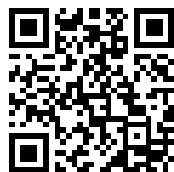

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Don. Leland Stanford

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REPORT



OF THE

CHIEF OF THE BUREAU OF MEDICINE AND SURGERY

TO THE

SECRETARY OF THE NAVY.

P.H. 93

1891.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1891.

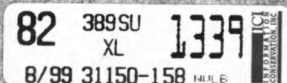
REPORT
OF THE
CHIEF OF THE BUREAU OF MEDICINE AND SURGERY

Compliments of

Surgeon General J. Mills Browne,

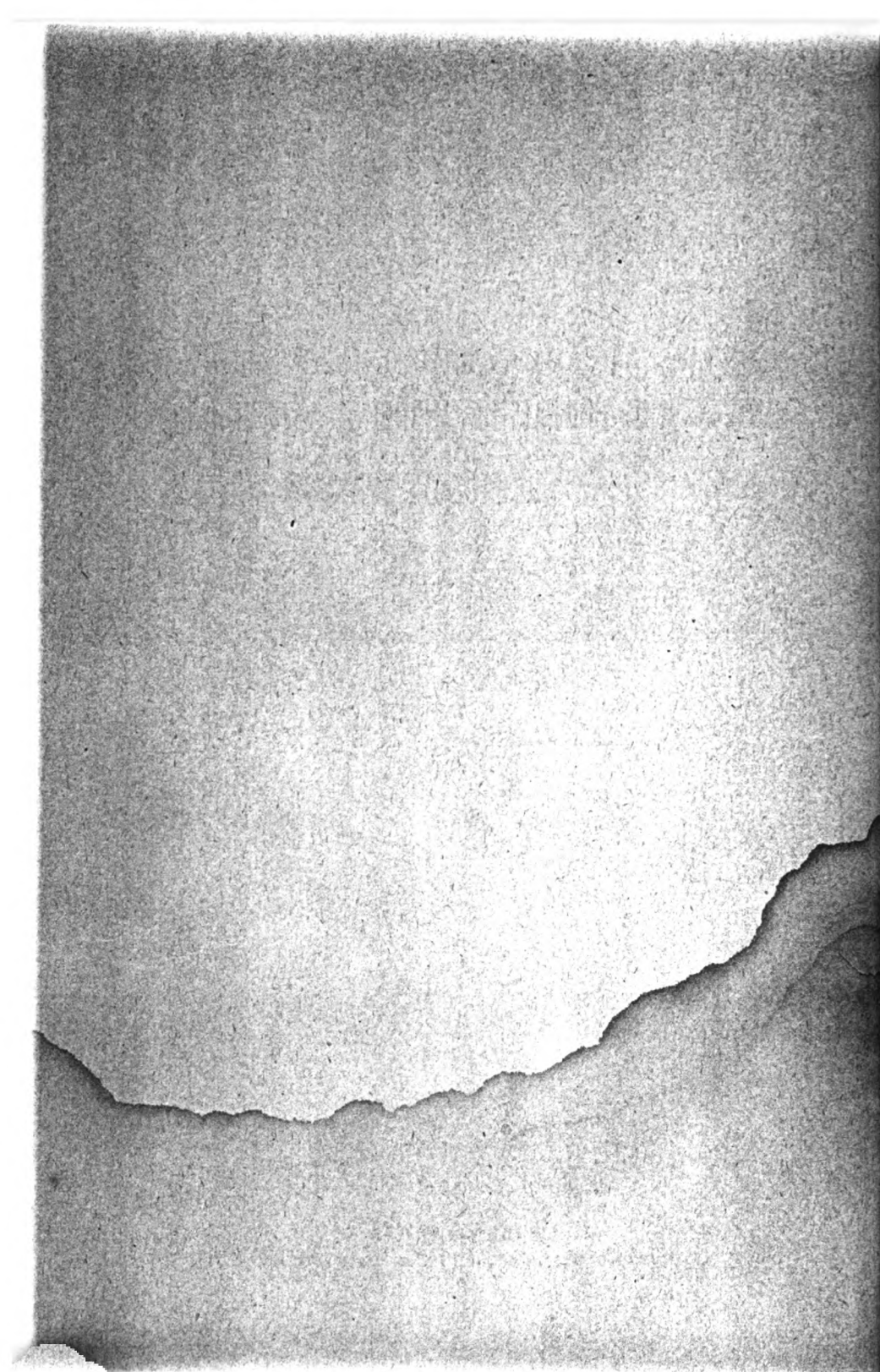
U. S. War

1891.



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1891.

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REPORT

OF THE

CHIEF OF BUREAU OF MEDICINE AND SURGERY.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., October 7, 1891.

SIR: I have the honor to submit the statistical report of the health of the Navy for the year 1890, together with estimates for the fiscal year ending June 30, 1893, the condition of the naval hospital fund, and the naval medical establishments.

NAVAL HOSPITALS, SANATORIUM, SICK QUARTERS, AND NAVY-YARDS.

Widows Island, Penobscot Bay, Maine.—This hospital, intended for the reception of sick from ships infected with yellow fever, has thus far been exempt from such admissions. It is kept in readiness and a contract for supplies, when needed, is made each year. Its condition remains good, and only a few minor repairs have been required, and those due to its exposed situation, namely, shutters for all the basement windows; storm strips applied to other windows; pointing of dead, well, and boat houses; pipe laid to carry off surface water from deck of well house. This work was done by the keeper and one laborer. One man and team was employed for hauling gravel to repair roads and walks, and a cedar planked rowboat was purchased.

Portsmouth, N. H., navy-yard.—No repairs or improvements have been made at the sick quarters, as the naval hospital was under construction. Plans and specifications for the construction of the naval hospital buildings were prepared by Mr. William M. Poindexter, architect, Washington, D. C. After due advertisement the contract was awarded to the lowest bidder, Messrs J. & J. Philbrook of Portland, Me., for the sum of \$38,967. The contract was dated September 5, 1890, and all the work of said contract having been performed under the superintendence of Civil Engineers Prindle and McCollom, it was accepted from September 16, 1891. The Bureau expresses its entire approval of the satisfactory manner in which the contract was executed. The hospital is in charge of the surgeon of the navy-yard, and its equipment will soon be completed. The grounds have been enlarged by the addition of an acre, making a total of about 3½ acres.

Chelsea, Mass.—The good condition of this hospital has continued. Among the various repairs and improvements were those to roof of hospital, replacement of slate; new water supply to barn; new floor in coal

shed; general repairs to doors, windows, and shutters; all water-closet tanks relined with tinned copper; bells, wire, and attachments repaired or replaced; repairs to arches of furnaces and smoke stack. The general sewer system has been overhauled, broken pipes replaced, blind drains fixed and free flowing insured; stable partly rebuilt with many improvements. At the smallpox annex floor timbers and posts of porch have been replaced, tanks relined, and plumbing repaired. A wire ribbon fence has been placed along a portion of the rear of grounds. At the house of the medical director the repairs are limited to defective soil pipes and main water supply.

The Supervising Surgeon-General of the Marine-Hospital Service made a request to the Secretary of the Treasury, and the latter to the Secretary of the Navy, that a portion of the naval reservation connected with the naval hospital at Chelsea be set aside for the purpose of constructing a roadway into the marine-hospital grounds adjoining. The present entrance to the marine-hospital is on High street, and necessitates a long and arduous climb before admission can be obtained to the grounds. The difficulty would be avoided by the construction of a roadway from Broadway through a portion of the naval reservation, which is unused. Upon reference the Bureau stated that the parcel of land desired was not in use nor would be required in the future for naval hospital purposes, and therefore recommended that it be transferred to the Treasury Department for the purpose of constructing the aforesaid roadway and entrance. The transfer has been made.

Boston, Mass., navy-yard.—The recommendation made in former reports to permanently close the offensive privy vault used by the prison guard and workmen, near the prison entrance, has been adopted. In proximity a new privy with approved sanitary arrangements has been substituted and connection made with the sewer. The result is highly satisfactory.

Attention is again called to the condition of the dispensary, its situation, dampness, want of sufficient light, and noise of thoroughfare. It is recommended that a building be erected expressly for its purpose in nearness to the workshops in the center of the yard where most of the accidents happen that require surgical aid, provided with rooms suitably equipped for their reception and properly fitted for the first treatment of the sick and injured from the yard and marines from the barracks.

Brooklyn, N. Y.—The situation and capacity of this hospital require that it be kept prepared for every demand that may be made upon its resources. It has been thoroughly repaired and its improvements are many.

A contract was made, after due advertisement, with Alexander McKnight for the laundry building for the sum of \$2,800, and with the A. M. Dolph Company for its machinery and fittings for the sum of \$2,120. The work has been satisfactorily completed in accordance with the specifications of the Bureau and under the supervision of Civil Engineer Asserson.

Owing to a fire in November at the steam building, by which the roof was destroyed, a uniform corrugated iron roof has been constructed over the old and new buildings. The laundry is equipped with a modern plant of two brass hydraulic washing machines, a centrifugal wringer, six soapstone washtubs, two cedar bluing tubs, a steam drying closet of ten racks, ironing stove, ironing tables, etc. It has a wainscot of glazed tiles and a handsome finish. Part of the space for the new laundry, in

the west end of the steam building, was gained by removing the large revolving fan for ventilating the hospital with the then existing heating apparatus, an entirely new heating apparatus having been introduced last year with increased facilities for obtaining its fresh-air supply from outdoors instead of from the cellar.

The site of the old laundry has been converted into a large messroom for the full-diet mess, a smaller messroom for the special-diet mess, and an additional employé's room for the laundryman. The former special-diet messroom is now used as a kitchen for the officers' mess, and the former full-diet messroom adjoining has been converted into a linen room with direct communication with the new laundry; the former linen room has been fitted and furnished as a reception and dining room for officer patients, for whom no such conveniences have heretofore existed.

An important work has been the opening of the manholes and vents to the entire sewer system, these having been originally covered with flags on the surface level and become overgrown by sod until their locations were hidden. All are now built up above the ground and covered with perforated plates. The highest point of the sewer is now connected by a ventilating duct with the chimney of the steam building, and the several drains from the kitchen, etc., which empty into the sewer, are supplied with running traps opening above the surface and accessible for inspection and cleaning. The large cisterns under the basement, fouled from disuse, have been emptied, cleaned, and closed. A new water meter and water gates have been introduced inside the main entrance to the grounds and covered by a suitable structure, affording easy access.

On account of the accidental destruction by fire of an old wooden waste chute it has been replaced by one of iron for the safe discharge of rubbish from the several floors to the ground outside the building.

Other repairs and improvements have been: Repainting of all rooms on the second floor and some on the first floor; floors of four wards sheathed with narrow strips of pine; repairing and repainting the roof of hospital; a picket and Styron fence separating the vegetable garden from the coal shed and steam building; gas pipes and fixtures introduced in the contagious diseases annex, and the building painted without and within; post-mortem building fitted up and painted.

The professional facilities of the hospital have been increased by a dark room equipped with a Ray storage cabinet for electro-cautery and electro-motor purposes; an atomizing stand and other special apparatus for examinations and operations; an electric room furnished with a Bannay cabinet battery for any form of galvanic or faradic work; bath rooms for all required medicinal baths, alkaline, hot air, steam, mercurial, sulphur, or vapor.

Naval Laboratory.—During the year this establishment, under its accustomed excellent administration, has, in the efficiency of its general purveying and distributing service, met every requirement and maintained its reputation to meet any emergency.

The building used for storing lumber and box factory has been extended and repaired and a new hoisting apparatus put in the laboratory in place of the dangerous old one.

At the laboratory residence, repairs to plumbing, water closets, and water tanks, replacement of fallen ceilings, and same rooms repapered, and carpets renewed in part, comprise the repairs made.

Navy-yard.—Octagonal building, No. 34, is being fitted for the accommodation of the dispensary and analytical laboratory according to the

plans of Civil Engineer Asserson. The upper story will contain the laboratory and three offices for a surgeon and assistant surgeons. The lower floor will contain the dispensary and a reception room for the injured and for operations. The building is well adapted for its purpose, being light, quiet, easy of access, and near the locality where accidents are likely to occur.

Analytical Laboratory.—Medical Inspector Kershner reports that at the analytical laboratory one hundred and thirty-one samples of supplies were examined, of which eighty-eight were accepted and forty-three were rejected.

Philadelphia, Pa., Naval Hospital.—The good condition of the hospital continues. The principal repairs and improvements have been to the steam engine, water cylinder, steam pump, and arch in furnace of boiler; to slate roof of engine and boiler house; one twelve horse-power engine and one auxiliary boiler provided; system in main kitchen range changed; hair mattresses and pillows repaired; wire screens supplied for one hundred and seventy-nine windows and twenty-two doorways; hot house thoroughly repaired, with extension of 10 feet made thereto.

Annapolis, Md., Naval Academy.—The sick quarters are in good condition.

The water closets for cadets are in a building detached from their quarters and are kept in order with difficulty. The recommendation made in former reports is renewed for the erection of a suitable structure containing a system of approved closets, traps, and ventilators, and the old building destroyed.

Washington, D. C.—The condition of the Naval Hospital continues satisfactory. During the year the following improvements and repairs have been made: Outside of building painted; new iron hot-water boiler, with wrought-iron stands for both boilers in kitchen; repairs to gas and water pipes and range; new water closets, urinals, iron tanks, bath tub and basin; discolored and broken plastering repaired, with pine ceiling; chimneys pointed with cement and two partly rebuilt; new shutters and caps to cupola; in attic dilapidated windows opening outwards, thereby causing much annoyance and expense by breakage by the winds and storms, replaced with new ones opening inwards; new flooring to several rooms; cement floor in laundry; two removable iron window-guard frames adjusted to the windows in one ward and a small room on basement floor, for the restraint of violent and insane patients.

Norfolk, Va.—The good condition of the Naval Hospital is maintained. The following repairs and improvements have been made: Abutment to foot bridge completed, covering surface with an artificial stone coping and pavement; curving and extending brick walk; repairing roof, cornices, gutters, and down spouts; repairing floors in certain wards and putting double floors in certain rooms; painting all doors, window frames, and blinds; ceiling and walls in main halls kalsomined; repairs to boiler, force pumps, and laundry engine; window awnings; repairs to wharf, driving piles, straightening up the decking, sheathing with plank, secured plank placed diagonally; taking down, resetting, and painting picket fence around hospital.

At the residence of the director: A new outbuilding for wood and coal; a Styron combination fence, with necessary posts and gates; painting fences and iron fencing on balconies; awnings for windows, door, and veranda.

Pensacola, Fla.—The wooden pavilion buildings erected on the grounds of the old Naval Hospital, near Fort Barrancas, continue to

answer all requirements. The renovation made has been the removal of old gutters and the substitution of new ones, two coats of paint to the buildings, and repairs to the plastering where necessary.

A large, round, brick cistern has been built and fitted with necessary attachments, including force pump, hose, etc., for extinguishing fires. The attendants have improved the appearance of the grounds and kept the place in order.

Mare Island, Cal., Naval Hospital.—The hospital buildings and grounds are generally in good condition. The distribution of water for fire purposes and in the grounds has been materially changed and improved. Old and worn-out pipe was cut out and removed, and about 2,000 feet of new pipe laid, and fire and steam hose purchased. A No. 3 Davidson pump has replaced a worn-out pump in the west end of the building, and 150 feet of galvanized iron pipe laid between the cistern and this pump to replace worn-out suction pipe; foundation of main steam boiler repaired and wooden floor of laundry torn out and replaced by concrete and cement; a new kitchen range, with overhanging hood, has been substituted for the old range; general repairs and improvements to buildings. The cemetery has been put in good order and thirty head and foot boards made, lettered, and put in place.

An electric-light plant has been installed at the navy-yard, and an extension of this system to the hospital will require no additional boiler and dynamo power; only independent wires, transferrers, switch boards, etc., will be needed. As it is not expected that gas will be used except at the Marine Barracks and hospital, it is apprehended the service may not be satisfactory; hence the desirability of lighting with electricity, which the Bureau hopes to accomplish.

At the last session of Congress the sum of \$15,500 was appropriated "for construction of a residence for the medical director in charge of naval hospital, Mare Island, California, in full of all expenses of erecting and making necessary improvements about the grounds." A suitable site has been selected near the entrance to the grounds, and plans and specifications comprising the views of the Bureau have been prepared by Civil Engineer Endicott, in the Bureau of Yards and Docks, and advertisement made for the construction of the building.

Yokohama, Japan.—The Naval Hospital has greatly improved in condition. The most important repairs and improvements are: Floors throughout main building covered with Oregon pine and shellacked; all ward bedsteads and tables repaired and painted; apothecary's quarters enlarged, and office, dispensary, and several rooms for the sick and employes repapered; all roofs and chimneys coal-tarred and repointed; front and side verandas of main building made new and, with other verandas, repainted; kitchen enlarged and refitted in part; additional bath room at surgeon's quarters. A disinfecting house was built, with a spacious oven, in which a temperature of 230° can be maintained, and a large pot for boiling introduced; a general library for the use of officers and patients; additional ornamentation made to the grounds.

The Brush system of electric lighting is now used in the hospital buildings, dating from April 17, 1891. Every necessary safeguard and convenience in the way of fuses, cut-outs, switches, etc., have been introduced. The inspector for the Yokohama fire offices reports as follows: "There are ninety-seven incandescent lamps installed, and Grimshaw white core wire is used throughout. The tests made speak well for the installation of the wire, and for the manner in which the

wire has been laid." The installation was effected by the Union Light Company of Yokohama.

MUSEUM OF HYGIENE.

Medical Director Wales in his annual report states that "the Museum is becoming better known, and the practical character of the work done is challenging attention throughout the country."

The purification of water by rapid filtration is the most important subject that has been investigated, and will be made a matter of a special and exhaustive report.

In the chemical department analyses of various animal substances, normal as well as the result of pathological processes, have been made; also, of foods and drinks, medicines, ores, minerals, metals, woods, cements, and deposit in drainpipes.

Voluntary contributions of 1,796 books and pamphlets have been made to the library during the year.

Work has been done in the bacteriological and microscopical departments, and their condition is satisfactory. New exhibits to the number of 126 have been added to the exhibit department.

Recommendations are made for acquiring a portion of the grounds soon to be vacated by the Naval Observatory for the permanent establishment of the Museum, in view of the fact that at no very distant day the question of new and permanent quarters will demand consideration.

As difficulty has been encountered in securing the services of a competent chemist in consequence of the present inadequate compensation, it is recommended that said pay be increased to \$1,500, or more. It is also recommended "that a permanent appropriation of \$5,000 per annum be asked for the museum for the purchase of exhibits, books, apparatus, etc., and the support of a course of popular lectures from competent men on the various subjects pertaining to sanitary science, which is the custom of similar institutions abroad."

The recommendations are approved by the Bureau.

VACANCIES IN THE MEDICAL CORPS.

There are at present four vacancies in the medical corps. In August the vacancies were reduced to two, the lowest number attained during the past twenty-six years.

The Medical Board is now in session at the Naval Hospital, Brooklyn, N. Y., and it is confidently expected that the existing vacancies will be filled during the present session of the Board.

DELEGATES.

In December, 1890, Medical Director Bloodgood and Passed Assistant Surgeon Ames were appointed delegates to represent the medical department of the Navy at a meeting of the American Public Health Association, held at Charleston, S. C.

In December, 1890, by request of the State Department, Surgeon Bertollette was appointed the special commissioner, on behalf of the World's Columbian Exposition, to the Argentine Republic.

In May, 1891, Medical Director Beardsley and Surgeon Flint were appointed delegates to represent the medical department of the Navy at a meeting of the American Medical Association, held at Washington, D. C.

In March, 1891, Passed Assistant Surgeons Rush and Ogden were detailed for duty in connection with the Intercontinental Railway Commission.

In June 1891, Medical Director Wales was appointed a delegate to represent the medical department of the Navy at the Seventh International Congress of Hygiene and Demography, held in London, England, in August 1891.

Special directions were given by the Bureau for Medical Director Wales, during his absence, to visit the museums of hygiene and bacteriological laboratories at London, Paris, and Berlin, and investigate the water supply of these cities; also, to avail himself of every opportunity for obtaining information concerning the latest improvements in the methods of bacteriological research and in water analyses, and to direct his attention to matters pertaining to hygiene that might be of value in the naval service, or would tend to the improvement of the Museum of Hygiene of which he was in charge.

YELLOW FEVER.

One case of yellow fever occurred on board the U. S. S. *Chicago*. Fleet Surgeon Walton reported—

That while the *Chicago* was in the harbor of Rio de Janeiro Lieut. Schuetze went ashore in the afternoon of June 24, and again the following afternoon. He rode in the street cars each day past an open drain, where workmen were overturning offensive soil, which was afterwards disinfected by the city authorities. Two to four deaths from yellow fever occurred daily during that week at Rio, and it is probable that Lieut. Schuetze contracted the disease while on shore at that port. He was placed on the list June 27, and was returned to duty entirely well July 20. The nature of the disease was not positively recognized until the appearance of albuminuria. The treatment pursued was sponging the body hourly with cold water and rum, and frequent doses of quinia and antipyrine were administered. After Lieut. Schuetze's recovery hygienic precautions were adopted as far as practicable; the compartment in which he had been located was thoroughly fumigated, his room painted, and his bedding and other effects destroyed. No other cases of the disease occurred on board during the year.

CHOLERA.

One case of cholera occurred during the year on board the U. S. S. *Omaha*. Medical Inspector Brush writes that the first case of cholera was reported at Yokohama, Japan, on the 14th day of July, from which time the disease increased from day to day in the city and vicinity until about the 1st of September, when it began to abate, although the disease continued active at many other points in the empire. The fact that the disease made less progress at Yokohama than in other cities of Japan is to be attributed to the superior quality of its water supply.

The origin of the single case that occurred on the *Omaha*, and which resulted fatally, was possibly due to some indiscretion of the man while engaged in necessary boat duty, although boats were supplied with water from the ship and their crews ordered to use no other.

SMALLPOX.

One case of smallpox occurred during the year on the U. S. S. *Monocacy*, while at Kiu-Kiang, China, January 20, 1890. Passed Assistant Surgeon Norfleet, of the *Monocacy*, reports that the origin of the disease

was probably due to exposure to morbid causes existing at the time at Kiu-Kiang. The patient was last vaccinated in 1878. The following day after the patient was taken sick, and there could be no mistake in properly diagnosing the disease, he was transferred ashore to a small hospital in charge of some Catholic sisters of charity, where he remained until he returned well, February 16th. After the patient was taken ashore his room was emptied of all its effects, bureau removed and scrubbed inside and out, and also the drawers under the berth. Every part of the room was thoroughly scrubbed with hot water and soap, and afterwards mopped over with a solution of bichloride of mercury one to five hundred parts, and the door and port left open for thorough ventilation. The sanitary precautions prevented any further spread of the disease, and no other cases occurred on board during the year.

MEASLES.

There were reported during the year twenty cases of measles, fifteen in the hospitals and on shore stations and five cases on the vessels afloat, all of which were treated successfully and the patients returned to duty.

INFLUENZA (LA GRIPPE).

This disease presents some very interesting facts in connection with the sick of the Navy for the year 1890. One thousand four hundred and twenty-two cases were reported, one-tenth of the whole number admitted to the sick list during the year, representing a loss to the service of 7,719 days, or an average of 5+ days for each case. The disease was not confined to any locality or to the force afloat, but prevailed alike on our vessels in foreign waters and at home, in the hospitals and at shore stations. It is more remarkable to note that only one death occurred out of 1,422 cases reported.

DENGUE.

Seventy-one cases of dengue were admitted to the sick list of the U. S. S. *Kearsarge*, during the month of December, while at Key West, Fla. The crew had been granted general liberty for forty-eight hours, and the origin of the disease was due, probably, to infection on shore, where there were a great number of cases at the time. The vessel came as far north as Norfolk, Va., arriving there December 31. The disease was soon controlled and treated successfully and no deaths occurred.

BERIBERI.

In the month of November the Brazilian cruiser *Guanabara* came into the port of New York and sent 5 cases of beriberi to the Naval Hospital in Brooklyn, where they were still under treatment at the close of the year.

PENSION CASES.

Number of pension cases remaining on hand, June 30, 1890.....	207
Number received during fiscal year ending June 30, 1891.....	1,830
Number answered during fiscal year ending June 30, 1891.....	2,033
Number remaining on hand June 30, 1891.....	4

ENLISTMENTS.

The number of persons examined for the Navy, including apprentice boys, during the year 1890, was 9,834; of this number 3,620 were rejected for physical disqualifications. The number rejected for color blindness was 110, or a ratio of 11.18 in a thousand.

SICK OF THE NAVY.

The number of patients admitted to the sick list and under treatment during the year 1890 was 12,849; of this number 8,607 were on vessels afloat and receiving ships; 1,496 in hospitals, and 2,746 at navy-yards and shore stations.

The daily average number of sick on vessels afloat and receiving ships was 161.86. The average number of days each case was under treatment represented a total loss to the Government of 59,080 days, or 6.86 days for each man.

The number invalided to hospitals was 771, or 88.50 in a thousand.

MORTUARY RECORD.

The number of deaths in the entire Navy, during the year 1890, was 106, distributed as follows: In the hospitals, 49; at the navy-yards and shore stations, 19; and on vessels afloat and receiving ships, 38. The death rate for the entire available force of the service, including officers and men and Marine Corps, was 9+ in 1,000.

The death rate for the year 1888 was 12+, and for the year 1889, 18+ in 1,000. The excessive death rate for the year 1889 was occasioned by the disaster at Samoa.

The death rate of the vessels afloat and receiving ships for the year 1890 is lower than it has been for many years.

The service was remarkably exempt from contagious and infectious diseases. One case of yellow fever occurred on board the *Chicago* while at Rio de Janeiro, Brazil; 1 case of cholera on the *Omaha* while at Yokohama, Japan, and 1 case of small pox on the *Monocacy* while at Kiukiang, China.

INSANE OF THE NAVY.

There were eighty-six patients belonging to the Navy treated in the Government Hospital for the Insane, in the District of Columbia, for the year ended September 30, 1891:

Remaining in hospital September 30, 1890.....	64
Admitted during the year ending September 30, 1891.....	22
Total under treatment.....	86
Discharged during the year:	
Recovered.....	4
Improved.....	2
Died.....	4
	10
Remaining in hospital September 30, 1891:	
Officers.....	8
Enlisted men.....	68
Total.....	76

BUREAU OF MEDICINE AND SURGERY.

NAVAL HOSPITAL FUND.

The condition of this fund is as follows, viz:

Balance on hand, October 1, 1890.....	\$214, 941. 96
Transferred to the credit since October 1, 1890	99, 378. 88
Credit by appropriation, act March 2, 1891	20, 000. 00
	<hr/>
Expended since October 1, 1890.....	334, 320. 84
	90, 555. 63
	<hr/>
Balance on hand October 1, 1891	243, 765. 21

I submit tabular statements of sick, etc., compiled from reports of sick from the different naval stations within the United States, and from vessels on home and foreign stations, for the year 1890.

Very respectfully, your obedient servant,

JNO. MILLS BROWNE,
Surgeon-General, U. S. Navy.

HON. B. F. TRACY,
Secretary of the Navy.

*Estimates of appropriations required for the service of the fiscal year ending June 30, 1898
by the Bureau of Medicine and Surgery, Navy Department.*

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1892.
SALARIES.			
Chief clerk (appropriated act of March 3, 1891)	\$1,800.00		
One clerk of class 3 (same act)	1,600.00		
Two clerks of class 2 (same act)	2,800.00		
Two clerks of class 1 (same act)	2,400.00		
One clerk (same act)	1,000.00		
One assistant messenger (same act)	720.00		
One laborer (same act)	660.00		
One janitor for naval dispensary (same act)	600.00		
One laborer for naval dispensary (same act)	480.00	\$12,060.00	\$12,060.00
BINDING.			
Rebinding of medical journals of hospitals, ships, and stations, on file in the pension department of the Bureau of Medicine and Surgery (submitted)		1,500.00	
The above-mentioned appropriation is earnestly recommended for the necessary preservation of important records. Many of the journals can with difficulty be held together, the binding having been worn out by constant use for reference to journals in obtaining evidence in pension cases.			
MEDICAL DEPARTMENT.			
For surgeons' necessities for vessels in commission, navy-yards, naval stations, Marine Corps, and Coast Survey, and for the civil establishment at the several naval hospitals, navy-yards, naval laboratory, museum of hygiene, and Naval Academy (appropriated, act of March 2, 1891)		60,000.00	60,000.00
NAVAL HOSPITAL FUND.			
For maintenance of the naval hospital at the various navy-yards and stations, and for care and maintenance of patients in other hospitals at home and abroad (same act)		20,000.00	20,000.00
CONTINGENT.			
For freight, expressage on medical stores, tolls, ferriages, transportation of sick and insane patients; care, transportation, and burial of the dead; advertising; telegraphing; rent of telephones; purchase of books and stationery; binding of unbound books and pamphlets; postage and purchase of stamps for foreign service; expenses attending the medical board of examiners; rent of rooms for naval dispensary and museum of hygiene; hygienic and sanitary investigation and illustration; sanitary and hygienic instruction; purchase and repairs of wagons and harness; purchase of and feed for horses and cows; trees, plants, garden tools and seeds; furniture and incidental articles for the museum of hygiene, naval dispensary, Washington naval laboratory, sick quarters at Naval Academy and Marine Barracks, surgeons' offices and dispensaries at navy-yards and naval stations; washing for medical department at museum of hygiene, naval dispensary Washington, naval laboratory, sick quarters at Naval Academy and Marine Barracks, dispensary at navy-yards, and naval stations, and ships, and rendezvous, and all other necessary contingent expenses (same act)		25,000.00	25,000.00
REPAIRS.			
For necessary repairs of naval laboratory, naval hospitals, and appendages, including roads, wharves, outhouses, sidewalks, fences, gardens, farms, and cemeteries (same act)		20,000.00	20,000.00

Force afloat.—General aggregate, 1890.

