with upholstery, furnishings, and adornment. They have not been constructed with the idea that they may become infected. The seats are partially upholstered and can not, except with difficulty, be removed. The finish and decorations are of the highest character, and they are, indeed, what they claim to be—palaces.

In 1895 the writer became impressed with the difficulties which would stand in the way of successfully disinfecting the railway coach—the sleeping car in particular. He instituted an inquiry in the hygienic laboratory of the Marine-Hospital Service to determine the effects of the disinfecting agents and methods upon the several materials used in the furnishing and decorating of railway coaches, and to this end over one hundred and fifty samples of material were examined. At the conclusion of the inquiry it was shown that almost all of the fabrics were injured. From these observations it was clearly evident that some other means must be devised for the purification of the railway coach, which would remove the objections, or the major part at least.

From 1895 to within a short time ago this subject has been under investigation, and the following is a summary of the results:

In 1894 attention was called to a chemical known as formaldehyde, which was at that time being produced at a moderate cost. It was found to possess germicidal properties in a high degree, and suggested itself as a disinfecting agent. Having made a preliminary study of this agent in 1894, the writer made a statement before

the American Public Health Association in October, 1895, in discussing the subject of car sanitation, that he was convinced from this preliminary study that formaldehyde gas and its solutions would play no small part in disinfection and our fight against disease.

Since then, with the approval of the Surgeon-General of the Marine-Hospital Service, the writer has had an extensive study made of this agent in the hygienic laboratory, the results of which have been published in the Public Health Reports under date of January 29, 1897. The report dealt more particularly with the disinfection of rooms. The value thereof can readily be seen in the disinfection of the car and its contents. Since the publication of this report special attention has been given to car disinfection with this agent, and while the experiments are not yet completed, they are sufficiently far advanced to demonstrate the superiority of this agent (formaldehyde) over sulphur, disinfecting solutions, or steam, and furthermore show the entire practicability of its application.

Commercially, it can be had in two forms—first, solutions of the gas (about 39 to 40 per cent), known as formalin, formol, or formalose; second, in a solid crystalloid form, known as trioxymethylene or paraform.

The free gas or the solution or solid state has wonderful germicidal properties. It readily kills all the pathogenic bacteria, even those in the spore state; it destroys the virus of smallpox and hydrophobia. The gas is the best for disinfecting purposes; the drier it is, the better it acts.

It was at first suggested to evolve the gas from its solutions by placing these in shallow dishes and allowing them to evaporate spontaneously or by moistening cloths and hanging them up in a compartment. The above methods are not of much value, because of the tendency of the formaldehyde to undergo polymerization and of the water carried off with it in the process of evaporation, which latter militates against the penetration of the gas.

To Triat belongs the credit of pointing out the way in which solutions of the gas could be used to the best advantage. This was by adding a quantity of calcium chloride or a neutral salt to the solution, in order to raise the boiling point above that at which the formaldehyde gas is evolved from its solutions. Now formaldehyde gas is given best between the temperatures of 92° and 100° C., and if a solution of formaldehyde and a neutral salt be placed in an autoclave or boiler, and the temperature raised to one or two atmospheres, all or nearly all the gas is given off in practically a dry state.

In August, 1896, a small boiler was designed by the writer, which was used in the hygienic laboratory for the experiment, and has proven highly satisfactory.

By use of such an apparatus not only can the percentage of gas be measured, but it can be applied with but little delay, a consideration which must not be overlooked in railway work. The best results are obtained with this apparatus when the mixture is heated until from 50 to 60 pressure is indicated, then to discharge the gas and reheat, allowing the gas to slowly escape under a pressure from 10 to 20 pounds and until all the gas has been given off. This requires about an hour for quantities where over a liter are required.

The percentage of the gas required for disinfection of the car depends entirely upon the time at your disposal and the kind and character of the car. The shorter the time, the larger the quantity of gas. It is not believed that anything is gained by keeping up the process after twelve hours, or that the time should be less than three hours, it matters not how much gas is used.

A 2 per cent volume strength is sufficient for all the pathogenic bacteria when exposed to the gas for twelve hours. A 5 to 10 per cent strength is required to accomplish the same when a shorter exposure is given.

The above estimates are made for the day coach only, and are not intended for the sleeping cars. These, by reason of their special fittings and furnishings, will require a larger percentage of the gas than the day coach, but the time of exposure need not be further prolonged.

Special lamps can now be had for generating formaldehyde gas from wood alcohol. This is perhaps the most economical way to apply the gas, but it does not give the same results as are obtained by the former method. It appears to be all that is to be desired as a disinfectant for surfaces. It is uncertain in effect upon upholstery and bedding, but does well for the lighter textiles, such as carpets, curtains, hangings, etc., when they are so arranged that all their surfaces are freely exposed. A lamp, to do good work, should convert not less than one liter of wood alcohol within an hour, and not less than 650 c. c. should be used for each 100 cubic feet of space.

Two lamps should be used for each car, and allowed to remain in the car during the whole time of the exposure.

At terminal stations, or at such places where clearing stations have been established, it might be well to have such equipped with special apparatus for disinfecting mattresses, pillows, and the like, in large quantities. A special apparatus has been devised by the writer, which admits not only of the rapid application of the formaldehyde gas to the above-mentioned objects, but of the accomplishment of the disinfection at a much less cost than by any other means. Such an apparatus is not portable, and must needs be at some terminal point. Its use would be suggested for disinfecting the contents of a sleeping car which has been in use for a considerable time and has carried a number of invalid passengers.

The apparatus consists essentially of the same kind of boiler as previously referred to, attached to a steam chamber provided with an apparatus for producing a vacuum. A similar apparatus is also provided for neutralizing the gas by means of ammonia at the end of the disinfection.

The bedding and upholstery of the car can be disinfected by the method of the autoclave, but it takes longer, and a larger quantity of gas is required. The autoclave or boiler, with all its accessories, can be made to fit in a case of small compass, and can be shipped from place to place, where it can be used by anyone for disinfection purposes. Several of these should be provided and kept in readiness to do duty should occasion demand it.

There may be a time when a car has become infected, and it is not expedient to await the arrival of the disinfector when disinfection must be accomplished immediately. Now, formaldehyde gas can be evolved from its solutions in yet a simpler manner than by use of the special boiler. It is a simple apparatus which anyone can have made within a short time and at little expense. It consists of a tin or copper boiler set within another receptacle, after the manner of a farina kettle. Now, a mixture of formalin and sodium nitrate, sodium chloride, or calcium chloride should be made, so that the boiling point of this mixture is from 110° to 115° C. When this mixture is heated to within nearly the boiling point nearly all the formaldehyde is given off. The boiling of this mixture is prevented by using a solution of one of the above salts which has a boiling point of about 106° to 108° C. When these solutions are heated, the outer one boils first and heats the inner sufficiently to evolve the gas without boiling the solution. A very little quantity of water is thrown off, and there is but little polymerization of the gas.

Aronson, of Berlin, has recently recommended the use of trooxymethylene for disinfecting purposes, by breaking up this substance by means of heat. So far as our experiences with this substance have extended it appears to be satisfactory, but owing to the fact that there has been so little of it procurable it can not be positively stated whether it will meet all our anticipations.

On account of the extremely irritating vapor it is hardly thought to be practicable to recommend the use of solutions of the gas in the form of a spray or as a wash for surfaces.

ARRANGEMENT OF A DAY COACH FOR DISINFECTION.

The same rules apply to the formaldehyde gas as do for other gaseous disinfectants. All the openings of the car should be closed as tightly as possible, especially the ventilators. These are best closed by means of waste. The carpets along the aisle

should be laid across the top of the seats; the water-closets, lockers, and storeroom should be opened. If the car is provided with curtains they should be pulled down and hooked over the window lift. The cushions of the seats should be shifted slightly away from the backs, so as not to prevent the gas from penetrating along these surfaces.

The gas can be introduced into the car by one of two ways, or both—by the keyhole of the car door or through the hopper of the water-closet. It is always better to throw the gas into the car from both ends, as this will materially aid in rapidly diffusing the gas. If the keyholes are used for this purpose the hopper of the water-closet and discharge pipe of the urinal should be closed with waste.

When a car has been badly infected it may be well to give the car a preliminary disinfection before doing all that has been outlined above. In this instance the car is left just as it is, the aperture closed, and a strong solution of the gas thrown in and allowed to remain for at least six hours before the car is arranged for its final purification. This will be sufficient to sterilize the dust and the surfaces of the interior of the car.

THE IMMIGRANT COACH.

If the coach is constructed with a view to easy cleansing the interior can be given an application of formaldehyde gas, and after this a mechanical cleansing of the floors, water-closets, followed by a thorough douching of the floors and water-closets with a strong disinfecting solution, preferably a solution of bichloride of mercury.

THE SLEEPING CAR.

The same rules apply to these as for the day and immigrant coach. The berths must be let down, the pillows be taken out from under the seats, and mattresses and pillows so arranged that all surfaces are freely exposed. The blankets and curtains had best be suspended from the curtain poles, the carpets lifted from the fastening, and some kind of support placed under it so as to lift it here and there from the floor. The lockers, closets, to be opened, and all articles therein be arranged so as to be freely exposed to the gas. Articles of food not hermetically sealed should, after the completion of disinfection—that is to say, after the exposure to the gas—be destroyed. Water tanks should be disinfected either by a solution of formaldehyde, 1–2,000, or by permanganate of potash, and afterwards thoroughly rinsed. The percentage of gas required for the sleeping car, as mentioned before, is larger than is required for other coaches. This is due to the fact that there is so much more material to disinfect in these cars than in the others, and then the character of the materials.

The textile fabrics are nearly all made from silk and wool, which, with feathers, are much more difficult to disinfect than textile fabrics of other materials.

It may be that it is impossible to procure the necessary appliances for formaldehyde disinfection, and recourse must needs be had to some other method. There is yet another way in which formaldehyde solutions may be utilized for this purpose. The process consists simply of sprinkling the solutions over the articles and placing them in a small air-tight compartment. The best way to accomplish this is to take the cushions, hangings, etc., and place them in the closets, and apply the formalin (solutions containing alcohol are the best) by means of sprinkling or by a stippling brush, care being taken to distribute the solution well over the surfaces, then another layer packed in on top of the first, and so on until the closet is filled. Then close the closet for at least thirty-six hours, open and neutralize the remaining formaldehyde by ammonia water. The formalin solutions can also be mixed with a dry nonresinous sawdust, one part of the solution to two parts of sawdust, and be sprinkled over the surfaces of the articles. This is perhaps the best method of using the formaldehyde solution. Such portions of the upholstery as can not be removed, or in case of plush decorations, the surfaces can be moistened with the solution, either by

sprinkling or by cloths dipped in the formalin solutions and laid over the parts to be disinfected.

Other parts of the car can be disinfected by washing with a disinfecting solution, preferably carbolic acid or trikresol.

It has been observed that the gas will be detected in an apartment, even for several days after, and when it has been thoroughly aerated. This is due in most cases to the polymerization of the gas into trioxymethylene, which breaks up and liberates formaldehyde. This is especially marked in articles of hair or feather goods, where it appears to form a kind of loose chemical compound, which breaks up in like manner as the polymerized form.

In most cases it may be necessary to neutralize the gas by means of ammonia. This can readily be done by sprinkling a quantity on the floor of the apartment of the car, and allowing it to remain for about an hour. About twice the quantity of ammonia should be used for each part of the formaldehyde solution. The formamide formed by these substances is also a disinfectant of no small value.

The time required for disinfecting a car by our present methods—that is, by sulphur gas, disinfecting solutions, and steam—is not less than twenty-four hours, and by means of formaldehyde gas from twelve to fourteen hours.

What has heretofore been said applies only to the interior of the car. It must be remembered that its exterior may also become infected, and if this be the case will require appropriate treatment. The platform steps and trucks are the parts more liable to be infected. These are best disinfected by first mechanically cleansing the parts and then applying a strong disinfection solution. Other portions of the exterior of the car may be treated also if suspected. The lockers under the car can be treated by formaldehyde gas.

The advantages of the method of disinfecting railway coaches by formaldehyde gas are: (1) Rapidity in which a car can be treated; (2) thoroughness of the process; (3) no injury to car or its contents; (4) comparative cheapness. Four good reasons for adopting the method.

Reports on the Bubonic Plague Bacillus as Studied at the Pasteur Institute.

By P. A. Surg. H. D. Geddings, M. H. S.

No. 5 Rue de Bassano, Paris, *April 21, 1897*.

Sir: I have the honor to submit for your consideration the following observations upon my studies upon the bubonic plague, with a full consciousness that they embrace nothing new, but with the hope that at this time they will possibly prove of some interest.

The bubonic plague, or pest, is an acute, contagious, communicable disease, primarily, it is now supposed, affecting the lower animals, as rats, mice, hogs, dogs, etc., and by them communicable to man. The specific organism of the disease was first discovered and described by Kitasato and Yersin, working independently and at some distance from each other, and the first published description which appeared in the United States was that of Kitasato, which was extensively quoted, and at this date is somewhat misleading. By him the organism was likened in size and appearance to that of chicken cholera, a small fine bacillus with rounded ends, staining well with the ordinary basic aniline dyes. In reality the organism is a cocco-bacillus, almost as broad as long, about two micromillimeters in greatest diameter, staining readily, it is true, with the ordinary aniline dyes, but also very easily overstaining with them, and its true characters are very apt to be overlooked. The best stain is a 1 per cent solution of thionin, carbolized, colored with which its true characteristics stand revealed, and it is seen to be, as said before, a cocco-bacillus, staining more deeply at the poles than in the center, and forming sometimes chains of

three or four elements. It is completely decolorized by the method of Gram, and this is a point which is insisted on with much earnestness by Professor Roux. It grows readily upon ordinary culture media, as peptone-agar, peptone gelatin, and peptone bouillon. Upon agar the separate colonies are very small, round in shape, almost transparent by transmitted, and white by reflected, light. In bouillon, under ordinary conditions of temperature, it forms flakes or flocculi, which rapidly sink to the bottom of the test tube, leaving the liquid above clear. So characteristic is this appearance that at the Institute Pasteur, in seeking to make pure cultures in bouillon, it has passed into a proverb that if the bouillon is turbid it is useless to examine the growth microscopically, for the culture is not pure. Examined in the hanging drop the microbe is perfectly devoid of automobility.

In old cultures, both on agar and bouillon, the organism rapidly assumes involution forms, some of which are very curious, and most prominent among them is that of a rather long, slender bacillus, segmented and presenting a vacuolated appearance. In this state they stain badly and irregularly and have notably lost some of their virulence.

By passing the organism successively through animals, as guinea pigs, rabbits, and mice, it acquires an extreme virulence, a subcutaneous injection of a very small quantity sufficing to kill a rabbit or a guinea pig in forty-eight to sixty hours and a mouse in even a shorter time, sometimes not more than twenty-four hours. Successive cultures upon ordinary media rapidly lose their virulence, but this is easily restored by again passing it through animals.

After death the microbe is found in all the organs and tissues of the body, notably the lymphatic glands, the spleen, liver, and heart blood. The glands near the seat of injection are enlarged and are surrounded by an extensive œdematous effusion, the bubo, which has given its name to the disease. The swelling is not confined to the glands near the seat of injection, but those in other parts of the body are enlarged, sometimes in chains, and all contain the bacillus in nearly pure culture. The spleen contains the microbe in enormous numbers; in animals which have died slowly the organ is enlarged and presents a mottled appearance, studded with white or yellowish minute spots, which spots are aggregations of the microbe in almost pure culture. If the animal has died rapidly, the spleen is enlarged to a great size and is uniformly red in color, the organism being also very abundant. In cases of slow death the organism has been found in the lungs and kidneys; indeed, it is always present in the lungs in man in all cases in which there are bronchial or pneumonic symptoms, a by no means rare complication.

The term "almost pure culture" is used advisedly, for the microbe of pest is almost always found associated in animals and man with the pus organisms, notably staphylococci and streptococci, and this is offered as an explanation of the fact that after convalescence from the pest suppuration of the glands often continues for a considerable time.

If, instead of being inocculated subcutaneously, the animal is subjected to intraperitoneal injection, death is more rapid, the organs are affected in the same way, and the swelling of the superficial lymphatics is replaced by swelling of the mesenteric glands, forming, as it were, internal bubos.

The virulence of the pest bacillus is extreme, and it would seem that a breach of continuity is not necessary for infection, as healthy rats have been caused to contract the disease by being fed either upon a culture of the microbe or upon the spleen or other organs of an animal dead with the plague.

During the process of the growth there is a toxin formed; this is proved by the fact that if a bouillon culture of the microbe is kept for some time at a temperature of 37° C. there are formed, as has before been said, flakes of flocculi, which sink to the bottom of the tube. Now, if these are removed by filtration through a Pasteur-Chamberland filter, there results a slightly turbid liquid in which the absence of micro-organisms can be demonstrated by microscopic examination and cultivation experiments, yet this liquid injected subcutaneously into an animal will cause its

death by an intoxication, and post-mortem examination will demonstrate the absence of the bacillus of pest.

Surpassing in interest, perhaps, the study of the disease itself, is that of the preparation of the serum for the therapeutic and prophylactic treatment of the malady. At this time extensive experiments are being made with it in India, and the results are said to be most favorable, within certain limitations, viz: That the remedy should be administered in sufficient quantities and as early as possible in the course of the disease. Given an ordinary case in the early stages, the hypodermatic injection of 10 to 25 c. c. of the remedy will usually suffice to produce a rapid amelioration of the symptoms, disappearance of the fever, relief of the profound prostration, and rapid absorption or disappearance of the bubo. In more pronounced or further advanced cases the administration of the remedy must be governed by the course of the disease. A dose of 25 c. c. should be administered at once, and some amelioration of the symptoms will be probably noted; but should these recur the remedy must be pushed in doses of 10 c. c. or more until permanent relief is secured or the uselessness of the treatment demonstrated.

I am perfectly aware that in the Indian correspondence of some English medical journals and in the editorial columns of another the results of the serum treatment of the plague in Bombay have been rather disparagingly spoken of. I pin my faith to the statements of Dr. Roux, who has asserted to me, and in my presence to others, that the reports received by him were satisfactory. Until he sees reason to change his opinion my faith in the remedy will remain unshaken. I am not in possession of statistics, and as they have not been offered me I feel a hesitancy in asking for them. Neither am I prepared to speak from personal observation as to the preparation of the serum, for the reason that I have not as yet arrived at this point in the course which has been marked out for me, and for the additional reason that for obvious reasons the serum is not prepared in Paris, but at a place in the country at some distance. From all I can learn there is no radical departure from the method which has already been outlined by Yersin in the Annales de L'Institut Pasteur. The horse selected for the purpose is treated by intravenous injections of a small quantity of a recent agar culture of pest suspended in boullion or sterilized water. The injections are made by the intravenous method, for the reason that in the earlier experiments, when they were made subcutaneously, there was always much swelling and œdema at the site of the injection and almost invariably the formation of an abscess. After each injection the horse is much prostrated, there are chills, and a fever reaching 40° to 41° C. and lasting for several days and gradually subsiding. As the animal is noticeably reduced in flesh and strength by the preparation, it is necessary to exercise great care in increasing and repeating the dose. The process is therefore rather a slow one, nor is a point arrived at where the animal ceases to react to the injection. These reactions are always present, but only become more feeble and last for a shorter period. The treatment is discontinued and the animal allowed to rest and a trial made of the strength of the serum. It is the object to have it of such a strength that a dose of one-twentieth to one-tenth of a cubic centimeter will protect a white mouse of about 20 grams in weight against a lethal dose of the pest culture not more than forty-eight hours old.

I have had the pleasure of witnessing several series of such experiments in which the animals protected by the serum are still alive and flourishing, while the controls, treated with an equal dose of culture and protected by a dose of the serum of a normal horse, are long since dead with typical symptoms and post-mortem appearances of pest. The serum of the normal horse was administered to the control animals to avoid any possibility of a claim that there might be a protective influence in any ordinary blood serum.

The serum has certain peculiar properties of its own; added to a turbid emulsion of pest in bouillon in the proportion of one-fiftieth to two-fiftieths, it will in some cases produce an agglutination of the organisms and their subsidence in the liquid, which becomes more or less clear. It is possible that the completeness of this clear-

ing is an index to the potency of the serum, for all serum must be tested by inoculation experiments, and it is not believed that all horses are equally susceptible of immunization.

If the serum is heated to between 50° to 60° C. its protective power is much diminished, and at a higher temperature is altogether destroyed; therefore great care must be exercised in the cooling of all pipettes, syringes, and instruments which are used in the inoculations and which have been sterilized by boiling. It is possible that the agglutinating power of the serum mentioned above may form the basis of a clinical test for pest similar to the Widal reaction for typhoid, though, of course, it will be understood that the diagnosis of pest is usually all too easily made.

This, I believe, will about cover all the information on the subject of which I am in possession at the present time, though, of course, something new is developing every day, and further observations will form the basis of subsequent reports. I have also been much interested in witnessing certain experiments made by Dr. Calmette with the serum for the bites of venomous serpents. I have seen rabbits successfully resisting, with the aid of this serum, an intravenous injection of the mixed venom of serpents which caused the death of control animals in from ten to fifteen minutes. It strikes me that the subject might become one of great importance for the people of the United States.

I would feel that I might well be accused of ingratitude if I omitted to make mention here of the uniform kindness and courtesy of which I have been the recipient at the hands of Professor Roux and his assistant, Dr. Borel. Of the former I can only say that language of mine can convey no adequate conception of his enthusiasm as a teacher, the incisiveness and clearness of his speech, and his perfect personal kindliness of nature. Instruction under him is a source of perpetual pleasure, and can not help being of the utmost value to the pupil.

In the former report I made mention of toxines prepared by the simple filtration through a Pasteur-Chamberland filter of a bouillon culture of the bacillus of pest, the liquid being thus deprived of its active microbial growth, and the product causing the death of animals, when injected subcutaneously, in a period of time varying according to the virulence of the culture, the length of time which was allowed for the growth, the size and weight of the animals, and certain other conditions, the nature of which is not as yet altogether understood. Since that time I have been conducting experiments with a toxine of pest, but one of an entirely different nature. If to the liquid mentioned before there be added ammonium sulphate, there is precipitated a varying amount of an amorphous, yellowish-brown powder, which when dried is soluble in cold water, forming a tolerably clear solution, and which when injected in doses of 0.0025 to 0.005 gram into a white mouse of from 18 to 25 grams weight causes the death of the animal in from twelve to twenty-four hours with all the symptoms of a profound toxæmia. After death there is found an extensive œdema around the site of injection, the peritoneal cavity contains a serous exudate, the spleen is enlarged, and other quite characteristic appearances are presented. The substance is, therefore, a true toxine, and one powerful and rapidly fatal. Heated to 56° C., its toxicity is much diminished; heated to 85° C. for an hour, the toxic property is altogether destroyed, though the precise point between these temperatures at which the toxic properties are lost is still a matter of experiment, for me, at least.

Nor is its simple toxicity the only interesting feature about this potent substance. Injected in the above-named doses into animals which are at the same time protected by an injection of the pest antitoxine of proved potency, the death of the animal is averted, sometimes with a varying degree of illness, sometimes without the slightest manifestation of discomfort. Apart from the interest attaching to this experiment as a demonstration of the efficiency of the antitoxine as a remedial agent, it establishes the important point that the pest antitoxine is an antitoxine in the true sense of the word, and is not an alexine, or an agent exerting its power by direct action on the microbe itself.

Nor does interest in the substance cease here, for it has been demonstrated by actual experiment that larger animals, especially horses, treated by repeated increasing doses of this precipitated substance, in time acquire an immunity against its action, and that when this is the case the blood serum of the said animal is found to yield an antitoxine of remarkably high remedial power. The word remedial is emphasized for the reason that animals treated by the injection of cultures of the pest bacillus in time acquire a certain immunity, but that their serum possesses powers more of an immunizing than of a remedial nature. These points are interesting from a practical as well as a scientific standpoint, for the reason that it opens up the possibility of preparing pest antitoxine without the necessity of injecting animals with the pest culture itself, a point I need not point out as one of great desirability, for if an animal being treated with pest culture dies, as will sometimes happen, that animal dies of pest pure and simple, and there is a certain chance of the spread of the disease, but if being treated with toxines, and death should unfortunately ensue, the sole cause of death is a poisoning by a chemical agen t, and there is no attendant danger.

A point in the use of this agent for the preparation of antitoxines is that its solution must be freshly prepared, as it seems to be changed by oxidation when the solution is kept from day to day. In this way were explained some exceedingly perplexing results which I reached as the finale of quite a train of experiments; the lesson thus practically learned being worth the time apparently lost.

The difference in the potency of the antitoxines prepared by the two methods given above is easily explained, but as the explanation would require an extensive excursion into the whole philosophy of the formation of antitoxines, it will not be given here.

I would again beg to emphasize a point of which I made brief mention in my last letter, viz, that not all horses lend themselves alike to the formation of antitoxine; indeed, some are perfectly useless for the purpose. I am informed that with some horses it is quite possible to prepare in three months an antitoxic serum of standard strength; that is to say, one the injection of one-twentieth cubic centimeter of which will preserve a mouse of 20 grams in weight against a lethal dose of pure pest culture. Others, after six months or more of preparation, will only yield a serum which is either not at all protective, or protective only in doses of much increased size, and the standard of potency which has been adopted at the Pasteur Institute is that as above given.

There are some other features of interest about the antitoxic serum which I would like to briefly allude to here. I have mentioned before a property which seemed to be possessed in varying degree by the antitoxine from different animals of producing a coagulation and precipitation when added to a turbid emulsion of pest culture in sterile bouillon or water. The same thing may be observed under the microscope when to a hanging drop of the antitoxine there is added a minute drop of the turbid emulsion of pest culture. There is at once seen an agglutination of the bacilli. The proportions in which the reaction will be produced can not at this time be definitely stated by me. The reaction was distinctly marked when the dilutions of the antitoxine were respectively one-twentieth and one-fiftieth. It was still noticeable when the dilution reached 1-100, but the matter is still under investigation. Further, 2 drops of the heart blood of a mouse just dead of the pest were added to 2 cubic centimeters of water, and the reaction was distinctly visible, though no further test was made at the time. This, however, establishes the value of the procedure as a possible diagnostic test, though, as has before been said, the diagnosis of plague is usually all too easily made by more ordinary methods. The organism of pest is a perfectly nonmotile one, so that the reaction does not have the beauty of the Wyatt Johnson modification of the Widal test for typhoid, still it is well marked and interesting.

I hope that it will be distinctly borne in mind in what I have here and before described, that my work is in no way original. It would be a gross injustice to my instructor, Dr. Roux, to allow it to be supposed for a moment that such was the

case. I am simply following with all possible attention the course which he lays down for me from day to day, and my work is only leading up to results which are evidently already well known to him, so that if any credit there be it is his and not mine. I hope to make further report as the work progresses.

Respectfully yours,

H. D. GEDDINGS,
Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

77–79 RUE NOTRE DAME DES CHAMPS,
Paris, France, June 14, 1897.

SIR: I have the honor to submit the following for your consideration, concerning the epidemic of plague in Bombay and Kerachi, most of the information being derived from the reports of Dr. Yersin to the Institute Pasteur, and imparted by Professor Roux in an address delivered at the weekly reunion of the workers at the institute:

Mortality.—From the most reliable information collected from all sources, it would seem that the average mortality in this epidemic in India has reached the appalling figure of 90 to 95 per cent of those attacked. This is open to some doubt, as the Hindoos have displayed an aversion to treatment in hospitals, and compulsory removal to these institutions having been adopted, as a rule, many cases occurring among the native population have been concealed and do not appear in the total of cases or deaths. The mortality as reported is, therefore, probably rather below than above the truth. It will also be understood that these figures do not include those subjected to serum therapy, of which special mention will be made in another portion of this summary.

Types of the disease.—For convenience of classification, and in accordance with the clinical symptoms presented, the disease in this epidemic has been classified as (*a*) bubonic, or ganglionic; (*b*) septicæmic; (*c*) pneumonic. Of these forms, the bubonic has been the most common, the pneumonic the most fatal. The method of infection—that is to say, the point of entrance of the specific microbe—is a point still under active discussion, and is different not only for the various types and forms given, but also varies in different countries and in different sections of the same country. For example, in Hongkong, where the natives as a rule go barefooted, infection in a large number of cases has been traced to abrasions and wounds of the lower extremities; in India, some covering or protection for the foot is usually worn, but the natives suffer from the bites of insects and vermin, consequently the point of entrance of the infection has been largely upon the hands and arms. Infection through the intestinal or respiratory tract, while admitted, is as yet largely unexplained; for, in spite of the assertions of Wilm, some breach of continuity would seem to be necessary for the entrance of the microorganism. As a rule, a small red spot marks the point of infection; this becomes successively a vesicle and a pustule, and in the ganglionic form and in a large proportion of cases a general redness or a series of vesicles marks the passage of the infection along a lymphatic tract or channel. These vesicles have been of very frequent occurrence in the Bombay epidemic.

Symptoms and course.—In the bubonic form the victim is seized with a chill, followed by a fever of greater or less intensity, sometimes reaching 41° to 42° C.; there is an overwhelming prostration; nausea and vomiting and the rapid formation of a glandular enlargement, surrounded by an extensive œdema, forming the bubo which has given the most common name to the disease. The bubo may or may not break down and go on to suppuration. If it does, the ganglionic form merges into the septicæmic, without any distinct line of demarkation between the two types. Early in the disease stupor, delirium, and a more or less profound unconsciousness mark the existence of an intoxication or general systemic infection.

In the septicæmic form it would seem that the infection has taken place through the intestinal, digestive, or respiratory passages, or has been secondary to the suppuration of a bubo. These cases are, as a rule, not as violent in their course as the other types, and furnish the larger portion of the small number of recoveries. The pneumonic form is at once the most insidious in its onset, the most difficult of diagnosis, and the most fatal in its results. It is usually ushered in by a pain in the side, which becomes more pronounced as the disease progresses; the respiration becomes difficult and embarrassed, and there is cough, with a tenacious, dark-colored, or bloody expectoration. It is through the examination of this expectoration that the diagnosis is most easily made, as, spread upon a slide, stained and examined under the microscope, the presence of the plague bacillus in large numbers is at once established. The bacillus is not in pure culture, but is accompanied by diplococci, staphylococci, and streptococci, and in making the diagnosis by this method the property of the plague bacillus of completely decolorizing by the method of Gram must be borne in mind.

Post-mortem, the pneumonia is found to be generally lobular or disseminated in character, though it is sometimes lobar, sometimes involves a whole lung, or may, indeed, involve both lungs.

The general characteristic of the lesions of plague is a tendency to hemorrhages, either into the parenchyma of the spleen or kidneys, the subdural and arachnoid spaces, the spinal cord, or into the loose connective tissue of various regions of the body.