Classification of diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Remaining at the end of the year.	Total number of sick days.
				To hospital.	From service.			
Morbid states and processes irrespective of parts affected	5	58	44	17	.....	.....	2	503
General diseases, dependent upon morbid poisons:								
Class 1.....	85	1,268	1,262	57	1	3	30	5,865
Class 2.....	.....	502	471	25	.....	2	4	2,589
Class 3.....	1	22	11	10	.....	.....	2	354
Class 4.....	10	407	311	96	5	.....	5	4,952
Dependent upon causes other than morbid poisons:								
Class 1.....	.....	42	41	1	.....	.....	.....	137
Class 2.....	2	181	173	8	.....	2	.....	554
Developmental diseases	.....	3	.....	1	.....	.....	2	24
Unclassified diseases	7	527	454	71	2	.....	7	3,942
Local diseases:								
Diseases of the nervous system	2	354	308	37	8	1	2	1,539
Diseases of the eye	1	101	86	15	.....	.....	1	878
Diseases of the ear	2	47	41	6	2	.....	.....	266
Diseases of the nose	.....	7	5	2	.....	.....	.....	31
Diseases of the circulatory system	.....	41	25	14	.....	1	1	303
Diseases of the respiratory system	12	860	699	136	2	7	28	6,095
Diseases of the digestive system	7	1,256	1,198	50	2	3	10	5,351
Diseases of the lymphatic system	6	171	122	50	.....	.....	5	2,816
Diseases of the urinary system	3	47	29	19	2	.....	.....	589
Diseases of the generative system	11	329	292	41	.....	.....	7	4,070
Diseases of the locomotor system	2	37	36	2	.....	.....	1	314
Diseases of the integumentary system	10	684	655	32	.....	.....	7	5,855
Parasitic diseases	1	8	9	.....	.....	.....	.....	25
Poisons	.....	13	13	.....	.....	.....	.....	60
Tumors and cysts, malignant or nonmalignant.	.....	12	9	3	.....	.....	.....	70
Surgical operations	.....	1	1	.....	.....	.....	.....	8
Injuries, etc	21	1,440	1,331	78	5	19	28	11,889
Feigned diseases	.....	1	1	.....	.....	.....	.....	1
Total	188	8,419	7,627	771	29	38	142	59,080

Force afloat.—Detailed statement 1890.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
MORBID STATES AND PROCESSES IRREPECTIVE OF PARTS AFFECTED.								
Adynamia.....	4	54	41	15			2	460
Atropia.....		1		1				1
Hæmorrhagia.....		1	1					5
Edema.....		1	1					21
Tuberculosis.....	1	1	1	1				16
GENERAL DISEASES DEPENDENT UPON MOR-BID POISONS.								
Class 1.								
Catarrhus epidemicus.....	79	856	884	28		1	22	3,400
Cholera epidemica.....		1				1		1
Dengue.....		71	69	2				443
Diarrhœa epidemica.....		1	1					5
Dysenteria acuta.....		13	9	3	1			97
Dysenteria chronica.....		3	2	1				27
Febricula.....		6	6					15
Febris cerebro spinalis.....		1	1					2
Febris continua simplex.....	5	226	224	5			2	1,107

Force afloat.—Detailed statement, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
GENERAL DISEASES DEPENDENT UPON MORBID POISONS—continued.								
Class 1—Continued.								
Febris enterica		15		9		1	5	177
Febris ephemeralis		1	1					2
Febris flava		1	1					22
Febris typho-malarialis		5		5				63
Morbilli		5	2	3				16
Parotitis		2	2	3				24
Vaccina	1	57	57				1	418
Variola		1	1					35
Varicella		3	2	1				11
Class 2.								
Cachexia malarialis		26	18	8				194
Febris intermittens		245	240	1			4	899
Febris remittens		230	213	15		2		1,488
Malaria toxæmia		1		1				
Class 3.								
Cellulitis		1	1					4
Erysipelas	1	15	8	7			1	140
Phagedæna		2	2					56
Septicæmia		4		3			1	154
Class 4.								
Gonorrhœa	7	166	157	14			2	2,112
Syphilis primitiva	2	70	49	22			1	927
Syphilis consecutiva	1	171	105	60	5		2	1,013
GENERAL DISEASES DEPENDENT UPON CAUSES * OTHER THAN MORBID POISONS.								
Class 1.								
Asphyxia		2	2					17
Caloris effectus		30	30					79
Frigoris effectus		10	9	1				41
Class 2.								
Alcoholismus	2	181	173	8		2		554
DEVELOPMENTAL DISEASES.								
Senectus		3		1			2	24
UNCLASSIFIED DISEASES.								
Anæmia		2	2					13
Asthénia		1	1					8
Diabetes		5	4	1				40
Lumbago		15	14	1				78
Podagra		15	13	1			1	114
Rheumatismus	4	387	329	55	2		5	2,843
Rheumatismus acutus	3	100	89	13			1	835
Torticollis		2	2					11
LOCAL DISEASES.								
Diseases of the nervous system.								
Apoplexia		2				1	1	17
Cephalalgia		72	69	3				205
Chorea		1	1					5
Convulsio		5	3	1	1			19
Dementia		8	2	5	1			60
Debilitas		1	1					2
Epilepsia		13	8	3	2			71
Hysteria		1		1				14

Force afloat.—Detailed statement, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
LOCAL DISEASES—continued.								
<i>Diseases of the nervous system—Continued.</i>								
Insolatio.....		5	5					44
Insomnia.....		9	8	1				21
Mania.....		5	1	3	1			32
Melancholia.....		10	1	7	2			51
Meningitis.....		1		1				2
Monomania.....		1	1					2
Nausea.....		1	1					1
Nausea marina.....		69	67	2				163
Neuralgia.....		120	116	3			1	582
Neurasthenia.....	1	1	1	1				11
Paralysis.....	1	9	4	5	1			158
Sciatica.....		2	2					22
Vertigo.....		18	17	1				57
<i>Diseases of the eye.</i>								
Asthenopia.....		2	1	1				2
Cataracta.....		1		1				1
Conjunctivitis.....		68	58	10				441
Dacrocystitis.....		1	1					4
Hordeolum.....		4	4					16
Iritis.....		7	6	1				80
Keratitis.....		6	5	1				230
Myopia.....		3	3					12
Ophthalmia.....	1	1	2					22
Pterygium.....		1	1					1
Trachoma.....		1	1					11
Ulcus corneæ.....		6	4	1			1	58
<i>Diseases of the ear.</i>								
Otalgia.....		11	11					50
Otitis.....		22	20	2				131
Otorrhœa.....	2	10	7	3	2			70
Surditas.....		4	3	1				15
<i>Diseases of the nose.</i>								
Coryza.....		1	1					4
Catarrhus nasalis.....		3	3					8
Epistaxis.....		2	1	1				10
Ozena.....		1		1				9
<i>Diseases of the circulatory system.</i>								
Aneurysma.....		2	1			1		2
Dilatatio cordis.....		2	2					61
Iritatio cordis.....		1		1				11
Hypertrophia cordis.....		1		1				1
Morbi valvularum cordis.....		10	3	7				40
Palpitatio.....		20	14	5			1	139
Phlebitis.....		1	1					37
Varix.....		4	4					12
<i>Diseases of the respiratory system.</i>								
Aphonia.....		1	1					4
Asthma.....		9	5	3		1		37
Bronchitis acuta.....	3	313	270	33			13	2,497
Bronchitis chronica.....		39	18	20			1	387
Catarrhus.....	1	302	284	8			11	1,011
Congestio pulmonalis.....		1	1					3
Hæmoptysis.....		12	7	5				67
Laryngitis.....		50	48	1			1	351
Phthisis pneumonica acuta.....		6	1	5				77
Phthisis pneumonica chronica.....	1	28	5	23	1			534
Pleuritis.....	3	40	32	10	1			361
Pneumonia.....	4	59	27	28		6	2	766

Force afloat.—Detailed statement 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
LOCAL DISEASES—continued.								
<i>Diseases of the digestive system.</i>								
Caries dentium		2	2					3
Odontalgia		10	10					30
Parulis		1	1					7
Ascites		1		1				79
Cholera morbus		65	63			2		160
Chololithiasis		1	1					17
Colica		107	103	3			1	313
Colica hepatica		1	1					4
Constipatio		46	46					116
Congestio hepatis		16	13	3				119
Duodenitis		1	1					2
Dyspepsia		33	30	2	1			235
Diarrhoea acuta	1	347	342	4			2	1,094
Diarrhoea chronica		6	5	1				21
Enteritis		7	6			1		36
Fistula in ano		13	7	6				205
Gastritis		18	15	3				44
Gastrodynia		4	3	1				27
Glossites phlegmonosa		1	1					6
Hæmatemesis		4	4					27
Hæmorrhoids		52	44	8				317
Hepatitis acuta		5	3	1	1			71
Hepatitis chronica	1	1	2					26
Icterus		17	13	4				167
Obstructio intestinalis		1	1					7
Oesophagitis		1	1					6
Peritonitis		1	1					19
Pharyngitis		71	69	2				223
Prolapsus ani		1		1				2
Stomatitis		4	3	1				23
Tonsillitis	4	412	403	6			7	1,791
Typhlitis	1	6	4	3				154
<i>Diseases of the lymphatic system.</i>								
Adenitis	6	169	120	50			5	2,802
Lymphangitis		2	2					14
<i>Diseases of the urinary system.</i>								
Albuminuria	1	6	2	4	1			113
Asthenia		1	1					1
Bright's disease		1	1					1
Colica renalis		1	1					5
Calculus	2	1	2	1				46
Cystitis		25	15	9	1			285
Dysuria		1	1					8
Enuresis		3	2	1				5
Hæmaturia		5	2	3				99
Ischuria		1	1					3
Nephritis		2	1	1				23
<i>Diseases of the generative system.</i>								
Abscessus perinei		1		1				16
Balanitis		8	7	1				39
Chancroides	6	110	103	13				1,915
Epididymitis		8	7				1	93
Fistula in perineo		2	2					51
Hydrocele		2	2					78
Mastitis		1	1					4
Orchitis	5	136	125	10			6	1,459
Paraphymosis		3	3					13
Phymosis		10	10					87
Prostatitis		1	1					35
Urethre strictura		39	24	15				232
Urethritis		3	3					26
Varicocele		5	4	1				22

Force afloat.—Detailed statement 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
LOCAL DISEASES—continued.								
Diseases of the locomotor system.								
Ankylosis		2	1				1	22
Arthritis		2	2					13
Bursitis		3	3					15
Caries		1	1					14
Ostitis		1	1					1
Periostitis		2	2					15
Synovitis	2	25	25	2				231
Talipes		1	1					3
Diseases of the integumentary system								
Abcessus	2	232	224	7			3	1,554
Anthrax		12	10	2				203
Bromidrosis		2	2					57
Cellulitis		2	2					9
Clavus		1	1					5
Condylomata		1		1				1
Dermatitis venenata		1	1					4
Ecthyma		2	1	1				5
Eczema		29	25	3			1	360
Erythema		4	4					28
Furunculus	2	218	217	2			1	1,220
Herpes		7	7					57
Lichen		2	2					27
Myoma		1		1				6
Onychia		10	10					61
Paronychia	3	25	27				1	287
Pemphigus		2	2					8
Pernio	1	1	2					8
Phthiriasis pubi		1	1					2
Prurigo		3	3					31
Purpura hemorrhagica		1		1				1
Scabies		5	4	1				62
Sycosis		2	1	1				4
Taenia solium		3	2	1				11
Ulcus	2	105	95	11			1	1,764
Unguis, involutus		5	5					38
Urticaria		4	4					16
Verruca		3	3					26
PARASITIC DISEASES.								
Vermees	1	8	9					25
POISONS.								
Ebrietas		1	1					1
Vulnus venenatum		11	11					58
Venenum		1	1					1
TUMORS AND CYSTS.								
Malignant or Nonmalignant.								
Adenoma		1	1					2
Cystis		6	5	1				17
Epithelioma		1	1					9
Fibroma		2	1	1				31
Lipoma		1	1					5
Osteoma		1		1				6
SURGICAL OPERATIONS.								
Circumcisio		1	1					8
INJURIES, ETC.								
Abrasio	3	80	80	1			2	444
Ambustio	1	79	74	4			2	791
Concusio		31	28	2			1	278
Contusio	2	322	311	8	1		4	1,931
Explosio		2	1			1		7
Fractura	4	88	52	2	2	3	2	2,064
Hernia	1	37	21	33	2		2	261

Force afloat.—Detailed statement, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	to Discharged duly.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
INJURIES, ETC.—continued.								
Homicide.....		1		13		1		1
Internal injuries.....		1				1		1
Luxatio.....		13	11					156
Rupture.....		2	1	1				9
Stremma.....	3	337	329	6			5	2,123
Submersio.....		10	2			8		13
Vulnus contusum.....	1	120	115	2			4	872
Vulnus incisum.....	2	129	124	3			4	1,078
Vulnus laceratum.....	4	127	128	2			1	1,312
Vulnus punctum.....		49	48			1		263
Vulnus sclopetarium.....		11	5	1		4	1	283
Vulnus venenatum.....		1	1					2
FEIGNED DISEASES.								
Neuralgia.....		1	1					1
Total	188	8,419	7,627	771	29	38	142	59,080

Navy-Yards and Stations.—General aggregate, 1890.

Classification of diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Remaining at the end of the year.	Total number of sick days.
				To hospital.	From service.			
Morbid states and processes irrespective of parts affected.....	2	72	68	5	0	1	0	626
General diseases—dependent upon morbid poisons:								
Class 1.....	32	493	491	32	0	1	1	3,066
Class 2.....	7	118	112	11	0	0	2	773
Class 3.....	1	4	1	4				18
Class 4.....	3	77	31	47	1		1	495
Dependent upon causes other than morbid poisons:								
Class 1.....		1	1					3
Class 2.....	1	45	41	4		1		128
Developmental diseases.....		1		1				1
Unclassified diseases.....	4	139	117	21	1		4	1,288
Local diseases:								
Diseases of the nervous system.....	4	172	144	21	3	2	6	1,024
Diseases of the eye.....	1	43	40	3			1	325
Diseases of the ear.....	1	26	24	2			1	238
Diseases of the nose.....		3	3					8
Diseases of the circulatory system.....		24	12	4	1	4	3	170
Diseases of the respiratory system.....	18	381	359	23		6	11	3,050
Diseases of the digestive system.....	5	558	529	24			10	2,445
Diseases of the lymphatic system.....	1	17	10	8				213
Diseases of the urinary system.....	3	23	17	6		2	1	579
Diseases of the generative system.....	1	37	20	17			1	383
Diseases of the locomotor system.....		8	5	2	1			55
Diseases of the integumentary system.....	2	116	111	4		1		886
Poisons.....		1	1					10
Tumors and cysts—malignant or nonmalignant.....		2	1	1				25
Surgical operations.....		2	2					32
Injuries, etc.....	11	286	262	28	8	1	8	2,262
Total	97	2,649	2,402	268	10	19	47	18,083

BUREAU OF MEDICINE AND SURGERY.

Navy-yards and stations.—Detailed statement, 1890.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
MORBID STATES AND PROCESSES IRRESPECTIVE OF PARTS AFFECTED.								
Adynamia	2	71	68	4		1		625
Hydriops		1		1				1
GENERAL DISEASES, DEPENDENT UPON MORBID POISONS.								
Class 1.								
Catarrhus epidemicus	27	404	414	17				2,488
Dysentery acuta	1	7	7	1				21
Febris continua simplex	4	50	46	7		1		230
Febris enterica		5	2	3				110
Morbilli		7	3	4				92
Parotitis	1	1	1					10
Vaccina		19	18				1	115
Class 2.								
Cachexia malarialis	2	6	8					30
Febris intermittens	5	101	96	9			1	556
Febris remittens		8	5	2			1	179
Febricula		3	3					8
Class 3.								
Erysipelas	1	4	1	4				18
Class 4.								
Gonorrhœa	3	62	27	38				405
Syphilis primitiva		8	2	5	1			66
Syphilis consecutiva		7	2	4			1	24
GENERAL DISEASES DEPENDENT UPON CAUSES OTHER THAN MORBID POISONS.								
Class 1.								
Caloris effectus		1	1					3
Class 2.								
Alcoholismus	1	44	40	4		1		123
Narcotism		1	1					5
DEVELOPMENTAL DISEASES.								
Senectus		1		1				1
UNCLASSIFIED DISEASES.								
Anæmia		1	1					8
Diabetes		2	2					30
Lumbago		2	2					10
Podagra	1	3	4					43
Rheumatismus	2	110	93	15	1		3	917
Rheumatismus acutus	1	21	15	6			1	280
LOCAL DISEASES.								
Diseases of the nervous system.								
Apoplexia		2	1			1		45
Cephalalgia	2	65	63	1			3	181
Convulsio		3	1	2				4
Congestio spinalis		1	1					58
Dementia		6		5	1			42
Epilepsia		7	2	3	2			43
Insomnia		1	1					15
Locomotor ataxia		2	1	1				34
Mania		1		1				1
Melancholia		2	1				1	2

Navy-yards and stations.—Detailed statement, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
LOCAL DISEASES—continued.								
<i>Diseases of the nervous system—Continued.</i>								
Neuralgia.....	1	51	50				2	241
Neurasthenia.....		6	6					84
Paralysis.....	1	8	2	6		1		187
Sciatica.....		1	1					12
Vertigo.....		16	14	2				75
<i>Diseases of the eye.</i>								
Astigmatism.....		1	1					1
Amaurosis.....		1		1				1
Asthenopia.....		4	4					54
Atrophy of optic nerve.....		1					1	80
Blepharitis.....		4	4					17
Cataracta.....		1	1					1
Conjunctivitis.....		23	21	2				124
Diplopia.....	1		1					9
Hordeolum.....		4	4					12
Iritis.....		1	1					9
Keratitis.....		2	2					15
Ophthalmia.....		1	1					2
<i>Diseases of the ear.</i>								
Otalgia.....		7	7					19
Otitis.....	1	12	12	1				155
Otorrhœa.....		5	5					45
Surditas.....		2		1			1	19
<i>Diseases of the nose.</i>								
Catarrhus nasalis.....		3	3					8
<i>Diseases of the circulatory system.*</i>								
Dilatatio cordis.....		1				1		1
Hypertrophia cordis.....		1			1			21
Morbi valvularum cordis.....		8	4	2		2		66
Myocarditis ch.....		1				1		1
Palpitatio.....		12	7	2			3	79
Varix.....		1	1					2
<i>Diseases of the respiratory system.</i>								
Asthma.....		5	5					22
Bronchitis acuta.....	7	71	65	7		1	5	661
Bronchitis chronica.....		17	13	4				167
Catarrhus.....	6	250	251	2			3	1,225
Emphysema.....		1	1					10
Hæmoptysis.....	1	5	4	2				35
Laryngitis.....		6	4	1			1	58
Phthisis pneumonica acuta.....		1	1					21
Phthisis pneumonica chronica.....	2	11	4	3		4	2	689
Pleuritis.....	1	5	4	2				25
Pleurodynia.....		2	2					8
Pneumonia.....	1	7	5	2		1		129
<i>Diseases of the digestive system.</i>								
Odontalgia.....		6	6					16
Cholera morbus.....		11	11					49
Colica.....		44	43	1				114
Constipatio.....		32	30				2	82
Congestio hepatis.....		5	5					46
Dyspepsia.....	1	41	40	1			1	337
Diarrhœa acuta.....	2	240	234	2			6	799
Fistula in ano.....	1	2	2	1				13
Gastritis.....	1	9	7	3				224
Hæmorrhoids.....		8	6	2				43
Hepatitis acuta.....		2	2					25
Icterus.....		4	2	2				25
Peritonitis.....		1		1				1

Navy-yards and stations.—Detailed statement, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
LOCAL DISEASES—continued.								
<i>Diseases of the digestive system—Continued.</i>								
Pharyngitis.....		47	47					194
Prolapsus ani.....		1	1					16
Stomatitis.....		1	1					6
Tonsillitis.....		104	92	11			1	455
<i>Diseases of the lymphatic system.</i>								
Adentitis.....	1	17	10	8				213
<i>Diseases of the urinary system.</i>								
Albuminuria.....	1	6	3	1		2	1	281
Calculus.....		1	1					6
Colica renal.....		1	1					4
Cystitis.....	2	4	5	1				207
Diabetes melitus.....		1	1					1
Dysuria.....		1	1					23
Enuresia.....		4	2	2				12
Hæmaturia.....		1		1				1
Nephritis.....		4	3	1				44
<i>Diseases of the generative system.</i>								
Balanitis.....		2	2					11
Chancroides.....		18	8	9			1	172
Oorchitis.....		13	8	5				114
Urethræ strictura.....		4	1	3				42
Varicocele.....	1		1					24
<i>Diseases of the locomotor system.</i>								
Ankylosis.....		2	1		1			23
Cellulitis.....		1	1					1
Ostitis.....		1	1					13
Synovitis.....		4	2	2				18
<i>Diseases of the integumentary system.</i>								
Abscessus.....		32	30			1	1	247
Anthrax.....	1	3	4					51
Clavus.....		2	2					52
Dermatitis.....		1		1				1
Eczema.....	1	6	6	1				151
Erythema.....		5	5					22
Furunculus.....		41	39	1			1	183
Herpes.....		2	2					25
Paronychia.....		4	4					16
Scabies.....		1	1					14
Ulcus.....		12	11	1				96
Unguis involutus.....		5	5					21
Urticaria.....		2	2					7
POISONS.								
Vulnus venenatum.....		1	1					10
TUMORS AND CYSTS (MALIGNANT OR NON-MALIGNANT).								
Cystis.....		1	1					24
Ranula.....		1		1				1
SURGICAL OPERATIONS.								
Circumcision.....		2	2					32
INJURIES, ETC.								
Abrasio.....		17	17					84
Ambustio.....	1	2	2	1				16
Contusio.....	1	57	58					326

Navy-yards and stations.—Detailed statements, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
INJURIES, ETC.—continued.								
Fractura	2	14	7	9	.....	.....	.....	150
Hernia	1	13	7	5	2	.....	.....	143
Luxatio .....	.....	9	8	1	.....	.....	.....	180
Stemma	4	88	86	3	1	.....	2	707
Vulnus contusum .....	.....	37	34	2	.....	.....	1	251
Vulnus incisum .....	.....	14	13	.....	.....	1	.....	133
Vulnus laceratum	1	20	17	4	.....	.....	.....	125
Vulnus punctum	1	10	11	.....	.....	.....	.....	111
Vulnus sclopetarium .....	.....	5	2	3	.....	.....	.....	36
Total	97	2,649	2,402	268	10	19	47	18,083

Naval hospitals.—General aggregate, 1890.

Classification of diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.			Remaining at the end of the year.	Total number of sick days.
				To hospital.	From service.	Died.		
Morbid states and processes irrespective of parts affected	2	19	14	1	5	.....	1	1,698
General diseases—dependent upon morbid poisons:								
Class 1	10	107	104	.....	.....	1	12	4,227
Class 2	2	47	41	1	.....	.....	7	1,515
Class 3	1	10	7	.....	.....	.....	4	334
Class 4	23	164	140	1	4	.....	42	9,313
Dependent upon causes other than morbid poisons:								
Class 1	1	1	2	.....	.....	.....	.....	131
Class 2	2	52	50	.....	.....	3	1	550
Developmental diseases	1	2	3	.....	.....	.....	.....	311
Unclassified diseases	18	114	91	2	8	1	30	7,676
Local diseases:								
Diseases of the nervous system	21	95	49	17	24	7	19	6,229
Diseases of the eye	5	21	15	2	3	.....	6	2,031
Diseases of the ear .....	.....	9	5	1	1	.....	2	660
Diseases of the nose .....	.....	3	2	.....	.....	.....	.....	115
Diseases of the circulatory system	8	32	16	2	11	6	5	2,327
Diseases of the respiratory system	28	191	128	8	25	23	35	11,882
Diseases of the digestive system	12	103	91	2	3	1	18	4,885
Diseases of the lymphatic system	10	54	50	.....	.....	.....	14	4,207
Diseases of the urinary system	4	28	18	.....	5	3	6	1,852
Diseases of the generative system	12	67	64	.....	1	.....	14	3,752
Diseases of the locomotor system	3	5	6	.....	1	1	.....	279
Diseases of the integumentary system	13	45	43	.....	3	.....	12	2,612
Parasitic diseases .....	.....	2	2	.....	.....	.....	.....	105
Tumors and cysts, malignant or nonmalignant .....	.....	12	7	.....	.....	2	3	452
Surgical operations	1	.....	.....	.....	1	.....	.....	128
Injuries, etc	25	111	87	5	25	1	18	8,780
Total	202	1,294	1,035	42	121	49	249	76,051

Naval hospitals.—Detailed statement, 1890.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
			To hospital.	From service.				
MORBID STATES AND PROCESSES IRRESPECTIVE OF PARTS AFFECTED.								
Adynamia	1	18	13	1	4		1	1,591
Atrophia		1			1			69
Hydrops	1		1					38
GENERAL DISEASES, DEPENDENT UPON MORBID POISONS.								
Class 1.								
Catarrhus epidemicus	6	50	55				1	1,831
Denguis		2					2	2
Diphtheria	1		1					104
Dysenteria acuta		8	7				1	137
Dysenteria chronica		1					1	3
Febris continua simplex		11	11					316
Febris enterica	3	21	19				5	1,418
Febris typho-malarialis		5	2			1	2	178
Morbilli		8	8					223
Varicella		1	1					15
Class 2.								
Cachexia malarialis		7	6				1	203
Febris intermittens		16	15				1	406
Febris remittens	2	24	20	1			5	906
Class 3.								
Erysipelas	1	10	7				4	334
Class 4.								
Gonorrhœa	5	58	51		2		10	2,148
Syphilis primitiva	7	23	25				5	1,504
Syphilis consecutiva	11	83	64	1	2		27	5,661
GENERAL DISEASES DEPENDENT UPON CAUSES OTHER THAN MORBID POISONS.								
Class 1.								
Caloris effectus	1	1	2					131
Class 2.								
Alcoholismus	2	51	50			2	1	500
Purpura hemorrhagica		1				1		50
DEVELOPMENTAL DISEASES.								
Senectus	1	2	3					311
UNCLASSIFIED DISEASES.								
Anæmia	1	3	3				1	155
Beri-beri		5	1				5	158
Diabetes		1	1					28
Lumbago		3	3					31
Podagra		1	1					50
Rheumatismus	14	87	71	2	7	1	20	6,463
Rheumatismus acutus	3	14	12		1		4	791
LOCAL DISEASES.								
Diseases of the nervous system.								
Apoplexia		4	1			3		36
Cephalalgia		7	2		1		4	432
Convulsio	2	4	2	1	3			187
Dementia	3	12	5	7	1		2	1,282
Epilepsia	3	8	5		4		2	253
Hysteria		2	2					136

Naval hospitals.—Detailed statement, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
LOCAL DISEASES—continued.								
<i>Diseases of the nervous system—Continued.</i>								
Insanity		1		1				17
Irritatio spinalis		1	1					5
Locomotor ataxia	1	3		1	1		2	608
Mania		3	1	2				63
Melancholia	3	7	5	2	2	1		574
Meningitis		1				1		1
Morphinomania		1	1					133
Myelitis		1	1					62
Nausea marina		1			1			34
Neuralgia	4	5	4	1	2		2	553
Neurasthenia	1	7	5	1	2			244
Neuritis		1	1					15
Pachymeningitis	1		1					97
Paralysis	2	18	6		5	2	7	1,018
Paresis		1		1				77
Rachialgia	1				1			171
Vertigo		7	6		1			231
<i>Diseases of the eye.</i>								
Amaurosis	2	2	3				1	421
Asthenopia		1	1					97
Cataracta	1	2			2		1	359
Conjunctivitis		12	8	1			3	869
Iritis	1	1	1	1				213
Keratitis		1			1			12
Trachoma	1		1					19
Ulcus corneæ		2	1				1	41
<i>Diseases of the ear.</i>								
Otalgia		1	1					5
Otitis		4	2	1			1	346
Otorrhœa		2	1				1	119
Surditas		2	1		1			190
<i>Diseases of the nose.</i>								
Catarrhus nasalis		1	1					23
Epistaxis		1	1					41
Ozena		1			1			51
<i>Diseases of the circulatory system.</i>								
Aneurysma		1				1		8
Dilatatio cordis		1	1					12
Hydrops pericardii		1	1					60
Hypertrophica cordis	2	2	3		1			352
Morbi valvularum cordis	4	16	5	2	7	5	1	1,047
Palpitatio	1	6	2		2		3	541
Phlebitis		4	3		1			151
Varix	1	1	1				1	156
<i>Diseases of the respiratory system.</i>								
Asthma		5	4				1	172
Bronchitis acuta	1	32	29		2		2	1,191
Bronchitis chronica	6	29	21	3	4		7	2,170
Catarrhus		6	5				1	116
Emphysema		1					1	265
Hæmoptysis	1	4	3				2	245
Laryngitis	1	2	2				1	16
Phthisis pneumonica acuta	1	5	1		3	1	1	336
Phthisis pneumonica chronica	8	45	18	4	13	9	9	4,045
Pleuritis		18	10	1	1	3	3	1,142
Pneumonia	10	44	35		2	10	7	2,184
<i>Diseases of the digestive system.</i>								
Alveolitis		1	1					21
Cholera morbus		6	6					46
Colica		5	3				2	25

Naval hospitals.—Detailed statement, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
LOCAL DISEASES—continued.								
<i>Diseases of the digestive system—Continued.</i>								
Constipatio	1	1	2					17
Congestio hepatis		3	3		2		1	215
Cirrhosis hepatis	2	4	3				3	467
Dyspepsia	1	10	9		1		1	515
Diarrhœa acuta		7	7					102
Diarrhœa chronica	2	2	3				1	387
Fistula in ano		9	7				2	650
Gastritis		6	3			1	2	182
Gastrodynia		1	1					106
Hæmatemesis		1	1					65
Hæmorrhoids	3	18	18				3	968
Hepatitis chronica		1	1					53
Icterus		5	2	1			2	215
Pharyngitis	1	2	3					66
Prolapsus ani		1	1					91
Stomatitis		1	1					13
Tonsillitis	2	16	17				1	486
Typhlitis		3	2	1				195
<i>Diseases of the lymphatic system.</i>								
Adenitis	10	54	50				14	4,207
<i>Diseases of the urinary system.</i>								
Albuminuria	1	4	3		1		1	343
Calculus		1			1			84
Cystitis	2	10	8		1		3	770
Enuresis	1	3	3		1			169
Hæmaturia		4	2		1		1	281
Nephritis		5	2			2	1	203
Urinæ retentis		1				1		2
<i>Diseases of the generative system.</i>								
Balanitis		1					1	63
Chanoroides	2	24	20				6	1,329
Fistula, urethral	1		1					104
Hydrocele		2	1				1	73
Orchitis	5	17	22					846
Phymosis		2	1				1	55
Urethra strictura	4	20	19				5	1,086
Varicocele		1			1			196
<i>Diseases of the locomotor system.</i>								
Arthritis	1		1					23
Synovitis	2	5	5		1	1		256
<i>Diseases of the integumentary system.</i>								
Abscessus	4	12	11		1		4	592
Acne		1	1					10
Anthrax		2	2					81
Dermatitis medic		1	1					8
Ecthyma		1					1	16
Eczema	2	6	6				2	409
Furunculus		2	2					52
Herpes		1	1					19
Psoriasis	1		1					24
Rupia		1					1	44
Scabies	1	2	3					101
Sycosis		2	1				1	177
Tinea		1					1	22
Ulcus	5	13	14		2		2	1,057
PARASITIC DISEASES.								
Vermes		2	2					105

Naval Hospitals.—Detailed statement, 1890—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.			
TUMORS AND CYSTS—MALIGNANT OR NON-MALIGNANT.								
Carcinoma recti.....		4				1		1
Carcinoma.....		1	1					101
Condyloma.....		1					1	2
Cystis.....		2	1				1	97
Chondroma.....		1	1					127
Epithelioma.....		2				1	1	43
Fibroma.....		3	3					36
Myoma.....		1	1					45
SURGICAL OPERATIONS.								
Amputatio.....	1				1			128
INJURIES, ETC.								
Ambustio.....		7	5	1			1	222
Concussio.....		2	1			1		9
Contusio.....	3	6	8				1	498
Fractura.....	7	42	32	2	5		10	3,435
Hernia.....	6	18	9	1	13		1	1,832
Luxatio.....	1	4	4				1	376
Rupture palm long.....		1	1					40
Stremma.....	3	11	9		2		3	946
Vulnus contusum.....	2	4	6					112
Vulnus incisum.....	1	7	3	1	3		1	344
Vulnus laceratum.....		5	5					339
Vulnus sclopetarium.....	2	4	4		2			627
Total.....	202	1,294	1,035	42	121	49	249	76,051

Report of enlistment for the year 1890.

Number of persons examined for the year 1890.....	9,834
Number accepted.....	6,214
Number rejected.....	3,620
Number color-blind.....	110
Number rejected per thousand.....	368.11
Number color-blind per thousand.....	11.18

Report of vaccination.

	Success-ful.	Unsuc-cessful.
No evidence of previous vaccination.....	196	554
Presenting good cicatrices.....	880	2,371
Evidence of former attack of smallpox.....	48	97

Ratio per thousand of admissions for each class of disease of the force afloat.

Classification of diseases.	Ratio.	Classification of diseases.	Ratio.
Morbid states and processes, irrespective of parts affected.....	6.96	Local diseases:	
General diseases:		Diseases of the circulatory system...	4.53
Dependent upon morbid poisons:		Diseases of the respiratory system...	96.47
Class 1.....	138.62	Diseases of the digestive system...	139.72
Class 2.....	55.33	Diseases of the lymphatic system...	19.58
Class 3.....	2.54	Diseases of the urinary system...	5.53
Class 4.....	46.13	Diseases of the generative system...	37.61
Dependent upon causes other than morbid poisons:		Diseases of the locomotor system...	4.31
Class 1.....	4.64	Diseases of the integumentary system...	76.77
Class 2.....	20.24	Parasitic diseases.....	.99
Developmental diseases.....	.33	Poisons.....	1.43
Unclassified diseases.....	59.07	Tumors and cysts—malignant or nonma-	
Local diseases:		lignant.....	1.32
Diseases of the nervous system.....	39.38	Surgical operations.....	.11
Diseases of the eye.....	11.28	Injuries, etc.....	161.63
Diseases of the ear.....	5.42	Feigned diseases.....	.11
Diseases of the nose.....	.77	Total.....	951.10

SUMMARY.—FORCE AFLOAT.

Daily average number of sick.....	161.86
Average number of days each case was under treatment.....	6.86
Admissions per thousand of mean strength.....	951.10
Invaliding per thousand of mean strength.....	88.50
Deaths per thousand of mean strength.....	4.20

General statistics.

Mean strength of the Navy and Marine Corps, including officers and men, for the year 1890:	
Officers of the Navy and Marine Corps on the active list.....	1,658
Enlisted men of the Navy.....	8,070
Enlisted men of the Marine Corps.....	2,040
Total.....	11,768
Mean strength of the force afloat, including officers and men.....	9,039
Total number of cases under treatment during the year 1890:	
Naval hospitals.....	1,496
Navy-yards and stations.....	2,746
Vessels afloat and receiving ships.....	9,607
Total.....	13,849
Total number of deaths from all causes during the year 1890:	
Naval hospitals.....	49
Navy-yards and stations.....	19
Vessels afloat and receiving ships.....	38
Total.....	106
Ratio per thousand of deaths in the navy for the year 1890.....	9.00

Mortuary record of the Navy for the year 1890.

Causes of death.	Number of deaths.			Total.
	Hospitals.	Yards and stations.	Vessels.	
Alcoholismus.....	2	1	2	5
Apoplexia.....	3	1	1	5
Aneurysma.....	1		1	2
Adynamia.....		1		1
Albuminuria.....		2		2
Abscessus.....		1		1
Asthma.....			1	1
Bronchitis, acute.....		1		1
Concussio.....	1			1
Catarrhus epididymicus.....			1	1
Cholera epidemicus.....			1	1
Cholera morbus.....			2	2
Carcinoma recti.....	1			1
Dilatatis cordis.....		1		1
Epithelioma.....	1			1
Enteritis.....			1	1
Explosio.....			1	1
Febris remittens.....			2	2
Febris enterica.....			1	1
Febris continua simplex.....		1		1
Febris typho-malarialis.....	1			1
Fractura.....			3	3
Gastritis.....	1			1
Homicide.....			1	1
Internal injuries.....			1	1
Melancholia.....	1			1
Meningitis.....	1			1
Morbi val. cordis.....	5	2		7
Myocarditis, chronic.....		1		1
Nephritis.....	2			2
Purpura hemorrhagica.....	1			1
Paralysis.....	2	1		3
Phthisis pneumonia, acute.....	1			1
Phthisis pneumonia, chronic.....	9	4		13
Pneumonia.....	10	1	6	17
Pleuritis.....	3			3
Rheumatismus.....	1			1
Synovitis.....	1			1
Submersio.....			8	8
Urinae retentis.....	1			1
Vulnus incisum.....		1		1
Vulnus punctum.....			1	1
Vulnus sclopetarium.....			4	4
Total.....	49	19	38	106

Ratio per thousand of deaths in the Navy for the year 1890—9.00.

CONTRACTS.

Proposals for supplies to the Naval Laboratory, Brooklyn, N. Y., July 22, 1890.

Bidders.	Class I, surgical in- struments.	Class II, dispensary furniture.
Rowland A. Robbins	\$82.64	\$1,023.26
Lister Manufacturing Company		

The contracts for both classes were awarded to Rowland A. Robbins. The bid of the Lister Manufacturing Company was informal, the guaranty not being filled out and signed. The bid was not considered.

Proposals for building sick quarters at Portsmouth, N. H., September 1, 1890.