This tendency to hemorrhages would seem to be a manifestation of the peculiar properties of the toxines formed by the plague bacillus in the process of growth, as it has been observed alike in animals subjected to inoculations with the culture of the bacillus and its isolated toxines.

Among the sequelæ of the plague may be mentioned as most frequent, long-continued suppuration of glands, boils, and carbuncles, and eruptive diseases of the skin, and paralyses, sometimes of a particular set of muscles, sometimes of the lower and sometimes of the upper extremities. These manifestations may persist, or the affected muscles may gradually acquire strength and tone. These manifestations may be accounted for as to the suppurations by the fact that the plague bacillus is usually accompanied by the organisms of suppuration; as to the paralyses, by the above-mentioned tendency to hemorrhages into the meninges and spinal cord.

Viability of the plague bacillus.—It would seem that the bacillus of plague, while not as sensitive to desiccation as the cholera spirillum, still loses its virulence by drying, and that to retain its virulence it requires the action of both heat and moisture. In ordinary water it will retain its activity for some time, but its existence in sterilized water seems to be limited to a period of from twenty-four to forty-eight hours. The presence of organic matter, animal or vegetable, and in a state of decomposition, would seem to furnish the most favorable nidus for its growth, which will account for its more or less prolonged existence in oriental countries and the comparative rarity of its appearance in Europe since the existence of modern and improved hygienic conditions. This does not mean, however, as was maintained by some at the Venice conference, that filth and crowding are alone responsible for the disease. The malady is preeminently of bacterial origin, and wherever the microbe is found there the plague is likely to develop.

Serum therapy and preventive inoculation.—This branch of the subject I approach with considerable reluctance, for the reason that the serum therapy has not in the Bombay epidemic given results as brilliant as were hoped for from the eminently successful experiments made upon a very small scale by Yersin in the epidemic at Hongkong. For this there are good and sufficient reasons, well understood by those best acquainted with the manufacture and preparation of the antipest serum. The figures will first be given, and explanations entered into afterwards. In the Bombay epidemic there have been used serums from two sources, the one prepared by Yersin at the Pasteur Institute at Saigon, the other prepared at the Pasteur Insti-

tute at Paris and forwarded to Yersin at Bombay. With the former serum the mortality of all cases treated amounted to 33 per cent; with the latter the mortality has been approximately 50 per cent. The total mortality of all cases in which the serum therapy was inaugurated prior to the systemic intoxication—that is to say, on the first or second day of the disease—is 12 per cent.

Compared with the mortality without the serum treatment, 90 to 95 per cent, there is nothing to be ashamed of even in these figures, but it is not the result that was hoped for. As a prophylactic measure the results have been much more favorable. It has proved in this respect eminently successful, but a point involved in some doubt is the length of the immunity conferred. In one case the disease manifested itself in a person constantly exposed forty-two days after the preventive inoculation. This would point to a desirability of inoculations for those exposed, as physicians and attendants, at intervals not exceeding thirty to thirty-five days.

Fortunately we are able to cite cases where the inoculation was instrumental in preventing the disease, and this, I think, should establish the principle that in future epidemics it will be just as rational and scientific to practice preventive inoculation as it is now customary to vaccinate those exposed to an infection of smallpox with a view of preventing the spread of the disease.

I would beg to relate the following incident: The Bombay manager of the local branch of the Credit Lyonnaise resided with his wife, children, and a numerous retinue of native servants in a dwelling in an infected portion of the city. His little daughter was stricken with the pest in a virulent form; was treated with the serum, and made a rapid and uneventful recovery. As a precautionary measure the whole family were subjected to inoculation, and the same measure of treatment was offered to the native domestics. Some accepted and escaped infection, while 6 who declined on the ground of religious scruples were all stricken, and 5 died. It seems that a more crucial test could not have been devised or a more triumphant vindication obtained.

I will endeavor now to briefly explain why the therapeutic results obtained have not been more brilliant and the success more uniform.

In the first place, the epidemic has been largely confined to the natives, a class notoriously suspicious and superstitious. It has been only with the greatest difficulty that they have been persuaded to accept the protective inoculation, and when stricken with the pest, their religious scruples have often led them to decline the serum therapy until almost moribund. These cases have, of course, only served to reduce the ratio of recoveries to treatments, and to bring the method into disrepute among those prone to criticise and sneer, of whom, unfortunately, there have been too many in high places during this epidemic.

Secondly, to be perfectly frank, the fault has been in the serum itself, as can thus be explained: The serum prepared by Yersin at Saigon had not only a strong immunizing power, but also very high antitoxic or curative powers, as is conclusively proved by the results in his 23 cases treated at Hongkong. Unfortunately, the supply was small. Yersin departed for Bombay and an unfortunate accident in his laboratory prevented the continuance of this supply and the further treatment and preparation of his already immunized and seasoned horses. Recourse, therefore, had to be had to serum prepared in the Pasteur Institute in Paris. A large demand had not been anticipated here, and the supply on hand was also small, but in the belief that even a weak serum was better than none, there was issued to Dr. Yersin a quantity of serum which was known to have a high immunizing but a comparatively low antitoxic or curative power. This is, in brief, the whole explanation. Every nerve is being strained to produce a stronger serum, but it is a matter which, in the very nature of things, takes a long time, and with a demand constantly exceeding the supply, it is impossible at this time to do better, though, if only sufficient time is allowed, there is no shadow of a doubt that a product will be reached whose potency will be a perfect vindication of the faith of such men as Professor Roux and his assistants. The technical reason, in brief, is the following: If a horse

is injected intra-peritoneally with a culture of the plague bacillus, killed by exposure to heat, the animal in time acquires a certain immunity to these injections, and his serum is found to have certain preventive properties, viz, it will protect an animal into which it is injected against a culture of the plague bacillus; in other words, it is preventive or prophylactic. This result has been arrived at by the action of the toxines contained in the killed culture, but it is to be borne in mind that the toxine is not in a soluble condition, but it is largely held enveloped in the bodies of the dead microbes. On the contrary, if the horse is injected with a live culture of plague, or a soluble toxine, and intravenously instead of intra-peritoneally, an immunity will be established, and the serum of the animal will be found to have not only an immunizing power as before, but in addition an antitoxic or curative power; that is to say, it will protect an animal against the toxines of plague, or, the animal having been inoculated with plague, it will exert its curative or antitoxic influence. The difference is one of degree and not of kind. Every antitoxic serum is immunizing to a high degree, but the reverse does not hold good. It can therefore be laid down as a general rule that to prepare an immunizing serum the injection of killed culture or enveloped toxine is sufficient, while to prepare an antitoxic one, either the culture must be living or the toxines in a soluble form and injected into a vein. Hence the difficulty; it is a most complex problem to dissolve the cellulose envelope of the microbe and set free its toxine without producing a chemical change in the product, and the matter is under continual experiment. That it will be solved eventually there is no doubt, but in the meantime the horses have to be treated with live culture, and the process is one requiring great caution and care, as accidents not infrequently happen, and the treatment of the horse has to be suspended. It will thus be seen that the whole matter is one involved in a great deal of difficulty, and requiring much earnest thought and work for its solution.

Nevertheless, I do not think it possible at this time to overrate the importance of the study of the toxines and antitoxines of the infectious and contagious diseases, as, to my mind, upon its development rests the whole future of preventive medicine. The study is at once fascinating and discouraging, for new difficulties constantly arise to take the place of those which have been overcome by laborious effort.

Respectfully yours,

H. D. GEDDINGS,
Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

ON THE CLINICAL DIAGNOSIS OF ENTERIC FEVER.

By EDO. ANDRADE-PENNY, M. D., *Assistant in the Hygienic Laboratory.*

The object of this paper is to offer a few remarks upon certain bacteriological and chemical tests which may be of service in making the diagnosis of enteric fever less difficult.

The researches of Von Fodor, Nuttall, Behring, and others have demonstrated the bactericidal properties of the blood, and have partly explained the phenomena of natural and acquired immunity.

Metchnikoff, who in the beginning denied the existence of these bodies present in the blood, was obliged to admit their presence, but attributed the main phenomena to be due to certain properties of the cell, and gave secondary importance to them. However, Metchnikoff described, in his report on immunity against chicken cholera, a clumping or clustering of the micro-organism when it was brought in contact with the serum of an animal which had been artificially immuned.

Pfeiffer later called attention to this same condition in his researches on cholera, and the reaction, or rather phenomenon, is now known after his name.

When a virulent culture of the cholera germ is mixed with the serum of a guinea

pig or rabbit which has been strongly immuned against the disease and injected into the peritoneal cavity of an animal not so treated, it will be seen, if examined after a few minutes, that the spirilla have lost their motion and soon after undergo a granular degeneration. The serum in this instance is bactericidal.

This action is also observed when the bacillus of typhoid fever is used instead of the spirillum cholera. It has been denied that this property could be demonstrated in vitrio.

Max Gruber and Durham also have described this action of the serum of animals vaccinated against the typhoid bacillus and the colon bacillus, respectively, and also have made mention of the fact that the bacilli not only lose their motion, but agglutinate into masses and fall to the bottom of the culture flask.

To Widal, however, belongs the credit of first bringing to notice this latter reaction and attaching to it a practical importance. By this reaction he claimed that not only could the bacillus of typhoid fever be immobilized, but that the diagnosis could be made by using the blood or blood serum of a patient with typhoid fever with the culture of the bacillus, and by this be able to diagnose the disease.

His method was to add to a fresh culture (actively motile) of the bacillus of Eberth a certain amount of blood or serum from a case, and then subject this mixture to a temperature of 37° C. for twenty-four hours. A reaction will then take place which is to be considered characteristic.

Instead of the uniformly cloudy, silky appearance, the liquid has become clear and the bottom is a whitish granular mass made up entirely of the bacilli.

This reaction does not occur when the normal human serum is used, or in the blood of persons suffering from other diseases.

The results obtained by Widal have been abundantly confirmed by many observers who have from time to time reported cases to which this test was applied, and not only have they done this, but have simplified the details so that now it can be applied outside the bacteriological laboratories with ease and certainty.

For the purposes of this paper it is hardly thought to be necessary to review in detail the several steps by which the present method has been brought to a state of perfection, but rather to deal with its present status. Wyatt Johnson, of Montreal, first made mention of his method of applying the test by using all the blood in a dried state. He suggests that the blood can be diluted with water to the requisite dilution and then mixed with a quantity of a fresh attenuated culture of the bacillus of Eberth, this mixture to be examined in a hanging drop under the microscope. If the blood is from a case of typhoid, the characteristic clumping of the bacilli will sooner or later be observed.

Before dealing with the results obtained by this method, it would be apropos to mention the different steps of the technic of the examination.

A drop of blood is collected on an ordinary microscopic slide, or on a piece of writing paper, and allowed to dry at ordinary temperature, after which it is sent to the laboratory for examination. The blood in this dried state will retain its specific properties for several weeks. The blood is diluted with water to about one-sixth until it has a slight yellowish color; a loopful of this is transferred to the cover glass, where it is mixed with a like quantity of an eighteen to twenty hours' culture of the typhoid bacillus, and transferred then to a cell slide and examined as a hanging-drop preparation. In case of positive reaction, the phenomenon as described by Widal is usually not long in appearing. The bacilli begin to lose their motility and agglutinate, first in small groups, which gradually grow larger until the whole field is covered with these clumps.

The reaction is produced in a variable time, sometimes almost instantly, in which case there are few if any clumps, the movements of the bacilli being immediately arrested and they are thus prevented from forming the characteristic groups. Usually the reaction commences within ten minutes and is completed at the end of thirty minutes. My experience leads me to say that the reaction, to be considered as positive, should be within an hour. I have noticed that the bactericidal action of the normal

blood will produce a pseudo-reaction and notable diminution, but not complete arrest of the motility of the bacilli. The number of cases examined by this method has been 45, and of these 35 were those where the diagnosis of enteric fever had been made or was suspected.

To better illustrate the cases by contrast the following table is given:

Number of cases examined	46
Number of cases suspected of being typhoid	35
Reaction present in	33

In addition to the above, 7 doubtful cases were examined—2 called catarrhal or mountain fever, and 1 malarial fever with enteritis, and the others continued fever; of these 5 were typhoid, 1 dysentery, and 1 malarial fever.

Number of cases examined known not to be typhoid	11
Reaction absent in	11

These 11 cases were distributed as follows:

Tuberculosis	2
Septicæmia	1
Pneumonia	1
Operative fever	2
Erysipelas	1
Dysentery	1
Malaria	1
Typhus fever	1
Hodgkin's disease	1

The specimens from the cases of typhoid fever were largely from the clientelage of the marine hospitals, and it was usual to receive them from three to eight days after they had been taken.

Regarding the time of illness at which the reaction is present, it is yet a question. Some have found it as early as the fifth day, and it has been found only after the convalescence has become established. My own experience was limited to but few cases, during the first stages of the disease—so few, in fact, that they are not of value for a conclusion. Most of the cases were examined after the ninth day.

Sometimes this reaction reappears, as was my experience in two cases; in one it was absent at the end of a week after convalescence had set in, and in the other at the end of the sixteenth day, notwithstanding the fact that the patient had had an attack of enteric (?) fever the year before.

Widal and others assert that this reaction remains as long as six or seven years after the attack, and in those cases who have recovered from a former attack and are ill with another febrile malady the reaction may be misleading. The substance in the blood of persons ill with typhoid fever is not bactericidal, and differs from the bodies described by Pfeiffer. This body or bodies have been termed agglutinans, on account of their action. It is found in nearly all the secretions, the lymph, in milk, urine, but not in the saliva, bile, and gastric juice.

The agglutinans behave much after the manner of the immunizing and bactericidal substances in the blood when subjected to the various chemical and physical agencies.

THE DIAZO REACTION OF EHRLICH.

Ehrlich describes a chemical reaction which takes place in the urine of a typhoid patient when it is mixed with a certain quantity of solution composed of the following:

Solution I.—A saturated solution of sulphanilic acid in a 5 per cent solution of hydrochloric acid.

Solution II.—Sodium nitrite, ½ per cent solution.

Forty cubic centimeters of Solution I is mixed with 10 c. c. of the sodium nitrite.

This is added to a few cubic centimeters of urine, and a small quantity of ammonia is allowed to drop down on the side of the glass and the reaction, which is a ring of deep brownish-red color, forms at the line of junction of the liquids. The reaction was first considered a pathognomonic of the disease, but subsequent observers have demonstrated that it is not alone confined to typhoid fever, but is present in many cases of measles, rheumatism, and especially in wasting diseases like tuberculosis. I have found it in a few cases in perfect health. The reaction does appear in many cases of typhoid fever, and there does appear some casual relation between the bacillus and the condition of the urine, because it can be produced artificially by injecting toxins of the bacillus of typhoid into dogs, and a short time thereafter observing the diazo reaction in the urine. It can also be produced by administering cultures of the colon bacillus in the same manner. Its value as an aid in making the diagnosis in enteric fever is nil.

THE ISOLATION OF THE BACILLUS OF ENTERIC FEVER.

The separation and isolation of typhoid bacillus, in the bacteriological examination of the water and of the excretions, has been the object of numberless studies, and none in the hands of others have fulfilled the expectations of the authors. In fact, to isolate the typhoid bacillus from water has been accomplished but a few times, notwithstanding the patient and laborious efforts of an army of workers. It has not been any easier to isolate from the stools of patients.

Such was the state of affairs when Elsner conceived a method by which this task could be made easier. By utilizing the suggestions of Holtz, and modifying the medium desired by him, he was able to isolate the typhoid bacillus even when diluted 8,000,000 times in water, or from the fecal matter of typhoid fever patients.

These results have been in general confirmed by Lazarus, Mills, Chantemesse, and Tatti.

The medium for isolating the typhoid bacillus is prepared by making an extract of 500 grams of potatoes, 1,000 grams of water, adding to it, after being boiled and filtered, 15 per cent of gelatine. The reaction of the test ought to be slightly acid. At the moment of use is added 1 per cent of iodide of potassium.

According to Elsner, the composition of this culture medium is such that it checks the growth of all bacteria found usually in water and feculent matter except the typhoid and colon bacillus; this last one grows so much more rapidly than the typhoid that after twenty-four hours its colonies are perceptible. The development of typhoid germs, on the other hand, is slower, its colonies being seen only forty-eight hours afterwards, when they appear like transparent points, as small as drops of dew, in contrast with those of the colon bacilli, which are opaque, yellowish, and of a greater diameter.

I have made many attempts to isolate the typhoid bacilli from the feces of patients, but with little or no result when the medium was prepared after the manner as recommended by Elsner in his article in the Zeitschrift fur Hygiene.

Elsner does not specify the degree of acidity of the test; he simply indicates that it ought to be slightly acid; but as a variable degree of acidity in the potato may change the results completely, Grimbert determined that the test ought to have an acidity equal to 4 or 5 c. c. of lime water, and at the same time had modified certain details of the preparation, which permits the obtaining of a more uniform composition. Grimbert prepares the test in the following manner: Five hundred grams of scraped potatoes in a liter of water, left to macerate three or four hours, or better one night. The liquid is slowly filtered so as to extract the starch, and is kept in the autoclave ten minutes for coagulating the albuminous matter. It is filtered and gelatine added to it, the proportion being 15 per cent. The mass is allowed to cool to a temperature of 55°, and the white of an egg beaten in water is added. The acidity of the test is then found by means of lime water, using the alcoholic solution of phenolphthaline as an indicator. If the acidity is greater than 5 c. c. of lime water

to each 10 c. c. of the test, a normal soda solution is added to this until reduced to the right quantity. It is again brought to the autoclave for a quarter of an hour, is filtered into tubes, 9 c. c. to each tube, and is sterilized anew.

At the moment of being used a cubic centimeter of sterilized 10 per cent solution of iodide of potassium is poured into each tube.

With a test prepared thus it has been possible for me to separate the typhoid and the colon bacilli from ordinary water contaminated with these microorganisms, and only once could the development of two liquifying colonies be observed in the rest of the plates of Petri, presenting exclusively the colonies of typhoid and colon bacilli. It must be observed that it was impossible to distinguish one set of colonies from the other before the third or fourth day. Previous to this time there was no special difference.

On account of the short time I have not been able to experiment with feculent matter, and I mention these results for what they may be worth in the examination of suspected water in cases of typhoid epidemics.

HYGIENEIC LABORATORY,
Washington, D. C., November 15, 1896.

A CONTRIBUTION TO THE STUDY AND CLASSIFICATION OF MALARIAL FEVERS IN THE DISTRICT OF COLUMBIA.

By W. B. FRENCH, M. D., *Health Office, District of Columbia.*

On August 22, 1896, the hygienic laboratory of the Marine-Hospital Service instituted a study of the character and origin of the malarial fevers in the District, with special reference to the prevalence of these fevers and the distribution of the various forms of infection, this work being preliminary to the study and classification of the several fevers incident to the southern portion of the United States.

The investigation was conducted mainly at the Washington Asylum Hospital, and two months later was continued at the Government Hospital for the Insane. The former is in the extreme eastern section of the city, on the banks of the Anacostia River, a branch of the Potomac, and not more than 15 or 20 feet above the surface of very extensive fresh-water marshes; the last-named institution is near the mouth of the Anacostia, about 200 feet above it, and a quarter of a mile back from the river shore.

The Asylum Hospital obtains its water for all purposes from the city pipes, while the Hospital for the Insane is supplied with drinking water and that used for tea and coffee from flowing springs that come from the same sand and gravel vein about 40 feet below the surface of the plateau on which the hospital stands. There are several of these springs within an area of a mile, from two of which the main supply is taken. The analysis shows them all to be of remarkable purity and free from organic and albuminoid substances. The main water supply for general purposes is obtained from tubular wells that draw their supply from a coarse gravel bed of unknown thickness, but more or less mixed with clay, at a depth of 300 to 400 feet below tide water. The drill to reach this passes through first about 30 feet of loam and sediment deposit of the river basin, then over 300 feet of clay with two or three deposits of sand and gravel, but not yielding sufficient water to be available for general use. Over 200,000 gallons are daily taken from the lower gravel bed by action of compressed air. At night, as there is considerable consumption of water for water-closets throughout the establishment, and also for steam heating and other mechanical purposes, and it is not practicable to run the air lift for this, water is taken from the Potomac River. While, as the tank only holds 10,000 gallons, most of this river water runs away before morning, it doubtless now and then occurs that some remains, and may be used for washing by the inmates in the morning, and as

an insane person may drink from any running water, it is possible that occasionally they may take a drink of it. The attendants never drink this water, but as the same tank is filled in the morning from the artesian wells and used for bathing, etc., during the day, there is a varying amount of river water mixed with it. If it is possible for the organism in question to be absorbed by the skin, then it seems probable that the water in this instance is a means of conveyance. The toothbrush would also enter into the question to some extent as a carrier of malaria-bearing water.

In attempting to trace the source of infection at St. Elizabeth the water supply can not be definitely excluded. So long as the artesian and river waters are mixed to any extent it is quite possible for the latter to infect anyone who bathes in it.

The Washington Asylum water supply is free from local contamination, at least, and would support the theory of aerial dissemination of the poison, but until we know to a certainty the life of the malarial organism outside of the human body the question is likely to remain an unsettled one.

The origin of the malarial germ or organism is no doubt in the expanse of fresh-water marsh close by, with its immense area of decomposing vegetable growth. There is no question about the quantity of malarial poison existing at the Asylum Hospital; its exact means of dissemination, however, is a matter for some speculation.

A residence at the Washington Asylum Hospital, even for a comparatively short time, is an almost certain guarantee of "chills and fever" for patients and attendants alike.

The same state of affairs exists at the Government Hospital for the Insane as regards the infection, though to a less extent.

During the late summer and early fall months at the Washington Asylum, in the almshouse, workhouse, and old men's home, all adjoining, the consumption of quinine is enormous. Sixty ounces were used in one month alone. In the old men's home it is the almost daily custom for a few of the inmates to take 5-grain capsules of quinine when their chill comes on. Indeed, so frequent are the attacks that the victims are not accustomed to report their trouble to the doctor, but apply to and receive from the colored man in charge of the two wards what he may deem necessary. Most of these old negroes have been in this part of the hospital for many years. They are generally able to totter about with the aid of canes, are more or less crippled with chronic rheumatism and old age, and spend their days sitting about in the sun and dozing. This pastime is varied with frequent attacks of chills and fever, which they break up temporarily with a few days' dosing with quinine. The medicine is dispensed with as soon as they feel better, only to be required again a little later, as the same infection manifests itself anew.

In illustration of this fact, a colored man from the old men's home was found making a friendly visit to a patient in the hospital proper, a quarter of a mile distant. When asked if had had chills lately, he replied that he had one twenty minutes ago; that he felt only "tolerable" just now. His temperature was taken and found to be 105.4 and pulse 124, yet he was making a social call, and seemed quite indifferent to a temperature which would have discouraged social duties in most of us. This man's blood showed the combined infections, tertian and crescentic bodies. He had taken quinine at irregular intervals for three months, and had had "fevers" at odd times during that period. He was from Virginia originally, and had been in the northwest section of this city for five years and at the hospital for eight months. His first chill occurred three months before the incident mentioned.

The character of the patients at the two institutions differs, in that at the Asylum Hospital they are generally transient, except those in the old men's home, while at St. Elizabeth they are more or less permanent, some having been residents as long as twenty years or more.

In some cases it could be fairly well determined that infection occurred after a brief stay at one or the other institutions, but generally it was found almost impossible to secure reliable histories. At one institution the patients were ignorant and

unobserving, and at the other they were insane in various degrees, so that objective symptoms alone had to be depended upon, or personal observation. For the same reasons it was found impracticable to sharply classify the several varieties of infection by means of their histories, nor could the percentage of infected cases to the total number of patients be determined, because the observer could not be present daily.

One hundred and five cases of known and suspected infection were examined, the ages of the patients ranging from 1 year to 87 years, and in 94 the organism was found. In 6 cases pigmented leucocytes only and free pigment were found, and in 5 cases the result was negative. About 20 additional cases were examined with negative results, but as the time of the examiner on some days was very limited, they have been excluded as not fair tests of the method.

A number of interesting conditions were seen in the blood at times. Phagocytosis was not uncommon. A few segmenting forms were met with, but more often their pigment clumps were found free or in the leucocytes. In a few instances two and three, and in one case four, ring-like forms were seen in one red cell.

In all cases the blood was drawn from the lobe of the ear, and used in its fresh state.

As a matter of choice it is preferable to examine before the patient is cinchonized, but as the æstivo-autumnal organism was found once after 50 grains of quinine had been taken in thirty-six hours, preceded by 20 grains daily for two or three days, it is not necessary nor fair to withhold the drug pending an examination.

From the histories obtainable at the Washington Asylum it seemed impossible to make any kind of a classification of cases by districts. Patients in many instances have moved about from place to place within the city, and even away from it and returned. They could give no reliable account of themselves. Dates and time meant nothing to most of them. Nor could it be told whether their present attack was the first. Their manner of expressing themselves generally left a doubt as to the truthfulness of their statements. They were more like a lot of children than adults.

Forty-nine cases of æstivo-autumnal, 40 cases of tertian, and 3 cases of combined infection were met with, and 2 cases of æstivo-autumnal fever complicated pulmonary tuberculosis.

Without figures to support the statement, but from a somewhat extensive experience with the disease under consideration, it has appeared to the observer that the black man is quite as susceptible to infection as the white. The disease, as far as could be observed, is as severe in its manifestations in the negro as in the white man. Generally speaking, the negro, owing to his lower state of civilization, bears the hardships of sickness with less complaint than his white neighors, and for that reason may appear to suffer less under similar conditions.

The total number of cases were distributed as follows:

At the Washington Asylum:	
Tertian infections	21
Æstivo-autumnal	34
Combined infections	3
Government Hospital for the Insane:	
Tertian infections	20
Æstivo-autumal	16
Total	94

It should be stated in connection with these figures that they do not include all cases of malarial infection, because the work was not carried on daily, nor during the entire twenty-four hours of any one day. Occasionally the observations were suspended for several days at a time.

Seventy white and 24 colored people were found infected, divided as follows:

Æstivo-autumnal:	
White	34
Colored	16
Tertian:	
White	34
Colored	7
Double infection:	
White	1
Colored	2
The ages of the patients examined were:	
1 year old	1
2 years old	1
10 to 15 years	2
15 to 20 years	5
20 to 30 years	7
30 to 40 years	22
40 to 50 years	11
50 to 60 years	16
60 to 70 years	17
70 to 80 years	8
80 to 87 years	4
Total	94

A study of this table, where the extremes of life are represented, a baby of 1 year and five men of 80 to 87 years, would seem to show that no age is exempt from the disease in question. The observer's experience in the preceding year bears out this statement fully, especially as to children and babies. Many cases of infection in nursing infants were found in a series of dispensary cases examined a year or more ago, and one instance of a combined infection with a semicomatose state, in addition to the one reported in this series.

MIXED INFECTIONS.

It is desired to call special attention to the two cases of pulmonary tuberculosis, complicated by the presence of malarial infection. In quite a large number of blood examinations these are the first two cases of the kind that the observer has met. In the 600 and more cases studied by Drs. Thayer and Hewetson, of the Johns Hopkins Hospital, malarial infection of tuberculous patients is not mentioned. It is readily seen how confusing to the physician and how troublesome to the patients such a condition of affairs would be, and that in all probability the tuberculosis would be suspected, for a time at least, as the cause of the chills and fever. The diagnosis in such cases would have, too, a very material bearing on treatment—in one case quinine and plenty of it; in the other the remedies thought best for the condition of the lungs would be indicated.

The blood showed crescents and free pigment blocks in one and ring-like bodies in the other. Tubercle bacilli were found in the sputum of each. It would have been very instructive to have followed out the effect of the malarial complication of tuberculosis, but in the absence of detailed temperature charts and histories it could not be done.

The combined infections, of which there were three, deserve mention. In two the symptoms were clearly those of the tertian organism, which largely predominated; in another, a baby of 22 months, the first infection was with the tertian parasite. Quinine was given, and the symptoms disappeared for about two weeks, when they returned, and quinine was again given with good results. About three weeks later the child was seized with convulsions, and on the following day its

blood showed flagellate bodies, a great number of half-grown tertians, and large extra-cellular bodies, some in process of budding, and fourteen crescents and one ring-like form in a small cover slip preparation. Quinine was given and the next day the various forms were less numerous. Under further treatment the baby had had no return of trouble eight days later when the work closed at the Asylum Hospital. As showing the possibilities in diagnosis, it was suggested that the baby "had worms" when the convulsion occurred, but a glance at the blood was convincing.

Another case of some interest was that of a white man of 69 years, a carpenter, a native of the southeast part of this city, whose previous health he said had been good. Three weeks prior to the occasion about to be related, he entered the hospital for treatment of a diarrhœa of a year's standing, and was discharged cured after a short stay in the hospital, but promptly returned with the same trouble; and a week later the note of the case reads: "Has had quin. sulph. grs. V., t. i. d. for six days. No chills. No temperatures taken. Very sallow and anæmic, emaciated and seems in much general distress." A blood examination was suggested by the general appearance of the patient and showed numerous pigmented leucocytes, crescents, ovoids, intracellular ring-like forms, glagellate bodies, frequent instances of two ring-like forms in one corpuscle, and phagocytosis of flagellate body in active motion. Death occurred ten hours after the examination mentioned and the autopsy showed "heart small and almost enveloped in fat. Lungs pigmented but normal. Liver normal in size and appearance. Spleen small, soft and pliable. Kidneys normal in size and general appearance, except for several small superficial watery cysts on surface of one of them." It was not practicable to examine the brain. A few hours before death the rectal temperature was 95.6, pulse 84 and small and weak. This was undoubtedly a death from malarial poisoning, a rather more rare occurrence than generally supposed, in this region at least.

Perhaps the majority of the cases studied would have been readily recognized as malarial, but in the doubtful cases the diagnosis was dependent upon the blood examination. This was particularly true of the baby in convulsions from a combined infection, æstivo-autumnal and tertian; of the two cases of tuberculosis where the former type of infection was found, and in the case of the man of 69 years just mentioned.

It is safe to say that a positive diagnosis can be made in 95 per cent of cases without the expenditure of undue time. The satisfaction of feeling sure of your case is well worth the labor required.

No cases of quartan infection were discovered, nor were there any cases of combined malaria and typhoid.

Every courtesy was shown the observer by the officers of the two hospitals named.