Bidders.	Amount.
Francis H. Smith	\$43,000
J. & J. Philbrook	38,967
J. E. Giddings & Son	41,970
W. H. Glover & Co	41,960

The contract was awarded to J. & J. Philbrook.

Proposals for engine and boiler at Naval Hospital, Philadelphia, Pa., September 22, 1890.

Bidders.	Amount.
Henry J. Snell	\$840
H. M. Sciple & Co	738
Daniel Kelly	1,300

Contract was awarded to H. M. Sciple & Co.

Proposals for supplies to Naval Laboratory, Brooklyn, N. Y., September 23, 1890.

Bidders.	Class I, hardware.	Class II, lumber.
J. W. Duryea		\$530.50
Lewis H. Ross		364.04

Contract for Class II was awarded to Lewis H. Ross.
No proposals were received to furnish Class I.

Proposals to furnish hardware to the Naval Laboratory, Brooklyn, N. Y., October 7, 1890.

Bidders.	Amount.
A. F. Brombacher & Co	\$886.32
Rowland A. Robbins	1,023.06
A. W. Paine	757.40

The contract was awarded to A. W. Paine.

Proposals for laundry building at Naval Hospital, Brooklyn, N. Y., November 5, 1890.

Bidders.	Building.	Tiling.	Total.
E. S. Boyd	\$2,825	\$425	\$3,250
Alex. McKnight	2,625	400	3,025

The contract was awarded to Alex. McKnight.

Proposals to furnish laundry machinery at Naval Hospital, Brooklyn, N. Y., November 24, 1890.

Bidders.	Amount.
* Thomas J. Laing*	\$2,047.00
Hospital Supply Company*	2,270.00
Laundry Machinery and Supply Company, Rochester, N. Y.	2,395.00
Wilson Laundry Machinery Company	2,259.96
A. M. Dolph Company	2,120.00
Troy Laundry Company	2,242.32
Empire Laundry Machinery Company	2,439.00

* Bids informal.

The contract was awarded to A. M. Dolph Company.

Proposals to build new roof to boiler house and laundry at Naval Hospital, Brooklyn, N. Y., December 27, 1890.

Bidders.	Amount.
Alexander McKnight	\$5,985
P. J. Carlin & Co	4,900

The contract was awarded to P. J. Carlin & Co.

Proposals to supply dispensary furniture and bedding at naval laboratory, Brooklyn, N. Y., February 6, 1891.

Bidders.	Class I, dispensary furniture.	Class II, bedding.
W. F. Bernstein		\$681.75
Roller & Shoemaker	\$2,046.39	
R. A. Robbins	1,945.04	851.50
Andrews, Gulick & Sillocks	2,195.95	
J. A. & C. H. Baldwin*		713.50
Wechsler & Abraham		724.25

* Bid informal.

Contract for Class I was awarded to Rowland A. Robbins.

Contract for Class II was awarded to W. F. Bernstein.

Proposals for supplying bottles to naval laboratory, Brooklyn, N. Y., March 2, 1891.

Bidders.	Amount.
Henry Allen	\$1,635.50
Hagerty Bros. & Co.	1,807.40
Roller & Shoemaker	1,496.02

The contract was awarded to Hagerty Bros. & Co.

Proposals for annual supplies to Naval Hospital, Mare Island, California, May 26, 1891.

Bidders.	Class I, meat.	Class II, groceries.	Class III, butter, cheese, and eggs.	Class IV, ice.	Class V, milk.	Class VI, bread.	Class VII, proven- der.	Class VIII, dispensary- yard proven- der.
James McCudden.....	*\$1,772.18							
Joseph Boss.....						\$340.00		
Wilson & Bruce.....		\$1,784.80	\$1,108.50				\$2,583.00	\$390.00
Aden Brothers.....				\$180.00				280.00
Henry Connolly.....			806.25		\$60.00		1,686.15	260.00
James Brownlie.....		1,689.42				300.00		
James Smith.....								
D. W. Harrier & Sons.....	2,305.20	2,203.43	1,057.50	240.00	100.00	500.00	2,181.50	330.00
Brown & Flemming.....						325.00		
Samuel Brown.....	1,816.40							

* James McCudden was debarred by order of the Secretary of Navy, May 27, 1891.

† The bid of Aden Brothers was informal.

Class I was awarded to Samuel Brown. Classes II, III, V, and VII were awarded to James Brownlie. Class IV was awarded to Henry Connolly. Class VI was awarded to James Smith.

Proposals for annual supplies to Naval Hospital, Portsmouth, N. H., May 26, 1891.

Bidders.	Class I, meat.	Class II, groceries.	Class III, butter, eggs, etc.	Class IV, ice.	Class V, milk.	Class VI, bread.	Class VII, proven- der.
Clarence M. Prince.....	\$731.30	\$537.67	\$423.00			\$280.00	
James E. Chase.....		542.49	405.00			230.00	
Herman R. Paul.....	752.20				\$95.00	280.00	
D. C. Norton & Co.....	1,081.40	568.98	389.00		100.00	235.00	

Classes I and II were awarded to Clarence M. Prince. Class III was awarded to D. C. Norton & Co. Class V was awarded to Herman R. Paul. Class VI was awarded to James E. Chase.

Proposals for annual supplies to Naval Hospital, Chelsea, Mass., May 26, 1891.

Bidders.	Class I, meat.	Class II, groceries.	Class III, butter and eggs.	Class IV, ice.	Class V, milk.	Class VI, bread.	Class VII, proven- der.
C. A. Simonds.....	\$2,578.50	\$2,494.95	\$750.00	\$300.00	\$600.00	\$600.00	\$406.25
Belch & Mansfield.....	2,673.40	2,574.26	810.00	330.00	700.00	650.00	420.50
M. J. Doran & Co.....	2,716.90	2,580.80	794.00	315.00	650.00	650.00	432.60
A. J. Bacon & Co.....	2,760.50	2,524.94	802.00	330.00	675.00	625.00	542.15
Boston Ice Company.....				225.00			
J. E. Lewis & Co.....							336.15

Classes I, II, III, V, VI were awarded to C. A. Simonds. Class IV was awarded to Boston Ice Company. Class VII was awarded to J. E. Lewis & Co.

Proposals for annual supplies to Naval Hospital and laboratory, Brooklyn, N. Y., May 26, 1891.

Bidders.	Class I, meat.	Class II, groceries.	Class III, butter, eggs, etc.	Class IV, ice.	Class V, milk.	Class VI, bread.	Class VII, proven- der.	Class VIII, lab- oratory proven- der.
Patrick Morrison.....	\$5,736.00							
Austin T. Fitch.....				\$750.00				
Andrew Koch.....	\$3,598.84	\$3,712.00				\$450.60	\$547.10	
W. H. Belford.....	6,638.00	3,797.79	3,518.00	675.00	\$2,400.00	\$1,812.50	497.20	565.55
Wm. Wright.....					2,325.00			
Peter H. Miller.....						1,875.00		

Class I was awarded to Patrick Morrison. Classes II and VII were awarded to Andrew Koch. Classes III, IV, and VI were awarded to W. H. Belford. Class V was awarded to William Wright.

Proposals for annual supplies to Naval Hospital, Philadelphia, Pa., May 26, 1891.

Bidders.	Class I, meat.	Class II, groceries.	Class III, butter and eggs.	Class IV, ice.	Class V, milk.	Class VI, bread.	Class VII, provender.
Robert McKeown		\$1,353.33	\$961.00	\$360.00	\$735.00	\$455.00	
Samuel Sproul		1,347.55	891.20				
Jno. T. Strickland	\$3,066.80		1,041.20	360.00	770.00		
L. Shuster Boraef	2,911.50				735.00		
Michael Dougherty		1,401.00	966.45			499.20	
Jas. M. Snyder							
David Mann	3,281.90						

Class I was awarded to M. Shuster Boraef. Classes II and III were awarded to Samuel Sproul. Class IV was awarded to Jno. T. Strickland. Classes V and VI were awarded to Robert McKeown.

Proposals for annual supplies to Naval Hospital, Washington, D. C., May 26, 1891.

Bidders.	Class I, meat.	Class II, groceries.	Class III, butter and eggs.	Class IV, ice.	Class V, milk.	Class VI, bread.	Class VII, provender.
Edward Costell	\$836.00						
Browning & Middleton		\$683.18	\$349.50	\$90.00	\$150.00	\$197.50	

Class I was awarded to Edward Costell. Classes II, III, IV, V, VI were awarded to Browning & Middleton.

Proposals for annnal supplies to Naval Hospital, Norfolk, Va., May 26, 1891.

Bidders.	Class I, meat.	Class II, groceries.	Class III, butter, eggs, etc.	Class IV, ice.	Class V, milk.	Class VI, bread.	Class VII, provender.
O. L. Williams			\$1,510.00				\$414.00
Jno. A. Codd	\$1,659.10		1,701.00		600.00		
J. T. Barker & Bro		\$1,504.60	1,335.00		600.00	\$478.80	358.30
W. G. Maupin				\$470.00			
E. L. Woodward	1,802.60						
V. J. Naw						450.00	
C. R. Robertson	1,912.60				420.00		
Thomas J. Barlow		1,436.70	1,440.00				
Charles R. Nash				460.00			
J. H. Cood & Bro	1,905.00		1,705.00				
Kate C. Brady					336.00		

Class I was awarded to Jno. A. Codd. Class II was awarded to Thos. J. Barlow. Class III was awarded to J. T. Parker. Class IV was awarded to Chas. R. Nash. Class V was awarded to Kate C. Brady. Class VI was awarded to V. J. Naw. Class VII was awarded to J. T. Barker & Bro.

Proposals for annual supplies to Naval Hospital, Pensacola, Fla., May 26, 1891.

Bidders.	Class I, meat.	Class II, provi- sions.	Class III, butter, cheese, and eggs.	Class IV, ice.	Class V, milk.	Class VI, bread.	Class VII, provender.
B. A. Philibert	\$159.75	\$412.56	\$98.00	\$187.50	\$75.00	\$50.00	\$200.00
Fred Baner	183.50	388.08	90.40		75.00	50.00	174.00
Benj. Dolphin	114.30	334.08	81.80	142.50	47.50	50.00	160.00
M. Mooney	122.20	338.47	88.00	150.00	50.00	60.00	174.00

Classes I, II, III, IV, V, VI, and VII were all awarded to Benjamin Dolphin.

REPORTS.

REPORT ON U. S. NAVAL HOSPITAL, BROOKLYN, N. Y.

By ALBERT L. GIBON, *Medical Director.*

The facilities of the hospital have been increased during the past year by the establishment of a special "dark room" for ophthalmoscopic, otoscopic, rhinoscopic, laryngoscopic, and other exploratory work of this character and for topical administrations to the passages by means of compressed air, and of an "electric room" for the electro-therapeutic, faradic, and galvano-caustic operations which now form so large a part of medical and surgical curative means. A plan is also in contemplation for the construction of apparatus for hot air, vapor, and medicated baths, which, it is believed, will secure, especially to chronic invalids, the advantages now sought by traveling to distant places, for beneficent climatic influences, and natural medicinal baths. With these and other minor improvements proposed this hospital may deservedly take rank among the best equipped military and civil establishments of the kind.

During the year ended 399 cases of disease and injury, occurring among officers and enlisted men of the U. S. Navy and Marine Corps, have been admitted to treatment, and 314 have been discharged; and of these, 256 or 81.5 per cent have returned to duty, and 39 or 12.5 per cent discharged from the service at their own request or by recommendation of board of medical survey. Five insane patients have been transferred to the Government Hospital for the Insane at St. Elizabeth, Washington, D. C., and three to other hospitals, that they might have the privilege of being near their families.

The fatal cases during the year numbered 11 or 2.5 per cent of admissions, and were incident to the following diseases, to wit: One morbus valvularum cordis, 1 phthisis pneumonica acuta, 4 phthisis pneumonica chronica, 1 pleuritis, 3 pneumonia, and 1 from rupture of bladder.

Apart from this death and the one from valvular disease of the heart, the rest of the mortality of the year, 9 deaths, was due to affections of the respiratory apparatus. One of the 3 fatal cases of pneumonia occurred in an old man, who had overstaid his leave of absence and indulged in a prolonged debauch, during which he was exposed to cold and rain, and the necropsy revealed, besides the remains of a former pneumonia, such a recent involvement of both lungs, that the amount of organ available for the respiratory act was reduced to a very small patch on the anterior portion of the right lung, both lungs being firmly bound down to the chest walls, throughout their whole extent, by recent adhesions.

Of the 399 cases treated during the year, 225 or 56 per centum belonged to the following classes: Venereal, 69; primary, 15; constitutional, 54; respiratory, 62; pneumonia, 14; phthisis, 18; rheumatism, 42; acute, 8; chronic, 34; casualties, 52; fractures, 20; hernia, 12.

The comparatively small number of cases of pneumonia, 13 (of which 3, or 23 per cent, succumbed), is in marked contrast with the record of the preceding year, when 43 were admitted.

Beside the casualties reported, two very serious cases of ambustio, involving the head and upper extremities in the persons of employés of the Bureau of Ordnance, caused by an explosion of gunpowder at naval magazine at Fort Wadsworth, were admitted to the hospital and treated with the most satisfactory results, contraction of cicatrices having been prevented, notwithstanding the loss of subcutaneous tissue which in one of the cases was extensive. It is interesting to note that the intolerable fetor, when these men were admitted and the primary dressings removed, was successfully counteracted by copious irrigations with warm mercuric chloride solution 1:5000, which was afterwards washed off

with hot boiled water, demonstrating the absolute innocuity and perfect safety of the use of this agent upon extensively denuded and absorbent surfaces.

The return of diseases for the year ended presents the unusual entry of five admissions for beri-beri from the Brazilian cruiser *Guanabara*, then at anchor in the harbor of New York, four having been admitted on the 29th of November and one on the 6th of December, three of which are now convalescent and awaiting an opportunity to return to their own country. The marked symptoms on admission were the profound anæmia and the dyspnoea, the respirations ranging from 24 in the mildest case to 42 in the most severe. The cases resembled each other closely, differing only in severity. The pulse varied from 90 to 120, the temperature from normal to 100° F. The urine was secreted in diminished quantity but contained no abnormal constituents in solution. Examination of the blood showed a diminution of red corpuscles, without corresponding increase of the white. Anæsthesia of the skin at various sites and stiffness of the lower extremities were present in all the cases and in one it was exaggerated, amounting to a partial paralysis. Edema developed in one case only, being present in both legs. The cases all progressed favorably, the dyspnoea being the first symptom to disappear. Paraplegia is probable in one of the cases still under treatment.

Eleven cases only (7 of erysipelas and 4 of morbilli) have required isolation. The "annex" hospital reserved for contagious diseases will probably subserve all the requirements of this station for many years.

Paper spit cups are used for receiving the sputum of all tuberculous patients and an open grate fire in each wing is kept for the immediate destruction of the cups and their contents.

Successful skin grafting was effected in a very unpromising case of extensive ulceration over the tibia in a broken-down syphilitic.

While the diseases specially referred to in the above report represent the more important classes which come within the cognizance of naval medical officers at naval hospitals, the range of clinical experience is sufficiently wide to embrace examples of nearly all of the constitutional and local maladies encountered in civil life. Ninety-two nosological titles denote the ground covered, while the severity of most of the cases sent to the hospital makes it as satisfactory a school for practical pathological study as could be desired for young entrants into the Medical Corps of the Navy, at the same time affording opportunities for special training in the technical duties of a naval medical officer.

Experimental use has been made during the year of the numerous pharmaceutical agents, dietetic preparations and surgical appliances, submitted for the purpose, the results of which have from time to time been reported.

The necessity for employing convalescent patients upon duty about the grounds, vegetable garden, cemetery, outbuildings, etc., due to the regrettable lack of a regularly enlisted naval hospital corps, while invalidating the strictly professional character of the returns in respect to duration of treatment, finds compensating advantages in the opportunity for out-door exercises, so that the convalescent returns to duty on board ship wholly recovered in strength and able at once to resume the most arduous labor required.

For the past five years there has been an average annual admission of about 9 cases of mental derangement. During the year 1890 the number has increased to 13 such, diagnosed as dementia 5, insanity 1, mania 2, and melancholia 5. The majority of cases of this character have been foreign born, and their disabilities traceable to occurrences antecedent to enlistment.

□ I append hereto the report of microscopic work by Assistant Surg. Rand P. Crandall, to whom this duty was especially confided, and who has discharged it with the most praiseworthy zeal and professional interest.

REPORT OF MICROSCOPIC WORK.

The clinical work for the year 1890 has consisted in examinations of sputum, blood, urine, urethral discharges, and abnormal cavity fluids.

The pathological work in examinations of neoplasmata and post-mortem specimens. Of sputum, 42 primary examinations were made in hospital cases and 15 in private cases. In all respiratory cases the sputum was examined, even when phthisis was not suspected, with the result of detecting several cases of incipient disease in time to commence active treatment and thus radically influence the future progress of the cases. In 4 cases when tubercle bacilli were found early and treatment begun at once the improvement was very marked, the bacilli diminishing in numbers at each subsequent examination. In certain acute cases the number of bacilli seems to be directly proportioned to the severity of the

case. In others again, more especially chronic cases, there is apparently no relation whatever.

Referring to the accompanying table of respiratory cases, in 14 cases of phthisis, so diagnosed on admission, bacilli were found in 12, in 4 of which the diagnosis was confirmed by post-mortem examinations and in the remaining 8 by the course of the cases and subsequent observation. The 2 cases in which no bacilli were found proved to be fibroid phthisis and chronic pleuritis.

In 19 cases admitted with bronchitis no bacilli were found except in one case, which further observation and examination showed to be a well-defined phthisis.

In 2 cases admitted with pleuritis, but in which phthisis was suspected in each case, microscopic examination gave negative results, which were confirmed by aspiration and the subsequent course of the cases.

In 6 cases admitted with pneumonia, bacilli were found in 1 case only. This case developed later unmistakable symptoms of phthisis.

The 15 private cases referred to in which examinations were made for physicians in New York and Brooklyn were, as far as could be learned, verified by subsequent observation.

Various methods of staining have been followed, the principal being the Koch-Ehrlich process, and the Ehrlich as modified by Rindfleisch.

Of urethral discharges, 10 primary examinations were made, the gonococcus of neisser being present in 9. The remaining case was one of gleet due to stricture, in which no gonococci were found on repeated examinations. In the above cases the number of gonococci served as an indication of the progress of the disease, being present in large numbers in the acute stage and gradually diminishing as the discharge became thinner, until they finally disappeared in the gleety stage. About 100 urinary examinations were made in hospital and private cases. The blood in 5 cases of beri-beri was examined, revealing a diminution in the red blood corpuscles; also in 2 cases of chronic fever revealing the same condition. In 6 instances the fluid obtained by paracentesis thoracis was examined for pus. Of neoplasms two specimens were examined, one an enchondroma the other a lipoma.

The accompanying drawings were made from slides showing characteristic fields and illustrating different methods of staining and preparation. The working apparatus of the hospital includes a 1.16-inch lens and an Abbé apochromatic condenser, besides the regular outfit. The 1.16-inch lens is misty and difficult to work with. A better lens is required in order that as accurate results as possible may be obtained.

Respiratory cases.

Case.	Diagnosis on admission.	Microscopic examination.	Microscopic examination verified by—
1	Phthisis pneumonia, chronic.	Bacilli in large numbers.	Necropsy.
2	do	do	Do.
3	do	A few bacilli.	Subsequent observation.
4	do	Bacilli in large numbers.	Do.
5	do	do	Necropsy.
6	do	do	Subsequent observation.
7	do	Very few bacilli	Do.
8	do	No bacilli	Subsequent physical examinations.
9	do	Bacilli in large numbers.	Necropsy.
10	do	Few bacilli	Subsequent observation.
11	do	No bacilli	Do.
1	Phthisis pneumonia, acute.	Many bacilli	Do.
2	do	do	Do.
3	do	Few bacilli	Do.
1	Bronchitis, chronic.	No bacilli	Results of treatment.
2	do	do	Do.
3	do	do	Subsequent observation.
4	do	do	Do.
5	do	do	Do.
6	do	do	Do.
7	do	do	Do.
8	do	do	Do.
9	do	do	Do.
10	do	do	Do.
11	do	Bacilli in large numbers.	Subsequent physical examinations.
1	Bronchitis, acute.	No bacilli	Subsequent observation.
2	do	do	Do.
3	do	do	Do.
4	do	do	Results of treatment.
5	do	do	Do.
6	do	do	Do.

Respiratory cases—Continued.

Case.	Diagnosis on admission.	Microscopic examination.	Microscopic examination verified by—
7	Bronchitis, acute.....	No bacilli.....	Subsequent observation.
8	do.....	do.....	Do.
1	Pleuritis.....	do.....	Aspiration and results of treatment.
2	do.....	do.....	Aspiration and subsequent observation.
1	Pneumonia.....	do.....	Necropsy.
2	do.....	A few bacilli.....	Subsequent observation.
3	do.....	No bacilli.....	Necropsy.
4	do.....	do.....	do.....
5	do.....	do.....	Do.
6	do.....	do.....	Subsequent observation.

TOTAL RESPIRATORY.

Phthisis pneumonia, chronic.....	11
Phthisis pneumonia, acute.....	3
Bronchitis, chronic.....	11
Bronchitis, acute.....	8
Pleuritis.....	3
Pneumonia.....	6
Total.....	42

Urethral discharges.

Case.	Diagnosis on admission.	Microscopic examination.	Diagnosis from examination verified by—
1	Gonorrhea.....	Gonococci in abundance.	Clinical observation.
2	do.....	do.....	Do.
3	do.....	do.....	Do.
4	do.....	Very few gonococci.....	Do.
5	do.....	No gonococci.....	Not verified.
6	do.....	Gonococci.....	Clinical observation.
7	do.....	do.....	Do.
8	do.....	do.....	Do.
9	do.....	do.....	Do.
10	do.....	do.....	Do.

Total, 10.

REPORT ON U. S. NAVAL HOSPITAL, NORFOLK, VA.

By Medical Director C. J. CLEBORNE.

I have the honor to submit to the Bureau the sanitary report of this hospital for the year ending December 31, 1890.

The number of patients treated during the year was 244; of these, 35 were continued from 1889, 209 were admitted, and there are 43 remaining. Fifteen cases were invalided, 4 were transferred to other naval hospitals, 4 were insane, 6 died, and 176 were cured and returned to duty.

Of the deaths, 3 resulted from pneumonia (9 cases—a loss of 33½ per cent), 1 from apoplectic coma, 1 from typhomalarial fever, and 1 from concussion of the brain.

Of the total number of 244 sick, there were 134 due to local causes, 30 were due to climatic influences, and 10 were diseased prior to enlistment.

The daily average number of patients was 30 $\frac{3}{4}$; average duration of treatment, 45 $\frac{1}{2}$ days; average cost per patient (including cost of repairs and all expenses of hospital), \$1.24 $\frac{2}{3}$; daily average cost of subsistence, 26 $\frac{5}{8}$ cents; total amount expended, \$13,945.10.

The total number of "sick days" were 11,198, of which 3,490 are credited to 68 venereal cases, some of a tedious and obstinate character.

METEOROLOGY.

There have been no destructive storms during the past year, and consequently there has been little damage done by high tides to the wharves, bridges, and

trees. The greatest enemies to the latter are the mischievous insect borers, and those who bruise or chip the oaks and pines for material to make horse and cough medicines. The miscreants who thus injure the trees are not easily caught, but their handwork is visible at certain seasons of the year when the bark is in condition and the young pine sap is flowing freely. A few trees were struck by lightning, and quite a number had to be cut down to prevent the destructive advances of the borers.

The general health of this vicinity has been good, and singularly free from all epidemics except la grippe. The weather has been moderate, and though the summer was hot and dry, there were no very decided deviations from the normal line during the year.

THE HOSPITAL.

This establishment is in fair condition for present needs, but the southwest wing requires extensive repairs to all woodwork and verandas before replastering and repainting. Estimates for these improvements will be found in my last reports. The wards now in commission in northwest wing, the corridors, and a good deal of woodwork and plastering needs repairing and repainting. The supply of water is now sufficient for every purpose, and the heating of the hospital has been considerably improved by placing the main steam-pipes of boilers underneath the courtyard, as explained in last report. The old hospital fence has been replaced or reset at a cost of but \$212, and is now as good as a new one, which would have cost about \$1,200. A walk or pathway 4 feet wide has been made around this fence, thus affording a dry and pleasant promenade for visitors.

The boilers of the hospital are in good order, considering their condition, and may with care last another year or two, but it will soon be necessary to have a new boiler of more modern type and greater heating capacity, and estimates have already been submitted to the Bureau.

Great difficulty is experienced in keeping the iron staircases of the hospital in good condition and appearance, and a wooden casing or "rubber tread" are recommended for this purpose and to prevent danger from slipping.

The doors opening on the verandas, the iron pillars and doors in courtyard, the stable, main corridors, baseboards, main stairway, rooms or chambers upstairs, officers' parlor, reception room, etc., have been repainted by the hospital employes, and a great deal of general touching up, plastering, whitewashing, bricklaying, embanking, draining, etc., has also been done by them without additional expense to the bureau.

FOOD.

The contractors have furnished the hospital with good provisions, and, with few exceptions, these have been promptly delivered. As much variety as is possible has been made in the food, and the cooking has been fairly good. The mess superintendent is a check upon waste or extravagance, and patients are better satisfied by having some one to specially guard their interests.

The provisions and other supplies are inspected by the medical officers (who also inspect each meal), and articles not up to the standard are at once rejected and returned.

WATER.

The water supply from Lake Kilby has proved very satisfactory, the only complaint being the juniper color, and occasionally some muddiness requiring the water to be filtered for table use.

FIRE QUARTERS.

General fire quarters is held once a month, and as there is now an ample supply of water from the new hydrants the average time of getting a stream or streams of water in operation on a fire is as follows:

At hospital building—First veranda, stream turned on fire in 15 seconds; second veranda, stream turned on fire in 25 seconds. Large stream from hydrant in courtyard turned on fire in 55 seconds from the first alarm of fire.

Fire at pesthouse, stable, director's quarters, gatehouse, and bothouses—Hose taken on hose carriage from hospital building to pesthouse or stable, attached to hydrant, and stream playing on fire in 1 minute and 55 seconds. Distance of pesthouse from hospital, 300 yards; from hospital to director's house, gatehouse or bothouses, 400 to 500 yards; stream could be in full operation (including time of transportation of hose on hose carriage from hospital) in about 3 minutes.

LIGHTING.

I have to renew my recommendation that the hospital and its grounds be lighted by electricity. I am only waiting for proposals from constructing companies to lamp and wire the reservation before I submit the complete estimates for lighting to the Bureau.

The introduction of the Westinghouse current into the hospital will admit of its utilization as a remedial agent. A good Faradise current may be obtained by the use of induction coils, and I would respectfully suggest the fitting up of room No. 9 in main corridor of the hospital as a battery room, where with proper electrical appliances chronic cases may be advantageously treated.

THE LIBRARY.

The hospital library is well supplied with medical and surgical works, and with a miscellaneous collection of monographs, pamphlets, circulars, journals, etc., upon hygiene and the kindred sciences. The books (mostly modern editions) are in good order and have been carefully catalogued. The latter work has been specially well done by Assistant Surg. A. R. Alfred, who made a very careful personal examination of every book, pamphlet, and journal, and compared it with other inventories, so that his list may be regarded as reliable. I have adopted the plan of entering in the list of books two catalogues, one of authors as required by the Instructions for Medical Officers, and one of titles, so that any work may the more readily be found. The medical journals and periodicals should be bound at the end of each year, otherwise they are apt to be lost or mislaid, or imperfect sets left for binding.

DIRECTOR'S HOUSE.

I have to renew my recommendations of last year as to the necessity for thoroughly repainting the director's house, repairing wall of iron fence of garden, resetting brick area, and for heating the house by direct or auxiliary steam apparatus, estimate for which has been submitted.

A mansard roof would greatly improve the appearance and add to the comfort of the house by affording protection from the excessive heat of summer, and by adding two or three bedchambers which are greatly needed.

The cost would probably not exceed \$1,500.

The liberality of the Bureau has enabled me to pull down the decayed and unsightly coal and wood houses, and to replace them with a substantial building (having four compartments and a large storage or vegetable loft) at a cost of \$250. The old fence around the inclosure has also been pulled down and will be replaced by a light ornamental Styron fence, which will add greatly to the appearance of these quarters. Outside the fence the low ground has been filled in, drained by piping, and will be leveled and regrassed in spring.

PESTHOUSE.

This building has been repaired and put in good condition. The kitchen, small rooms, and main ward are now fit for occupation, and the gutters, drain spouts, and window frames have been repaired, painted, and put in order. The gardener occupies the front or administrative part of this building and acts as watchman for this part of the hospital grounds. The drainage of the pesthouse (for which provision was not properly made) has been overhauled, and I have had the gutters and sink pipes of the main building and the drainage from the pump led into a terra cotta 4-inch drain and carried about 150 feet to a cut drain on the grounds which carries off the excess of rainfall from the higher land around the cemetery. The cleared ground of the park would now afford capital camping grounds for tents or temporary hospitals, in the event of a serious epidemic of yellow fever.

WOODSHED AND LAUNDRY GROUNDS.

The woodshed adjacent to stables need some slight repairs. The sills and studs need over-hauling in order to prevent the sides bulging when wood is carelessly thrown or piled against them.

The present system of drying clothes on lines attached to poles is not a good one. The drying ground is in an exposed situation, subject to high winds, and

the result is that sheets and clothing are frayed out or torn by continually flapping in the wind. I would respectfully suggest, in place of these poles, a revolving clothes drier or reel, such as is used in the East for this purpose.

HOSPITAL PARK.

The pine grove and park in front of hospital are in fairly good order. The flower vases have been raised on brick bases, the ornamental beds have been increased in size, raised in height, and everything is ready for planting some eight or ten thousand outdoor bedding plants raised in the hospital greenhouse. The latter has well fulfilled its purpose, and has now a fairly good assortment of flowers and plants for ornamenting the gardens, lawns, and grounds. Last year the display of coleus, red sage, colored borderings, and geraniums was quite creditable, and added considerably to the park-like appearance of the carriage and foot entrances, the grass plots around Ambler Crescent, and other parts of the grounds.

The driving roads and walks through the grove and park are in fair order, but some of the roads need reshelling, and the road on northwest side of sea wall needs filling in, grading, and shelling. The plan I adopted last year of using a layer of broken granite with the shells has worked well, and the roads in some parts have now a good foundation and are as hard as bed rock. I would therefore suggest that in future a small quantity of broken granite be laid on the middle of the roads in line of traffic, and after this has been well rolled in the shells should be spread and rolled into the granite. In this manner the driving roads of park can be made hard and will need less frequent shelling.

Some attempt has been made to repair the injury to the trees at the Green street entrance (made by removing the soil for filling up the road in Green street) by filling up with beach mud and covering that with soil fit for grassing. This may save the oaks, but the pines are doomed. A foot walk or path has been made from the entrance gate to the footbridge by filling in with mud and material from creek and by draining and embanking the walk at the lowest parts of the road. The deep hollow above this walk has been filled in and raised by using hundreds of loads of beach mud, and with a light layer of soil this ground will be fit for grassing in the spring.

The abutment at footbridge was finished at the original contract price, \$125, and the appearance of the triangle at this point (made of artificial stone in two colors) is quite park-like. A vase (filled with flowers or plants suitable for the season) is placed on each side of the base of the triangle, and these present a pretty and cheerful appearance. In extending the brick walk from this point to director's quarters the walk has been moved over in order to bring it in a line with the bridge and has been increased nearly 2 feet in width without the purchase of additional bricks. This improvement might be made all the way up to the hospital by doing a little of this relaying at odd times by the force at the hospital. The director's wharf and boathouse are in good order and have withstood the high tides and rough weather. The semicircular abutment has done good service in protecting the great oak in front of director's quarters, and has been found so useful in protecting the river bank that the brick has been extended (using the old condemned bricks) about a hundred feet on each side, thus protecting the grass bank in front of quarters.

The footbridge was repaired and painted at an expense of \$140, but the paint wore so badly that I have had to repaint both this and the director's bridge out of the paint supply of hospital.

The hospital wharf needs redecking, but the float or "camel" has been repaired by hospital force, and some new piles for wharf and float were contracted for by Bureau.

I must again call attention to the necessity for protecting the shore line of the hospital grounds from the inroads of storms, high tides, and the ever increasing "wash," caused by steam vessels and tugs on the river. The cheapest way of doing this will be found in the use of "rubble concrete," as recommended in my last report.

The beaches of the hospital are most difficult to keep clean, being daily covered with oak bark, chips, shavings, and other debris from the woodyards of Norfolk and from stuff thrown overboard by passing vessels. There seems to be no way to remedy this evil, so the beaches are cleaned once or twice a week by convalescents. The sand has made very irregularly during the past year. In some places the beach has been denuded of sand, in others it has drifted in hillocks; this year the reverse may obtain, so changeable are the currents of the Elizabeth River.

Visitors.—The number of visitors to the park is increasing, and they seem to enjoy the increased facilities for walking and driving, and the improved appearance of the grounds and park. Both entrances present an attractive appearance, but the county and city roads leading to them are kept in such a bad condition that in wet weather they are almost impassable. Of course nothing can be done beyond representing their condition to the civic and county authorities, which has been done. But thirty-one permits for picnics and excursion parties have been issued by the hospital during the past year, and not more than three or four by the "yard," the restrictions as to the sale of liquors, etc., no doubt drive many parties to other localities. The rules are rigidly enforced, each person in charge of a party or picnic being furnished with the printed permit annexed.

The Bureau's action in preventing tugs landing passengers at the hospital wharf has been of service in many ways, for the park was in danger of becoming a public highway for workmen and negro laborers.

The pine woods have been thoroughly cleaned and grubbed up to the extent of nearly 60 acres, thus destroying the "under-brush," and the old stumps (for the removal of which \$1,180 was the lowest bid made by a dynamite company) have been nearly all removed by the hospital laborers without additional expense to the Bureau.

Trees for the front park are necessary, but only such as are able to stand high winds and the salt spray from the river should be planted. I have obtained from the country and woods about two hundred small trees, oaks, poplars, maples, cedars, etc., and these have been planted to the best advantage in and about the grounds.

The osage orange hedge around the inclosure has not done well in some parts where the soil was poor, but the contractors have recently manured, cultivated, and reset the hedge, and it is to be hoped that in three or four years it will be fit for wiring and prove an ornament to the grounds and a defense against trespassers.

CEMETERY.

The cemetery is now in excellent order. Grass is growing over every section; the "cairn" or monument to the heroes of the *Congress* and *Cumberland* is nearly covered with ivy and vines, and on last Memorial Day the services of the Grand Army were held around this spot. All the lots have been put in order, railings painted, paths cleaned, and hedges trimmed. All the old and decayed headboards have been removed and replaced by 240 new marble headstones supplied by the courtesy of the Quartermaster-General of the Army. The wall of the cemetery needs repointing and should be painted to preserve it properly, but no other repairs are needed.

REPORT OF U. S. CRUISER BALTIMORE.

By Medical Inspector J. H. CLARK.

From middle of January till early part of May this ship was fitting for her first cruise at the Norfolk navy-yard. From May to the last of August she was in the North Atlantic squadron on the coast of the United States, between Key West and Bar Harbor. Then she left for Stockholm, Sweden, and later visited Kiel, Copenhagen, Lisbon, Mahon, Naples, Spezia, and Villefranche. No epidemic or infectious disease has appeared, and the only contagious diseases were venereal. The crew was not given liberty at Kiel because of an epidemic of diphtheria, nor at Lisbon on account of the prevalence of variola. The ship has thus far been very healthy, as was to be expected in a new steel vessel, and our duty has not taken us to especially unhealthy places. The sick list has been very small, but the proportion of cases of slight indisposition, not requiring to be excused from duty, has been very large—as those of bronchitis, tonsillitis, chronic rheumatism, dyspepsia, gonorrhea, syphilis, and minor accidents. The number of cases of malingering has been large.

VENTILATION.

The ventilation, both natural and artificial (by the Sturtevant blowers), has been excellent in all parts of the ship. The air space of wardroom officers is adequate; that of the steerage and berth deck is limited. This is due to the fact that the plans of the ship were changed to make the Baltimore a flagship.

The quarters for the admiral were taken from the wardroom, which was moved forward, encroaching on the steerage and warrant officers' quarters; which in turn were placed in the after-part of the berth deck. No harm has come from this thus far, as we have had no trying climatic experiences. Carbonic acid observations, in different parts of the ship at different times, have shown from 5 to 10 parts in 10,000.

WATER.

Distilled water is used for drinking and cooking, with rare exceptions. That for officers is filtered. The Pasteur-Cumberland filter is useful.

SICK BAY.

No plan for a sick bay was made in the design of the ship. One-half of one of the torpedo rooms is devoted to the purpose. Steam heaters were put in at Norfolk, without which it would be dangerously cold at times. In very hot weather, especially at sea when the ports on the defective armor deck are closed, the sick are removed to the crowded berth deck. The heaters fill rapidly with water, as they are supplied with steam by pipes running down vertically from the berth deck. The bay is well supplied with electric light, which must be used in surgical operations, even in the daytime.

HOSPITALS.

Stockholm is well supplied with modern hospitals. Two deserve special mention. The Sophia Hospital, founded by the Queen, is on a hill site overlooking the city, is small and for the use of private patients, with one or two beds in each room, and is modern in all ways. Ventilation and drainage are excellent; floors of hard wood, polished; rooms have but little furniture, which is readily moved. It has an excellent antiseptic operating room. Each patient selects his physician or surgeon. The hospital is scrupulously neat, and in charge of trained female nurses.

The Orphan Hospital with its 1,000 beds is very large, situated on a hill within city limits, built on three sides of a hollow square. On the remaining side are outbuildings. Wards large, high, light, well ventilated, furnished with hot air, contain from 6 to 24 beds, including cribs. A mother with illegitimate child is received there, provided she nurses one orphan and cares for it in all respects as her own. Thus we see a crib on each side of every bed. When old enough these children are taught in a schoolroom the usual branches and some useful art. Later they are sent to some family in the country where they remain, still wards of the State, until old enough to support themselves. There are separate buildings for contagious diseases, steam power, electric lighting, washing, autopsies, etc. At Kiel the naval hospital was visited, old perhaps in its architecture, but very large, light, well ventilated, and heated by hot air, excellently drained. A ward is used for operating room where antiseptics is practiced. Part of the building is devoted to storing the medical outfits of the men-of-war at the Kiel naval station. Each ship's supplies, when out of commission, are kept labeled on shelves, so they can be taken on shipboard at a few hours' notice. The supply of surgical instruments and appliances is unusually liberal. A small laboratory manufactures some of the medicines. At Lisbon the principal hospitals were visited. With one exception they are converted from churches and monasteries of the Jesuits. They can not be expected to be well adapted to their purpose. They are crowded, poorly ventilated, but neat. Most of the wards are dark. Those for women and children are better. Iron bedsteads with inelastic slats and straw beds are used in both civil and military hospitals. In the city hospital of over 1,000 beds wool mattresses can be had by order of visiting physician. In some male wards the beds cover over one-half the floor space. A new hospital for women and children, built by a charitable organization, on a high hill within the city, surrounding a square filled with shrubs and flowers, is light, airy, well ventilated, and neat and comfortably furnished. It is of two stories, sunny and with pleasant prospect; built of brick. Connected with this institution are two long, narrow, temporary pavilion wards of wood, of one story, raised several feet from the ground, supported on pillars. Each ward contains 24 beds. The weather is so mild that no provision is made for heating. No "Sisters of Charity" are employed in any Lisbon hospital.

GYMNASIUMS IN SWEDEN.

Sweden, where originated the "Movement Cure," has the most general and perfect system of gymnasia. It is taught in the public and military schools. Officers of the army and navy are teachers. A captain in the navy has charge of system in Stockholm. People continue to take exercise in these gymnastiques until 50 or 60 years of age, for preservation of their health. Special gymnasia are constructed for treatment of sick. In these passive motion is first given by attendants with the use of the mechanical appliances. Later, patient begins to exercise himself with assistance. Dr. Zander's gymnastique is of special interest—the original and largest of its kind in the world. Its originality consists in applying passive motion by machinery run by steam. It occupies three large rooms, connecting, on same floor. The ingenious machines are numerous and well calculated to bring into play almost every muscle and set of muscles. Students come to Stockholm from different countries to prepare themselves for teachers in their respective homes. Some of the diseases benefited are paralysis of all kinds, congestions of brain, kidney, liver, and pelvic viscera, dyspepsia, rheumatism, and those conditions due to sedentary habits. Even one case of phthisis pulmonalis claimed to be much better after six months' treatment by active and passive exercise of thoracic muscles.

[Extract from letter of Medical Inspector J. H. Clark, U. S. Navy, senior medical officer, U. S. S. *Baltimore*, relative to examinations for color blindness.]

In accordance with your request I have visited Prof. Frithiof Holmgren, at Upsala, Sweden, who received me very kindly and instructed me fully in his method of examination for color blindness.

He used five methods, including those of Profs. Donders and Shilling and his chromatioskiameter. Practically he tests candidates for color blindness by his Berlin worsteds, as we do in the Navy. There are four slight differences, however, in the use of the worsteds as compared with their use by the Medical Examining Board.

First. Half a dozen skeins of different shade of green are shown the candidate to illustrate what is wanted of him in selecting those skeins when mixed with the others (confusion colors). The same is done later with shades of pink.

Second. The test skeins (green and pink) are of the same size as all the other skeins: not four times as large as with us.

Third. Only green and pink are used as test skeins; for green and red blindness respectively. Red and violet skeins are not used unless to determine so slight a degree of color blindness as not to cause rejection in candidates for railroad or steamship service.

Fourth. Instead of using the deepest or brightest shades of green and pink as standards of comparison, those of medium shades are used.

REPORT OF U. S. NAVY-YARD, LEAGUE ISLAND, PA.,

By Medical Inspector A. A. HOEHLING.

On February 21, June 3, June 14, July 1, July 26, and July 28, cases were sent to the U. S. Naval Hospital at Philadelphia, Pa., which proved to be enteric fever, and which appeared to have originated at the marine barracks here.

Six cases comprise all that occurred during the year. When I reported for duty on July 19, my attention was called to this matter by letters sent here in relation thereto by Medical Director A. C. Gorgas, U. S. Navy, in charge of the Naval Hospital at Philadelphia.

As the result of an examination into the surroundings of the marine barracks, I reported to the commandant on July 26 that the water-closet of the men was in an improper condition; it was too full, and the odor was extremely offensive. I also reported that the driven well at the barracks supplied water that held a good deal of organic matter in solution. This water was carefully analyzed at the Naval Museum of Hygiene, and the following report was there made relative to its condition:

Report of analysis of a sample of drinking water received from the League Island navy-yard, September 18, 1890.

WASHINGTON, D. C., October 3, 1890.

This water when received was very muddy from mechanically suspended matter, clay, etc. In a short time this subsided completely, leaving a clear, bright liquid, the analysis of which is as follows:

	Parts per million.
Ammonia, free	0.67
Ammonia, albuminoid	0.04
Solids, dried at 100°C	83.00
Nitrogen, as nitrates	0.40
Nitrogen, as nitrates	Trace.
Chlorine	14.80
Oxygen, consuming power	1.20
Iron	Trace.

This water contains an excess of nitrogenous organic matter, which seems to be of vegetable origin, in a rapid state of decomposition. This rapid decomposition renders it doubly objectionable, and it can not be considered a safe drinking water.

There is no contamination from cesspool or sewerage.

Very respectfully,

PHILIP S. WALES,
Medical Director, U. S. Navy, in Charge.

In a letter on the same subject, dated October 3, 1890, Dr. Wales says: "We consider the water as dangerous, and, as we understand several other surface wells are contemplated, we strongly condemn the use of the water should they be sunk. The well in question consists of a 2½-inch pipe driven down 60 feet. It was against orders for the men to drink this water unboiled, but I have learned that they often did so surreptitiously. I found that the water supplied for drinking purposes came from iron tanks that received rain water collected on the roof of the barracks. There was an order that the hose which conveyed this water from the roof should be allowed to empty the water away from the tanks for fifteen minutes at the beginning of each rain, but this does not appear to have proved efficient in procuring clean water, because I found it full of organic matter on adding a solution of permanganate of potash; and the men told me it had a bad taste, and sometimes made them vomit. The truck farms on South Broad street are fertilized with human manure, and a good deal of typhoid fever prevailed in the city of Philadelphia during the year just passed as well as for several preceding years. The dust from these farms blows all around, and much of it alights upon the roof of the barracks, and so finds its way, in a greater or less amount, into the rain water collected from the roof in question. Typhoid fever germs have been found on celery grown in beds fertilized with human manure, and I think it highly probable that such germs found their way, in the manner outlined above, into the rain water tanks whence the marines drew their drinking water. I am, therefore, of the opinion that our cases of enteric fever were due to the use of the contaminated rain water above mentioned, and not to the foul cesspool or the well water.

As a result of the investigations before mentioned the cesspool was emptied and abandoned, the men using barrels, which were emptied into the back channel. A new water-closet was built, which will empty into the same stream. The water from the driven well was again interdicted from use, except in cooking and washing; the rain water was removed from the tanks, and they were thoroughly cleaned out, though this had also been done quite recently, and all water was boiled before being used for drinking purposes, its flavor being restored by ice placed in it.

So soon as these measures were in full operation enteric fever disappeared at once, and diarrheal attacks, which had been frequent, diminished notably, the warm weather probably being responsible, as well as fruit, for such few cases as still occurred.

The marine barracks are too small for the number of recruits often quartered there, and have double bunks in which the pallets are arranged in pairs, one above the other. This is a poor arrangement, both for comfort and health, in that it permits too much crowding, with all its attendant evils. Those of the men who sleep near the doors are very liable to colds during the winter.

During the malarial season a few cases of malarial fever occurred at the marine barracks and in house A, both situated near the back channel. The cases were not pernicious or grave in type, and the early frosts put an end to the appearance of new cases, while there have been but few relapses in old ones. When South Broad street is built up to the navy-yard gate, and the yard is completed, there is every reason to believe that this station will be as free from malarial diseases as is possible in any place situated near a fresh-water river. There will always be some malaria, but nothing more than is quite common in our country.

[Extract from quarterly report of sick for the fourth quarter, 1890, made by Medical Inspector A. A. Hoehling, in charge of medical department, navy-yard, League Island, Pa.]

Three cases of intermittent fever were admitted during this quarter, the early frosts this year having put an end to the malarial influences sooner than is commonly the case. That malarial diseases find their cause here is, of course, historical; the old "Neck" having earned that reputation from the earliest days of Philadelphia; but I can truly say that I have not found pernicious, or even serious cases of such affections since I have been on the station.

Broad street is being rapidly built up toward the south, and when it is improved to the gate of the navy-yard, and when the latter is completed as a navy-yard, and the back channel is dredged so as to be free from flats at low water, there is every reason to believe that this station will be as free from malarial influences as is possible in a location on a fresh-water river.

REPORT ON U. S. FLAG SHIP PHILADELPHIA.

By Medical Inspector T. WOOLVERTON.

I respectfully submit the following report concerning the sanitary condition of this vessel. The *Philadelphia* is classed as a protected cruiser, and was built for the Government by William Cramp & Sons, of Philadelphia, and launched September 7, 1889. Her length is 335 feet; beam, 48 feet 6 inches; mean draft, 19 feet 2 inches; displacement tonnage, 5,200. Built of mild steel; the plating five-eighths-inch thick, the protective deck $2\frac{1}{4}$ to 4 inches thick, and the conning tower 3 inches thick. She is fitted with electric lights throughout, four powerful search lights, and 98 watertight compartments. Ventilation is facilitated by two blower engines, situated on the afterpart of the berth deck, which connect by means of pipes with every room and compartment in the ship.

MACHINERY.

There are two triple-expansion engines, capable of developing over 10,000 horse power, and connecting with twin screws. She may be driven ahead at the rate of 19.68 knots per hour. There are 40 separate and distinct engines on board for various uses. The coal capacity is 1,095 tons.

ARMAMENT.

There are twelve 6-inch breech-loading rifles, which constitute her main battery. The secondary battery, mounted on the rail and in the military tops, comprise two 1-pounder, four 3-pounder, and four 6-pounder rapid-fire guns, Hotchkiss revolving cannon, and Gatling guns. There are also five torpedo tubes for use of automobile torpedoes.

I. MEDICAL DEPARTMENT.

The personnel of the medical department of this ship consists of one medical inspector, one passed assistant surgeon, one assistant surgeon, one apothecary, and two baymen.

Dispensary.—The dispensary is situated on the berth deck, port side, just aft of the surgeon's examining room, and about 30 feet forward of the wardroom bulkhead. It has a cubic capacity of 400 feet, is supplied with a 16-candle-power portable electric light, and a pump connecting with a fresh-water tank. There

is an air port here, having a diameter of 1 foot and an exhaust register connecting with the blower. The dispensary is large enough for its particular purpose, but so much room is occupied by the counter, desk, drawers, sink, and pharmaceutical apparatus space is not afforded the apothecary for bunking or swinging here. The light here is good, and the ventilation, when the blower engines are in operation, is all that could be desired.

Surgeon's examining room.—The examining room is forward of the dispensary, from which it is separated by a wooden bulkhead. Like the dispensary, it is rectangular in shape, but is somewhat larger, having a cubic capacity of 584 feet. The air port and exhaust register are similar to those in the dispensary, and we have here two 16 candle-power electric lights—one portable, the other stationary—a desk and lockers for the surgical instruments, test cases, the microscopes, and the antiseptic cases. In this room, where we have privacy and comparative quiet, sick call is held and physical examinations are made. The artificial light given by our two Edison bulbs is excellent, and the ventilation, as on the berth deck, very fair when the blowers are rapidly in motion.

Sick bay.—No provision was originally made for a sick bay, but when the ship went into commission the necessity was so apparent that on so large a ship we should certainly have a room exclusively for the sick that the port side of the midship torpedo room was set aside for this purpose. This room is situated below the berth deck and about on the water line; it is reached by means of the larger midship hatchway. It is intended to separate the sick bay from the starboard side of the midship torpedo room by a wooden bulkhead, but at present a canvas curtain serves this purpose. The sick bay is rectangular in shape, and extends from the foot of the midship hatchway or ladder outboard to the ship's side. The cubic capacity is 2,646 feet. Ventilation is here effected by the two exhaust registers and the hatch. In fair weather the two air ports, each having a diameter of 1 foot, are opened, thus making ventilation perfect. At any time when the sick bay is not overcrowded it can be said that the ventilation is fair. The natural illumination here is not good, but the artificial, from three 16 candle-power electric lights (two stationary and one portable) is excellent. The sick bay has numerous steam pipes passing around its bulkheads a short distance above the level of the deck. The place can be kept warm enough, and with care and attention a temperature almost equable might be preserved. As has been said, the room was not constructed for a sick bay, and hence there are several deficiencies which must be supplied before it can afford the most usual requisites of such a place. We have here neither water-closet, urinal, nor bath tub, and there is no connection with the fresh-water tanks. It was pointed out to the recent board of inspection sent by the Department to this vessel how much it would contribute to the comfort of the sick were these deficiencies supplied.

The patients sleep in the comfortable swinging cots or in their hammocks; and ten men can be accommodated here without overcrowding.

Medical storeroom.—The medical storeroom, or compartment 88, is situated in the afterpart of the vessel, below the captain's cabin. It is of good size, and affords us ample stowage room.

Medicines.—The medicines for the ship have been furnished by the naval laboratory, and are very satisfactory.

Enlistment of recruits.—Since the ship has been in commission we have made comparatively few physical examinations for enlistment, and in these cases the persons examined were chiefly servants. In the surgeon's examining room we have all the essential apparatus for doing this most important duty with care and accuracy.

Instruments and apparatus.—The surgical instruments and the instruments used as aids to diagnosis are all in good condition, kept so by stowing them in the driest lockers and by frequently inspecting them. The galvanic battery is in good condition, and it is kept in readiness for immediate use. The urinary test case, the atmospheric apparatus, and the microscope are in the same condition as when received aboard, and are frequently made use of by the medical officers of the ship.

Medical records.—The medical journal has been carefully and neatly written by the medical officers only. Metric weights and measures have generally been employed. Copies of all official papers have been preserved.

II.—SANITARY CONDITION.

[Complement: Officers, 33; men, 357; total, 390.]

Quarters.	Number of occupants.	Total cubic air space.	Average cubic air space per occupant.
Cabin:		<i>Cubic feet.</i>	<i>Cubic feet.</i>
Spar deck.....	1	5,608	5,608
Berth deck.....	1	5,608	5,608
Spar-deck rooms.....	2	789	394
Ward room.....	15	12,449	829
Steerage, starboard.....	12	2,950	245
Warrant officers' rooms.....	2	789	394
Berth deck.....	250	23,422	93
Forecastle.....	35	3,343	95

The steerage (there is only one and that on the starboard side) is well illuminated and ventilated and comparatively comfortable. It is provided with ten bunks, two single and four double. With the double bunks the bedding of the lower one is stowed away in the upper during the day, the mattress only remaining. This being upholstered on one side is reversed and a lounge by day is thus offered. The upper bunks are folded up in the fashion of the Pullman sleeping-car berths. Communicating with the steerage is a good-sized bath and wash room containing a stationary bath tub and five stationary wash basins. The basins are all supplied with fresh water, the tub with salt water, which is nearly always quite warm, as it comes direct from the condensing boiler.

Cells.—There are two cells situated on the berth deck forward. They are small, semicircular, in cross section, and have a cubic capacity of 100 feet each. The ventilation is only fair. The prisoners are usually confined on the berth deck, starboard side forward, where they are kept under a sentry's charge. In this way they enjoy as good air as anyone, and may see all that is going on about them. The cells are generally used for court-martial prisoners, who may be serving short terms of solitary confinement.

Water.—The amount of water supplied by our condenser, or the daily capacity, is 3,000 gallons. The water is aerated and cooled, and has proved to be of excellent quality for drinking and cooking purposes.

Food and messing.—Ice chests are provided for the different messes, and there are lockers for the stowing away of mess gear. The meats and vegetables are usually inspected by a board of survey, of which a medical officer is always a member. The provisions have been, as a rule, of good quality, and very few complaints from the crew have been made on account of poor meat or bad vegetables.

Water closets and head.—The head is situated under the forecabin, and is well protected from the weather. The men's closets are situated forward of those for the officers. They are ample in number, are well flushed by means of the circulating pumps, and answer every hygienic requirement.

Bath rooms.—There are bath rooms in the cabins; one for the ward room, one in the junior officers' quarters, and two wash rooms on the berth deck for firemen only. There are no facilities of the kind afforded the men.

Clothing and bedding.—The men stow their clothing in ventilated wire lockers on the berth deck. While this arrangement has many very apparent advantages and insures some tidiness and ventilation the clothing has little protection from dust. This is most noticeable when coaling ship, for then the black particles pervade everything in the lockers. Coaling ship is, however, not a thing of very frequent occurrence. The hammocks and bedding are stowed by day in the netting under the rail on the spar deck.

Health of the ship's company.—The health of the crew has been good, but there has been no climatic exposure so far, except to the cold of winter. The vessel, having but a single deck, carries her men badly. There is not hammock room enough, and the messing upon and constant crowding of the berth deck makes it difficult to keep clean. The deck is cold in winter, owing to the various hatches, and will be warm in summer from engine room and blower engines on the deck. If the space now occupied on this deck by the firemen's wash rooms could be given up to general use it would be an advantage.

REPORT FROM THE U. S. S. SAN FRANCISCO.

By Medical Inspector C. H. WHITE.

This ship was commissioned on the 15th November, and has been lying here at the navy-yard, with the workmen aboard of her still, and the officers and crew unsettled yet in their new quarters.

I am not now able to make a definite statement as to her sanitary condition, and can only give some general facts as to her quarters and ventilation.

Forward in the eyes of the ship are located the dispensary and bath room; the one on the port side, the other on the starboard.

The dispensary is well fitted up, with lockers, drawers, dispensary counter, and stationary washstand. Water is supplied by a tank overhead, and an escape pipe gives exit to the waste water near the water line of the ship. Two ports give abundance of light, and when open give ample ventilation. There is also one ventilating register in this room. This room has a capacity of 400 cubic feet.

The bath room, on the starboard side is larger than the dispensary by 50 cubic feet. It is fitted with a porcelain-lined bath tub (connected for hot and cold water), a water closet, and a stationary wash stand. This room is very convenient for patients who require frequent dressings, as gonorrheal cases, abscess cases, etc. A cover fitted to the bath tub serves as a table for apparatus for the examination of urine, etc.

Two ports, which have an opening each of 132 square inches, give air and light, and one ventilating register besides for use at night and in bad weather.

The sick bay has space of 2,200 cubic feet, and six patients can be comfortably accommodated here. On occasions it may be necessary to exceed this number, and this may be done without much inconvenience, provided the ventilating apparatus is in motion. Four ports give abundance of light, and may be kept open for ventilation in good weather. There are two ventilating tubes communicating directly on the upper deck, each tube having an area of 250 square inches, besides six ventilating registers connected with the blowers. The bay is dried and heated by steam coils.

The berth deck is divided into three portions, viz: A forward portion that occupies the whole width of the ship, and two lateral portions extending from the forward portion to the steerage on the starboard side, and warrant officers' rooms on the port side.

The forward portion has a capacity of 12,500 cubic feet and is occupied by the blue jackets, about 200 in number. Light and air are abundantly supplied by 16 round ports of 132 square inches area each, two square ports of 4 square feet area each, and two hatches leading to the spar deck of a combined area of 37.5 square feet. Ventilation is further insured at night, when this deck is fully occupied, by ten registers connected with the ventilating fans.

There are two brigs on this deck, each 7 feet 6 inches long by 6 feet 10 inches wide, with a cubic air space of 300 feet. Ventilation is insured by perforated iron doors and one ventilating register in each, besides a round port of 132 square inches area, which gives light and further ventilation if necessary. The perforations in each iron door aggregate 168 square inches, whereby the ventilation of this part of the ship is fully secured. This division of the berth deck is separated from the after divisions by a water-tight bulkhead.

The starboard portion abaft the bulkhead has 13,400 cubic feet capacity, and is occupied by a portion of the engineer's force, all the musicians, and servants—in all, about 60 persons. It is well lighted and ventilated by 6 round and 9 square ports of the same size as those already mentioned. There are four ventilating registers besides on the open deck.

The port division is somewhat less roomy than the starboard side, owing to the location here of the machine shop. Its available cubic capacity is 11,600 feet, and it berths the marines and a few firemen—about 40 in all. There are seven round and eight square ports of same size as those before mentioned and four ventilating registers. The connecting passages between the starboard and port divisions of this deck have three more ventilating registers, besides two in the junior officers' water-closet, one in the ward room water-closet, and one in the paymaster's office.

There has not been sufficient time for a trial of the ventilating apparatus of this ship to determine how far it will avail to keep the air fresh when the berth deck is fully occupied and the hatches are hooded (as they are usually in bad weather),

but this determination will be made when occasion permits by the estimation of CO₂.

For heating and drying this deck steam coils are distributed at such frequent intervals as to amply secure these ends.

REPORT ON U. S. FLAGSHIP CHARLESTON.

By Medical Inspector G. W. WOODS.

During the year 1890 the *Charleston* has divided the time between Mare Island, San Francisco Harbor, the Hawaiian Islands, and Puget Sound, more than seven months having been spent at Honolulu, Hawaiian Islands. During this period there has been no serious illness on board save six cases of pneumonia and one case of purpura hemorrhagica, which terminated fatally in cerebral apoplexy at the Naval Hospital, Mare Island. The number of admissions was 185, with 1,586 sick days, and at the end of December there remained on the medical journal but eight cases of a trivial character.

The following interesting report of an accident to the diver of the ship is made by Passed Assistant Surg. W. F. Wieber:

Frank, Alexander; sailmaker's mate; employed as diver. While at Seattle, Wash., in August, 1890, was at work cleaning the ship's bottom. In trying to get from one side of the ship to the other, holding by and following a rope ladder, he lost his hold and fell to the bottom, a depth of about 17 fathoms, temporarily checking the supply of air, and thus abolishing the counter-pressure. During his descent he noticed the following symptoms, viz.: A tight sensation about the head; cracking in the ears, with a sharp stinging pain, and hemorrhage from right ear. The descent of the diver being noticed almost immediately, he was quickly pulled up, the pumping in of air being started, and was quickly relieved of his diving suit. The following symptoms were noticed: Puffiness of the face, subconjunctival extravasation, especially of eyelids, and the same bloody extravasation under mucous membrane of mouth, palate, and pharynx; thickness of speech and a feeling of constriction about throat, with dyspnoea. During the day patient was drowsy, and on several occasions spat up some blood. The following day he was as usual. Absorption of extravasated blood was rapid, and he made a good recovery.

The ship, from a sanitary point of view, has proven very satisfactory, with two exceptions, one of which was immediately remedied. This exception had reference to a condensation of moisture upon the iron deck forming the ceiling of the sick bay. During the cold months of the late winter and early spring, while at Mare Island, Cal., the atmosphere of the berth deck, saturated with moisture from the lungs of three hundred men swinging between decks, would condense upon the iron surface at the period of maximum cold, about 3 a. m., producing a veritable rain, and necessitating the putting up of tarpaulins over the cots and hammocks occupied by the sick. The matter being reported, a survey was held, and the board recommended the putting in of a wooden ceiling with an intervening air space. This recommendation being carried out, no further inconvenience was experienced. This condensation of moisture had apparently been provided for by coating the iron with a so-called cork paint, consisting of ordinary white lead and oil mixed with ground cork. In the sick bay, where the iron had no covering above or below, it was entirely inefficacious, as has been seen; and in the section between the barbettes, where there was a wooden deck above, only partially so.

The second exception is the dynamo room, faulty in construction, position, size, and ventilation. It is placed beneath the protective deck, has only a cubic area of 807 feet, and into this are crowded three dynamos, occupying 35 per cent of the space. A diminutive blower, worked by an electric motor, gives but slight relief, and this can only be used when the dynamo is running. For further ventilation an aperture has been cut into the shell hoist, but this only seems to partially fulfill its purpose. Originally the room was supposed to be ventilated through the hollow iron foremast, but in this object it has failed utterly, only seeming to condense moisture which descends in streams. The heat of the dynamo room is often so great that the thermometer, indexed for 140°, can not register the temperature, and the men perform their work entirely naked, complaining of nausea and vertigo whenever the revolutions of the little electric blowers are for even a brief period suspended. It is suggested that a new dynamo room be constructed.

forward on the spar deck, and that the present one may be retained for the emergencies of war. If this recommendation is not accepted, some connection should be made with the Sturtevant blower, or a special blower of more power should replace that at present in use. The Sturtevant blowers, adapted to every part of the ship save the dynamo room, act successfully, and when at work no such thing as impure air can be demonstrated, also maintaining a dry atmosphere between decks in ordinary weather. The lighting of the quarters occupied by the enlisted men by means of well-distributed electric lights is to be commended, as it gives them the opportunity of reading during the evening hours of recreation; and the heating apparatus is so arranged that the ship is rendered comfortable without foci of excessive heat and others of cold.

Honolulu, and its eleemosynary institutions, have been so often described in reports to the Bureau of Medicine and Surgery that a reference here is unnecessary. I must, however, speak of the Government work in behalf of the leper in which, it is no flattery to say, that the Hawaiian Government, represented by its admirably organized board of health, is in the lead with other nations, and in its personal care of the leper in advance of any of them.

The Kalihi Hospital, or receiving station, and "House of Detention" for lepers, is located 3 miles from the city of Honolulu, near the sea shore, and beyond the boundaries of the harbor. Here all suspects are brought, and after inspection by the board of health, are either declared lepers and sent to Molokai, or are detained until the disease has manifested itself, or are discharged as not being affected with the disease. For carrying out these purposes the inclosure is divided into two sections, one for suspects, and one for the declared lepers, who are sent to Molokai as speedily as possible, save where, as recently, they have been detained for the purpose of observation and experiment. In both divisions the patients occupy comfortable, well furnished cottages, with good beds and bedding, and the food supply is superior to that usually enjoyed by the natives. A competent physician generally resides at the station, and the board of health meets here monthly to examine new cases, inquire into the condition of the suspects, and make a careful inspection of the premises.

In 1890, January 12, D. O. Lutz, M. D., of San Paula, Brazil, an associate of the eminent Unna, of Hamburg, and a physician of large experience, as a dermatologist, was commissioned as government physician for the study and treatment of leprosy. After consideration of the matter for some time, he concluded to confine his work principally to Kalihi receiving station, exercising only a general supervision over medical affairs at Molokai, where Dr. Swift was in charge. At Kalihi he was to constitute one of the members of the examining board, that advantage might be had of his diagnostic ability in matters of dermatology; and he was to be permitted to retain twenty lepers for purposes of treatment and experiment. The work of Dr. Lutz really commenced November 26, 1889, and terminated October 12, 1890, when dissensions having arisen between himself and the board he was forced to resign. During the continuance of this service at Kalihi he had associated with him in the care of the lepers and suspects a competent trained nurse in the person of Sister Rose Gertrude, a young and enthusiastic English girl, whose duty was admirably performed.

The period of Dr. Lutz's stay at Kalihi was but eleven months, yet several valuable quarterly reports were made by him to the board of health, and from the first and last I condense the following information:

In April, after four months' experience, he speaks encouragingly and thinks that treatment had suppressed development, especially in tuberculous cases, and in many absorption of tubercles, even that of the ear lobes, and disappearance of cutaneous pigmentations, so prominent a feature of the dorsal surfaces, had taken place. Syphilis was found in many cases distinctly separated from the leprosy condition, and yielded to specific treatment. "In several anæsthetic cases, even in very unpromising ones, a partial restitution of feeling and a diminution of contraction had been noticed, which he credits to treatment. This treatment was chaulmorgia oil and gynecardic acid, its essential constituents, with which he had had previous success in Brazil and Paris. Salol, however, was his chief remedy," first introduced by him in the treatment of leprosy several years ago. It would seem, to judge from Dr. Lutz's observations, that the progress of leprosy was associated with inflammatory conditions and febrile excitement always, and that the salol acting as an antiphlogistic and febrifuge stayed the morbid processes. Creosote and guayacol, its active principle, were given in cases where the lungs were affected with satisfactory results, but its beneficial effects on the disease itself were not positively determined. Antipyrine gave great satisfaction in three cases where there was neuralgic pain. Arsenious acid was found not to

act favorably; contrary to common experience, and antisyphilitic remedies, especially potassium iodide, were not clearly beneficial in uncomplicated cases.

In external use, chrysarobin, or crysophanic acid was used, and acted favorably in causing the absorption of tubercles, and the disappearance of maculonervous, and psoriasis-like eruptions. It also quickly improved extensive conditions of paræsthesia. Chrysarobin was employed in 5-10 per cent ointments, or in solutions with either benzine, chloroform, and similar solvents, always being covered with elastic collodium. Pyrogallic acid was found to act like chrysarobin, but more slowly, and was only employed on the face and hands to avoid toxic symptoms, which are manifested as pernicious anæmia. Ichthyol is praised as combating inflammatory symptoms, and was used both internally and externally.