Inasmuch as the method of making preparations of blood suitable for immediate examination without staining seems to be understood by a few only, and requires the very careful observance of some simple rules and a little practice, it may be stated as a first requisite that the glass slides and cover slips must be clean, and if slightly warm, say body temperature, so much the better, the blood will spread more readily. To secure absolute cleanliness of the slides, after they have been soaked in pure nitric acid for a day or two, washed in clean water, in 95 per cent alcohol, and dried on a clean towel, they should be washed in absolute alcohol and the flat surfaces not touched by the fingers in handling. This last precaution is very essential, otherwise an oily film is deposited which prevents the proper spreading of the blood. The cover slips are cleaned by boiling about two hours in battery fluid, rinsing in distilled water, in 95 per cent alcohol, and then in absolute alcohol, after which they are spread out, preferably in the sun, to dry. These slips also should not be touched by the fingers on their flat surfaces, otherwise they are spoiled for blood work.

Of course, in emergencies, it is practicable to prepare a few slides by using a perfectly clean handkerchief to dry a slide previously washed in clean water and alco-

hol, though the preparation is very likely to be a poor one, and unsatisfactory to examine. The cover slips may be breathed on and dried in the same way, but can not be depended upon; and if from necessity this method has to be used it is safer to make four to six cover slips, two on a slide, and even then failure may be the result. Perfect cleanliness of slides and slips is of the utmost consequence, and can not be insisted upon too strongly, especially for the beginner. There is a certain dexterity which comes with practice that later enables one to take some liberties with this rule, but until the technique is acquired it is not safe to depart from it.

The cover slips and slides may be carried dry. Sometimes the former are kept immersed in equal parts of alcohol and ether and dried at the time of using, but it is not necessary to do so. Enough slips for a dozen or more preparations may be carried in an ordinary pill box, and if the slides are wrapped in clean paper the whole outfit occupies very little room. It is entirely practicable for the general practitioner to be prepared to make preparations at any time, and by a method which the writer has devised, and which may have occured to others. The glass slides may be dispensed with at the bed side and only the cover slips used, which materially lessens the demand on pocket space. One of the frequent objections heard to this method of diagnosis is that so many articles have to be carried by a physician that it is impossible to load the pockets with more. As said before, a pill box—better if made of tin—an inch or an inch and a quarter in diameter and one-fourth inch thick, containing the slips and a flat needle, is all that is required, and certainly no objection can be offered to that on the score of size.

To secure the blood, first wash and dry the lobe of the ear with the corner of a wet towel. Lay out the cover slips and slides within easy reach. Pinch up a small portion of the lobe between the finger and thumb, and make the skin rather tense, and while so holding it puncture slightly with the needle. The puncture will then bleed at any time for an hour or more if squeezed. Now wrap a fold of the dry towel around the middle finger, and hold the cover slip by its edges between the index finger and thumb of the same hand, and pinch very lightly the lobe of the punctured ear between a finger of the other hand and the towel-wrapped finger; a small drop of blood will flow; this should be wiped away and a second and third drop treated in the same manner, so as to secure the blood from some little depth. The fourth drop may then be touched on its top only by the cover slip, the towel dropped from the finger, and the slip quickly placed drop downward on the slide. The blood should then spread evenly beneath the slip, and the corpuscles will be found lying flat and apart from each other. The whole process only requires a minute or two, and is not nearly so troublesome as reading a description of it. If it is desired to examine the slide at once this is all that is needed; otherwise the edges of the cover slip must be sealed with paraffin melted on the blade of a penknife, or in cold weather vaseline may be used, though it is apt to get between the two glasses. Slides thus sealed will generally keep for several hours—three or four—sometimes much longer.

Another method, the one referred to as dispensing with the slides, is to substitute a cover slip for the slide—in other words, secure the drop of blood as described, and immediately place upon it another cover slip, when the blood will spread very readily. These two slips, glued together by the intervening blood, may be later laid upon a drop of immersion oil on a slide, allowed to flatten the oil out by their own weight, and examined in the usual way. They can not be sealed, however. Pressure on the slips will probably spoil the specimen by distorting the corpuscles and huddling them together.

To make slips for staining, obtain the drop of blood as heretofore described; lay upon it a cover slip, and allow the blood to spread, then separate the two slips by sliding them apart. Lay them blood side up until dry, when they are ready for fixing and staining. It is generally well to prepare two to four slips in this way in general practice, as our intention of examining the fresh specimen is often spoiled by interruptions. Or, draw the edge of a cover slip across the drop of blood, and

then draw the same edge over the surface of a second slip. Several slips may be made in this way from the first slip, if the work is quickly done.

There are some don'ts that it is well to remember, in making specimens for examination in the fresh state or for staining. Don't handle the slides and slips by their flat surfaces. Don't make pressure on the slips after they have been laid upon the slides or upon each other. If the blood does not spread, the slide is not clean—make a new one. Don't take a large drop of blood; one the size of an average pin head is ample; more than that is apt to make the specimen too thick. Don't touch the ear with the slip, or it will very likely become greasy. Don't squeeze the ear hard. Make a puncture that will bleed with very little pressure.

The lobe of the ear as a source of blood supply has some advantages over the tip of the finger. It is not nearly so sensitive. Indeed, most patients do not know that the lobe has been punctured until told, and a nursing baby rarely interrupts its occupation on account of the needle. It is out of sight of the patient, a decided gain in those to whom a drop of blood is sufficient cause for fainting. It is less likely than the finger to be infected, and will bleed, as occasion requires, for a longer time, without a new puncture.

Infections Caused by the Pneumococcus (Preliminary Note).

By P. A. Surg. J. J. Kinyoun and P. A. Surg. M. J. Rosenau, M. H. S.

In 1891, while at the Hygienic Institue in Berlin, one of the writers (Kinyoun) was engaged in an investigation relative to the production of immunity in animals which were susceptible to pneumococcal infection, and finally succeeded in conferring immunity upon mice by the administration of dead cultures of the germ.

Subsequently, 1893, it was also demonstrated that this immunity could be conferred by the administration of considerable quantities of blood of an animal which had died from the disease, after it had been freed from the pneumococci. This immunity was not of high degree and not lasting.

In 1895 the subject was again taken up by one of the writers (Rosenau) with a view of producing the antitoxic serum, which would be of service in the treatment of the disease in man, and also to inquire further into the biology of the germ, the etiology and pathology of the diseases induced by this organism.

The first step necessary was to obtain a culture of sufficient virulence to warrant its use in the proposed experiments. Accordingly the organism was isolated from sputum and passed through rabbits until the virulence was sufficient to kill the animal within from twelve to twenty-four hours. The inoculations from animal to animal being made with the blood containing the organism and injected intraperitoneally. After the virulence had thus been exalted the organism was then used to carry on the work.

Animals were found to respond to inoculations of this germ much after the manner described by other writers, rabbits, mice, and guinea pigs succumbing to the disease, with lesions of an acute septicæmia, and frequently well-marked pneumonia of the lobular variety. Cats were nearly refractory to the germ; so also were fowls and pigeons. Dogs were found as a class refractory, but a certain proportion of them, especially the young dogs, succumbed to inoculations of the pneumococcus. Some only responded locally, while in others there was a general infection. A number of experiments were made to ascertain if it were possible to infect these animals through the respiratory tract, by injecting into the trachea and larger bronchi cultures of the pneumococcus, with a view of causing pneumonia. The dogs were infected in this way, and a certain number had pneumonia, which, to all appearances, clinically, resembled lobar pneumonia and terminated in recovery, while others had, in addition to the pneumonia, a general septicæmia (a later infection) which ended fatally. In another series, where the above experiments were duplicated, the dogs

were killed at stated intervals and the lungs were examined for the lesions, which indicated both by the physical examination and clinical history a pneumonia.

The process in the lung, macroscopically, was that of acute lobar pneumonia, and microscopically was identical with the croupous pneumonia in man.

Acute fibrinous pleurisy was observed in several of these cases, both in local and general infections, which was the same to all appearances as that seen in man. This induced pneumonia in dogs was traced through the several stages of the disease, from the acute engorgement to the gray hepatization. The disease of the lung was always lobar, and when not followed by an acute septicæmia ended by a crisis and resolution which in all respects was identical to the lobar pneumonia in man.

Intraperitoneal injections in dogs of culture or of blood from rabbits dead from the disease proved fatal in about the same number of cases as when injected into the respiratory tract. Horses are all susceptible even to small quantities; the process is local, and when injected subcutaneously has not been observed to cause a general infection.

Intravenous injections of considerable quantities of culture in the horse have caused the death of the animal. The bovine species are all susceptible, but less so than the horse. Goats are also susceptible to the organism, causing in them a general septicæmia.

PRESERVATION OF CULTURES, AND MAINTENANCE VIRULENCE.

It is a well-known fact that the pneumococcus is a short-lived organism in vitro. It has been extremely difficult to keep for any length of time, and when successfully kept alive the virulence diminishes rapidly.

It had been the custom of some investigators to keep the virulence of the organism up to the standard by a continuous passage through animals; and others by keeping blood cultures in a cold place for some time, between its passage from animal to animal. In this way a smaller number of rabbits are required within a given time. Pfeiffer recommended a medium known after his name, which was claimed to keep the organism in a state of virulence for an indefinite time. The methods tried were: (1) A continuous passage through animals, combined with keeping blood cultures in a refrigerator for intervals between inoculations; (2) on Pfeiffer's medium; (3) on special media; and (4) growing in sterilized eggs.

The organism has been found in a virulent state after sixty days (blood culture), after which there appears to be a diminution; on special media, Marmorek's, etc., from ten days to two weeks; on Pfeiffer's medium, about thirty days, after which it loses its virulence, but lived for seventy-two days. Growing the culture in eggs, the organism was recovered one hundred and eighty-eight days after inoculation, and at the end of one hundred and sixty days it had lost but little of its virulence.

This method had been previously tried by one of us in 1891 (Kinyoun) and found to give good results, for periods under thirty days, in growing the organisms of pneumonia and erysipelas.

Our experience with the virulence of the pneumococcus leads us to believe that it is far more difficult to maintain at a given strength than for others of this class. Given a twenty-four hours' old bouillon culture, of which one-fourth c. c. will prove fatal to a full-grown rabbit within twelve to fifteen hours, it will, on some occasions, suddenly rise to a 500-fold strength without any apparent reason. This feature has been observed in a number of incidents throughout our experiments.

This feature made it difficult to be able to always gauge the proper quantity in determining the minimum lethal doses, or for the experiments in immunity.

IMMUNIZATION OF ANIMALS.

It has been known for a considerable time that animals can be immunized against the fatal dose of a culture of the organism, and space will not be given to go into the details of how it has been accomplished more than to briefly mention our work where it is confirmatory of that of other workers.

Immunization by attenuated cultures can be produced, but the results obtained by this method are by no means constant or certain. However, when the immunity is established in this manner it is strong and lasting. The substance which produced the immunity is attributed to the cell, and is not soluble like that produced in diphtheria, tetanus, or tubercle cultures. It is rather insoluble, and is perhaps the protonuclein of the cell. Little of it is found in the filtered cultures. The small amount of this substance in solution has immunizing properties, and this state can be established by it if the treatment is continued sufficiently long. The coccus itself appears to retain almost all the immunizing substance. Cultures heated to 58° C. for an hour appear to give the best results in immunity; a higher temperature than 60° C. destroys its power. The organism can, without detriment, also be killed by the addition of carbolic acid or trikersol. This latter method is perhaps the easiest to prepare the toxin, unless the quantity required for the injection be large; then the amount of the antiseptic would naturally preclude its use.

EFFECT OF THE TOXIN ON ANIMALS.

In our experiments we observed that the cultures of the pneumococci always give an acid reaction and that there was a considerable amount evolved in the first few days of its growth. Further, that there appears to be an intimate relation between the amount of acid produced in the culture and its virulence. The acid begins to form soon after the inoculation of the culture and continues until after twenty-four to forty-eight hours, when it remains stationary. As soon as the maximum quantity of acid has been evolved the virulence of the organism begins to diminish and in a short time disappears. Whether the acid is derived from the culture medium or from the pneumococci themselves has not been fully determined, but it appears to be produced by the action of the pneumococci on the culture medium. Peculiar phenomena are observed in bodies of animals dead from pneumococcal infection. The secretions of the pericardial, pleural, and peritoneal cavities were found to be decidedly acid, and this acidity is in direct relation to the intensity of the pathological process.

The blood was seldom acid, even where there was an enormous number of pneumococci present. Sometimes, however, this did occur, but it was slight. The same conditions have been observed in lobar pneumonia of man, the tissues invaded—the lung pleura and sometimes the pericardium—having been found acid. The peritoneum did not give the acid reaction unless it had been invaded by the microorganism. This acid must have something to do with the pathological processes, especially the effect upon the muscular structure of the heart, and is in all probability partly responsible for the fatal terminations of the disease in men.

The acid can be separated from the germ by filtration and its effects studied. The experiments made with this acid were few because of their mild effect even on the most susceptible animals. When filtered cultures were given to rabbits they were followed with a local inflammation, loss of appetite, weight, and a pyrexia lasting for a few days, ending in recovery. The effects of the combined action of the pneumococcus and the acid, after the culture was destroyed by heating to 58° C. for an hour or more, gave a more decided reaction. When a considerable quantity of this dead culture was given subcutaneously to a full-grown rabbit, it produced the same chain of symptoms as the filtered, but more intense. The fever was usually higher and the emaciation more pronounced. Frequently it caused death.

In one experiment, where a large quantity of the dead bouillon culture had been given to a horse, with fatal issue, there was a serous effusion in the pluræ and pericardium, fatty degeneration of the heart muscle, a swelling and fragmentation of the cell nuclei of the liver and kidney, and the spleen was engorged.

The lesions found in animals dying of this toxin resembled very much the conditions found in an animal dying from an acute septicæmia. There was always an inflammatory œdema at the point of inoculation, fatty degeneration of the liver,

heart, and kidneys, the lymph glands enlarged and reddened, the spleen pale but not enlarged. Sometimes there were extravasations of blood under the mucous membrane.

IMMUNITY.

From the above it would appear that the greater part of the poisonous principle of the pneumococcus lies in the cell protoplasm, and is likely to be a nuclein. The resistance to the culture can be increased by continuing the administration for a period of from two to three months, when it appeared to remain stationary. The immunity in rabbits and white mice when once established is not so very strong, and can be broken down by a slight increase of the quantity of a culture which had been resisted.

Dogs can be immunized with the dead culture, but whether this is due wholly to the culture or is aided by the natural resistance can not always be determined.

Horses, goats, and calves have also been partially protected in this way, but the results have not been very satisfactory. As this inquiry was undertaken mainly in the interest of the sero-therapy of the disease, it was our aim in the before-mentioned experiments to ascertain what animal was best suited for the purpose.

At first dogs and goats promised well, but later on it was found that the immunizing properties of their serum was slight, so attention was then turned to the immunization of horses.

In June, 1895, a young horse, 4 years old, was put under experiment, and was treated by one of the writers (Rosenau) with small and increasing doses of the dead culture of the pneumococcus, and after two months a fair tolerance to the effect of the germ was established. The injections of virulent culture were then made in increasing amounts. During these administrations, once while the dead cultures were being given and later with the injection of the living cultures, a complication arose which is thought worthy of note.

About twenty-four hours after the administration of a *dead culture* there followed a rigor and high temperature, a swelling of the joints of the leg, followed later by the involvement of two more joints, and the animal was thought to be suffering from acute articular rheumatism. The treatment was stopped and the attack ran its course.

After recovery, which was slow, the immunization was again commenced, using the dead culture first and later a living culture.