Dr. Lutz considered infection as furnishing the largest number of patients; heredity, if it really exists at all, as quite secondary, and vaccination as a most doubtful factor in the propagation of the disease; opinions corresponding to those of most dermatologists now engaged in the study of leprosy. In concluding his first report the following important conclusions are presented by Dr. Lutz, after many years of study and experience:

Leprosy is a chronic disease, and therefore requires a chronic treatment, like syphilis and tuberculosis. While in the latter disease we can do nothing more than help the natural tendency to a cure, and all the methods tried in late years have led no farther, still the hope survives that specifics may be found as for syphilis. This latter disease is perfectly curable, although the moment when the cure is accomplished may never be ascertained. But we know that watching the patient from the first, and curing every fresh outbreak by immediate treatment, we may finally come to a real cure. The stationary tubercles and nerve affections of leprosy do not endanger life, and their removal, which is often possible, does not warrant cure. It is probable that most of the microbes in the tumors are dead and that the effect of our remedies is only to hasten the reabsorption of the dead material. This may be obtained, perhaps, without a specific action, by an artificial irritation and hyperemia.

But at the same time we may again throw into the circulation a few surviving organisms, and thus promote new outbreaks. We must therefore direct our principal attention to the general treatment. If we learn to recognize the very first outbreak (as I have done during the last years with several patients in my private practice), if we can check it, as seems to be possible, by the use of salol and salicylate of soda, if we treat in the same way every feverish and eruptive period, giving in the intermediate time other remedies which have a favorable influence, and finally slowly remove the morbid deposits where they already exist, we do more to prolong the life of the patient than is done in all the sanatoria for tuberculosis. At the same time we may avoid at least a good deal of the consequences of the untreated cases and make leprosy, as it has proved with most of my private patients, a rather benignant disease. I believe we shall then also see cures which may be attributed, not to extraordinary fortunate chance, but to our methods of treatment.

In his final report, dated October 1, 1890, satisfaction is expressed with the effects of salol, chrysarobin, and pyrogallic acid, and reference is made to cresalol as a substitute for salol, and to some experiments with sulfural. Several patients are referred to as having improved under treatment and five are mentioned by name as recommended for transfer from the leper to the suspect side of the hospital, presumably because they were considered to be cured of their leprosy.

In October, 1890, Dr. Lutz abruptly closed his connection with Kalihi Hospital and terminated his contract with the board of health, Dr. Henry McGrew taking his place. On account of the confidence evinced in Dr. Lutz's course of treatment by the natives, all of his therapeutic measures were continued up to the period when the *Charleston* left Honolulu, in February, 1891. At this time I was informed by Dr. McGrew that, in his opinion, and that of his associates on the board, Dr. Lutz's course of treatment was not curative, and that all the patients supposed to have been cured had been committed to Molokai.

In July, 1890, I visited the leper settlement of Molokai as a guest of the board of health which accompanied a legislative committee upon its biennial tour of inspection.

Since my visit in 1876, an account of which was published in the Bureau's report of the succeeding year, great changes have taken place in the leper settlement, and it is hard to see in what way these exiles could have their condition improved, physically, medically, morally, and mentally. Comfortable cottages have been built for all; there is a well-appointed hospital; a bountiful supply of

provisions and clothing is issued to all, and for the young there are two excellent schools for boys and girls, the Bishop Home for the former, and the Damien Home for the latter, both under the control of Franciscan Sisters. There are two Catholic churches, with two resident priests, successors to the lamented Father Damien, and those of other religions receive appropriate ministrations in four special places of worship.

The resident physician is Sydney Bourne Swift, M. D., a man of superior attainments, and a close student of the disease with which he is principally associated.

In his latest report Dr. Swift says that he regards the disease, both anæsthetic and tubercular, as undergoing a rapid modification and assuming a new type. A pronounced feature of the anæsthetic variety is the proneness to take on ataxic symptoms, and at the expense of other neural disorders; and the typical tubercular cases, with pendulous ear lobes, are becoming rare. He also notes cases where the disease having apparently wholly disappeared suddenly redeveloped, and, in a surprisingly short time, the subjects became full-fledged lepers. Treatment—what treatment is not mentioned—has often in his experience produced most satisfactory results. During the biennial period extending from March 31, 1888, to March 31, 1890, the commitments to Molokai were:

Hawaiian born	783
British	2
American	2
Portuguese	2
Chinese	11
South Sea Islanders	3
	803
Number of lepers at Molokai, March 31, 1888	749
Total with commitments	1, 552
Deaths during two years	393
Total remaining	1, 159

Leaving at settlement, April 1, 1890, 1,159 and showing the death rate to have been 25.32 per cent. A comparison with my report of 1876 shows that the annual average of commitments from the date of the establishment of the leper settlement in 1866 had been 157, as against 374 during the year 1889 and 1890, and the average mortality 87.2, as compared with 25.32 during the latter period.

We can certainly deduce from these figures that the leper, being now better cared for than in the earlier days of the settlement, the expected result has followed, the disease being retarded in its development, irrespective of therapeutic measures, and longevity promoted. But the large number of commitments, considering the rapid decrease of the native population during the last fifteen years, may either mean greater vigilance in the search for lepers, or a suddenly developed desire on the part of the lepers to take advantage of government aid, or an increased impetus given to the disease. Although opposition to Molokai is not so pronounced as formerly, it is still estimated that, for one leper secured, four remain in concealment. There is one feature of the government of the leper settlement which can not be too strongly condemned, and it is inexplicable where all else is so rational and admirable, and that is the presence of *koknas*, nonlepers, on the plea of helping their stricken relatives and friends. There is no excuse for this, as the majority of the lepers are quite capable of helping themselves, and for the minority who require attention a detail should be made from those in comparative health. These *koknas* are undoubtedly bearers of infection from the settlement, for there is little restriction on their movements, and this association is one of the great opposing conditions to the eradication of the disease, to judge from the observations of Dr. Morwitz and Dr. Arming, former resident physicians of Molokai. An associated cause is the permission granted to natives to visit their afflicted relatives, which at times has been greatly abused under a sentimental pressure put upon the authorities. There is every reason why these two privileges should be denied, and sentiment need not be asserted in advocacy, as the lepers are happy and contented, thanks to most liberal treatment, and though the Hawaiian is noted for his devotion to family, they are pining neither for their old homes nor their relatives.

But little has been added to our knowledge of leprosy since my report of 1876 and the study of the bacillus lepræ has been productive of no worthy results.

A consensus of opinion has, however, been almost universally established throughout those countries afflicted with the disease, that it is inoculable and contagious; that its heredity is probable, but not positively demonstrated; that it is not a form of syphilis; that its etiology is undeterminable and that it is yet without a remedy. The treatment employed by Dr. Lutz represents the best therapeutics of the day and yet just as good results have been obtained from careful housing, good nourishment, and the treatment of lesions and symptoms according to the principles of general pathology, which will, as pointed out in my previous report, keep the disease in abeyance, and, if steadily pursued, prevent it in most cases from shortening life, but the relaxation of vigilance will be followed by rapid and fatal development.

NOTES.

(1) Dr. Morwitz says: "If 100 Hawaiians (sexes mixed) had continuous contact with leprosy for a period of years, say five to fifteen, at the expiration of that period no less than 82 would have become lepers, the remaining 18 would be clean, and those latter are the class who are illustrations of leprosy being a *noncontagious* disease. I have come to the conclusion that about 18 per cent of the Hawaiian race resist the contagion.

(2) Dr. Arming studied the bacillus lepræ for a considerable period in the years 1884 and 1885 at Molokai. He says: "In the so-called anæsthetic cases the bacillus is not found in the anæsthetic patches nor in the chronic sores of neurotic parts of skin, tissue, and bone, but, as nerve excisions have proved to me, in the nerves supplying these mutilated parts with vitality." Dr. Arming failed in his cultivation of the bacillus in artificial soil, as did Dr. Lutz, and also in the inoculation of the lower animals, but apparently succeeded with a criminal, Kenan by name, whose sentence of death was commuted to penal servitude in consideration of his consenting to experimental inoculation with the bacillus. Dr. Arming's experiments established the wonderful vitality of the bacillus lepræ and its extraordinary power of resisting putrefaction, an examination of the dead showing the germs to be in a state of activity after three months of interment.

This observation may be of great importance in an inquiry into the etiology of leprosy. As regards the case of Kenan, he was inoculated September 30, 1884, and in March, 1885, microscopic examination revealed the bacillus in large numbers near the spots of inoculation, and again, fourteen months afterwards, though there were no other evidences of leprosy. Later, and after Dr. Arming's departure, Kenan became a developed leper, and subsequently died of the disease. This case promised to be one of great importance as establishing the contagion or inoculability of leprosy, but investigation, made subject to Dr. Arming's departure, seems to prove that Kenan came from a leper family, and by heredity—if that is admitted as a factor—or like exposure to cause—if we wish to exclude contagion—may have been affected with the disease. No such experiment, however, was necessary to an unprejudiced observer of Hawaiian leprosy to prove the truth of contagion.

REPORT ON U. S. NAVAL HOSPITAL, NAVY-YARD, PORTSMOUTH, N. H.

By Medical Inspector F. L. DU BOIS.

The following sanitary report for the year 1890 is hereby submitted:

MARINE BARRACKS.

During the past two years an effort has been made to improve the condition of officers' and men's quarters. Water-closets formerly used by marines during the summer only were found too exposed even for that season, and their use has been discontinued. The other one, affording better shelter against the weather, is now used constantly. The walls of its sink, which had fallen in, have been rebuilt. It is cleaned twice a year instead of once as was formerly the custom. Disinfectants in liberal quantity are used three times weekly in summer and twice weekly in winter. It is, however, recommended that a drain be laid from the sink to the river by which it can be flushed out once a week.

For many years the medical officers of this station have advised the building

of a covered way from the barracks to the water-closets. This has at last been done in part, but there remains a distance of about 100 feet which can not well be covered as it would interfere with a roadway. One can readily understand how liable the marines must be to contract serious diseases when suddenly summoned in the night time, and often with scanty clothing, to hurry through snow-drifts and against a biting northeaster to attend a call of nature. The remedy for this is to extend the barracks building so that the water-closets, urinals, and bathrooms may be placed within it. The water for flushing these can easily be obtained by use of a windmill.

The drains connected with the barracks have been thoroughly examined and repaired where defective and are now in good working order.

Good results are anticipated from the change of diet consequent upon the issue of the Navy ration instead of feeding the men upon 18 cents a day.

The subject of clothing for the Marine Corps has been so frequently discussed that I will only remark thereon that my attention has been forcibly called during the wet and slush of November and December to the fact that the allowance of one pair of arctics for five years was entirely inadequate in this climate.

OFFICERS' QUARTERS.

The Bureau of Yards and Docks has done much during the present year towards the comfort of officers and their families by painting, repairs, and supplying new furniture. The sewerage system of quarters occupied by the commissioned officers is in good working order. The supply of water is excellent and abundant; and while on this subject it is well to mention that, during the summer, work was begun to construct on Fort Sullivan, the highest point on Seavey Island, a reservoir, with a head sufficiently high to furnish water for extinguishing fires in the navy-yard. It is the intention to connect this with the new sick quarters, now being built on that island. In my opinion, this water, being stagnant and often muddy, is not potable. It has, however, a good chance to settle and purify itself, as it is first pumped into one reservoir from the ponds and thence into a second. I recommended the placing of two filters, one in each reservoir, believing this would suffice to make the water fit for drinking purposes. This was not attended to, but, as work has been temporarily suspended, it is not too late.

WARRANT OFFICERS' QUARTERS.

Improvements have been made this year in one of these which is occupied by a lieutenant. An addition has been built, in which are placed a water-closet and a bathroom. The same is recommended for the other houses now unprovided therewith. The present water-closet system is most offensive and unsanitary. The closets are sinks, and located in sheds at the rear of the houses, with which they communicate by a covered way. They are ventilated by a wooden flue opening above the roof, but below its peak. Through this the foul odors are supposed to pass, but do not, preferring to loiter in the woodshed, which they fill with stench. This is not the worst feature of the arrangement. A northerly wind drives these effluvia through the covered ways, in spite of closed doors at each end thereof, into the houses themselves, making them at times almost untenable. In consequence, diseases of the respiratory and digestive organs are frequent in these quarters, and an outbreak of fatal disease may occur at any time. A liberal amount of disinfectants is constantly used, and the sinks are cleaned out once a year. The difficulty here met with can be remedied by a simple method. Between the sheds and the quarters there is now a drain pipe leading to tide water. With this the sinks, of which there are two, can easily be connected, though a larger main than the one now in use may be required. By means of the hose the sinks can then be flushed once a week, as is now done with similar closets attached to the commissioned officers' quarters, and with which no fault has been found. For temporary relief ventilators might be placed along the peak of the roof to allow escape of a portion of the odors.

SICK QUARTERS.

As we hope to vacate these next summer for the new ones now in process of construction on Seavey's Island we have contented ourselves with patchwork. The floors have been repaired, doors which were falling from their frames have been rehung, ceilings which had dropped have been replastered, and various repairs made in the water-closets. When this house is vacated by the medical

department it will doubtless be used for some other purpose, and I urgently recommend that a similar plan be adopted for its sinks as that proposed for the warrant officers' quarters. They are similar in construction to those described, and though, from their location, the disgusting odors are not so frequently driven into the house, it is by no means uncommon to find the lower rooms and the surgeon's office redolent with them. In fine, with the unusual facilities we enjoy, surrounded, as we are, on all sides by a swift-flowing tidal river, it is a disgrace if our sewage is not carried off speedily and thoroughly. Before moving into the new sick quarters some arrangement for holding sick call for the barracks and navy-yard will have to be made. To tramp through drifts, slush, and storm three-fourths of a mile is a hardship for robust men; to oblige the sick so to do would be dangerous and inhuman. I am informed no room in the barracks can be spared for this purpose. After thinking over many plans, I advise that the surgeon's office and two rooms in the building we now occupy be retained for the purpose under consideration, one room for the apothecary and one for the dispensary. This plan would necessitate the employment of an additional apothecary, but I do not see how it can be avoided.

NEW SICK QUARTERS.

Work was begun on these in September of this year, has progressed rapidly, and though delayed somewhat by bad weather, it is hoped the buildings will be ready for occupancy next summer. The contractors have, thus far, given satisfaction, in material and character of work done, to the supervisor.

The outlet of drain pipe has been placed in an eddy. It should be carried further out, so as to deliver the sewage where the tidal current is swift, otherwise an offensive deposit will soon accumulate in the slack water.

EPIDEMICS.

In common with the rest of the world, we were visited by the Russian influenza, la grippe. It arrived here with the beginning of the year; reached its height about the 10th of January, and disappeared about the 26th of the same month. A report in regard thereto was made to the Bureau on March 4, 1890. We were fortunate in having no deaths to record; but many of those attacked continued to suffer therefrom for months, and some have never recovered perfect health. The most marked of the sequelæ are weakness of the eyes, and pulmonary troubles.

During the month of September we had many cases of diarrhea and dysentery, none, however, of a serious character.

There have been no deaths in the hospital during the year.

REPORT ON NAVY-YARD, NEW YORK.

[By Medical Inspector D. MCMURTRIE.]

The general health of the station during the last year has been moderately good. Its advent was marked by the visitation of epidemic catarrh, which was then fairly upon us. In the marine barracks those already sick from that cause on January 1, 1890, together with the subsequently attacked, numbered 18, and amounted in the aggregate to 93 sick days. This disorder had the effect to immediately swell the number of sick days and indirectly to augment them through increasing the number of admissions to the sick list from the usual causes. The total number of sick days recorded for the marines during the year is 1,251 in a daily average of 222 of force, men and officers, or a daily percentage of 1.54. Of course these figures tell but a small part of the story, for during the year there were 25 patients transferred to the Naval Hospital, New York, and 1 to the Asylum for Insane, at Washington. The records of these patients at hospital would very considerably increase the total of sick days at barracks were they reckoned and reported by me as still an integral part of the command. But, on the other hand, in any report of sickness or disability dependent upon sanitary conditions all surgical cases and all venereal must be carefully eliminated, or the figures will be misleading; more than this, all the cases resulting directly or indirectly, recently or remotely, to exposure incurred elsewhere must first be deducted, or the conclusions will be unsound. Data are not at hand to determine

accurately the relationship of the two sets of figures, but probably 592, representing the number of sick days from epidemic catarrh, injury, and venereal, would not be exceeded by the sick days in hospital, seeing that nine of the cases belong to the category of injury and venereal. So then, with these qualifications, 1.54 per cent may stand as representing the loss to the force from causes lying within the province of sanitation.

It is found that the new ward or sick bay at the barracks poorly answers its purpose in cold or stormy weather. The woodwork is all cheaply and hastily constructed, and the doors and windows and skylight are so ill-fitting as to render the apartment uncomfortable from escape of the heat and from admission of the storm.

The officers of the yard and their families have been free from serious sickness or ailment since the subsidence of epidemic catarrh. The records show forty-two admissions of officers to the sick list during the year. Of these there were of febris intermittens 4, diabetes 2, rheumatismus 5, catarrhus 7, epidemic catarrhus 9, albuminoid 2, diarrhea 5, vertigo 1, marb. valv. card. 1, myocarditis 1 (fatal), laryngitis 1, tonsillitis 1, pharyngitis 1, furuncle 1, hernia 1. The average number of officers attached to the yard is 54; total number of sick days, 391; daily average of sick, 1.07, or 2 per cent. First aid has been rendered from this dispensary to 78 cases of accident among the civil employes of the yard during the year.

In the laboratory connected with this office 86 samples of merchandise have been received and chemically tested with reference to certain standards. They comprise alcohol, acids—hydrochloric and sulphuric; candles, glycerin, lead—red and white; oils—lard, raw linseed, boiled linseed, olive, sperm, mineral sperm; soap—castile and salt water; timber, tobacco, turpentine, zinc metallic, zinc white. Favorable reports were made upon 62 of these samples and unfavorable upon 24.

REPORT ON NAV-YARD, BOSTON.

[By Surg. J. B. PARKER.]

The addition of a few notes relating to the barracks, prison, yard, and the city of Boston, respectively, will continue our annual record at this station of such professional matter as may be deemed of interest to the Bureau and can be appropriately entered under the general subject of sanitary report.

THE BARRACKS.

The sick reports for the past year indicate only the appearance of such diseases as are incidental to men in the military service ashore, and it is probable they have existed in a minor degree than would be found among the same number and class employed in other spheres of life. The admissions for treatment number 338, and of this number 84 were transferred to hospital. The transfer of 84 to hospital may appear to the uninformed excessive, but to the Bureau, who is well aware of the absence of provision for the treatment of injuries and acute diseases when they require special attention, no surprise will be created.

Of the number so transferred 12 were injuries, as follows: Seven fractures, 1 dislocation, 2 sprains, 1 hernia, and 1 lacerated wound.

The slight increase in the number of injuries reported during the year was due to the recent introduction and occasional practice at the now popular football game. This statement, it is hoped, will not be construed to discourage healthful outdoor amusements, even at the expense of a few additional fractures or other injuries. Indeed it is to be regretted that more frequent opportunity does not offer for this character of amusement, which at the barracks is necessarily restricted by absence of extensive drill and parade grounds. It has no doubt contributed largely to the general contentment and efficiency which has prevailed, supplemented as we find by other pleasures, such as comfortable quarters, every reasonable indulgence, a reading and smoking room, and sufficient liberty. Infractions of discipline are exceptional, and as a rule the men are superior morally to recruits obtained at other stations on the Atlantic coast. This fact has not escaped the observation of the executive authorities if the statement is correct that the Department intends to enlist in large numbers sailors and marines at this point. If the recruit here experiences disappointment and regret it must be in most cases when he exchanges his comfortable life in barracks for the un-

avoidable discomforts incident to duty at sea. That some enlist without further thought than life in barracks and ultimately experience disappointment is evident to those who have professional or other relations with the recruit. This may be remedied, in part at least, and is not unworthy of the attention of the Bureau and Department. This subject has been presented to Congress during a recent session in form of a bill, which directed, in connection with other proposed legislation, that recruits in the Army shall be retained in barracks two weeks prior to enlistment, the object being, it was stated, to enable the recruit to better determine the character of the service before final decision. It was further stated in explanation that it was hoped this probation would lead to greater contentment and reduce the number of desertions. We have no definite knowledge of the ultimate fate of the bill, which appears to us wise legislation and equally applicable to the corps of marines. Our convictions on this point are inspired by contemplation of the fact that 75, an average of 6 + monthly, deserted this post during the past year.

Relief of an immediate necessity is often assigned as the cause of desertion, but our experience at this station where, as stated, a superior class of recruits are obtained, leads us to suspect that in many cases the impelling cause is disappointment upon better knowledge of the service and its requirements.

The contemplated addition of twenty-five single cots and a clothing room by incorporating what was a stable, referred to in our first report, has been accomplished and proves a desirable increase in the capacity of the barracks. In the present arrangement of quarters, offices, guard, and mess rooms, and officers' quarters no further increase can occur as every available space is now in use. The average monthly strength of the garrison last year was 200; present number 225, 70 of this number recruits. The total number of cots provided is 170. In the sleeping quarters proper we find 146 cots, 53 of these double. In the guard-room, at main and north gates, and prison, single or double cots increase the number as stated to 170. Usually about 10 are in hospital, and a few old non-commissioned officers may sleep apart from the barracks or yard, but allowing liberally for possible vacancies from 10 to 20 or more must occupy the floor where straw mattresses are provided. The duration of this deprivation depends upon the transfer of recruits. Often the period is brief and even if prolonged apparently causes no serious disturbance, for in no instance has indisposition been ascribed to insufficient repose, notwithstanding the objectionable atmosphere. The enlistments during the year number 313, a monthly average of 26. Slight derangement of health is not infrequent among recruits soon after entering the barracks. The indisposition complained of usually pertains to the digestive or nervous systems, oftener the former. Some partake too freely of the rations, others find it objectionable as served, but in the majority of cases the derangement of health is due to an excess of coffee. This beverage as supplied the service the Bureau is aware is often injuriously strong or inferior, and requires superior vigor and digestive power to escape its injurious effects. So many instances of its ill effects among recruits have arisen that it has become our habit when impaired health without acute symptoms is complained of to inquire at once regarding the quantity of this liquid consumed. Our suspicions are often correct and verified by the prompt benefit which follows suspension of the drink or its use in diminished quantity. Instances of its diuretic effect have been observed, as in the following case very recently under observation. An unusually vigorous recruit, two weeks in barracks, complains of frequent micturition, particularly annoying at night. Prior to enlistment his health is perfect, nor at the date of his appearance does he experience further discomfort than some pain in back and the interruption to sleep. Upon inquiry we learn it is his habit to drink one full cup of coffee at breakfast and often two at supper. Suspension of the evening coffee with diminished quantity at breakfast is followed by prompt recovery.

The ration is liberal and generally gives satisfaction. As pertains to other matters militant and mortal it is not constant and may rise or fall in quantity and quality as the pressure of funds is heavy or light. It will be itemized when speaking of the prison as the same ration is supplied both institutions. An instance of its mutability occurred during the year, made known officially by the surgeon upon the following statement made at sick call by a marine of some experience in the service: "I am not sick, but hungry. We had nothing for breakfast but oatmeal and molasses; I can eat either separately but not combined as served." The commandant was pleased to appoint a board, composed of a commander, captain of marines and surgeon to ascertain the cause of defection and make recommendation. The immediate cause of complaint was found to be due to a commend-

able effort on the part of the commanding officer to economize the ration with a view to liquidate debts contracted at an earlier period. A more important discovery was the failure to supply the navy ration authorized by law which by reference is found one-third superior to the army ration, as served to the Marine Corps in potential energy (calories). The issue of the army ration at this station is no exception, and when supplemented by post gardens as contemplated by army regulations it is the equal, perhaps superior, ration. Post gardens for the Marine Corps are not mentioned in navy regulations and consequently do not exist. The board found also a deficient supply of fats in the ration served and butter in connection with the substitution of the navy for the army ration was recommended, which, we are informed by the public print, has met the approval of the honorable Secretary.

THE PRISON.

The naval prison in the yard for confinement of general court-martial prisoners during a period not exceeding three years was established January 19, 1888, the date of this writing by coincidence being its third anniversary. Though brief in existence its duration is sufficient to justify a few notes respecting its health, routine, punishments, and supervision.

The total number confined since its establishment we find to be 188. Of this number 3 were summary court-martial sentences (marines) for one month in double irons. Of the remaining 185 general court-martial prisoners 95 were marines, 70 sailor men, 20 naval apprentices. The longest period of confinement was one, rated coal-heaver, sentenced for three years, who served two years three months and eighteen days. The average term of confinement was ten months, and the daily average number of prisoners was 32. The largest number confined at one time was 47; the smallest number 19, at the date of inauguration. There are 41 cells single, 1 double; also a dark cell where prisoners have been confined from one to five days—in two instances ten days—for infraction of prison discipline on bread and water, with or without irons. General good health has prevailed during our service of two and one-half years. Diseased and weak prisoners have improved in health and strength. In other instances inaction and consequent torpor of the digestive system caused more or less constitutional derangement with its accompanying pallor and reduction of weight. As the prisoner became habituated to his unnatural life this was usually overcome for a period at least when aided by drugs or other remedies. The disposition to constipation, however, is so general that it requires the special attention of the medical officer, and to provide more than a temporary relief was an early thought; with this hope a saline mixture was provided and placed in charge of the sergeant, with directions to administer before breakfast (and supper) when required. Its administration has not been abused, and the mixture has become a regular supply to the prison. The oft-required purgative or enema has now quite disappeared, and the almost daily summons of the medical officer has become an exception.

Since the inauguration of the prison 6 have been transferred to hospital, 4 of this number prior to our service, and all save 1, who died of perforation of the intestine, due to an ulcer, returned to the prison in good health.

The routine of the prison is as follows: All prisoners are called at 5 a. m., and in detachments of 6 visit the wash and closet room where night buckets are cleaned and ablutions performed. Three bath tubs enable prisoners to bathe and change underclothing weekly; oftener, if exigency requires. At 6:45 breakfast is served in the cells by the cook, aided by two prisoners. From twenty minutes to one-half hour is allowed for meals; a pan and spoon are allowed at this time. Apart from the cot the furniture of cells comprises a tin cup, water pail, and night bucket. At 9 a. m. the officer of the day visits the cells, when the prisoners and cells are carefully examined by the sergeant under his direction. Dinner is served at 12 m.; the hour for exercise is 2 p. m., in the adjacent yard for one-half hour, weather permitting, otherwise the corridors of the prison are used for exercise. At 4 p. m., water pails are filled, night buckets again cleaned and supplied with one-half pint of solution of iron sulphate. Night buckets can be cleaned at other hours during the day if necessity requires. Supper is served at 4:30 or 5 p. m., according to season, and then prisoners are secured in the cells for the night. Wednesdays of each week transfer to other cells is made, the cells of the central corridor being dark and consequently more objectionable. The thermometer in this corridor ranges from 6° to 8° higher than in the outside corridors, due partly to illumination by gas day and night, to enable the officer of the day and sentinels to inspect the cells and also to permit prisoners to read,

Paint work is scrubbed by prisoners on Fridays, and the corridor floors on Saturdays. Bags are allowed on Saturdays, and clothing and small stores requisitions are prepared on the first of each month.

On Monday of each week the commanding marine officer visits the prisoners and hears complaints, if any. Friends and relatives are permitted at the gate of the prison twice monthly and prisoners at this time are permitted to receive, from them fruit or other small articles of food. Letter-writing is permitted on the first and third Mondays of each month, subject to the inspection of the commanding marine officer as also are all letters addressed to prisoners. Reading matter is supplied usually by the chaplain of the Wabash and consists of daily and weekly papers and magazines and are issued to the prisoners on Sunday morning. Occasionally books and magazines are sent by officers or their families in the yards. Punishments by confinement in the dark cell have not been frequent if number of inmates is considered. The total number of punishments of this character has been 46. Of this number 3 were firemen, 1 of this number confined six times; 3 seamen; 1 ordinary seaman; 5 coal-heavers, 1 of this number confined five times; 7 apprentices, one of this number confined five times; 2 landsmen; 8 marines, 1 of this number three times; 2 blacksmiths.

The commanding marine officer has supervision of the prison and its details. The guard consists of 1 first sergeant, 1 sergeant of the guard, 3 corporals, 6 privates and during the day are in immediate charge of the first sergeant under direction of the officer of the day who during his tour of duty visits the prison at longer or shorter intervals. A corporal and 2 privates are posted in the corridors of the prison every two hours, day and night.

The following is the ration supplied the post and prisoners at this time.

Rations for prisoners and garrison.

Sunday.—Breakfast: Coffee and bread, fresh sausages and baked beans, or fried bacon and beans. Dinner: Fresh soup, roast beef and mashed potatoes, 6 ounces bread. Supper: Coffee and bread, dried hash every second Sunday, rice pudding or baked apples.

Monday.—Breakfast: Coffee and beef stew, 6 ounces bread. Dinner: Beef soup, bread and potatoes, bacon, corn, and lima beans. Supper: Coffee and bread, baked beans.

Tuesday.—Breakfast: Coffee and bread and pork scouse. Dinner: Mutton soup, fresh mutton, bread, and green peas every fourth Tuesday, canned corn. Supper: Bread and coffee, corn meal (fried) and molasses.

Wednesday.—Breakfast: Coffee and bread and mutton stew. Dinner: Bean soup, shoulder, bread and potatoes or boiled rice. Supper: Bread and coffee and baked beans.

Thursday.—Breakfast: Bread and coffee and mutton scouse. Dinner: Beef soup, roast beef, bread and peas, hot gravy. Supper: Coffee and bread, beef hash.

Friday.—Breakfast: Coffee and bread and pork scouse or fish balls. Dinner: Coffee and bread, shoulder and cabbage or corn beef and potatoes.

Saturday.—Breakfast: Coffee and bread, liver and bacon, fried onions or fried potatoes. Dinner: Fresh soup, fresh beef, bread and peas. Supper: Coffee and bread, oatmeal and milk.

Same quality and quantity of rations issued to prisoners as to guard.

Ration above given supplied with permission of commanding officer by Edward Yates, the faithful and efficient first sergeant, who has been in charge of the prison since its establishment, and from whom we have learned some of its details. He adds that during the past few months the ration has improved in quantity and quality and no complaints are made.

In our survey of the prison two points may attract the attention of the Bureau: First, that a number of prisoners were incarcerated in the dark cell several times; second, that apart from the weekly visit of the officer in charge and the routine visits of the officer of the day—this duty usually performed by three or more officers—the prisoner comes in contact with no other commissioned officers than the surgeon and chaplain, whose visits pertain solely to their respective professions. It should be added here that this mention is not prompted by a spirit of adverse criticism, for we are pleased to state, so far as our observation extends, that the administration of the prison under the present system could not be excelled, as its favorable record clearly shows. Nor do we intend insinuations respecting change in the prison discipline, notwithstanding the great attention this subject as a science has received of recent years from home and foreign governments. But crime and abnormal psychic conditions are often

associated, if the opinion of the alienist and attentive observer is of value, which properly brings the subject under cognizance of the medical officer and therefore we hope appropriately included in this report. When prisoners of the character confined in our military prisons, whose original offense in civil law would probably be embraced under misdemeanor, certainly not felony, are repeatedly punished by imprisonment in a dark cell, suspicion that a normal mental state is lacking should arise and such cases receive the careful attention of the medical officer.

In illustration we present the case of a marine prisoner whose disorderly conduct led to frequent punishment of this character of longer or shorter intervals. On a few occasions he had requested the visit of the medical officer, hoping to obtain relief from a derangement not infrequent among men in solitary confinement, and which may or may not be associated with mental alienation. Until a later period we were unaware of his repeated punishments and then might have continued in ignorance had we not addressed the sergeant directly for information respecting his conduct. The sergeant at once expressed opinion that he "believed something was the matter with the man," which led us to suspect that the unfortunate marine became insane periodically. This suspicion was confirmed later by a board of survey which recommended his transfer to an insane asylum. Detection and investigation of such cases can not be expected of the commanding officer or his subordinates whose chief concern is the security of the prison and discipline of the prisoner, and unless brought to the attention of the authorities by the medical officer, as in the case mentioned, long continued and unjustifiable punishment may be inflicted. Again, prisoners are not equally insubordinate and the less vicious are often early repentant. Observation by other than those directly intrusted with the care and discipline of the prison may assist the officer in charge to determine the more worthy and deserving, which will likely lead in such cases to an earlier remission of sentence for good conduct and reformation than is now so generally offered without injury to the discipline of the service.

In this connection I quote from the annual report of the warden of the State prison, just given to the press and published in the local issues of to-day. It is not inapplicable to our naval prison, notwithstanding we have to deal with minor offenses comparatively, and the average duration of confinement is but ten months. "First, separate these men as early as possible. A large majority of the prisoners have an inward determination to lead a correct life when discharged. Many are here almost by accident and claim the sympathy of all good people. Some are easily led to do desperate acts and should only come in contact with those well disposed."

The good results of a board of visitors to institutions of the above character have long since been determined, and if of advantage to State prisons it is reasonable to suppose some good results would follow the appointment of a like board to our military prisons. With no desire for the adoption of any new system, but simply as auxiliary to the present, a board of visitors is suggested for the consideration of the Bureau. Should suggestion as to the composition of said board be appropriate, we will add that to us one that will comprise a line, marine, and medical officer, preferably seniors, promises best results.

THE YARD.

The population of the yard, including officers and their families, marines and prisoners, number at the present time 320, which is increased during working hours by employes to 570. The not infrequent minor injuries and sudden illnesses which have occurred among employes have received the usual attention of this office. But one serious injury occurred during the year and this resulted fatally in the shop just prior to the arrival of the surgeon.

Examination of drugs and foods, extension and improvement of sewers, receive the usual close attention of the city authorities. Recently several medical gentlemen have studied the ill effects of dust emanating from the crowded and narrow thoroughfares of the city, and able papers upon this subject have been read before the medical societies.

REPORT OF THE U. S. S. ATLANTA, SECOND-RATE.

By M. C. DRENNAN, Surgeon, U. S. Navy.

At the beginning of 1890 the *Atlanta*, in company with the other ships of the Squadron of Evolution, was at sea between Lisbon and Tangiers, arriving off the latter port on January 2. The Moorish authorities refused to grant pratique to the squadron, owing to the epidemic of influenza prevailing in the ships, and strict quarantine was enforced during the few days the fleet remained at anchor in the harbor. From there the squadron passed over to Gibraltar, where pratique was given, on condition that those having influenza should be isolated on board the ships and not permitted to visit the shore afterward. There were several cases of the disease existing in the town at the date of the squadron's arrival, and before the ship's departure from the port it had become epidemic. Cartagena and Port Mahon were the next places visited. No restrictions were enforced against the squadron in either place on account of sickness, as influenza had been epidemic in both for some time, and was decreasing. Over eighty cases were admitted to the sick list of the *Atlanta*; a few were so mild that they were prescribed for without being excused from duty. The epidemic lasted about a month, and was followed by an outbreak of tonsillitis, very severe in most cases, with high temperature and great depression; a dirty yellowish exudation covered the tonsils, which, at first sight, was suggestive of diphtheria. None of those attacked died.

The squadron remained about ten days at Port Mahon, and while there the local authorities made a request that those in the ships suffering with venereal disease be not given permission to visit the town. A restricted list was established on board the *Atlanta*, containing the names of those under treatment for that cause, with the object of keeping them from leaving the ship; unfortunately there were some whose cases were not reached in that way. There is a sanitary inspection of prostitutes at Port Mahon. Leaving there the squadron next visited Toulon, where a short stay was made, and then sailed for Villefranche. At the latter place landing parties were of frequent occurrence. The *Atlanta* and *Boston* were sent to Genoa for the purpose of coaling; the weather there was very cold and the ship decidedly uncomfortable. A seaman ill with pneumonia, contracted a few days before the ship left Villefranche, began to grow worse; a survey was asked for in his case, and on recommendation he was placed in the Ospedale Protestante di Gernova, where he recovered and joined the ship later at Corfu. From Genoa the *Atlanta* and *Boston* joined the *Chicago* at sea, and then went to Naples. At the latter place a seaman seriously ill with acute rheumatism was placed in the International Hospital. The hospitals of that name, established in seaport cities of the Mediterranean, are usually in charge of German or Swiss medical men; their charges for care of seamen are moderate. While these hospitals may be an improvement over those under the control of the Italian and Spanish authorities, there are many conveniences which could be introduced into them with benefit to the sick. I was not favorably impressed with the one at Naples or in Genoa. The squadron went from Naples to Corfu, where three weeks were spent in target practice with great guns and small-arms; also in landing parties. A few trifling accidents occurred while there.

The *Atlanta* and *Boston* were sent to Messina to be docked, after which they joined the other ships at Malta. At the latter place, a colored landsman belonging to the ship was found one morning lying in a gully on shore, having fallen, or been thrown, a distance of probably 25 feet, from a parapet above. He was taken to the military hospital; aside from cerebral concussion, the only injury found was a small irregular wound of the scalp, requiring a few sutures.

He complained of severe pain in right shoulder; of this there was no evidence but his own statement. As those in the naval service are not allowed to remain in the army hospital at Malta, he was transferred to the naval hospital a few hours later; when the squadron was leaving, he was brought on board of ship, where he still remains, a frequent applicant at sick call. From Malta the squadron went to Algiers and then to Gibraltar; at the latter place two of the crew were sent to the Colonial Hospital, suffering with albuminuria. The hospital is a well-arranged building, well lighted and well ventilated. Trained female nurses are employed. The charges are moderate. Private rooms can be had. Chloroform is the only anæsthetic used in the hospital. From Gibraltar the ships went to Tangiers and then to Madeira. As small-pox was epidemic on the island no communication was held with the shore save by the flagship. Leaving there the next place visited was Porte Grande, Cape Verde Islands. There the York-

own was detached from the squadron. A number of chronic cases, which had encumbered the sick list of the *Atlanta* for weeks, were transferred to the former vessel for passage to the Naval Hospital, New York.

The remaining ships continued on to Bahia, where a two days' stay was made, and then proceeded to Rio de Janeiro; remaining there ten days.

After entering the tropics sanitary regulations for the guidance of the ships were issued; nothing liable to carry infection was allowed to be brought on board. Special permission was given to the *Atlanta* to ship a cook for the warrant officers' mess, and one was enlisted in Rio.

The squadron left Rio on July 5 and reached New York at the close of the month. Soon after the *Atlanta* was sent to Boston, and returned to New York within a week, where she remained several weeks. About September 20 she arrived in Norfolk, where she is at the close of the year.

The weather was hot at Norfolk for nearly a month after the *Atlanta* arrived there. When she reached the yard a mud dredge was carrying on operations, at first alongside of the ship, and later in the immediate vicinity. As work had to be done mostly at low water it went on night and day. In a short time evidences of malaria began to show among officers and crew. No serious sickness occurred till November, when one of the engineer's force was taken ill with an almost typical case of typhomalarial fever; he was sent to the Naval Hospital, Norfolk, and died a few days later. From the time the chronic invalids were sent out of the ship at Porto Grande to the date above mentioned the sick list of the *Atlanta* was small and the ailments trifling. The last two months of the year there were several cases of remittent and intermittent fever and one of typhoid, which are still in the hospital.

During the cruise in Europe many cases of venereal disease were treated on board of the *Atlanta*. I am of opinion that syphilis is becoming more virulent. Almost every case of chancroid admitted to the list was followed by bubo; several of the latter were cut out. At Gibraltar, where the system formerly in use of inspecting prostitutes has been discontinued, venereal disease is on the increase. In the venereal ward of the Colonial Hospital, at that place, I was shown a well defined hard chancre on the penis of a boy 11 years old.

The water for drinking, cooking, etc., used aboard the *Atlanta* has been obtained from an evaporator. When its tubes became clogged and could not be used, a supply was brought from off shore; no sickness could be traced to the use of the latter. There were occasions where that made by the evaporator was objectionable to taste, particularly during the trip from Rio to New York. At times fluid extract zingiber was added to the water used by those at work in the fire rooms.

There has been no change in the heating or lighting arrangements of the ship during the past year.

More care should be exercised in enlisting men for the service in modern ships of war. The mere fact that the candidate for enlistment shows no evidence of organic disease ought not to be sufficient proof of fitness. If disabilities, such as hernia, patulous rings, defective vision, etc., are waived in men with long service, it should be with the understanding that they are not to form part of a new ship's company, and particularly that of the engineer's force.

SANITARY REPORT ON NAVY-YARD, MARE ISLAND, CAL., FOR 1890.

By Surgeon DWIGHT DICKINSON.

The past year was ushered in by the prevalence of epidemic influenza, the first case occurring January 1, 1890. It increased in intensity, reaching the maximum about January 20, diminishing gradually and ending about the 7th of February. Fully 15 per cent of the inhabitants of Mare Island were attacked, and many suffered from croupous pneumonia; only one case, that of the lamented medical director, A. Hudson, U. S. Navy, proving fatal. Since that epidemic the health of this community, now numbering 507 by the census of June 1, 1890, has been excellent. There has been an almost complete absence of malarial diseases; rheumatism and catarrhal affections of the respiratory and digestive systems being the prevailing complaints. Aside from the fatal case of croupous pneumonia mentioned above, there have been but three deaths among the yard residents, one from delirium tremens, one from cerebral hemorrhage, and one from

angina pectoris—all men past the prime of life. With a large number of children, there has been no case of epidemic or eruptive disease.

In relation to the sewer system and ventilating of the official residences I earnestly indorse the recommendations made by my predecessor, and I respectfully invite attention to this subject in order that it may be thoroughly examined and the evils resulting from defective drainage and ventilating systems may be checked.

However much superior the drainage system as completed in 1886 is over that of a prior date, the fact remains that in all of the official residences there are bad odors, which originate either from inadequate sewers or defective plumbing, and perhaps from both causes. Some of the buildings referred to were built more than thirty years ago, and many of the closets and pipes as then introduced are still in use. The pipes, which at no time were of adequate size, are often choked with the accumulation of fatty substances and require frequent overhauling, which, however, affords only temporary relief.

As to the sewers laid in 1886 to carry off the discharges from the closets in rear of the officers' residences, too much is evidently expected from them. The pipes (of vitrified clay) are only 5 inches in diameter. In a total length of about 900 feet there is a fall of not more than 2 feet, which is too imperceptible for practical purposes. It sometimes happens that this pipe line becomes choked and no amount of flushing appears to afford relief, in which case it becomes necessary to hunt for the cause. After much labor it is finally discovered that roots from the numerous evergreens and other trees have made an entrance through the joints of the pipes; and these obstructions removed, the sewers appear to work well again for a time.

The large sewers carrying the kitchen drainage are subject to the very same causes of temporary failure to carry off the sewage, but as they are sufficiently large to permit a man to go from one end to the other, and thus to ascertain the locality of the obstruction, it only requires a reasonable amount of careful attention on the part of those whose business it is to look after the matter.

In my opinion it would be advisable to greatly enlarge the sewer-pipe system, as a 5-inch pipe on a fall of about 2 feet in 900 feet is evidently inadequate, and to substitute pipes of twice that size laid in a bed of cement; or the rear closets might be connected with the large main sewer by small pipes. There would not be much difficulty in keeping such a system in good working order.

Ventilators extending to the roofs of buildings should be placed where openings in the large main sewer now exist. I have been informed that an unused chimney in the southern end of the smithery can be utilized for this purpose, and in such case both sewer openings at either end of this structure could be closed. The stench from the present ventilating holes in this portion of the sewer is exceedingly offensive during certain conditions of the wind. It is highly important that all the drain pipes from the sinks and closets should be renewed and all the old pattern water closets and bath tubs be discarded. The traps of modern water closets can be vented by pipes extending to the roofs as they are renewed.

Under the supervision of Second Lieut. J. N. Pendleton, U. S. Marine Corps, an improvement has been made to the sewer from the officers' quarters at the Marine Barracks. It formerly ended in a cesspool on the eastern side of the road which passes from the sawmills to the stables. Commencing at the point where the old 4-inch brick sewer came to the surface, an extension was made to the nearest place in the tidal slough of the tules. This was effected by a 5-inch vitrified pipe, 550 feet long, properly cemented and with a fall of 3 feet 6 inches, laid on crossbars supported by redwood stakes driven into the solid ground. Handholes were made into the sewer from the officers' quarters into that from the commanding officer's house, and a third after the juncture of the two pipes. This system seems to work well so far, and when visited about three weeks since no deposit had commenced in the slough.

The sewers from the water closets, bath, and wash rooms of the barracks for the marines, and from the naval prison, connect and run to the beach on the western side of the island.

This sewer is ventilated by an opening near the naval prison into which the surface water drains and by which it can be flushed. The discharge end of the sewer is always exposed at low tide as well as a portion of its deposit.

Whenever the wind blows from the northwest the odor is driven back through the ventilating opening mentioned above. Some deleterious effect must also be produced by the prevailing southwest wind blowing over the bare mud flats where some of the sewage is deposited. An improvement can certainly be made by

carrying the end of the sewer into deep water where it could never be exposed.

The rainfall for the past year, 1889-'90, was very large, amounting on this yard to 33½ inches, a greater fall than any recorded since 1849. So much water was collected by the Vallejo Water Company that no apprehension of a famine, for the present year at least, need be felt.

A plant for electric lighting of the buildings and residences is in process of construction, which will correct the offensive odors from the illuminating gas pipes, now old and rusty.

REPORT OF NAVY-YARD, PENSACOLA.

By Surgeon J. W. ROSS.

This navy-yard is situated on the north side of Pensacola Bay, about 5½ miles by water and 6½ miles by land southeast of the city of Pensacola. The inclosure consists of about 80 acres, which is surrounded on the north and west sides by a brick wall 14 feet high and on the south and east sides by the water of Pensacola Bay. The villages of Woolsey and Warrington, combined population about 1,150, lie just without the walls, Woolsey on the north and Warrington on the west. Both these villages are upon the naval reservation. The soil is composed of white sand which is very sparsely covered with grass. The vicinity of the officers' quarters and the principal avenues are amply shaded by live oaks and other trees.

The point of land upon which the navy-yard is situated is only a few feet above the level of the bay. In 1888, during a dry season, I had a number of holes dug at different points in the yard and in the villages. Water was reached at these points at an average depth of about 3 feet from the surface. In wet weather the whole soil is water logged.

Although this is a highly malarious latitude and the above condition of affairs one of the most fertile sources of malaria, the officers and their families residing in the yard are almost entirely exempt from malarial diseases. This is attributed to the fact that they sleep in upper stories well above ground. (See report of the Chief of the Bureau of Medicine and Surgery, 1889.)

The other sanitary conditions of the yard are good. Cistern water only is used for drinking purposes, each residence being furnished with a brick cistern, and three large cisterns with a combined capacity of 500,000 gallons affording the general supply.

The state of affairs and hygienic condition of the outlying villages of Woolsey and Warrington are quite different from that of the navy-yard. Here malaria is rife during the summer and autumn and crops out off and on during the spring and winter. An average of about a dozen cases of typhoid fever occur yearly on the reservation.

The year 1890 has been a very unhealthy one, there having been an unusual amount of typhoid fever and malarial troubles during the summer, followed by an epidemic of grippe in the autumn and winter. The year seems to have been a very sickly one pretty much everywhere in the United States, however. In my opinion by far the greater part of the sickness in these villages is caused by defective drainage, unsanitary management of water closets, sleeping too near the ground, and bad drinking water.

The villages are drained by ditches leading into the bay, which, owing to the sandy nature of the soil in which they are made, easily fill up and require to be thoroughly opened and cleaned out at least once a year, if they answer the purpose for which they are intended. Experience has shown conclusively that there is marked difference in the health of the inhabitants of these villages during the years in which the ditches are opened and cleaned in the early spring and the years in which this is not done. They were not cleaned in 1886, 1888, and 1890, and there was an unusual amount of sickness during the summers and autumns of these years. In 1887 and 1889 they were cleaned and the health of the villages was remarkably good these years. To show that this was not accidental, the health of the surrounding country was as bad the years in which the ditches were cleaned as those in which they were not cleaned.

The work on the ditches is done by the commandant of the navy-yard, the funds being furnished by the Bureau of Yards and Docks.

Regarding the water closets, in most instances the excreta are deposited upon the sand underneath them and left there indefinitely, and as the ground where many of these water-closets are is low and often overflown the effect upon the water

supply, which is almost entirely from wells 4 to 20 feet deep, can readily be understood.

Although Pensacola is in Florida, the extreme western end of the State, on the Gulf of Mexico, its climate is not the Florida climate proper. That is found in the eastern and more southern portion of the State. The climate here approaches more nearly that of southern Alabama. The weather is pleasant almost all the year round, the winters generally delightful, and the summers, though long, never very disagreeable, the proximity to the sea and the sea breezes preventing it from ever being very hot. There is not enough cold weather, however, to brace one up in the winter, and a prolonged residence here is the reverse of invigorating.

Malaria is the great curse of this region, as it is of the South generally, the West, and many parts of the North. It may be shorn of nearly all its terrors by the proper observance of certain long-known and well-established precautions, such as sleeping in upper stories, avoidance of the direct rays of the sun in summer, using only good drinking water, thorough drainage of the soil, etc.

My own experience here, covering about five years, and that of other physicians covering a much longer period, lead to the conclusion that this is an unfavorable climate for persons with tuberculosis. Most patients who come here from other parts of the country with pulmonary consumption do badly and many cases of that disease originate here. This is probably because the elevation above the level of the sea is so slight, the climate so enervating during the summer and autumn and so humid during the spring and winter. The annual rainfall is at least as great as that of any part of the United States, being upward of 60 inches. Almost all other diseases do well here and the mortality is remarkably low, the annual ratio of death, per mille, being only about fifteen.

Children do wonderfully well here, the mortality among them being extremely small. The diseases belonging more especially to childhood run a very mild course. Diphtheria and scarlatina rarely show themselves here, and are so mild as to be hardly like the same diseases in the North. Typhoid fever, with old and young, is immensely less formidable than in any other region with which I am acquainted. Pulmonary diseases, not tuberculous, are generally mild and easily manageable in this part of the country.

Three artesian wells, one in Woolsey and two in Warrington, would furnish potable water to the inhabitants of these villages and would greatly enhance their healthfulness.

In former years yellow fever has scourged this region, but the evidence seems positive that the disease has been every time imported and that it has no right here. It has not shown itself here since 1883, and there is no manner of doubt that with proper precautions, in the way of quarantine, etc., it ought never to appear in this part of Florida again. The time is fast approaching, if it has not already arrived, when yellow fever will be as effectually banished from the cities of the Gulf of Mexico as it now is from Norfolk and Philadelphia. The establishment by the legislature of Florida, some two years ago, of a State board of health and the enactment of excellent laws for its use were a long and admirable stride in that direction.

REPORT U. S. RECEIVING SHIP ST. LOUIS, LEAGUE ISLAND, PHILADELPHIA, PA.

By Surg. THEODORE C. HEYL.

It is interesting to note that notwithstanding the gloomy anticipations concerning the prevalence of intermittent fever on the *St. Louis*, following the opening of a large extent of earth necessary for the construction of the new wooden dry dock (yet unfinished), no such epidemic has appeared. On the contrary, the record shows but one case of intermittent fever during the year, with but one day's illness; the case of remittent fever occurred in a recruit of three weeks, in an unusually healthy season, and who had been steamboating for months prior to his enlistment.

It has long been a stock remark, yet accepted as a matter of course, that League Island and malarial fever are almost synonymous. But if the logic of facts, as set forth from the experience on the *St. Louis*, is to have the proverbial force of "irresistible," this stock remark should become trite and flippant; indeed is so

with many well qualified to observe and to know. There have been men and things who have scarcely become righted in history after a century or more, and, if League Island be accused of being a *nidus* for marsh fever, the evidence, it is not unfair to say, should be produced. There are many people employed on the *St. Louis* who have been so serving from three to thirteen years; some of them reside on the island and have reared families. None of these so residing, on questioning, complain. The great majority live on board and form part of the ship's complement; for these the records speak eloquently enough.

The surroundings of League Island are generally low and marshy for miles, and should present the same features of disease. Yet inquiry develops no intermittents, although some of the shanties—they can hardly be called houses—long dwelt in by the same family, are surrounded by ditch water covered with a green and mantling scum, from which the popular mind averts its eye; yet scientists have pronounced this growth in standing ponds as not only entirely innocent of any disease-producing quality, but useful as a germ destroyer. The workmen in the new wooden dock have occasionally been ill with diarrhoea, rheumatism, and bronchitis, and one case, lost sight of after ten minutes of examination, gave promise of typhoid fever; but, of all the cases applying to the writer, two only gave signs of intermittent, and these were colored laborers from Norfolk, Va., where they had ague.

The writer suffered from intermittent fever in the Washington Navy-yard in 1876, and subsequently on the Rio Grande River, in Texas, between 1877 and 1880; but after two and a half years of duty on the *St. Louis*, during which he has been out at all hours, the disease has not been relighted, nor does he know during his stay here of any case of the disorder occurring for the first time in any officer while serving here; more, he has found that complainants against malaria are those who are here less than most, or who have sustained the original attack elsewhere. Two years ago he had forebodings when Simpson's men unearthed so much, as had many, but the result has caused him and others—forced him, in effect—to admit the innocuousness of the upturned ground here. Whatever may have been true of intermittent fever in the "Neck," League Island included, in years ago, the specific germ seems quiescent or wanting now, and this much-abused locality should be redeemed by the logic of events and of facts.

It is well to be remembered, by those who speak of the "well-known malarial influences of League Island," that there is a so-called sanitarium immediately opposite to it on the Jersey shore, not a mile distant, washed by the same river, and on as low land, whereto thousands resort in summer for health and for pure air, with profit. Smith's Island is used for a like purpose, and it has been proposed to remove this island and place the earth dredged therefrom on League Island. No one contemplates sowing disease by this means.

These remarks, though not strictly pertinent to the *St. Louis*, are made as a plea for League Island and that a few facts may be known which will tend to remove the load of malarial obloquy so long overfreighting it. The banks of the river Delaware have many health resorts, places which have everything in common with League Island on that river; therefore there is no reason why the island should be more healthy or unhealthy than these, nor in any way differ from these surroundings.

The *St. Louis* is moored about three hundred feet or more distant from the place at which she was at the last yearly writing. Another change in location will be made on the completion of the wooden dry dock, but where is not yet promulgated. The medical officers of the *St. Louis* have given aid, as was announced last year, to those of Simpson's men who required it.

REPORT ON CHOLERA IN JAPAN.

By Surg. C. M. GRAVATT.

The first epidemic of which there are authentic accounts occurred in 1822, and there is good evidence that it was brought by a Dutch trading ship from the island of Java. The second took place about 1858 and lasted until 1860, and was attributed to cases brought to Nagasaki in the U. S. S. *Mississinipi* from Chinese ports. The third epidemic began at Nagasaki and Yokohama almost simultaneously in the year 1877, and it, too, was charged to importation from China. Since

that time cases have been reported each year with decided epidemics in 1879, 1881, 1882, 1885, 1886, and 1890, as shown in the following table:

Year.	Cases.	Deaths.	Percentages.
1877	13,816	8,027	58.10
1878	902	275	30.49
1879	162,637	105,786	65.04
1880	1,580	618	39.11
1881	9,389	6,237	66.43
1882	51,631	33,784	65.43
1883	969	434	44.79
1884	900	415	46.11
1885	11,772	9,310	67.60
1886	155,923	108,409	69.59
1887	1,228	654	53.26
1888	811	460	56.79
1889	751	431	57.39
1890	41,771	28,626	68.53
Total	456,080	303,466	66.54

**REPORT ON U. S. NAVAL TRAINING STATION, NEWPORT, R. I.
U. S. TRAINING SHIP RICHMOND, SECOND RATE.**

By Surg. C. A. SIEGFRIED.

October 24 the *New Hampshire* was relieved here by the *Richmond*, and the latter is now the stationary training ship at this place, having at all times a division of boys on board for purposes of drills and instruction, and her own complement of men, the whole numbering about 120. In the annual report for 1889 I gave an account of the condition of the *New Hampshire*, and also a description of the climate, soil, water, and general hygienic environment of this island.

The sanitary defects of the gymnasium and the long frame building back of headquarters building continue. They both need cellars; their lower floors rest on a water and filth-soaked soil, without any open-air space beneath. In the gymnasium building—a large brick structure—a deep cellar is impracticable, because of lowness of site regarding the sea level; still, a cemented air space is practicable; or, when the present floor is renewed it might be raised a few feet, leaving a ventilated space underneath. Or, better still, this floor should be made of tiles or cement. The present floor of yellow pine is never quite dry, and in corners is rotting. It also is built upon a former rotting and wooden floor. It is difficult to keep this floor clean now. In the long frame building, used for prisoners as workshops, marine barracks, etc., the lower floor rests on ground soiled by many years' of scrubblings and soakings from quarters once used by the pauper lunatics of Newport County. There is high enough ground here for a fine cellar, thus also securing valuable space, besides a safe and healthy building.

Much improvement has been accomplished in the past year in sewerage and water-closet construction and management, and now there are ample facilities of this sort. A few marines remain in tents in the old burial ground on the east slope of the island, and they continue to use a water-closet built over the shallow shore adjoining. A stench hence comes from this region at times, noticeable on the causeway, especially at low tide, and this should be obliterated. The disposal of garbage is still an unsolved problem with us. It is now thrown on the northern shore of the island, whence on occasions come very unpleasant odors. Sooner or later other and better management must be undertaken; separation and cremation or incineration of the residue.

The *Richmond* is not adapted for her present service, especially in cold weather. She is a spar-decked sloop of war with a low berth deck; and being out in the stream, without hatch houses, she is at this season draughty, cold, and uncomfortable. She woefully lacks bathing and washing facilities, and the darkness on her berth deck is insurmountable. Working with these apprentice boys afloat under such conditions can not compare in efficiency and results with the work ashore in the gymnasium, where, at least, there are more room, light, warmth, dieting, bathing, and clothes-washing facilities. Young green boys simply waste material, and at once become disheartened under these conditions aboard ship; whereas, in the gymnasium ashore, they get broken in with less hardship at first, eat their meals in light, and have a fair chance to keep themselves and clothes

clean. The amount of spar sail and great gun drill on the ship in these winter months is very small indeed.

The island needs a systematic and intelligent plan of sewerage and drainage, with an allowance for possible future enlargement, all clearly mapped out. Such does not now exist. The eastern slope, sheltered, and, naturally draining into a shallow channel separating it from the main island of Newport, might have a receiving pipe or sewer curving around on a level to the southwest shore, where it could empty into deep tide water. Into this all drains on that side could empty, and here should be placed the sick quarters, removed some distance, of course, from the probable future quarters of the officers stationed here, should this naval apprentice system ever be developed and placed on a profitable basis. This slope now contains barns, cow stables, the farmer's residence, and the gardens, besides a part of the marines in tents in the old cemetery.

The water supply needs further development, with a view to a fuller supply and an improvement in its quality. The three artesian wells, sunk 90 feet, from which steam pumps force the water into an elevated storage reservoir, show signs of being limited in capacity, nor is the water system as now distributed an ideal one, or as good as it could be made. The watershed in part is flat land, with some bog and a pond, the whole being used for grazing and hay cropping, and more or less is annually manured, the place supporting twenty-odd cows and 5 horses. The water should be filtered at some part of the system, and simple sand filters would do very well. It is at times slightly turbid, somewhat hard, contains slight excess of chlorides, and acts energetically on the iron pipes. It is, however, a fairly good potable water, and has thus far not been suspected of causing disease. I do, however, consider its contamination a possible contingency. The reservoir when cleaned last spring was found to contain much mud sediment and many bucketfuls of fine edible frogs. Usually, the water contains the ordinary infusorial life, algæ, fungi, etc., and not to excess. A slight fishiness at some seasons I consider due to the decomposition of the gelatinoid substance coating all the grasses and lower vegetable forms, this change being due to the common microorganisms present in all fresh water.

The bulk of our sickness during eight months of the year is due to disorders or diseases of throat and lungs, temporary in character, and in great part preventable. Ephemeral, irritative, and catarrhal fevers come next in frequency, and are due to the suddenly encountered harsh and changeable physical conditions here present to newly arrived boys. They need only proper shelter and nursing for a few days, with simple remedies. In some cases the variations of temperature are extraordinary, and if the heat continues elevated beyond a few days there is a liability to heart failure. In such cases the modern antifebrile remedies and cool spongings act well, and quinine is of no value. Some cases of tonsillitis, with pultaceous deposit on the glands, are looked upon with suspicion, and may simulate or lead to diphtheria under unfavorable external and internal conditions. For suspicious cases of any character we use the Army bell tent, placed fifty yards from the hospital. In cold weather such cases are transferred to the Newport civil hospital, which has now a new and isolated pavilion for cases of infectious disease.

From an experience of some years in the naval apprentice system, both in a cruising vessel and at this station, I am convinced that the minimum age limit should be changed from fourteen to sixteen years. Many of these young boys are in all respects children, and I have no doubt that some of them do not even come within the present minimum age limit (fourteen years), parents desiring to be rid of them. They are thus not amenable or adaptable to the service for many months, and cause endless annoyance and confusion. They are too young to comprehend matters and do not realize their duties; helplessly go on from day to day knowing not what to do; in tears on the slightest provocation; imposed on or shielded by other boys; not strong enough for drills or work; never clean, and always clog the organization. Nor should any physical defects found by medical officers on examination for enlistment be waived, for out of every hundred boys ninety-nine wish to get out again within the first two months, and if defects exist they at once endeavor to encumber the sick list to compel medical survey or discharge, by reason of a physical disability their parents and themselves were only too glad to forego or make light of before enlistment.

If it is the intention of the Government to establish here permanently a naval apprentice system and station, the proper buildings and appurtenances should include a dormitory, a cook and mess house, a wash and bath house, several schoolrooms, and yards, docks, and landings, with the usual boats, heating and lighting plants, necessary repair shops and storehouses, good roads, walks, and

parade grounds, and finally a recreation field. There is now here a part of this outfit, but dormitories, cook and mess house, and a wash house are urgently needed, and would at once ease up the present difficulties we labor under. This island so equipped would be an ideal spot for the purpose, easily within reach of centers of large population for recruiting, and with unequaled water facilities. To this add a number of cruising training ships, or put them at once aboard regular service vessels after a year spent here, provided we get them not younger than sixteen, and it would seem to be a plan more satisfactory in results than the one now permitted to exist with such makeshift and limited facilities as we now have. Two buildings, one for dormitories and one for cooking and messing, with a few additional schoolrooms, would not cost over \$25,000, and would accommodate twice our present capacity. Properly devised and placed the boys would then never be without that constant overlooking so necessary for conduct and discipline; and further, the present unwholesome and dusty atmosphere in the gymnasium (the one large room being constantly in use for all purposes) would be obviated. The quarters for the sick should be moved to the lee side of the island and be nearer the working buildings.

SANITARY REPORT OF U. S. S. ENTERPRISE.

By Surg. M. H. SIMONS.

October 30 we sailed for Colon, United States of Colombia, and made the trip in thirteen days; found the ship a fair sea-boat, but wet and a heavy roller. We reached Colon November 12 and relieved the Kearsarge. Colon is on Manzaniilla Island, in the bay of the same name. The highest part of the island is not over 5 feet above sea level, and the greater part of it is under water, which runs in from the back bay. The greater part of the town was burned down last September, but is being rapidly rebuilt. The two principal streets are made by the embankments for the tracks of the Panama Railroad. The houses of the poorer people are built over the swamp, and, in fact, water stands in pools under the houses and in the yards everywhere, except in that portion occupied by the railway offices and residences, and by the canal company. Malarial fevers, diarrhea, and dysentery are the common complaints. Yellow fever is said not to be indigenous, and there was none during our stay. The Panama road hospital is a plain, wooden, two storied building built on piles over the water on the north beach. It will accommodate fifty, is fairly well furnished, and presents no points of special interest. The canal company's hospital is about 100 yards to the eastward of it, is similarly situated, of wood, two stories, and will accommodate about two hundred patients. It has a French surgeon, and nuns for nurses. There were no diseases of interest in hospital during our stay; the average number of beds occupied in the railroad hospital, during our stay, was seven; in the French not more than ten. If it ever be necessary to occupy Colon with our forces, these hospitals will be the proper places for our sick and wounded, and the northern beach, or end, for the encampment of the well, as the prevailing winds are from the northward and eastward, and they will bear back the odors, germs, and insects from the town and swamps. Christophe Colombe is a part of Colon, being on the southern end of the island, and projecting to the westward so as to protect the mouth of the canal from the swell. The houses, residences, and machine shops, and storehouses are owned by the canal company. The ground has been raised about six feet above sea level and surrounded by a loosely piled wall of artificial stone in blocks about 3 x 3 feet. On the canal face there are wooden piers and wharves, now mostly in ruins. On the point overlooking the canal there are two large two-storied houses and a statue of Columbus. The town has three graded streets, running east and west, and beautifully shaded by cocoanut palms. There are possibly thirty-six residences, mostly one-storied; occasionally one and a half, with metallic roofs and verandas. Where there are no trees or shrubbery they have sowed a native coarse grass, which has made a fair sod. There are sewers opening into the bay for drainage, and the water for ordinary purposes is brought from Monkey Hill by pipes, and drawn from hydrants along the streets. The drinking water is brought in boats from Limon Point, where there is a pipe leading from the Panama Railroad's reservoir in the hills back. Colon is supplied during the dry season by water brought from Matachin in tanks on the cars. On the west side of the bay, in Kenny's Bluff, the Panama

Road has a reservoir of excellent water, 2 miles in length, with a greatest depth of 60 feet. At a small expense this water can be piped into Colon.

The Panama Canal has been cut for about 15 miles from Colon to a depth of 5 or 6 feet for the first 6 miles, or to the Chagres River; above that to the first rapids, about 7 miles, it varies from 6 to 16 feet at present. It is rapidly filling up by the falling in of the banks and by deposits from the muddy water. The current in the canal varies from 1 to 2 knots. Minde Cut, which is about 2 miles above the canal mouth, carries surplus water into Minde Bay, which is merely an extension of Colon Harbor. This current and that from the canal are rapidly filling up the west side of the harbor and depositing a great deal of fine sediment all over the harbor. The water of the bay is discolored in the rainy season over the whole harbor. It is to the presence of this mud in the water that I attribute the outbreak of malarial fever on the *Enterprise* in January (as in the case of Her Majesty's troop-ship *Powerful*, in India, vide article Malaria, in Quain's Dictionary), for our men were not ashore, and there were no shore breezes, but there was a very evident current from the canal and the ship's bottom was quite foul, and the water was used for washing decks necessarily. It is, therefore, advisable for ships to anchor during the rainy season clear of the current from the canal and from the Minde mouth; that is, on the east side, outside and about half a mile or more off the

In the dry season, when the Chagres is low, and the strong trade winds, blowing night and day, force the fresh seawater into the whole harbor, the anchorage can be abreast the Panama Road or Pacific Mail wharves. The last of November the *Enterprise* visited Boca del Toro, a small town about 150 miles to the westward of Colon. We stayed only twenty-four hours, and therefore have little to say about it. The population is about 7,000; there are 12 whites; the soil is sandy and swampy; the water is collected from the roofs. There has never been an epidemic of yellow fever, but malarial fevers and dysentery are common. Steamers run there from the United States and from Europe for cocoanuts and bananas, of both of which there are large plantations on every hand. Venomous snakes are said to be abundant, but no specimens could be procured.

We returned to Colon and stayed there until February.

In the sick bay the average height of the dry-bulb thermometer was 83°; average wet bulb 79°; average relative humidity 80°, highest 90°, lowest 68°. Whenever the weather permitted the clothes and bedding were thoroughly aired and dried, but it is impossible in such a climate to keep dry, or even moderately comfortable aboard ship. There might be a moderate amount of comfort on a ship with a gundeck, where clothes could be dried and exercise be taken, but no ship ought to be left there longer than six weeks or two months, and their stay ought to be broken by occasional trips to sea, for two or three days, and the usual precautions in dress, place of sleeping, etc., taken. If fever or headache appear a saline ought to be given, and then antipyrine or antifebrine in sufficient amounts to check the symptoms, then quinine until 2 g. or more have been taken. I found this the best plan, and that quinine had very slight effect on the fever, that antipyrine did better, but that quinine, in large doses, between the paroxysms, would prevent or make lighter the recurrence. I omitted to state that the crew and officers of the *Enterprise* number, all told, 183. This number is too great for the sleeping space.