On one occasion a large quantity of the culture was injected subcutaneously, and twenty-four hours after there was not only a marked local reaction, but a general one as well. The temperature was 42° C., and two of the joints were hot, swollen, and extremely painful. The condition grew worse, and again the animal had an attack of acute synovitis. There was a large effusion into the affected joints of a sanguineous serum. Cultures made from this effusion did not reveal the pneumococci.

The two attacks being so alike and following the administration of the toxin and culture respectively, makes it quite probable that the pneumococcus had something to do with the intercurrent affection. The third attack coming on directly after the administration of a larger quantity of the culture than had previously been given left little doubt as to the cause. The same chain of symptoms was observed in the goat and calf undergoing immunization.

After about seven months' treatment the horse yielded a serum which had a slight protective power, but not sufficient to warrant its use in the treatment of animals infected with the pneumococcus. The process of immunization up to this time was marked with frequent accidents, such as abscesses and joint complications, which greatly retarded the work. When a certain tolerance had been established there were less of these complications. At the end of eight months the serum had a protective strength of about 15 c. c. of the serum to the kilogram of rabbit against the fatal dose of the pneumococcus injected intraperotoneally, and it now appeared possible to obtain a curative serum. Unfortunately an overdose of the culture killed the horse, and the long and tedious work was begun again.

In August, 1895, one of us (Kinyoun) began the immunization of a young heifer by subcutaneous injections of the pneumococcus, gradually increasing the quantity from time to time. After two years of treatment a serum has been obtained which appears to have both protective and curative properties for rabbits and dogs, and it now seems possible to produce a curative serum for pneumonia in man.

The experiments made upon dogs and rabbits are encouraging. For example: Two dogs were etherized and given a quantity of living virulent culture of the pneumococcus, injected in the trachea. On the day following both animals sick, loss of appetite, high temperature, breathing accelerated, cough, and commencing consolidation; on the day following area of consolidation well marked, temperature high. Twenty c. c. serum from calf given to one, with the result of lowering temperature and improvement in general symptoms; another injection of the serum, and the disease ending in crisis. The control dog also recovered, the crisis occurring on the seventh day, whereas the one treated occurred on the fourth.

Rabbits have also been successfully protected against the fatal dose with 2 c. c. to each kilogram of weight.

Only to one case of lobar pneumonia in man has the serum been administered, and apparently with no result. The case was one of double-pleural pneumonia of four days' standing. Two doses of 20 c. c. of the serum were given on the fifth and sixth days, respectively. The necropsy, made 6 hours post-mortem, showed a double pneumonia, with pleurisy and pericarditis. The organism was recovered from all the affected parts and from the blood, liver, and spleen. The condition suggested a general infection.

The above is only a résumé of our work. The experiments are being continued, and it is hoped that in the near future we will be able to report practical results.

The Serum Therapy of Variola and Vaccinia.

By P. A. Surg. J. J. Kinyoun, M. H. S.

The sundry civil bill for the fiscal year commencing July 1, 1896, carried with it a provision that the sum of $900 should be made immediately available for the investigation of the cause and treatment of smallpox in the laboratory of the Marine-Hospital Service; this appropriation being the direct outcome of a preliminary note on the investigation of this subject made during the latter part of 1894. At that time the results appeared so encouraging, that the Supervising Surgeon-General deemed it advisable to carry the investigation still further, so this amount of money was asked for the completion of the work.

Of all diseases with which the clinician and pathologist has had to deal, variola is perhaps the easiest to recognize. Its period of incubation, the prodromal symptoms, the febrile stage, and the eruption are so well known, that it would be only a repetition to describe them.

What the writer will have to say concerning this subject will deal more in particular with the pathological side than with the etiology.

From the time of Jenner's discovery until now the matter of the identity of variola and vaccinia has been in dispute. Some have claimed that they are two distinct diseases, while others that vaccinia is only the modified and attenuated form of variola. This latter contention existed only as a theory until a few years ago, when an intelligent attempt was made to set this much-vexed subject at rest by a series of experiments on animals.

The first recorded experiments were those of the Lyons commission, of which Chaureau was chairman. Chaureau attempted to transfer smallpox to the calf by inoculating it with material taken from the smallpox pustule. His results were in most cases negative, except in a few, where he obtained what appeared to be an abortive form of the lesion. These were nodular swellings, and here and there a

small papule; pustulation was not observed. Some of the serum was taken from the lesion and inoculated into children, with the result of a confluent pustulation about the point of the inoculation. A second child, inoculated from the first, developed a localized pock, which was circumscribed and without any constitutional symptoms.

The conclusions of the commission were that variola virus can occasionally be transmitted to the calf, but that its passage through animals (ox and horse) in no wise affected its virulence or changed its nature, variola and vaccinia being separate and distinct diseases.

In reviewing the number of experiments conducted by Chaureau and his associates, one can not fail to ask why these were not made more extensive, as it appears the conclusions were based on the strength of one experiment alone. This would not be considered at the present time fulfilling the requirements of experimental medicine unless error had been excluded by control and duplicate experiments.

The subject, however, was considered as a settled one for nearly twenty years, when it again began to excite interest, and the additions to our knowledge made within the last decade has been quite important, so that we are now in a better condition to pass judgment. It is now the almost universal belief that vaccinia is a modified or attenuated form of variola. The two points to be settled in the investigation were these: (1) The transmission of smallpox to animals otherwise susceptible to vaccinia; (2) the modification or attenuation of the variola virus.

In the first category are the experiments of Chaureau, 1877, which have already been referred to; Freyer, 1892, and later Haccius, 1894. Copeman and Voight independently report successful inoculation of calves with variola, and cultivated it through several generations.

Copeman and De Haven (1893) obtained the same results with monkeys.

All the investigators agree, with but on exception, that the virus can be easily transferred to calves and monkeys. It was observed further that the pustules of the first and second generations behaved much in the same manner as those occurring after inoculations of variola in man, which have a tendency to spread and become confluent about the point of inoculation, but after the second passage the pustule became circumscribed and localized, and resembles more and more that of vaccinia. When carried on as far as the fourteenth generation, it did not change its local character.

This is not all. Children were inoculated with this modified variola virus by Freyer, Haccius, Copeman, and Voight, who all report that the appearance of the pustule and the course of the disease were in every way similar to vaccinia.

These experiments made by independent observers, all arriving at the same conclusion, should be convincing. No one has observed that variola vaccine virus, when once modified, returns to its former virulent state.

Susceptibility.—It is a well-known fact that there is quite a difference in the susceptibility of animals to vaccinia even of the same species, much more so than is observed in man. The greatest susceptibility is in the young state—old animals (ox and horse) are not nearly so easily inoculated, sometimes failure resulting.

Almost all the herbivora are susceptible to vaccination, and have been found by the writer to be so in the order named, viz, the horse, ox, goat, and sheep. The rabbit and guinea pig have not been found to be susceptible. Dogs, cats, pigeons, and chickens are also immune. The monkey, with exception of two species, has proven quite as susceptible as man.

Immunity.—The modus operandi by which the state of immunity is brought about is not yet fully understood except in an empirical way.

It was considered at first that vaccinia was a local process, becoming general from the invasion of the system by the virus from the local lesion, and that the lymphatic and circulatory systems entered very largely into the process.

Chaureau demonstrated that when vaccine virus was injected subcutaneously in man, horse, or ox complete immunity could be established in this manner. This he termed vaccination without exanthems.

Not only has it been demonstrated that the immunity is established by subcutaneous inoculation, but by intravenous injections as well. Animals such as the horse and ox could be easily immunized in this way, even when but a minute quantity of the virus was injected. Sometimes it was observed that intravenous injections in the horse were followed by a general eruption.

From the above it would appear that the lymphatic system was in some way implicated, yet on careful examination this does not appear to be so. If it is nevertheless true, the involvement must be of a passing character, because lymph glands located at or near the point of infection have been removed and other susceptible animals have been inoculated with these glands without producing the least effect.

The skin and mucous membrane, as is known, readily lend themselves to variola and vaccinia infection, and one observes in these tissues the typical lesions of the disease. It may be significant or it may only be a coincidence that pustulation of both variola and vaccinia reaches its highest development in those parts of the skin which are richly supplied with lymphatics and sensory nerves, more especially the latter.

The eye can also be readily infected with the virus. Here the lesion develops not only rapidly, but also typically.

In observing how easily the cornea of the ox and goat respond to the vaccine infection, it suggests that the nervous system may enter more largely into the pathological process than has heretofore been ascribed to it.

The above fact suggested the following experiments to determine the inoculability of the nervous system. The animals best suited for the experiments are monkeys. The animals were trephined in a similar manner as if for inoculation for rabies and given a quantity of glycerinized germ-free vaccine virus (about one-fourth cubic centimeter) injected under the dura, and in two instances into the brain substance.

At periods varying from six days to five months the animals were tested in the usual way by skin vaccinations with proven lymph and all found to be immune. What significance this has can not at the present time be stated, but it is quite suggestive, to say the least.

To summarize: Immunity to vaccinia can be produced through the skin and mucous membrane; subcutaneous and intravenous injections; through the eye and cerebro-spinal canal.

Is the process of vaccinia local or general? There are two theories by which it can be explained: First, the general infection; the skin lesion is first a local process, wherein the contagion develops and subsequently, or rather cotemporaneously with this development, the virus is taken up by the lymphatic and circulatory system and thereby becomes a general infection. This theory is partly borne out by the fact that when subcutaneous and intravenous inoculations are made the immunity is established as promptly as if they had been made through the skin. This circumstance would lead us to believe that the virus completes its cycle within the blood current; that is to say, the local process becomes general.

On the other hand, it may be considered as a local process. There are substances evolved in the pustule of a chemical or proteid nature which, being absorbed into the circulatory system, act upon the tissues of the body in such a way as to bring about immunity.

The researches of Beclere and associates (1896) appear to establish the fact that vaccine virus may be present in the blood at the time when the vaccination reaches the height of development. They conclude that the blood of a vaccinated animal (heifer) under certain conditions may be considered a powerful vehicle of the virus of vaccinia, or of the principle capable of conferring immunity.

Strauss (1889) repeated the experiments of Chaureau and Maurice Raynaud, and he arrived at very similiar conclusions. He says:

"The microbe of vaccinia (still unknown) exists in the blood during the eruptive

period, but in slight quantity, and that immunity can be conferred on other animals by the transfusion of blood, provided a large quantity be given."

The weight of evidence seems to be on the side of an immunity resulting from a general rather than a local process.

The statements made by Beclere are rather paradoxical, if construed to relate exclusively to the blood as the vehicle of the virus, but when the antitoxic properties are considered in connection with the other process it appears to be more tenable.

It is quite evident that Strauss's conclusions are based on the immunizing properties of the blood rather than the presence of the virus. It will be referred to later on when we consider the question of just how far the circulatory system is involved in the immunizing process.

Incubation.—The period of incubation and the time in which it is required for vaccinia to reach its full development—that is to say, when a complete resistance has been established in the body against the disease—is with one exception the same; it matters not whether the virus is inoculated in the skin, mucous membrane, subcutaneously, intravenously, or in the cornea; nor does it seem to matter whether there is a large or small quantity of virus in the inoculation, the process is in no way expedited.

The exception referred to is the intracranial injections, in which instance the period of incubation is shorter and the disease appears to complete its cycle earlier. The temperature curve commences within twenty-four to thirty hours after the intracranial injection and lasts from seventy-two to ninety-six hours, gradually declining after the first twenty-four hours of the fever.

In these experiments the effect of trauma was excluded by control experiment; in these latter the temperature resulting from the operation was never more than from 0.5° to 1.° C. and lasted only for a short time.

Lesions of vaccinia.—The lesions of the skin and mucous membrane are practically the same and need no description. That of the eye is histologically the same as formed in the skin, but usually smaller and but slightly elevated. There is not so great a tendency to necrose and form pus as is observed in the skin, unless it becomes infected by pyogenic bacteria.

Subcutaneous injections of the virus are usually followed by a slight inflammatory reaction, being less when the virus is well diluted. There is a slight engorgement of the vessels and occasionally a slight exudate at the point of inoculation, which disappears within a short time. There is no lesion accompanying subcutaneous inoculations.

In order to ascertain just the conditions present in the brains of monkeys inoculated with the virus, a control experiment was made in this manner: Four monkeys were trephined in the usual manner and injected subdurally with a given quantity of germ-free vaccine virus, and then the animals were killed at the end of twenty-four, forty-eight, seventy-two, and ninety-six hours, respectively, and their brains examined. The one killed at the end of the twenty-four hours presented a slight engorgement of the vessels at the point of inoculation, with a slight exudate. In the second (forty-eight hours) there was little or no engorgement and no appreciable exudate, and in the third and fourth nothing abnormal was noted.[1]

Immunity to vaccinia can also be established by subcutaneous and intravenous injections of blood of vaccinated animals, provided a considerable quantity can be employed. As before stated, the immunity brought about by these injections was thought to depend on the vaccine virus present in the blood, but while this may be at times possible, it is hardly probable that this is the cause of the immunity by blood or blood serum.

Recent researches have shown that the immunizing power of the blood is some-

[1] The infection of the nervous system with vaccine virus and the lesions induced by it will be the subject of another paper.

what different than that of vaccinia. It is possible to bring about the state of immunity by means of the blood-serum injections in a much shorter time than is possible to do with the virus. For an example, a large amount, say 1,500 to 2,000 c. c., of blood taken from a vaccinated animal is injected into another, and within two days vaccinated—immunity is the result.

On the other hand, the experiment has been made by injecting vaccine virus subcutaneously, or intravenously, and then vaccinating from one to three days thereafter. In this case there was no immunity from the injection; the vaccination was in no wise interfered with.

The blood of a vaccinated animal at the time of the height of the eruption contains a new substance (the exact nature of which is yet unknown), which commences to show in the blood even before this time; it may be said to be *pari passu* with the development of the pathological process, and reaches its height soon after pustulation, remaining stationary for ten to fourteen days, when it gradually declines, so that after several weeks it has disappeared.

The blood serum of the vaccinated animal is equally potent after the passage through a porcelain filter, while the same applied to vaccine virus renders it sterile. This fact would alone suggest that it must be a soluble proteid on the order of the alexins and antitoxins.

The cause of variola and vaccinia.—Since the era inaugurated by the discoveries of Pasteur variola and vaccinia have been examined from time to time with a view of determining its specific bacterium. So far the researches, from a bacteriological standpoint, have not been fraught with success. The several bacteria which have one after the other been brought forward as the cause have been abandoned, and we are no further advanced in our knowledge of its cause (if a bacterium) than when the attention was first directed to it. The bacteriological researches have in the main been of great service in our study of vaccinia, and have pointed out the infectious processes which may arise from the use of impure vaccine.

These pathological processes, variola and vaccinia, have not had the same attention given them as other infectious diseases; in fact, one is struck with the paucity of the literature covering the investigations. Perhaps the explanation is the fact that variola is so easily and thoroughly controlled by vaccination that there was not the need of studying it so much as other diseases for which we had no such remedy or preventive. Nevertheless, if this is the true explanation, it is not a valid excuse for neglecting a field of research which may yield results no less brilliant, and of value, not only with regard to variola and vaccinia, but in other diseases about which so little is known. The writer feels assured that if the same attention had been given to the study of the etiology of variola and vaccinia that has been devoted to other infectious diseases the forthcoming results would have been as valuable to science and as beneficent to humanity as the results which have crowned our efforts in the study of tuberculosis, diphtheria, cholera, and wound infections.

There is a class of diseases to which variola evidently belongs which have yet to yield the secret of their cause, and when the cause of variola is settled beyond a question it will furnish the key to the etiology of such diseases as yellow fever, typhus, and the other exanthems.