REPORT ON RECRUITING, U. S. S. MINNESOTA.

By E. Z. DERR, Surgeon.

Total number of men examined, 112; of whom 17 were rejected. Total number of boys examined, 1,370; of these 806 were rejected for physical defects, making the percentage of rejections 58.83.

	Boys examined.	Rejected.	Accepted.	Enlisted.
First quarter	373	236	137	107
Second quarter	294	178	116	96
Third quarter	418	255	163	133
Fourth quarter	285	137	148	117
Total	1,370	806	564	453

From this table it will be seen that of the 564 accepted, 111 were not enlisted. Some of these were rejected by the recruiting officer—the percentage is not known—but the majority failed to enlist from other causes.

Of those rejected on the physical examination, 270 were for defects in vision, a percentage of 19.7 of the whole number examined; 78 for poor development, a percentage of 5.62; 55 for varicocele, a percentage of 4; 52 for spinal curvature, a percentage of 3.79; 60 for defective teeth, a percentage of 4.37; 40 for color blindness, a percentage of 2.91; 35 for defective hearing, a percentage of 1.97; 25 for deformity of chest, a percentage of 1.82. The remainder were rejected for various other troubles.

REPORT OF U. S. S. MICHIGAN, FOURTH-RATE.

By Passed Asst. Surg. L. B. BALDWIN.

The sanitary condition of the vessel, judging from the comparatively small amount of sickness, must be fairly good, and effort is continually being made in charge to keep the vessel clean and sweet.

Electric lighting would contribute to the comfort of all, and the same reasons exist for its establishment as elsewhere.

The quality and quantity of food appears good and sufficient, but the system permitted by continued access to markets would not meet the necessities of a man of war in war times.

Two hundred and forty-three physical examinations for enlistment were made on board.

This was done without any of the facilities, conveniences, or appliances theoretically regarded as indispensable for the proper performance of this important duty. With the kindest cooperation of those in authority, even light and space were unattainable.

Owing to causes stated I am convinced that no medical officer can do good work, himself justice, or secure the nation's interests as could be done by restricting all recruiting to rendezvous and receiving ships, where a better opportunity could be afforded for making thorough examinations. A properly conducted rendezvous permanently established in Chicago, Ill., would secure many valuable men and boys for all branches of the naval service.

I find that of the 243 examined, I found 139 physically qualified, rejecting 104. Of the 139 accepted, only 103 were shipped—60 apprentices and 43 men. The remaining 36 were largely boys examined before they had concluded to enter the service, and unaccompanied by parents or guardians. The physical defect of two special service men were waived by the Bureau of Navigation, as reported at the time.

I find this to have been a much larger number of examinations than during 1889, when the record of the ships, by my predecessor, show that 160 were examined, 95 accepted, and 65 rejected. Seventy-eight were shipped—40 apprentices, and 58 men. One man having defects waived by Bureau of Navigation.

Medical officers with whom I have conversed are almost unanimous in believing that apprentices should not be shipped at 14 years of age.

Could the limit be 16 to 19 years, and required service until the age of 23 or 25 years, it would be found that much of the sickness and inefficiency now required to establish stability of health and usefulness could be avoided.

REPORT OF THE U. S. S. MONOCACY, THIRD RATE,

By Passed Assistant Surgeon ERNEST NORFLEET.

On the 2d of January the *Monocacy* left Shanghai and proceeded up the Yangtse River, returning on the 15th of February, and having visited during this interval the treaty ports of Chinkiang, Woohoo, Kiukiang and Hankow, and the ancient capital of Nanking, which lies on the right bank of the river some 200 miles from its mouth. The weather for the most part was much milder than usual at that season, but several times the thermometer fell below the freezing point, and cold, raw winds from the north were frequently experienced, sometimes laden with fine dust, that caused slight conjunctivitis and much annoyance.

The *Monocacy* lay at Chinkiang in all about three weeks, and during that time I saw something of the city, which is situated on the right bank of the river, 150 miles from its mouth, and nearly opposite the Grand Canal from Peking, which connects the Yangtse with the rivers of the north. Like all the Chinese cities I have seen, Chinkiang contains a central walled portion and a populous suburb outside the walls; the latter are 3 or 4 feet thick and from 15 to 20 feet high, and firmly constructed of fire bricks 2 inches thick and a foot square, made of a blue clay, abundant in all this region. The houses are mostly of 1 and 2 stories, built of small blue bricks, of mud and stucco, straw, or any material that can be used and gotten cheap; the roof is covered with tiles or thatched with straw. Wood of all sorts is very scarce and dear, the forests throughout this entire region having long ago been cut down. Their fuel for the most part is supplied by dry cotton stalks and a cane-like grass that grows abundantly on the islands and flats of the Yangtse to the height of 15 or 16 feet, and, gathered when dry in December and January, is used for cooking, thatching houses, making fences, and many other purposes. Few can afford a fire for warmth, relying solely on their work and their wadded garments, which judging from their filth and that of the wearer, are seldom if ever changed.

The population of Chinkiang is variously estimated at from 200,000 to 300,000, but all estimates of this sort are unreliable. The authorities probably know with sufficient accuracy for all practical purposes, but they are slow and chary about communicating their knowledge. I have been told that their system consists in dividing the city into small wards, and appointing an officer over each, whose business it is to keep himself informed of the number, name, and occupation or condition of every dweller in each house in his district and to post the same conspicuously on the front of the house. The houses are mostly small, containing three or four rooms, which are seldom more than 10 feet square, oftener less, with no ventilation except that afforded by the open door or window in the daytime. The latter are closed at night, and the Chinese pack themselves in these small rooms like sardines in a box, and yet it does not seem to hurt them. The thoroughfares in Chinese cities hardly merit the name of streets; the broadest are seldom more than 10 feet wide, while most of them are less than 6, which renders traffic with loaded wheelbarrows and donkeys a slow and difficult process. It can readily be imagined what fearful destruction fire sometimes makes in cities like this, where an active man could, and the more agile feline probably does, go from one end to the other without ever touching the ground. Their fire engines are a rude hand pump mounted on wheels and pulled through the streets by men.

So far as my experience goes Chinkiang is no exception to the rule that Chinese cities are filthy beyond description. Masses of filth accumulate in the painfully small back courts, where all the slops are thrown to rot and fester, except such as find their way along the two or three shallow and generally choked gutters that pass just under the ground floor out to the deeper and larger but no less obstructed trench under the broad stone flags that pave the street loosely and give passage to all sorts of falling dirt. When the mud and filth have filled the street gutter the flags are raised, and it is taken out and removed in pails probably to the fields, for a Chinaman wastes nothing, not even filthy mud. This nastiness is notably conspicuous for the absence of excrement of all kinds; that of animals falling in the street is carefully removed at once in small baskets and used as a fertilizer on gardens and fields, while numerous public latrines containing large earthen jars for excrement leave no excuse for the careless, lazy, and depraved that too often deposit it elsewhere. The contents of these jars are sold to the farmers, who carefully transport the matter to their fields and gardens. This makes it risky in China to eat any green vegetable without first thoroughly cleansing it with hot water, for fear of receiving the eggs of parasites or germs of dysentery, etc., into the system. It has been said that typhoid fever does not exist among the Chinese, notwithstanding their filth, and if this be true, it is a powerful argument in favor of the dry-closet system and surface drainage, for human excrement is about the only form of filth not abundantly contained in the shallow gutters and mellow porous subsoil of their cities.

Smallpox prevails in an endemic form every winter probably in all the cities on the river, but attacks young children almost exclusively, doubtless because all older persons have had it during childhood. The Chinese regard it as a mild disorder, merely tying a red rag about the child's head as a distinguishing mark, and suffering it, if the weather be fine, to run about in the street and play with the other children.

Chinkiang was almost destroyed during the Taiping rebellion, when it was repeatedly taken and retaken by each party, and on the neighboring hills to the

south are lines within lines of fortification stretching over miles of country, while the innumerable graves everywhere bear witness to the bloody nature of the conflict, and prove that here at least, literally, "the living are but as a handful to them that rest beneath the sod."

The ship left Chinkiang on the 10th of January for Hankow and reached there on the 14th, the distance being 450 miles and the navigation so difficult and dangerous as to render anchoring at night necessary. Hankow is one of the largest and most important cities in China; in fact, on the two sides of the river there are said to be more than two millions of people congregated at this point. It is a great central mart for tea and silk and many other products, and a point from which supplies of many sorts, domestic and foreign, are distributed. Hankow is said to be one of the hottest places in the world in the summer, and not free from malaria, which prevails during the summer and autumn to a greater or less extent in all the towns and cities on the Lower Yangtse. Unfortunately this is the season of high water, and the porous silt of which the soil is chiefly composed becomes saturated with water to within a few inches of the surface, and probably produces much more sickness, especially among foreign residents, than would be found under drier conditions of the subsoil. The *Monocacy* remained at Hankow five days and then started on her return voyage. On the evening of the 18th one of the wardroom officers reported with suspicious symptoms, and the next day was admitted to the list with fever, nausea, headache, sore throat, etc., and late that evening the characteristic eruption of discrete smallpox appeared. He did not remember when he had last been vaccinated, but there was a good scar on his arm. In December, 1889, those of the crew that seemed to require it, some 40 or more, were inoculated with bovine virus obtained in Tokyo, but it did not take in a single instance.

The officer in question had gone in a chair on an official visit to the taotai at Chinkiang, and had also been once on shore along the main street for an hour or so, and probably contracted the disease at one of these times. The ship reached Kinkiang on the 20th, and arrangements were at once made to transfer the officer to a small hospital belonging to and conducted by the St. Vincent Sisters of Charity. This was accordingly done at 10 a. m. the next day and the officer made as comfortable as possible under the circumstances, the weather being raw and cold and the accommodations of the hospital quite limited. The institution is connected with the French missions and is intended solely for the use of natives, our officer being the first sick foreigner, perhaps, ever admitted within its walls. Fortunately the symptoms had already begun to abate, and on the 24th were so mild, it was considered proper to proceed down the river, which was falling rapidly at this time. The patient was left in charge of the intelligent resident physician, and making an uninterrupted recovery, rejoined the ship at Shanghai on the 18th of February, and returned to duty on the 23d of that month.

As soon as he left his room for the hospital all his effects were transferred to the hurricane deck and well aired for one week; the mattress, bedclothes, and his own clothes worn during his illness were left at the hospital; the room having been thoroughly scoured with hot water and soap, was mopped over everywhere with a 1 to 500 solution of mercuric chloride; the bureau and bunk had been previously removed and thoroughly scrubbed. The door and port of the room were left open for one week, as also were the doors and skylights of the wardroom and the ports and doors of the other staterooms, although the weather was quite cold. No other case occurred.

The ship left Shanghai on the 1st of March and proceeded to Canton, having spent a few days at Amoy and Swatow and about two weeks at Hongkong. She reached Canton on the 29th March, just at the commencement of warm weather, and remained there till May 2. Much of what has been said about Chinkiang will apply to Canton, which, however, though much larger, is, I believe, a much cleaner city; the streets are also wider and better paved. The city is on the northeast border of a very rich delta 70 miles broad by 100 long, and is built on the Pearl River, which is one of three short streams forming the delta. The soil is silt, as level as a billiard table, and only 3 or 4 feet above the surface of the river at high tide, which rises about 5 or 6 feet; but the water is fresh, except during strong easterly winds. The city lies on the north bank of the river, about 95 miles from Hongkong, and consists of an irregular parallelogram; 3 by 1½ miles, and its population is estimated at a million and a half. The drainage is naturally bad, and what there is consists of several large canals that penetrate the city from the river, and receive the filth from smaller canals and street gutters emptying into them; but all these become greatly choked, and notwithstanding the daily rise and fall of the tide, the city everywhere reeks with odors of the

vilest sort—i. e. to Christian noses. The natives do not seem to notice them at all. Their water supply is taken from the river and from wells and a few springs on the north side. The wells must be saturated with the filth that seeps into them from the adjoining soil, for they are fed from the rainfall for the most part; but it is always boiled and drunk in the form of tea or consumed in soups. The water contains little, if any, excrement for the reasons stated in the remarks on Chinkiang, for the latrine system of Canton is in the hands of private persons and is more perfect than that in the former city.

From October to February or March there is comparatively little rain, the thermometer ranges from 40° to 60° F., and the climate is said to be delightful, but during the greater part of the remainder of the year there are deluges of rain, the thermometer ranging from 80° to 95° F., the atmosphere is saturated with moisture, and a condition is produced which saps vigor and energy like a pest and the place is unfit for anything but a frog to live in. Foreigners suffer at all seasons with fevers, diarrhea, and dysentery, but these disorders are most prevalent during late summer and autumn. As the Chinese have no statistics, it is difficult to compare the health of Canton with that of western cities of similar size and situation, but the fact is conspicuous that cholera and other epidemics visit this overcrowded, teeming mass of humanity with less virulence than in the case of the neighboring almost entirely European-built city of Hongkong. We have here on the borders of the tropics a densely populated city, with no sanitary arrangements worthy the name, a water supply saturated with dead and living organic matter of every description, heat, moisture, foul air—in short, almost every imaginable condition ordinarily considered unwholesome, and yet typhoid fever is practically unknown and epidemics of the rarest occurrence. Dr. J. G. Kerr (to whom I am indebted for much kindness and courtesy, as well as for most of these remarks on Canton), surgeon in charge of the large native hospital near Shamien, says, in his "Report on the Sanitary Condition of Canton" (China Medical Missionary Journal, September, 1888), that he considers the comparative immunity of the Cantonese from disease due to the following causes, viz: Rise and fall of the tide twice a day sweeping a good deal of the filth out into the river; the heavy rainfall in the summer, filtering through the porous soil, probably purges it of much of its rottenness; most of the work can be performed in the open air, owing to the mildness of the climate, and as almost all have to work the occupation gives exercise; the houses and shops are open all day long and are fairly well ventilated; a good supply of wholesome food, consisting of rice, vegetables, fish, and animal food, all well cooked; water used only in the form of tea, soups, etc., and never without being boiled; lastly, the closure of the street gates requires all to be indoors by 10 p. m., thus securing regular rest. But the poor physique of the population generally leads me to fancy that the nastiness they hourly breathe must in some degree lower their vitality. I had no means of knowing positively, but, judging from the few old ones I saw, I should say they are not a long-lived people.

Western medicine has, I believe, made more progress at Canton than in any other part of China, but so little there as to greatly discourage effort in that direction, I fancy. The little in this line that has been accomplished at Canton has been due to the commendable zeal and enthusiasm of the medical staff of the above-mentioned hospital, which for sixty years has been a charitable asylum for the afflicted of Canton and its neighborhood. Almost from the first the surgeons have instructed a few Chinese students in medicine and surgery, and lately they have begun to teach obstetrics to a few women. I saw a Chinaman at the hospital perform the operations of iridectomy and cataract with great skill and rapidity, and learned afterwards that the result was excellent in each case. But for some reason or other these men will not impart their knowledge to their ignorant fellow-countrymen, probably on account of selfish illiberality; hence our methods make little headway or impression among them. The male students seemed to me to be much cleverer and more interested in their work than the female ones, who appeared rather dull and listless. This difference is to be ascribed, I imagine, to lack of education and culture in the latter, or the education of all eastern women, owing to their peculiar status, is sadly neglected.

The *Monocacy* left Canton on the 2d of May and went to Nagasaki, where she remained nine days, and then proceeded to Shanghai to take on board the minister to China. Leaving Shanghai with the minister on the 27th of May we visited the following ports in the order named, spending a few days in each, viz: Canton, Hongkong, Amoy, Foochow, Chinkiang, Shanghai, Niuchuang, and finally leaving him at Taku on the 12th of July. Niuchuang, the most northern open port of China, ships vast quantities of ginseng, and the customs officials showed me at least

a hundred grades, the finest of which he said, if I mistake not, was worth a hundred dollars a pound. The Chinese ascribe marvelous virtues to it, believing it will almost make an old man young; among other things they believe it to be an excellent aphrodisiac. From Taku the ship went to Chifu and spent a week, and while there news of the outbreak of cholera at Nagasaki reached us. We arrived in Shanghai on the 24th of July and found that no cases of cholera had appeared; but early in August, a good many having appeared among the Chinese in Hong Kew, and two or three among the foreigners, it was advised to quarantine the crew, with the exception of the wardroom and cabin stewards, who were allowed to go to market once a day; the bumboat was carefully inspected, and nothing of a dangerous or suspicious nature allowed on board; milk was entirely forbidden. The disease, I believe, first appeared among the Chinese working along the wharves in Hong Kew, discharging vessels from Nagasaki and other ports, and was thought to have been introduced from the latter place; but this is pure conjecture, I fancy. Hardly a Chinese city on the coast is free from sporadic cases of cholera every summer, and Shanghai is ever ripe for it. But the most notable feature of this epidemic was its fatality to foreigners, who have hitherto been remarkably exempt from its ravages; it carried off about 40, I believe, in Shanghai alone. The sanitary condition of the English portion of Shanghai leaves little to be desired; that of the French town is not so good; while Hong Kew, or the American part, lags shamefully in the rear. All these are supplied with water from the waterworks just below the city, which pump the water out of the Woosung, and having filtered it through great banks of sand, pump it up into a huge tower tank in the English settlement, whence it is distributed in pipes; but it is not safe to drink until it has been thoroughly boiled, though it is almost as clear as well or spring water. Old Shanghai, the Chinese city, which touches the French portion, is fouler than any pig sty I have ever seen, and gets its water supply from the river and from wells.

On the 9th of August we went over to Ningpo and remained a week, and on our return to Shanghai on the 18th, found cholera so prevalent, especially in Hong Kew, as to render the following precautions advisable, viz: Strict quarantine of all on board, no communication with the shore except such as absolutely necessary; no passing through Hong Kew; all business to be promptly attended to and the person or persons to return to the ship without delay, and in every case before sundown; no wash clothes to be sent on shore, and all those left behind when the ship went to Ningpo, and since returned, to be triced up in the rigging and well aired before being taken below; no fruit except ripe peaches; no vegetables except onions, potatoes, and tomatoes; no fresh milk; no shellfish, and no fresh meat, except poultry, to be allowed on board; all drills, and all work except such as absolutely necessary to be stopped, and the crew to be kept out of the sun as much as possible, the weather at this time being very hot and sultry, the thermometer marking over 90° F. in the shade at noon. Two or three deaths a day among the foreigners and many more among the natives were occurring at this juncture, and many of the former had already left, and others were preparing to leave for Chifu, and for Kobe, and Yokohama. Hopes had been entertained that a heavy rainstorm about the 15th would check the progress of the epidemic, but it did not do so. On the 22d the ship sailed under telegraphic orders for Chifu, and as we have not been south since I have been unable to obtain any information or statistics of the cholera in Shanghai last August and September. The *Monocacy* remained at Chifu till the end of September. Chifu is generally breezy and cool, even in the middle of summer, the prevailing winds at this season being from the north; but the climate is treacherous, causing, even in midsummer, colds, rheumatism, neuralgia, and bowel complaints, as I, still suffering from a cold taken there in July, know to my sorrow. A few deaths from cholera or cholera morbus took place among the Chinese during our stay, but there was no well authenticated case of cholera among the foreigners.

On the 2d of September the *Suatara* arrived at Chifu from Chumulpo, Korea, the distance being about 480 miles. The next day a death at 6 a. m. from cholera morbus was reported on board that vessel; and during the following week, three cases with similar symptoms occurred, but without fatal result. They were called cholera morbus. On the 8th of September Assistant Engineer J. H. Baker, of the *Suatara*, was ordered to this vessel for temporary duty, and came on board late in the afternoon of the 9th with his effects. The next day about 9 a. m. he was taken with purging and vomiting and great weakness and prostration, and died on the morning of the 12th about 6 o'clock. The case, of which there is a detailed report in the returns for the third quarter, was called cholera morbus, though for obvious reasons treated throughout as one of cholera; but subsequent

information regarding the outbreak of the latter at Chemulpo before the departure of the *Suvarata* for Chifu, and the fact that the crew had not been quarantined, makes me strongly suspect that all these cases were genuine cholera though it is true that Mr. Baker's imprudences, dietetic and other, detailed in the report referred to above, were enough to kill a far stronger man.

The *Monocacy* reached Chemulpo on the 2d of October, and with the exception of a ten days' trip to Nagasaki and back in November, spent the remainder of the year there. During the autumn and early winter the climate of this part of Korea is for the most part clear, bracing, and delightful; but about the middle of December the weather becomes very unsettled and changeable; we have bitter, piercing winds from the north, cold rainstorms from the southward, and now and then snow, with sudden changes of temperature and their inevitable consequences, viz: colds, neuralgia, etc., while the almost continuous gloom of leaden skies settles like a pall on the spirit and makes the most cheerful despondent.

Chemulpo is situated on a hilly peninsula that, by a short and not very deep canal, could easily and with great advantage be made an island at high tide the latter rises here about 30 feet and, running with great force, would necessarily be an excellent cleansing agent. The town contains 25 or 30 foreigners, some 1,200 Japanese, and probably 6,000 Koreans. The foreigners and the Japanese and Chinese, of whom there are several hundred, occupy the hills nearest the harbor. This portion of the town is being laid out in streets and otherwise improved deep ditches for drains are being cut and lined with loose stone, and, though the result will be an improvement on the former condition, still the amount of filth soaking into the soil between the stones can hardly fail to be harmful. The authorities are laying out streets in the Korean part of the town, and after a time perhaps, the sanitary condition of the place, with its excellent natural drainage will be very creditable.

The Korean part of the town consists of mud and straw huts, with an occasional wooden house, huddled together more like ant hills or holes of prairie dogs than human habitations. There isn't a ghost of drainage. All the slops are thrown just outside of the door. The water-closet is a straw excrescence on the corner or side of the hovel, and so flimsy as only partly to conceal the occupant—which however, does not worry him or her in the least; nor is any of this filth ever removed, but left, even in summer, to seethe and fester under the burning sun and one may readily imagine that the winds which wander over Chemulpo are less balmy than the zephyrs that fan Araby, the blest! The persons of the people are in keeping with their surroundings. Cholera appeared here in August, and for a time was rife among the Japanese and Koreans, but was over by the end of September.

The average complement for the year has been 141 persons, the total sick days 1,262, and the average number of sick each day, 3.45+. The greatest loss of time has been due to the following causes, viz., venereal diseases and their complications, 332 days; bowel complaints, 126 days; catarrhs, 83 days; rheumatism 65 days; and chest diseases, 60 days.

A word about the personal cleanliness of a ship's crew. I believe that every enlisted man should be required to bathe once a day in summer and at least twice a week in winter, and that to this end a part of the spar or berth deck, according to season, should be screened off every morning and the men furnished with buckets of fresh water. The berth deck should be protected with tarpaulins or painted cloths. With questionable utility and a zeal that smacks of religious devotion, the decks are almost daily deluged with water, while the men are ever required to appear in clean clothes; is there any reason, then, why they should not also be required to wear clean skins? Besides the immediate benefit to all on board from a sanitary standpoint, I hold that cleanliness is one of the most elevating and humanizing agents we possess, and the quantity of soap they use is a bad index of a people's civilization. A clean man has more pride than a dirty one, and is by so much the less likely to be guilty of misconduct of all sorts.

REPORT OF U. S. S. JAMESTOWN.

[By Passed Assistant Surgeon W. R. DUBOSE.]

During the year the general health of the crew has been good, and very few accidents have occurred.

No cases of epidemic catarrh appeared among the crew when the disease was so prevalent elsewhere, although catarrhal troubles have been common. Eighteen cases have been transferred to hospital, the absence of a sick bay necessitating prompt removal of sick when practicable. The ship seems to be in fair hygienic condition. As far as practicable the bilges have been looked after, but there will continue doubt as to their cleanliness until they can be thoroughly examined when the ship is in dock and necessary strips from the outside removed. The same crowded condition of the crew obtains as well as the unsanitary condition of the berth deck and lack of accommodation for the sick, mentioned in a previous report. There is not room for a complement of more than two hundred and forty. The officers' water closets are essentially bad, and the existing trough, practically unflushable, should be removed and replaced by an outlet discharging straight overboard. The crew have no conveniences for bathing. It is unfortunate that in the period of training apprentices can not be made to acquire systematic habits of personal cleanliness and to practice personal hygiene. With present lack of facilities this is hardly to be expected. The ship should be provided with two bath tubs, and the steam, now exhausting overboard, could be easily led to and utilized in them for hot-water supply.

In this connection it seems proper to say that good results would follow the adoption of systematic weekly instruction of our ships' companies in simple matters relating to individual hygiene, preservation of health, treatment of the drowning, aids to the injured, etc. A useful beginning might be made at the training station and on our training ships in this direction, but to accomplish anything a definite time for such instruction should be fixed by an order from the Department. It is gratifying to notice the few cases of venereal disease which have been treated among the apprentices of this ship and to note the rarity of a return from liberty in an intoxicated state. The medical topography of the ports visited by this ship is too well known to justify any mention. At Madeira communication with the island was restricted because of suspicion aroused by recent epidemic prevalence of small pox. Inquiries ashore proved a widespread epidemic of a mild type of the disease during the earlier months of the year, but in August the epidemic was at its end. There have been no deaths on board. The health of the crew has been the object of solicitous care with the commanding and executive officers of this vessel, and in consequence the discharge of the functions of the medical officer has been easy and gratifying. Nothing need be said of the food, water, and clothing supplied during the year.

Should it be decided to give general repairs to this ship her hygienic condition would be improved by attention to the following items:

1. Replacing the small plunger deadlights with large air ports along the berth deck and ward room.
- 2d. Removing lamp room from berth to gun deck.
- 3d. Introducing two porcelain-lined bath tubs for use of crew fitted with steampipe from boiler.
4. Water tanks to be porcelain lined.
5. Fitting up a properly located, simply constructed, and ample filter, with pump, to admit of filtering the water used by the crew for drinking.
- 6th. Providing better water closets for officers and for the men, with correction of the present very objectionable plumbing and fittings.

I would again repeat my opinion as to the undesirability of allowing apprentices to use tobacco. It may be impossible to prevent its use entirely, but it can be restricted, and to do this, which is especially desirable for growing boys, its issue to any apprentice on a training ship should be forbidden.

REPORT OF U. S. S. YANTIC, THIRD RATE.

By Passed Assistant Surgeon HENRY G. BEYER.

The *Yantic* is a wooden, bark-rigged, steam corvette, with a single uncovered deck for guns, and provided with forecabin and poop, both of which are covered. The berth deck is divided into a forward part and an after part, by the engine room country. No communication exists between the forward berth deck and the engine room; the steerage, however, communicates directly and largely with the engine room. The after part of the berth deck consists in a steerage with two rooms on each side and a storeroom country; the forward part is used exclusively for the berthing of the men, and also contains in one corner of it the dispensary, about 3 feet broad, 6 feet long, and 6 feet high. The covered poop is divided into the cabin, occupying the after part and the forward room, with four rooms on each side just forward of the cabin. The *Yantic* has lately received two new horizontal, cylindrical fire-tubular boilers with forced draft. Her armament at present consists of one converted muzzle-loading 8-inch rifle, one 60-pounder breech-loading rifle on the forecabin, two 9-inch smooth-bore muzzle-loading guns, with a secondary battery consisting of one 3-inch chrome-steel rifle, one short Gatling, and one Dahlgren howitzer. The *Yantic* is about 175 feet long, 26 feet beam, has 900 tons displacement, and carries about 150 men and officers.

The medical division on board the *Yantic* consists of one medical officer, one apothecary, one bayman, and, at battalion drill, four stretcher bearers chosen for the purpose from the different gun crews. There is no sick bay and whenever any of the men get sick and require rest in bed they simply get permission to sling their hammock where they would sling them at night. Sick call is held on the forward part of the berth deck near the dispensary, where a portion of the deck is temporarily screened off by large pieces of canvas suspended from the deck overhead. Officers are examined, treated, and berthed in the ward room.

WATER SUPPLY.

There are two water tanks aboard this ship, situated on the forward part beneath the berth deck, holding 2,200 gallons of water, an amount calculated to last about one week under ordinary circumstances and with the usual complement of officers and men allotted to her.

HEATING, LIGHTING, AND VENTILATION.

In winter time this ship is heated by steam supplied from the boilers. There is a single steam heater on the forward part of the berth deck and one in the steerage. Steam pipes (single) supply the cabin and ward room. The galley forms the only heat supply for the forecabin, which latter is screened off from the general gun deck by canvas whenever the weather is very cold and may be said to be moderately comfortable. Lighting is done in the usual and old-fashioned way, by means of oil lamps and candles. No electric plant has yet been proposed for the *Yantic*. Ventilation is accomplished by natural means, no system of artificial ventilation being in operation. So far as we are able to judge from the limited time and experience aboard, this has been sufficient everywhere except on the forward part of the berth-deck, where the air at night is especially foul in cold as well as in warm weather; although the ordinary wind sails, when kept in trim, make it rather better in warm weather than in cold weather.

FOOD AND CLOTHING

Seem both extremely satisfactory, and so far as we have seen our Navy ration is not merely on paper, but the men get it and live on it handsomely. Not a single complaint of any kind has been brought to our notice of the present ration being either insufficient or unsatisfactory in anyway. There are but very few men aboard this ship who commute their ration. Certainly no diseases have appeared which could be traced to an insufficient, imperfect, or unhealthy diet.

GENERAL HYGIENE

May be pronounced as good as it can possibly be on board of a ship of this description. The gundeck is scrubbed once a week, usually on Saturday, and in fine weather is clean and dry. Rarely any but hot water is used for scrub-

bing the berth deck, and this is done only in dry weather. Generally speaking, I have never been on board of any ship where there was more attention paid by the commanding officer to the general sanitary condition of the vessel and the condition of the health of the crew, nor where I have been so frequently consulted as to cleaning and scrubbing the ship, airing bedding, disinfecting bilges, etc., and where my suggestions and recommendations were received with so much intelligent appreciation as on board the *Yantia*. Our bilges are quite frequently disinfected by flooding them with about sixteen buckets of a solution of bichloride of mercury in water in the proportion of 1:1000. I think I am justified in pronouncing this ship clean and healthy.

SANITARY REPORT FROM U. S. S. PALOS.

By Passed Assistant Surgeon J. W. BAKER.

During the early part of January the repairs to the ship's boilers and engines were completed, the trial trip passed off without any incident of note, and the ship left the harbor of Nagasaki and steamed to Ningpo. Here she remained a few days and then proceeded to Shanghai and Chinkiang, arriving at the latter port in early February, at which place I joined the ship February 22. The influenza had made its appearance on the station in the early part of January of this year, and Yokohama and Kobe, Japan, were already infected. It soon made its appearance in Shanghai, and the natives of Chinkiang were first affected in March. Though I had arrived on board ship suffering from this malady, the disease was not communicated to anyone aboard, nor could the subsequent cases occurring on the *Palos* be traced to the disease prevailing ashore. The element of contagion seemed to be entirely eliminated so far as concerns the few but typical cases on board our ship. But seven cases appeared, but they exhibited the three different types of the disease, catarrhal, gastric, and nervous. All were amenable to treatment in the different stages and made good recoveries. During the spring months smallpox prevailed extensively ashore, and one would meet with many convalescing cases on a short stroll through the native city. Immediate precautions were taken, with success as it seems, against the invasion of this malady and among other measures adopted the entire crew was revaccinated with lymph from the Tokio farm, which always gives satisfactory results.

Children affected with this disease are clothed in red, which is supposed to insure a more rapid and perfect recovery by propitiation of the "pest god," who looks after this disease and presides over its victims. Often the cautious parents will clothe their well children in red clothes during these epidemics in order to deceive this "god," and they affirm that sometimes he will pass such children by. Inoculation is of course adopted, but is unsatisfactory, and is really in some cases quite as virulent as the original disease, causing loss of vision and permanent disfigurement and spreading the contagion. As the Chinese have found from experience that the disease is not so fatal among girls they frequently put girls' clothes on their boys, still carrying out this deception. As a mode of treatment they think a great deal of the intensely filthy wash water from the public bathhouses. This is creamy colored, something of the consistence of soup, and is of course well stocked with epidermal scales and various human excretions. Its therapeutic action is not so evident.

There is no hospital in Chinkiang, but Dr. Lynch (Dublin school), the efficient customs physician and surgeon, has one in contemplation, and public meetings were held in the spring for the purpose of raising funds. There is a small infirmary attached to the Jesuit Mission School, but the treatment is mainly confined to the scholars as a special privilege. In the latter part of April the *Palos* steamed up the Yang tse Kiang 450 miles through a generally low and fertile country to the city of Hankow, 600 miles from the sea, and the center commercially of a very large and important tea industry. Here also are manufactured the bricks of tea composed of sweepings and fine gleanings which are subsequently carried on camel to Mongolia, Tartary, and Siberia, and which pass as current coin in these distant places.

Hankow is practically the head of navigation during a large portion of the year, all the Shanghai steamers discharging their cargoes here, though light-draft boats proceed to Ichang, some 600 miles farther up, and the English all endeavoring to open to navigation and commerce according to the stipulations of the

The Foo convention the port of Chung King, 1,400 miles from the sea. A consul, a commissioner of customs, and a physician are already there, but the rapids intervene between Ichang and Chung King and it is doubtful if the prejudice of the natives will be overcome so as to permit of steamers running in this region. Had there been sufficient water in May we would have steamed to this first port above Ichang.