The researches of Guarnieri, in 1892, and L. Pfeiffer, in 1889, have awakened a renewed interest in the subject, and have, perhaps, added considerable to our knowledge of the cause of variola and vaccinia. These investigators claim that the cause of variola is a protozoon, which they found constantly present in the epithelial cells of the lesion.

When the skin or cornea of a susceptible animal is inoculated with vaccine virus, certain changes in the cells begin to occur which they ascribe to the invasion of a parasitic protozoon.

L. Pfeiffer (1889) was the first to announce the discovery that he had found these bodies in the pustules of variola and vaccinia. There occurred in the epithelial cells and leucocytes of the lesion certain changes which he had never seen in any other pathological process.

The epithelial cells contained new bodies which appeared to be of extra-cellular origin. These were, in his opinion, parasitic protozoa. These bodies were also found in the blood during the eruptive stage.

Three years later (1892) Guarnieri reports the results of his investigations, which had been undertaken on the same lines as those of Pfeiffer. Instead of confining his researches to variola and skin inoculations of vaccinia, he chose for his field of observation the cornea of animals, where he was better enabled to study the various changes occurring in the evolution of the vaccinal lesion and the life history of the parasite.

Morphology of the parasite.—Soon after the inoculation of the skin or cornea with vaccine virus a certain number of the epithelial cells at the point of inoculation begin to undergo a change. They now contain small, round bodies which highly refract the light, lying in the protoplasm of the cell, and are surrounded by a clear zone or areola. These bodies are usually spherical in shape and variable in size, some occasionally attaining the size of the nucleus of the cell, while others may appear as minute points. They are also variable in shape, and may be of the amœboid form. There is no limiting membrane or nucleus.

Its reaction to coloring reagents is much like the nucleus of the polynucleated leucocyte.

Mode of production.—The mode of production is by direct division, and the cell is endowed with amœboid movements.

"The parasite has a circular evolution; it develops from around a central point—concentrically from within, outwards—hence the lesion of variola and vaccinia is circular."—(Guarnieri.)

The contentions of Guarnieri and Pfeiffer may be summarized as follows: The rounded contour, high refraction, its affinity for coloring reagents, the mode of reproduction, its regular evolution, special localization, the lesion of the protoplasm of the cell, the formation of the vacuole, and being always found in the lesion following vaccination and never in any other pathological process, establishes beyond question the cause of variola and vaccinia.

Pfeiffer also says that there is no inflammatory process produced by chemical irritants which so alter the tissues and leave the nuclei unchanged.

Leoni (1894) thought that the changes described by the above authors were not due to the specific infection, but were the result of a karyo kinesis occurring in the cell.

Salmon (1896) was the first to cast a genuine discredit upon Guarnieri and Pfeiffer's theory of the protozoon infection. While admitting that in both variola and vaccinia these small bodies do occur, he claims that they are of intracellular origin, and are derived from the nucleus of the cell; that they are the direct result of karyo kinetic changes occurring in the nucleus, and are the result, not the cause, of the pathological process. In support of his theory he states that there is no known parasite belonging to this alleged species which completes its cycle in the manner which is accorded to these bodies. The variations in the size and shape of these bodies are not in keeping with our knowledge of the parasitic protozoa.

This is about the status of the question at the present time:

While the evidence adduced by Pfeiffer and Guarnieri is in favor of the parasitic theory, the writer is not entirely convinced that theirs is the correct one. It must be remembered that only a short time ago the same claims were made with regard to the cause of cancer; a parasitic origin was ascribed to it, but on further investigation the cellular changes were found not to be caused by a parasite, but were the result of inflammatory changes.

As before stated, Pfeiffer calls attention to the presence of the parasite in the blood during the eruptive state, but his description of it is not only vague but meager. It is natural to suppose that the parasite would enter the blood when one considers the eruption in the skin and mucous membrane.

Dr. Walter Reed, U. S. A., has made an extensive study of the blood in cases of vaccination, and in one case of variola he has found an amœboid body quite unlike any corpuscle heretofore described. It makes its appearance in the blood soon after vaccination, and is more numerous about the seventh or eighth day, when it gradually disappears. This body apparently fulfilled all the conditions of a protozoon parasite, and was thought to be at the time the organism of vaccinia. Subsequent observations made upon the blood of those not inoculated demonstrated that this supposed parasite was sometimes to be found in healthy blood.

The writer can also confirm the above, for in 1896 he encountered this same corpuscle in the blood of monkeys which had never been vaccinated.

Reed states that in his opinion this corpuscle described by Pfeiffer has nothing to do with causing either variola or vaccinia, but that it is a corpuscle of the blood which, under certain conditions, may make its appearance. It is a corpuscle which has not been hitherto described.

Sero therapy of vaccinia and variola.—The theory that the blood of a vaccinated animal may contain the contagium virum of variola and vaccinia or that it may possess preventive and curative properties is by no means new. The researches of Maurice Raynaud (1877) were the first to suggest the remedial qualities to the serum, more in particular to the antagonism between the serum and the cause of the disease. Sternberg and Wilson in 1892 made experiments to determine the devitalizing effect of the serum on vaccine virus, and were successful in demonstrating this action.

Menard in 1889 supposed the blood of the vaccinated animal derived its preventive properties either from the absorption of the virus direct from the pustule into the blood or that certain soluble substances, evolved within the pustule, were taken up by the blood current and brought about the state of immunity.

This latter theory is the most probable.

The time at which the blood contains the greatest amount of this substance, and in consequence thereof the highest immunizing power, appears to be just after the completion of the vaccination (about the tenth to the fourteenth day), and continues unimpaired for about seven to fourteen days thereafter, but may exist, though in a very weak state, for several weeks thereafter; it finally disappears. It appears in the blood of some animals sooner than in others; in the horse as early as the seventh day, and continues about the same length of time as in the ox.

Beclere and collaborators (1896) conclude that the serum of vaccinated animals possess decided immunizing properties, provided a large amount of serum be employed, and that the character of the immunity (partial or complete) is in a direct ratio to the amount of serum administered. Immunity can be brought about in one or two ways: (1) By administration of a sufficient quantity of the serum at one injection. (2) By giving daily injections of the serum for several days. This second method appears to require less quantity than the first to establish the same degree of immunity.

The serum of the vaccinated state does not depend upon any living principle, i. e., the virus, but to bodies which are of the order of the alexins and antitoxins. This substance, whatever it is, has dual properties, one by which a resistance can be established to vaccine virus by a single injection of a sufficient quantity of the serum, and the other is its direct devitalizing effect upon the virus itself.

When fresh serum is mixed with vaccine virus in proportion of one of virus to ten of serum, it is sufficient to devitalize the virus. Serum taken from an animal from four to six weeks after vaccination will have but little effect on the virus, even if it be mixed in larger proportions than one to ten.

The immunity brought about by serum injections is temporary; it may last only for a few weeks. Its deportment in this respect is much like that of the immunity produced by the antitoxin of diphtheria.

There is yet another interesting feature connected with the serum, and that is the power it appears to have to modify the virulence or potency of the virus.

It has frequently been the case that an animal has only been partially immunized by the injections of the serum, and when vaccinated the process goes on to its termination without being influenced in any way. Sometimes the process is distinctly modified. Now, if some of the material from the modified pustulation be transferred to a fresh subject, it is usually the case to find that this virus has lost its potency. In fact, it is no longer possible to propagate it. The same also is true of cases where the skin lesion of the vaccinia has not been modified by the serum injections. Even from these apparently full developed pustules it is with great difficulty that it can be transferred to another animal, and if so, the second generation is usually of the abortive character.

This appears to be the explanation of how the virus of variola is modified in its passage through the lower animals.

When the virus of either variola or vaccinia has been modified in the above manner, it appears impossible to restore it again to its original virulence.

The writer's experience with the effects of the serum in conferring immunity to the vaccinal process has not been as extensive as reported by Beclere, Chamou, and Menard, nor has it been crowned with the success of these observers. They have been, however, sufficiently extensive to be deemed worthy of record.

Our experiments have been conducted almost entirely with monkeys, as they appeared best suited for the object in view.

The first attempts were made to determine the action of the serum in averting the disease.

These observations date back to March, 1895, when the appropriation already referred to was made available, and have been continued from time to time until now. This investigation was undertaken to supplement another which had been undertaken in 1894, to determine the influence of the serum of vaccinated animals upon variola.

The results were as follows: Monkeys which had received only small quantities of serum from vaccinated calves below or approaching one one-hundredth their body weight and then vaccinated showed no influence upon the latter process. When the animals were given one-fiftieth to one-tenth their body weight in serum the vaccinal process was distinctly modified, but in no case were the animals rendered completely immune.

In the second series of animals, they were first vaccinated, and on the second or third day thereafter, just when the vaccination appeared to be "taking," they were given varying quantities of the serum, usually in two injections, morning and evening. When given daily in less quantities than one one-hundredth their body weight, there was no effect on the process; but when it was increased to above one-fiftieth, even to one one-hundredth the body weight, the vaccinal process was distinctly modified and in two instances averted.

The best results were obtained in the cases where the serum was given twice daily in quantities of one-fiftieth the body weight, and continued from three to five days.

The vaccinal process appears to be more difficult to modify or abort after the third day of infection. If the serum injections are commenced synchronously with the vaccination a less quantity is required than in the former case to bring about the same result.

Reed (1896) also reports on this same subject; his conclusions are practically the same as those of the writer—that the quantity of serum required to influence vaccination in the lower animals is entirely too large to use in the human subject.

In 1895 the writer reported the treatment of several cases of variola, in which the serum of vaccinated animals had been given with apparent benefit, and on the strength of the reports of the physician in charge of the cases, made the following preliminary report, dated January 15, 1895.

Preliminary Report on the Treatment of Variola by its Antitoxin.

By P. A. Surg. J. J. Kinyoun, M. H. S.

During the fall of 1893, while on special duty at the New York quarantine, application was made to Dr. Cyrus Edson, health commissioner of New York City, for permission to visit the smallpox hospital on North Brother Island for the purpose of making certain observations upon smallpox. Among these was the subject of this letter.

Since then and until quite recently, my laboratory work and other duties have prevented me from availing myself of the opportunities offered in the smallpox hospital. During the past three weeks I have been able to accomplish something in this direction, and wish to place it before the medical profession for what it is worth.

Just previous to the appearance of smallpox in this city, I had made arrangements with Dr. Ralph Walsh, proprietor of the national vaccine farm, to conduct a line of inquiry concerning the nature of vaccinia, and while engaged in this, took advantage of the cases of smallpox to put a theory into effect. It has been already demonstrated by Maurice Raynaud and Sternberg that the blood serum of an immune animal destroys the potency of vaccine lymph. It had occurred to me, as well as to others, that this fact could be utilized in the treatment of smallpox by the injection of this serum in patients suffering with the disease.

Accordingly, on December 23, 1894, I took a liter of blood from a heifer calf which had been previously vaccinated on November 26. At the time of bleeding the local effects of the vaccination had disappeared; the animal to all appearances was sound and well. As soon as the blood was withdrawn it was taken to the laboratory, where on the next day about 350 c. c. of tolerably clear serum were drawn off.

A part of the serum was transferred to a small sterilized flask, while another part of equal quantity was passed through a special filter in order to remove the blood corpuscles and any chance bacteria which might have contaminated it.

About 35 minims of pure vaccine lymph (two days old) was added to 2 c. c. of the filtered and unfiltered serum, respectively. After a few hours' exposure the serum was sent out to the vaccine farm and a small heifer was inoculated in the usual manner with each sample. The results were negative in both instances, demonstrating that the process of filtration does not affect its power. The substance which possesses this neutralizing power is soluble and not confined to the corpuscular elements.

Accordingly I prepared a considerable quantity of this filtered serum and sent it to Dr. Elliot, the physician in charge of the smallpox hospital, accompanied with the request that he would use this serum upon such cases of variola as were in his judgment suitable for the experiment. It was suggested that the treatment be given to fresh cases before the stage of pustulation, for these, I thought, would react more favorably to the serum than older cases.

As a trial dose, 15 c. c. was suggested, to be repeated within from eight to ten hours if there was no reaction or amelioration of the symptoms. It was, however, the opinion that a large dosage would have to be given before such effects would be noticed.

It was suggested that a careful note should be made of the patient's condition before the administration of the serum and accurate observations be made of the pulse, respiration, temperature, the presence or absence of alumen in the urine, and the condition of the eruption. It is much to be regretted by Dr. Elliot and myself that an opportunity did not offer to give serum to cases in the first stage of the eruption, whereas the treatment was confined to two which were in the pustular stage.

Being in telephonic communication with Dr. Elliot, we managed to discuss the cases from day to day, and make mutual suggestions as to the modification of treat-

ment. Dr. Elliot kindly sends the notes of the cases under treatment and embodies therein his conclusions, drawn from his observations on the effects of the serum:

"SMALLPOX HOSPITAL, *January 16, 1895.*

"MY DEAR DOCTOR: In accordance with your request I herewith transmit the clinical notes of 2 cases treated with the vaccine serum which you so kindly furnished me.

"*Case 1.*—Male; negro; age, 28; admitted to hospital December 21, 1894, under the diagnosis of variola malignans. His condition on admission was very unfavorable; the eruption confluent, accompanied with a high temperature and violent delirium. The temperature from December 21 to 28 varied from 103.6° F. to 99° F. During this time the temperature steadily declined, whereas the pulse and respiration remained high, the delirium continuing about the same; this was so violent at times that restraint became necessary.

"On December 25 considerable hemorrhage occurred in the pustules, and there was much gastric irritation. On December 28, 10 a. m., the patient's condition was as follows: Temperature, 99; pulse, 120; respiration, 32 and quite superficial. Patient was conscious at times; very weak. A small quantity of urine passed, found to contain albumen 10 per cent per volume.

"At this time 15 c. c. of the serum were injected subcutaneously, after having carefully disinfected the skin. At 11 a. m. the respiration became deeper, pulse stronger and fuller; temperature, 99.6. Patient very thirsty. The œdema caused by the injection had entirely disappeared. At 2.30 p. m. another dose of 15 c. c. given; condition about the same; temperature, 100; pulse, 130; respiration, 32; respiration deeper, pulse stronger; considerable expectoration. At 9 p. m. another dose of 15 c. c. given. At the time of the injection the skin over the face had become very dry, hard, and bleached, the skin in its texture resembling very much the appearance of an elephant hide. Temperature, 99; pulse, 120; respiration 28 and shallow; expectoration free and tinged with blood.

"On the morning of the 29th another dose of the serum was given; temperature, 98; pulse, 130; respiration, 32. No urine passed during the past twelve hours.

"The patient growing weaker; died on the morning of the 31st. No post-mortem.

"The total quantity of serum injected was 60 c. c.

"*Case 2.*—Negro; male; 20 years old; well developed, of strong constitution. Admitted to the smallpox hospital on January 25 under the diagnosis of variola. The eruption had appeared about five days before and covered the arms, chest, body, and legs. His temperature (axillary) on admission was 99.8° F., pulse 98, and respiration 24. Had considerable bronchitis.

"At 11 a. m. of the same day the patient was given 15 c. c. of the serum subcutaneously injected at a point about 1½ inches below the nipple. During the process of the injection the patient became very much frightened, but experienced little, if any, pain. The urine on examination showed 8 per cent of albumen per volume. One hour after the injection the temperature registered 100.8; pulse, 88, strong; respiration 24, and deeper. At 5 p. m. of the same day 15 c. c. of the serum were injected; temperature 102; pulse, 90, full and strong; respiration, deep and full; expectorating freely; 6 p. m., temperature, 100.8; pulse, 96; respiration, 30. January 6, temperature, 102.2; pulse, 92, full and strong; respiration, 24, of good depth. The patient complained of soreness at the point of injection.

"Quite a notable change occurred in the pustules, which appeared to be losing their moist character, having an inspissated appearance, and quite a number of very small pustules appeared in the healthy skin.

"*3 p. m.*—Patient in a profuse perspiration; temperature, 99.4; pulse, 88; respiration, 28; urine showed a marked decrease in the quantity of albumen. Thirty c. c. of the serum were administered. About one-half hour after this injection the patient complained of a difficulty in breathing. This passed of in the course of an hour.

"*9 p. m.*—Another dose of 30 c. c. was given; this produced no ill effects; temperature, 102; pulse, 100; respiration, 26; albumen present but in smaller quantity. On the following day there was a marked change in the eruption—all the former pustules now drying up—the smaller ones which had appeared the previous day appeared to have aborted. The general condition of the patient more favorable.

"No further treatment was given. This case is convalescent.

"During a period of forty-eight hours 105 c. c. of the serum was given.

On January 16 the scabs were becoming detached from the skin, and presented a very favorable appearance. There were no indications that there would be any pitting, whereas 2 other cases, not receiving the serum, to all appearance identical with this one, will be badly marked.

Dr. Elliot says:

"It is very unfortunate that cases did not present themselves until the variolous eruption was well developed into pustular stage, since it is before this period of the disease that the serum would have an opportunity to show its full effect. As it is, I believe the use of the serum in these 2 cases has given good results. The injections were given under the most careful aseptic precautions, care being taken to inject the serum at a place where there were but few pustules. The effect of the serum upon the pulse tends to increase its volume; there is also what appears to be a slight rise in the temperature. Its effect upon the quantity of albumen in the urine was quite apparent after the second injection. The change in the appearance of the pustular eruption was noticeable after the first eighteen hours.

"There was no effect on the eruption in the first case. It is my opinion that the vaccine serum will shorten the course of variola if given in the papular stage of the eruption. The vaccine serum does modify the variolous eruption, even in the pustular stage, but does not shorten the attack. The most serious objection to its application is the largeness of the dose, 15 to 30 c. c., which leads the patient to object to its use.

"I hope this memorandum of the cases will be of service to you in your further experiments. Sould other cases present, I will adopt the serum treatment if possible.

"Yours, very truly,

"LEWELLYN ELLIOT, M. D."

From the history of the 2 cases treated with the serum it appears that it does have a modifying effect upon the disease, especially upon the eruption. (Case 2).

I am informed by Dr. Elliot that it was his belief that by administering the serum to the first case life was prolonged at least seventy-two hours.

Since it appears possible to modify the postular stage of smallpox, and in this case have little or no pitting follow, it certainly appears reasonable to assume that it would have even yet a greater power over the disease in its first stages.

Since it seems possible to mitigate the attack of variola, it also appears rational to presume that the serum would have power to render susceptible persons refractory to the disease. It is intended to pursue my investigations on these lines and incorporate the results of my experience in a forthcoming communication.

As bearing upon this subject I insert here the following article by Dr. E. H. Wilson:

A contribution to the serum-therapy of smallpox.

By E. H. WILSON, M. D.

Director of the Department of Bacteriology, Hoagland Laboratory; Bacteriologist to the Brooklyn Health Department.

In 1892, while associated with Surgeon-General Sternberg, I assisted in some experiments which demonstrated the fact that the blood serum of an animal immune from vaccina, or a human being immune from smallpox by having recently had it, contained some substance which neutralized vaccina. The blood serum from

vaccine immune calves and from smallpox convalescents was used to inoculate children who had never been vaccinated, at the same time that an inoculation with good fresh vaccine virus was used on the other arm. The result was uniformly the same, the vaccine virus did not "take." At the same time control vaccinations with the same virus produced typical vaccine pustules. The same effect of neutralization could be obtained by exposing the fresh vaccine virus to the action of the immune serum in a water bath at a fixed temperature for an hour.

These experiments were interrupted, and it has always been the intention of the writer to continue them when occasion offered. The great strides lately made in the direction of that form of therapeutics known as "Serum-therapy" suggested more than a year ago the possibility that this peculiarity of the serum of immunized animals could be utilized in the treatment of smallpox. Other duties prevented the preparation of the serum for use at the time when we had so much smallpox in our city, but since that time the serum has been supplied to the Kingston Avenue Hospital and has been used there. I wish, in writing this short article, to contribute to the two cases reported by Dr. Kinyoun (preliminary report on the treatment of variola by its antitoxin. Abstract of Sanitary Reports, Marine-Hospital Service, Vol. X, p. 31, 1894) three cases treated by this method at the Kingston Avenue Hospital, for the histories of which I am indebted to Dr. Ambler, the medical superintendent.

Case 1.—L. R, aged 7 years. A native of the United States. Admitted February 20, 1895. She had been exposed to infection for two weeks, and had been vaccinated on the 16th, the same day that the prodromal symptoms appeared in the shape of headache, lumbar pains, chill, and fever. The diagnosis was confirmed by Dr. H. H. Morton.

On the 18th the eruption was papular; on the 21th, pustular, semiconfluent on the face, and discrete on the body.

February 21, 8 c. c. serum injected subcutaneously in the interscapular region; 10 p. m.; marked delirium and great restlessness.

February 22, disease taking the usual course; patient feeling more comfortable and taking nourishment well.

February 23, patient doing nicely; height of vesicular stage.

February 24, desquamation commencing on the chin; treatment, tinc. ferri-chlorid.; eruption taking regular course and uneventful.

February 25, general condition of the patient has been good since the use of the serum; no secondary fever and convalescence seems hastened.

February 26, desquamation going on nicely.

This patient recovered, with no complications, no abscesses, and no pitting.

On the fourth day of the disease, the day of admission, the temperature was 101° F. in the evening.

On the fifth day the serum was used, and in the evening the temperature rose to 101½°. On the sixth day it fell to 99½°. On the seventh day, 100½°, a. m., and 99¾° evening. On the eighth day it fell to 99°. On the ninth day, 99.2°. On the tenth day, 98.5°. After which it remained normal.

Case 2.—W. H.; aged 2½ years; native of the United States. Vaccinated February 16, 1895.

Prodromal symptoms, chill, fever, lumbar pains, and vomiting, February 19.

Admitted February 21 with eruption in the pustular stage, confluent on face and hands, semiconfluent on body, and discrete on greater part of limbs. Five c. c. serum injected subcutaneously. Patient very restless.

February 22, 8 c. c. serum injected, eruption vesicular, and beginning œdematous condition about the eyes, throat swollen and painful.

February 23, eyes entirely closed by œdema, takes nourishment badly.

February 24, disease taking usual course as regards the eruption. General condition somewhat improved.

February 26, desquamation begun. Eyes discharging considerably.

March 1, patient doing fairly well.
March 8, desquamation going on. Patient up.
March 15, desquamation going on. Patient up.
March 20, desquamation going on. Patient up.
March 28, desquamation going on. Patient up.
April 11, discharged. Considerable pitting.
There were no complications in this case.

Port variola abscesses, common in this form of the disease, are absent, and the patient seems to have made a much more speedy recovery than would be expected, considering the severity of the attack. The temperature chart in this case is nearly the same as in Case 1.

On the third day of the disease, the day of admission, the temperature were 102⅔°, and 5 c. c. serum were injected. On the fourth day the temperature fell to 100. On the fifth day it rose to 101.2, and 8 c. c. serum were used. On the sixth day the temperature fell to 98⅗. On the seventh day it rose to 99½. On the eighth day it remained at 99. On the ninth day it fell to 98.8. On the tenth day it fell to normal and so remained.

Case 3.—A. L.; aged 5. Native of the United States. Vaccinated March 7, 1895, not satisfactory.

On March 17 began to have headache, pain in the back and limbs, severe chill, and high temperatnre. Admitted March 18. Very restless, eruption papular and confluent; prognosis given by appearance of the eruption, which showed patches of hemorrhagic nature.

March 19, eruption still extending, and now involves almost the entire body, and is confluent in most places. Patient delirious and restless, throat sore, takes but little nourishment; 8 c. c. serum injected subcutaneously.

March 20, disease taking the usual course; 3 c. c. more of the serum injected.

March 21, patient much better. Eruption shows signs of aborting.

March 22, general condition of patient improved. Eruption aborted, and desiccation of vesicles taking place rapidly. No pustules have formed.

April 4, patient up and doing nicely. No abscesses and no complications.

April 15, desquamation complete.

The temperature chart of this patient shows a steady decline of the temperature, with no secondary fever.

On the second day of the disease the temperature was 103½, and 8 c. c. of the serum were injected. On the third day, 102⅗. On the fourth day, 101; 3 c. c. more of the serum. On the fifth day, 100, with a slight rising rise to 101. On the sixth day, a drop to 98.5. On the seventh day, a slight rise to 99.5. On the eighth day, normal, and so remained.

A few words in reference to the preparation of the serum used in these cases may not be out of place. I placed myself in communication with Dr. W. E. Griffiths, of this city, who has made a study of vaccina in calves, and who kindly aided in the experiments of 1892. From him I obtained a healthy young calf, from whose abdomen and thighs he had gathered a crop of virus after vaccination. In order to be sure of the immunity Dr. Griffiths vaccinated the animal with virus from other sources, and no vesicle resulting we were sure of the immunity. It is, of course, unnecessary to state that every precaution should be exercised to eliminate the possibility of tuberculosis in the animals used for this purpose. The calf was then brought to the laboratory, and after a few days' rest a quantity of blood was drawn from the external jugular vein into sterilized flasks and allowed to stand in a cool place until the serum had separated from the clot, when the serum was removed by sterile pipettes to sterile bottles or into Sternberg bulbs.

A small piece of camphor was placed in each bottle for the purpose of preservation, for although the serum is sterile on leaving the laboratory, unless it is all used the first time the bottle is opened it is liable to be contaminated, inasmuch as it is a good culture medium for any molds or fungi gaining access to it. The question of

a preservative agent for serum intended for hypodermic injection is an important one. Such an agent should have a certain bactericidal power, be nonpoisonous, not coagulate, or render the serum turbid, and perfectly insoluble in the serum. Carbolic acid and trikersol in one half per cent proportion is apt, after a while, to cause a turbidity in the serum.

Chloroform does not mix well with the serum. Sodium salicylate, as recommended by Ohlmacher, does not possess the requisite antiseptic powers, although it makes a clear solution in the serum. Crystals of thymol answer very well, but in my opinion the best agent is camphor. (*End of Dr. Wilson's contribution.*)

The results of the treatment of cases reported by the writer and those of Dr. Wilson in the above article were so flattering that belief was then entertained that we had a safe and efficient remedy for the treatment of variola. In August, 1895, there was an epidemic of smallpox among a lot of negro colonists returning from Mexico at Eagle Pass, Tex. The Marine-Hospital Service was called upon to assume charge of them. This was an opportunity not to be lost to put the serum therapy in operation. As the writer could not go to Eagle Pass and give the treatment, this duty devolved upon his colleague, Passed Assistant Surgeon Rosenau, who was then on duty in the hygienic laboratory. Dr. Rosenau was directed by the Surgeon-General to proceed to Eagle Pass, with instructions to institute the treatment in a sufficient number of cases.

The serum was prepared by the writer and sent with instructions to Passed Assistant Surgeon Rosenau.

The results of the treatment were not encouraging and were just the reverse of what was expected. Dr. Rosenau renders a full and exhaustive report on the cases treated, which leaves no doubt that the conclusions of the first report were erroneous.

There is only one factor in the serum treatment yet to be considered, and that is, what influence the high temperatures have on the serum.

During the month of August, 1895, the temperature was excessive, especially at Eagle Pass, Tex. This may have had an influence on the serum in destroying what little therapeutic value it possessed. I am of the opinion that this fact did influence it in some degree, but this would not be of sufficient importance to urge it against the report of Dr. Rosenau, whose calculations can not be gainsaid.

To summarize our present knowledge of the variola and vaccinia question:

(1) That the cause of the disease has not yet been definitely settled.

(2) That the serum of vaccinated animals possesses a slight immunizing and curative action.

(3) The treatment of variola with the serum of vaccinated animals has so far been a failure.

CONCLUSION.

A brief résumé of the foregoing report may be of interest as illustrating the grave responsibilities and serious duties thrown upon this bureau of the Treasury Department, as well as the wide scope of its operations.

Beginning with the personnel of the medical corps, attention is invited to the care necessary to be exercised in the selection of candidates for admission thereto, the maintenance of discipline, the cultivation of a spirit of industry, and advancement in medical science, and in the training of its members in executive duties involving expenditures to be incurred in accordance with the laws and the strict regulations of the Treasury Department.

Attention is also invited to the large number of patients treated in the hospitals and dispensaries of the service, and the professional aid given to the Life-Saving Service, Steamboat Inspection Service, Revenue-Cutter Service, and the Bureau of Immigration.

This report, like foregoing ones, includes contributed articles by the officers of the service of great aid in the successful administration of the hospitals, and to the cause of medical and surgical science. The necropsy reports, prepared and edited with great care, are of acknowledged statistical value.

It is the constant aim, both of the bureau and of the officers in command of the several stations, to make the hospitals models in the matter of sanitary arrangements, equipment, supplies, and professional care of patients.

In the still broader work of the service, more distinctively in aid of the public health, as heretofore, a history for the year is given of each of the principal epidemic diseases, cholera, plague, yellow fever, and other contagious diseases.

The measures adopted to protect the United States from the invasion or spread of these diseases include details of great interest, not only to the physician, but to those interested in international sanitary relations or in the constitutional relations between the National Government and the States, to legislators, and to all to whom sanitary science and the public welfare appeal.

The measures taken to obtain knowledge of epidemic disease in foreign countries and to prevent its transportation to the United States—involving the sending of inspectors to ports in China, Japan, South and Central America, and the West Indies, and reports from the United States consuls in Europe, and the publication weekly of the information thus gained for the benefit of health officers of the United States—is an important element of the service work.

It has been attempted herein to show the care exercised at the several national quarantine stations and to describe the efforts of the service to maintain friendly relations with State and local quarantines while exercising the surveillance required by law.

While the treatment of disease and the prevention of epidemics has engaged so large a part of the attention of the bureau the scientific investigation of the cause of disease has also received attention, as shown in the report of the hygienic laboratory and by reference to the commission appointed for the scientific investigation of yellow fever. It is expected that this commission, whose term of service is not limited, will give positive and valuable scientific additions to our knowledge of this perpetual western scourge.

Finally, attention is invited to the epidemic of yellow fever in the Southern States during the past year and to the efforts of the service as herein narrated looking to its suppression. This epidemic, though not attended by an excessive rate of mortality, by reason of conditions

heretofore explained had attained a wide range before the preventive measures were taken. It is believed that not within a century has the infection been more widely scattered than it was in the last year. In spite of discouraging circumstances the efforts of the service in restraining its spread were markedly successful.

In closing, I desire to express the appreciation which I myself feel, and which should be felt by all, of the energetic, fearless, self-sacrificing devotion to their duty shown by the officers of the service in the field in suppressing this epidemic, and the same devotion which characterized the officers serving in the bureau at Washington where the labor by night, as well as by day, was severe and unremitting.

I have the honor to remain, respectfully yours,

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

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