There are two hospitals in Hankow and one across the river in the city of Wuchang. This last is a woman's hospital and was established by the American Board of Missions. No patients have as yet been admitted by reason of the stone wall surrounding the hospital not being considered high enough (by the grossly superstitious Chinese) to keep off Fêng Shui, or the malign principles of nature. The doctor, a lady, is frequently insulted and her chair jostled by the rude crowd in the streets and it looks doubtful if many patients will be treated for some years. The two hospitals in Hankow are practically in the Foreign Concession and are abundantly supplied with clinical material, such as necroses of bones of arm and leg (more frequently the latter), calculus (not as common as in Canton), leprosy-ulcers, very extensive and difficult to heal, and hernia, for which a truss is generally provided at cost price. The one is under the auspices of the London Mission, the other connected with the great convent and school of the Italian Lazarists; as many as 800 children from two years upwards in the latter and all busy, working or playing, and under the watchful eyes of the patient Sisters, of whom two are regularly attached to the infirmary. The want of funds and scanty number of assistants connected with the hospitals in China render them far from inviting to the average European patient, but they are considered commodious, if not luxurious, quarters by the Chinese, who abhor water, eschew soap and towels, and as a nation are given over to filth and unwholesome habits of life. The student of modern surgery, in these days of asepsis and antisepsis, wonders how any surgical operation can be performed with safety or how wounds can heal in an atmosphere loaded with human exhalations, scales from clothes which may have been on the person for six months, and germs and dust of all kinds. Native assistants are trained and employed as nurses and apothecaries, but often try the patience of the doctor. The convent is about to construct a new hospital, where the doctor may work in coöperation with light, air, under more advantageous conditions.

Hankow is flooded during the months of July and August and the rise in the yellow waters of the river may amount to 50 feet, which will place the Bund under water and oblige the people to use boats instead of rikshas. During the summer months the temperature in this humid region may rise to 104° F., and sleep is rendered well nigh impossible. Malarial, typhoid, and certain obscure forms of fever are rife in the autumn, and dysentery and diarrhea sap the vital powers, if they do not cause invalidism or death. Both the doctors are Edinburgh graduates and thoroughly capable, efficient surgeons and most untiring and faithful physicians, who are hard worked the year round. They are greatly encumbered with lack of funds and are obliged to struggle on with old and few instruments generally, and watch the years pass with contemplated improvements not begun.

Hankow is the great head and center for black tea, and the season was just commencing in May and the tea factories were all astir. Opportunity was afforded us to visit the Russian factories and to witness the operation of the manufacture of brick tea for Russia, Tartary, and Siberia. In those remote regions these hard, compressed, flat cakes of dull black, and weighing about a pound, pass current as money and are readily interchangeable.

The tea is made into a thick soup with mutton fat, and the whole eaten and not drunk, as in ordinary fashion. We remained here a week, and then dropped down to Kiukiang (Nine Rivers), which is situated in a fertile, well-watered district and surrounded by hills, and is frequently visited by the people from Hankow, for whom it is a veritable sanitarium. Upon the hills back of the city, toward which the ground gently rises, are situated bungalows for the residents of the city, and surrounded by the cooling streams and mid the bowers of leaves the missionaries wear away the tedium of a summer day. There is a hospital here established by the Vincentian Fathers, and 6 Sisters are in attendance. It was in this hospital that Ensign Whittlesey was treated, and from the funds of his sickness there has been provided a European room. This hospital, and especially the dispensary and operating room, which come under the direct charge of faithful Sister Ryan, are models of order and cleanliness, and might convey a useful lesson to many hospitals in the East. The doctor in charge temporarily is an Edinburgh graduate (B. M. C. M.) and is kept busy with ma-

laria, typhoid, syphilis in many forms, and eye diseases. The mandarins about sometimes send for him and really acknowledge the value of surgery, but reject European medicine for their own strange mixtures of almost unknown and revolting masses. The wheel of progress certainly moves slowly in China, and when you add to this the utter and wanton disregard in which human life is held, and the prevailing want of sympathy toward the afflicted, one is really surprised that the Chinese tolerate European methods of practice. But such medicine and services are generally free, and though many are relieved and restored to health the literati and officials think but little of any science for which a man labors at the rate of \$1,000 per annum. It is reckoned there are now 500 medical missionaries in China, and they are gradually leavening the mass of ignorance and superstition amongst which they work.

There is an annual inundation at Kiukiang, the water rising to different levels in different years, and sometimes the first floor of the hospital is under water and the patients are barely kept dry in their rude beds of boards and matting. No attempt is made by the sisters or fathers to convert these natives while under treatment, which, I think, will appeal to the good sense and judgment of most people and which is quite contrary to the practice in vogue among the Protestants. The latter invariably have a chapel affixed to the dispensary, and gathered in this room are all the patients in the early morning, and here they are preached to and expostulated with ere they are permitted to go in the dispensary and have their aches, pains, and sufferings attended to.

The hospital, however, is no exception to the general rule that they lack not patients, but money, and the eager doctor sees many needed changes neglected for want of funds.

From Kiukiang we proceeded to Wuhu, and found a city considerably elevated above the banks of the river and with a very old pagoda falling into ruins, bearing on its sacred and battled surface the marks of the bloody Taiping rebellion. There is no hospital here and only one physician, who acts in a double capacity as physician to the imperial maritime customs and clerk to the same. I saw no patients here during our two days' stay. This region from Kiukiang to Wuhu is one of remarkable beauty and great fertility, and in the vicinity of Payang Lake are the potteries whence come the porcelain for the empire, and from whose Chinese name is derived our own kaolin.

Nanking (South Capital) was then visited, and a day spent in traveling through this large but ruined city and visiting the arsenal.

This is not a treaty port, and only missionaries are found here, but they, however, in great numbers. A hospital has been established at considerable expense by the liberal donation of a wealthy lady, and presents quite an imposing appearance and is certainly the superior of any in detail and finish outside Shanghai and Hongkong. But inside we are disappointed and find it almost given up to living quarters, and I saw but a scant number of patients. This is the site for the famous porcelain tower which was blown up by the rebels, and the tombs of the Mings lie just outside the city, which is large, clean for a Chinese city, and surrounded by a thick and lofty wall. The city may be approached by canal or road, the latter a very pretty ride, and one may gather, as he jogs along on his mule, the idea that this city once was large and grand and superior in many ways to the wretchedly dirty and forbidding modern Chinese city. For many years Nanking was in the possession of the Taiping rebels until the brave Gordon rescued it from vandal hands and restored peace and quiet.

Chinkiang and Shanghai were again visited, our stay being very brief, and then we sailed for Nagasaki, arriving there in June, with the officers and crew generally in good health.

A sudden and unexpected departure was then made for Korea with dispatches and under sealed orders, and the ship labored heavily in a gale for thirty-six hours, being at times completely at the mercy of the waves and winds, as the engines must now and then be stopped to make necessary repairs, and practically she has no sail power. The ship labored violently, leaking, and straining her upper works, and pitching in such a manner that the officer of the deck could not keep his feet.

We remained but a few days in Chemulpo and then returned to Nagasaki, at which port we remained until the outbreak of Asiatic cholera in July. Upon my recommendation the ship departed July 2 for Kobe, which port remained free from cholera until the latter part of August. Daily visits were made to the kencho (city hall) to obtain the latest and most reliable information concerning the spread and progress of the epidemic, which began to assume alarming proportions in spite of the enforcement of strict quarantine throughout the Empire.

Ample arrangements were made at the quarantine station, which is admirably situated some two miles from the city on a long, dry, sandy spit, exposed its entire length to deep water and sea breezes. At this ground the *Ossipee* rode out her epidemic in 1885. Passengers, Europeans and natives alike, on arriving here from infected ports were detained a few hours, given a good wholesome bath, a glass or more of liquor or coffee and cigars, their effects disinfected as far as possible, and they then were allowed to land; and it was the pride of the quarantine authorities that when cholera did succeed in planting itself in Kobe it came from the rear and not by sea. At the risk of disgression I can not refrain from again referring to the uniform courtesy with which I was treated by all the officials with whom I came in contact in my search for information and the readiness with which everything was thrown open for my inspection. A short trip to the naval hospital, Yokohama, was necessitated by the sudden development of insanity in the case of Lieut. Walter M. Constant, and upon my return the ship left for Korea (August 26), making the passage in five days with perfect weather and smooth sea. Cholera had already appeared in Jenson, the southern port of Korea, and Japanese and Koreans were alike dying, and from this port it was carried in a cargo of dried fish to Chemulpo, Korea, there being frequent communication during the summer by steamer and junk.

Active preparations were made by the customs and consular authorities to meet this danger, and quarantine was enforced by them and the Japanese local physicians against all steamers and sailing craft from Jenson. The cold weather in latter part of September put an end to the few cases and strict precautions were observed on the *Palos* as had been done already in Nagasaki and Kabe.

No case occurred on the ship during the epidemic.

A case of Asiatic cholera occurred on a junk lying alongside the *Palos* and she was at once disinfected and conveyed to the outer harbor and the patient transferred to an island for treatment.

October 12 the march was made from Chemulpo to Seoul, 10 men and 3 officers going from the *Palos*. All the men of the expedition (*Monocacy* and *Palos*) arrived in fair condition, a spirit of rivalry between the men from different ship's companies doing much to bring about this happy result. When one considers the length of march, 28 miles, the incumbrances of the baggage, rifles, and ammunition, the fact that sailors eat heartily and get but little practice in marching, the results obtained are most gratifying. One man succumbed, but he had been secretly drinking more than his allowance of beer at Aurecole, the half-way station, where a two hours' halt was made. I at once opened a temporary hospital in the legation compound, set out the medical stores, instruments, etc., and administered to each man 2 ounces of whisky, and dressed the swollen and blistered feet, allowing the men to wear Korean sandals, which are soft and easy to the feet, and may be purchased for a few cents. Arrangements were then made with Dr. H. N. Allen, the courteous and obliging physician in charge of his majesty's hospital, to have all serious cases treated at his hospital, as the events of the twenty-four hours succeeding were looked forward to with some apprehension. Two rifles were accidentally discharged the next day by excited sentries, but the bullets whistled harmlessly in the air. At 1 o'clock the following morning all hands were mustered in marching order with 40 rounds of ammunition, and though they had had but few hours' sleep after the fatigues of the preceding day the men promptly responded, had hot coffee and biscuits, and stood in line until 3 a. m., when the long, dark march was made to the palace gate, and then down the main street through the east gate, and halted outside the city. The morning was cold and raw and, each officer and man was given 2 ounces of whisky and a few some quinine. At 8 a. m. all returned to the legation, and no ill results followed the exhaustion and exposure of this most unwelcome march. After remaining five days the men returned to their ships by small steamer down the river Han, thus avoiding the fatiguing march.

This Korean Government Hospital was founded by Dr. Allen in 1885, after the distinguished services of this skillful surgeon had restored the bleeding and almost pulseless Prince Min Yon Ok to life. The King looked with favor on the doctor and the hospital, and a yearly grant of \$2,000 from the royal exchequer was the direct result. People came far and near to obtain relief, and subsequent numbers have never reached the figures of the first six months, when nearly all the chronic ailing in the capital came to get the foreign medicine. Dr. Allen, on his return to the States, was relieved by Dr. Heron, and both physicians have rendered invaluable and lasting service to government and people. Dr. Heron, I regret to say, is since dead from hardships and exposure contracted while on a distant visit to render aid to a European.

Dr. Scranton is also here, and has lately erected a hospital of brick almost in the heart of this large city of 250,000 inhabitants. In addition to this he has still his old hospital situated near the American legation, where he intends in future to treat only women and children, and will turn this over to some women physicians who are expected soon from America. Dysentery, diarrhea, dyspepsia, and intestinal parasites are especially common, and all kinds of eye diseases prevail, and blindness from smallpox is daily seen. This latter disease is still endemic in Korea, and about one person in three is badly disfigured from the pitting. The Koreans do not count their children until they have had smallpox, as they don't consider his life as certain until he has passed through this disease. The ancient method of inoculation, adopted from China, is still in vogue, the mucous membrane of the girl or boy being scraped and the scab directly applied in bulk or powder. The right or left nostril is used according to the sex of the child. Of course this is but slightly modified smallpox, and the true and virulent disease may be directly contracted from such a patient. The Koreans have learned the great value of quinine in their fevers, and Europeans who may travel in the interior of this country are constantly beseeched by the people for this favorite medicine, and commonly a consul will acquire a great reputation for medical skill by giving quinine, rather indifferently too, as he passes through these districts.

Nothing has as yet been done toward establishing a school for medical instruction in Korea, but Dr. Allen has one in contemplation. Progress is slow in Korea as in China, the latter country taking pains that Korea, her so-called vassal state, shall not imbibe modern ideas to any great extent. Soon after the detachment had returned to the ship we left for Tien-Tsin, running into the fortified port of Nei Hai Wei from stress of weather, and remaining one day. The viceroy of Chihli, his excellency Li Hung Chang, has here established, by the advice of Medical Director Irwin, of Tien-Tsin, F. R. C. S. (Ireland), a hospital, and it is in charge of a former graduate of the Tien-Tsin Medical School (now lapsed). It is a purely naval and military hospital, and many cases of acute and chronic diseases, medical and surgical, are annually treated. The surgeon in charge, a native, makes frequent written reports to Medical Director Irwin of the most important cases. A similar hospital has been established at the fortified port directly across the Gulf of Pechili, called Port Arthur, and is in the direct charge of a native surgeon, also a graduate of the McKenzie School of Medicine in Tien-Tsin. The supplies consumed at these hospitals, and such as are from time to time forwarded to the northern squadron, which is attended by one foreign physician, Dr. Rennie-Robertson, are all purchased by Medical Director Irwin, of Tien-Tsin, upon whom requisitions are made as necessary. The northern squadron was here attacked by cholera last summer, and lost many lives. From this port we went to Che-Foo, distant 40 miles, and coaled ship. Che-Foo had many cases of cholera the past season, and the European graveyard visited showed recent evidences of the virulence of this disease, yet the greatest mortality occurred among the natives. All reliable information on this point is either withheld by the authorities or is not a matter for Europeans to know. Still, as to death and disease in China, I believe there are no statistics. At Che-Foo, coal of excellent quality may be obtained from the best English, Japanese, and Chinese mines—Cardiff, Takashima, Chipuzen, and Kaiping.

Our trip across the Gulf of Pechili was stormy, and the crew were much exposed to cold, and wet, which showed their evil effects later on in an increased sick rate. We arrived off the Taku Bar to find the Chinese fleet waiting for the imperial commissioners and letter of condolence from his majesty the Emperor of China to his majesty the King of Korea on the death of the late Queen Dowager. The bar very fortunately next morning had sufficient water on it for the ship to cross, and we then commenced what proved to be a very difficult and trying trip up the Pei-Ho to Tien-Tsin, distant about 60 miles by water. We finally arrived off the Bund November 4, after five days of most laborious and constant work, during which the crew were much exposed to the inclemency of the weather and suffered from want of rest. Only the untiring and persistent efforts of our commanding officer, Lieut. Phelps, made this difficult feat possible, and he was almost constantly on deck day and night throughout. The European portion of Tien-Tsin, which extends directly along the bank of the Pei-Ho for three-quarters of a mile, and three streets deep, is called Tsu-Chu-Lin, and is largely composed of the sand and mud which is dug, each fall and winter out of river bottom. Naturally the place is perfectly level, and unprovided with either drainage or wells, surrounded by the outlying marshes, which are mostly uncultivated, and at times under water. Tsu-Chu-Lin is most undesirable as a place to live in, or a port to stop at, save in winter, when the intense cold and highly ozonized air render

it very pleasant. The climate was all that could be desired, and clear blue skies, abundant sunshine, and a high barometer soon restored the health of the crew. Influenza was prevailing among the Europeans of the settlement on our arrival, and scarcely a person, man, woman, or child, escaped. I saw many of these cases with Dr. Irwin, and the remarkable manner in which the inmates of one house would be effected, all sick at once; children, adults, nurses, and servants, seemed rather to point to infection than contagion. Typhomalarial fever was also prevalent, and one case, that of an English naval officer, was fatal, and many were serious. Among the Chinese both diseases prevailed extensively, and pneumonia and bronchitis carried off many victims. Neuralgia, generally bifacial, followed nearly all cases among adults, and was only relieved after exalgine had been freely administered. Swelling and suppuration of the glands of neck and below the inferior maxilla was not uncommon among children after influenza. The country round about Tien-Tsin for quite 2,000 miles had been inundated the season past, and hundreds of thousands of people rendered homeless, and many thousands were almost deprived of food, and thousands lived almost entirely upon the chaff of millet, the husk of the peanut and grass seeds, and enormous suffering and destitution prevailed on every side. As the cemeteries were still under water, the French Sisters' Hospital St. Joseph's was closed to serious cases, as they would have no way to dispose of the bodies, opportunity for interment being rendered for the time being impossible. Drs. Frazer and Irwin look after the health of the community, and the latter is also medical attendant to the viceroy of Chihli, Li Hung Chang, the greatest and most influential Chinaman in the Empire to-day. The viceroy is well disposed toward European methods of cure ever since his wife, Lady Li, was so seriously ill, and this regard was increased by his own more recent illness. Besides the St. Joseph's Hospital there is the Isabella Fisher Hospital, established by the American Board of Missions, named in honor of its donor and intended only for women and children. There is a larger one almost opposite established by the London Board of Missions and that most competent and enthusiastic worker, Dr. Roberts (Edinburgh), is in charge and sees from 40 to 70 out-patients daily and generally has from 20 to 40 patients in the hospital throughout the year. The number varies according to the period of the year, there being scarcely any during the first two weeks in New Year and most during the summer season when travel is made easy in China. This hospital was established by the viceroy of this province, Li Hung Chang, and was under the direct management of Dr. MacKenzie (now dead), who also started a medical school in conjunction with the infirmary. Upon the doctor's death, two years ago, the hospital came into the hands of the London Missionary Society, and the viceroy established another just opposite. Unfortunately the sites of both hospitals are poor, there being stagnant water reeking with all manner of garbage and filth directly about them, and in addition a much-used Chinese graveyard. This latter is a source of cadaveric odors to an alarming degree, the Chinese not burying the body deep in the earth, and it is quite impossible to keep the windows open on that side. Continued remonstrances from year to year have resulted in a diminution of the burials, but now and then at night a coffin is quietly conveyed and thrust into the decomposing mass, which is about 10 feet above the surrounding level.

The viceroy's hospital is a low structure of coarse brick, divided into three wards of eighteen beds each, imperfectly ventilated, and with dust and cobwebs lying thick in some portions of them. It seems almost impossible to make the Chinese understand what cleanliness is, even in a hospital, so deep rooted and strong are their prejudices against soap and water. There are also several private rooms, where a paying patient may be treated; an operating room, fairly well lighted, if the glass were washed occasionally; some reception rooms for official patients and Chinese officers; a dispensary well fitted out, and storerooms well stocked with all manner of drugs and modern instruments. There is plenty of money at the disposal of the doctors, Lin and Chung, Medical Director Irwin acting as consultant and operator. Summer, of course, is the busy time, patients coming from great distances to seek advice and treatment. Cases are mainly opthalmic and surgical, and no women are received. Though the private rooms are provided with stone or brick cougues for heating, these have in most cases been suffered to drop into disuse, and patients bring those abominable and deadly charcoal pans directly into their rooms. These pans are in general use among the Chinese of the city, and a winter never passes without adding its quota of victims to the fumes of carbonic oxide. Some patients addicted to the opium habit are found among the general cases, and the habit is not generally interfered with. Now and then a patient presents himself for treatment suffering from this habit, and the general custom is to slowly diminish the quantity of

opium consumed by substitution of morphine and bismuth powders. In the majority of such cases I learn that the cure is but temporary, the man relapsing soon after his return to old associations. Much interest and some excitement has arisen among the medical missionaries as to the relative value of the two methods of cure—sudden and absolute deprivation of the drug or its more gradual withdrawal. I think most unprejudiced observers agree that the former is applicable to only a limited number of victims of this drug, especially the recent cases, whereas the latter works particularly well among the confirmed smokers and those weakened and impoverished by age or abuse of this drug. The exercise of proper restraint over these patients and careful attendance to see that they do not secretly obtain the drug from friends, are things very difficult to enforce, and sometimes well-nigh impossible; and I think that the great variation noticed in statistics of cure is to be attributed to this want of precaution. Morphine and bismuth powders are now in general demand among the Chinese who can obtain them from the European drug stores, and the Chinese are consuming annually great quantities of morphine in this form. It is cheaper, more convenient, and less liable to be detected. Cases of suicide by opium are not uncommon, and the Chinese rely principally on human faeces as a means of cure. The faeces are simply jammed down the throats of these unfortunate sufferers, who too often are thereby choked to death. These people make use of the most offensive and disgusting of things as medicines, and a child's urine is supposed to be wonderful in restoring strength to those enfeebled by sickness or infirm through age. Many wealthy mandarins travel with children, whose urine they drink, believing that vigor is thereby imparted to the frame and life prolonged. This remedy was much employed the past winter by those suffering from influenza, following it up with a human foetus baked. Of course they still believe in the great virtues of ginseng, and fabulous prices are still paid for fine specimens of this drug. The best samples of this root come from the mountains of Korea, and the annual tribute from that country always contained a large and valuable quantity of ginseng. This medicine is supposed to impart renewed sexual vigor, and is in much demand, the Chinese being addicted to licentiousness in its many forms. The placentæ of newly-born babes are most highly prized for this purpose, and even the still-born child is roasted and eaten to be the means of imparting tone to the flagging system and stimulate the wasted form. It is very highly prized for this purpose, and only the wealthy may afford it. To mention a more commendable practice (considered from an ethical point of view), I must speak of a case which came under my observation this winter. It was that of a mother who was dying, and whose son proudly and affectionately excised a large piece of flesh from his own calf of leg in order that soup might be prepared therefrom for his sick parent. In spite of this the mother died, and the boy had to be taken to the hospital that the hemorrhage might be controlled. This illustrates how strong filial duty is among these people and to what end a duty is carried.

In regard to the floods which the past autumn in this region caused such widespread ruin and devastation, it is interesting to note that over 1,000,000 people were rendered either homeless or despoiled of their crops. Widespread devastation prevailed and people resorted to the eating of chaff and grains of grasses in order to ward off the pangs of hunger. It is hard to say how many died, as no figures are obtainable. The Government finally took measures to relieve this distress, and enormous quantities of rice, over 2,000,000 piculs (133 pounds), were conveyed to Tien Tsin as famine food. As late as the latter part of December a steamer left Shanghai for the famine district about the mouth of the Pei Ho with abundance of provisions and clothes on board. The quantity would seem to be ample, but so rapacious and greedy are the officials in China that only a small quantity of this food will find its way to those in actual want. It is interesting to note in this connection that an adult may be kept alive for the small sum of 10 large cash per diem, less than a cent, and on this basis was distributed the European famine relief fund of some \$5,000, and the large sum in 1871, when a similar flooding of all the plains in this region occurred.

The general health of officers and crew has been excellent in spite of the prevalence of cholera the past summer. But two patients have been invalided to the hospital, one for hernia, the other for insanity. The influenza visited the ship in the spring with a total of seven cases, or 16 per cent of the entire force, but was mild in character, and though lying in the river abreast of Tien Tsin, where it is prevailing among the Chinese and has already carried off many victims, the ship still preserves immunity from this disease and has maintained a

fair degree of health, considering the age and character of physical health among the crew, who too often are the refuse of the station.

I have to thank the Bureau for the medical literature disbursed; the magazines arriving each mail. In this country where medical libraries are few and difficult of access, it is a great boon to be able to keep even with remarkable developments and discoveries continually going on in medical science.

The accompanying diagrams represent the progress of the cholera in the Empire of Japan during the season of 1890, and the map indicates with sufficient accuracy the division of that country into so-called Fu (three in number, Tokio, Osaka, and Kyoto) and Ken. The returns were all made to the central sanitary bureau by Ken and Fu, and it was found necessary to construct a special map for this purpose, no Ken map of the Empire being obtainable from any source. This has been most admirably and accurately done by Dr. T. Mayeda (Japanese), attached to this ship and serving as apothecary. Under each division of the Empire into Ken will be found the population of said Ken and the number of cases of cholera (if any) which occurred there, as well as the deaths. The large numerals affixed to each Ken, whether cases aggregated 300 or more, correspond to similar numbers affixed to the multicolored circle opposite. Those sections of the country where no cases occurred are colored faint yellow, and it is interesting to note that it was chiefly that part of the Empire attacked where are seaports and a commerce. The epidemic hardly spread outside these divisions, owing to the watchful care of the authorities, and most of the cases occurred in the southwest and central portions, where is chiefly the trade and commerce. The colored circle adjoining represents graphically the relative number of cases furnished by each Ken, beginning at the most densely populated, marked 1, and passing in progression according to total population through all the Kens where the total number reached 100. The city district, or Fu, of Osaka, is seen to have suffered the most, and this is easily accounted for when it is known that Osaka is a large seaport, having much commerce and many steamers plying to Nagasaki and infected ports in the inland sea; that the people have no proper water supply, using wells almost entirely; that the city is completely cut up into canals and streams, whose water is spread everywhere by too willing hands, and that the city is overcrowded and has many poor.

The other chart is drawn to show the relative number of cases of cholera, as well as actual, which have occurred the past fourteen years in Japan, beginning with 1877 and ending with the present epidemic. A remarkable ratio is observed and though the period of time is only too brief, the general law would seem to be three years of freedom from cholera, followed by a large and extensive epidemic, then a period of rest for two years and a medium-sized epidemic; though it is also gratifying to notice that the epidemics are gradually growing somewhat smaller and that the black line indicating total number of cases is somewhat shorter in later epidemics.

Another point observed is that cholera always prevails in this country, though in off years to a very limited and hardly appreciable extent; that local conditions for development do not always present themselves, but do with some degree of regularity. The red or mortality line also varies in different epidemics and generally directly as the epidemic. That, if the epidemic be extensive, the mortality rate is high and vice versa.

I regret that I could not be constantly on the scene, as doubtless many interesting facts might have been noted.

CHOLERA OUTBREAK IN NAGASAKI, JAPAN, 1890.

As this port was the first invaded by Asiatic cholera the season of 1889, I have deemed it of some interest to make a special study of the outbreak in this place. It is seen that the first case appeared in the Russian settlement called Inasa, directly across the harbor from the city proper, and the patient was a Japanese coolie, who had been employed in unloading a steamer from Shanghai. This was June 27, 1890. The following day another case appeared. This was the wife of a coolie who had been employed also on this steamer—as women do all the loading of coal on board the steamers in Nagasaki. It will be noticed that the first ten cases occurred entirely among people living directly about the harbor edge or were persons employed on steamers. One case, No. 7, occurred in a samponin in the harbor. After a week or ten days cases began to occur in houses situated

away from the harbor and among people of various occupations. About this time it spread to surrounding cities, carried there by hands employed on the steamers from Nagasaki, of which there are many running to surrounding ports. Some cases were also noticed inland, but these had been conveyed by persons who contracted the disease in Nagasaki.

Waterworks are already in process of construction in Nagasaki, and it is hoped that when completed a good supply of pure water may be furnished the inhabitants, and that we will see less ravages in this really charming city from cholera, typhoid, and dysentery.

Population of city proper may be estimated at about 25,000 people, and the epidemic had exhausted itself about the 1st of September in the city, though villages and towns about were reinfected in the latter part of September and continued until cold weather put a stop to its further spread.

NAVY DEPARTMENT, BUREAU OF MEDICINE AND SURGERY,

Washington, December 12, 1891.

I have the honor to transmit herewith my report as a delegate to the International Congress of Hygiene and Demography, held at London, England, August 10, 1891, under orders of the Navy Department June 16, 1891, and the Bureau instructions 8th June, 1891.

Very respectfully,

PHILIP S. WALES,

Medical Director, U. S. Navy, in charge.

Surg. Gen. J. MILLS BROWNE, U. S. N.,

Chief of Bureau of Medicine and Surgery.

REPORT.

I have to report that in obedience to my orders of June 16, 1891, from the honorable Secretary of the Navy, I arrived in London on the 16th of July, and registered as a delegate to represent the United States Navy Department in the International Congress of Hygiene and Demography to meet August 10, 1891.

A paper I had prepared on the purification of water by rapid filtration was submitted, which was referred to the section of engineering in relation to hygiene.

The time intervening between my arrival at London and the meeting of the congress was employed in carrying out the other instructions contained in my orders.

My attention was first directed to the water supply of London, which is effected by enormous works under the control of eight companies, viz, the Kent Water Works Company, the New River, the East London Water Company, the Southwark and Vauxhall, the West Middlesex, the Grand Junction, the Lambeth, and the Chelsea, which up to the end of 1890 had expended on these works a sum approaching £15,000,000. About 50 per cent of the total water supply is derived from the Thames, and a few deep springs in the chalk district, 38 per cent is derived from the Lea and chalk springs in the Lea Valley, and the remaining is derived from deep wells.

The average daily supply delivered from the Thames during the month of May was 94,658,337 gallons; from the Lea, 59,860,957 gallons; from springs and wells, 25,383,525 gallons; from ponds at Hampstead and Highgate, 6,030 gallons. The last is used for other than domestic purposes. This gives a daily total of 179,908,849 gallons for a population of about 5,726,405, representing a daily consumption per head of 31.42 gallons for all purposes. About 20 per cent of the water delivered for other than domestic purposes. In 1890, 2,000,000 gallons were used in extinguishing fires, of which 60 per cent was taken from the street pipes. The whole number of houses taking water from the companies during the year was 773,700, and the total supply divided by this number gives a daily average of 232 gallons for each house.

The total quantity consumed last year reached the large figure of 64,000,000,000 gallons (290,623,000 cubic meters).

For raising this large amount of water the companies employed no less than 184 steam pumping engines of the bucket and plunger description, having an aggregate of 21,659 horse-power. These huge engines work continuously day and night throughout the year, their speed being somewhat reduced for about six hours in the night.

The greatest lift of water from the engine wells to service reservoirs by steam power is 600 feet, at the Kent Water Works. The head of pressure in the districts supplied is also large, reaching in some cases 620 feet, but in no case is it less than 20 feet. The two systems of house supply, the intermittent and the constant, are in vogue, the latter being used in about 63 per cent of the total number of houses supplied.

There are 4,760½ miles of water pipes, of which 3,242½ are in the metropolis, affording ample facilities for the locating of hydrants for public and private uses, and for fire purposes; at the present time they number 17,430.

All the water delivered to the city, excepting that drawn from the chalk wells, is passed through filtering beds of varying areas and depths. One hundred and four beds, from three-fourths to 25 acres each, and representing a total of 102½ acres, are operated by the seven water companies. They are constructed of alternating layers of fine sand, coarse sand, gravel, and bowlders, and in one case a layer of shells is intercalated of different thickness, the minimum depth of the total material being 1 foot and 3 inches, and the maximum 8 feet. The filtering area per million gallons of average daily supply ranges from 0.51 to 0.88 acres, and the rate of filtration from 1½ to 2½ gallons per square foot per hour. The water, after passing slowly through the filters, flows into the engine wells, where it is lifted by pumps to the service reservoirs. The beds have to be cleaned from time to time, and this necessity arises chiefly from the character of the water as to turbidity that passes through them, and from other causes. At the Chelsea works there are seven filter beds, of which four or five are usually in operation at one time, the remainder being cleaned by the removal of the top layer of sand, which is washed, dried, and replaced. Some idea of the amount of work of this kind required may be gotten when it is stated that nearly 6 acres were cleared in May, and 26 acres in the present month. The beds are prevented from clogging, as far as possible, by subsiding and storage reservoirs, into which the unfiltered water passes, so that the coarser matters in suspension are deposited before it runs into the following beds. There are fifty-four of these reservoirs covering an area of 481½ acres, with an available capacity of 1,300,100,000 gallons. The East London company has eight such reservoirs, with an area of 236 acres, and a capacity of 610,000,000 gallons.

The number of days' supply represented by reservoir capacity belonging to the different companies varies from 2.7 for the Southwark and Vauxhall companies to 14.1 for the Chelsea company; with all the reservoirs yet it sometimes becomes necessary to admit flood water to the filters, and then they are overtaxed and soon need cleaning.

The filtered water is stored in covered reservoirs, of which the companies have fifty-nine (two are uncovered), with a total capacity of 215,790,000 gallons; the individual reservoirs ranging in size from 70,000 through the millions and topping off with one of 50,000,000 gallons capacity.

The water supplied from the chalk wells of the Kent company is not filtered, being invariably clear and bright. The average daily supply from this source during the month of May was 13,150,319 gallons, and the cost and construction and maintenance of the filter beds is great.

The metropolitan act of 1871 provided for a water examiner, who reports monthly to the local government board the condition, character, and other particulars of the water supply, taken daily at various points.

The purity of the water in respect to organic matter is determined by the oxygen and combustion processes and the quantity of oxygen required to oxidize it, and in respect to color by the colorimetric method, which indicates the proportion of brown to blue in the water. Bacteriological examinations by Koch's process of gelatine-plate culture is also an important feature of the report.

SEWAGE.

The question of the disposal of sewage of populous places has long been a difficult one, and up to the present an unsolved problem to the sanitarians, and the question is of grave importance to London.

The river Thames courses through the valley in which is situated the city of London, the land on each side sloping towards the river, and thus determining

the natural course of drainage directly into it. The river becomes excessively polluted, but since the year 1856, when the now extinct metropolitan board of works was formed, there has been expended on the main drainage works alone the sum of nearly £6,000,000 in eliminating this pernicious system by putting down immense conduits parallel to the course of the river, intercepting the sewage at different points, conveying and discharging it into the river far below. The sewage flows by gravitation, and when the levels interfere it is pumped from a lower to a higher level until it reaches the two outfalls at Barking and Crossness. The main intercepting and principal branch sewers, respectively, measure about 80 miles.

At the outfall stations are located the precipitation works, in which at present only a part of the sewage is precipitated with lime and the sulphate of iron, but it is intended, when the new works are completed, which will cost a million sterling, including the cost of ships to carry the sludge to sea, to dispose of the whole amount in the same manner. When necessary, in addition to the treatment by precipitation, deodorization is resorted to by means of permanganate of soda. The sewage, after treatments with the precipitants, runs into channels, each of which is 30 feet wide and from 860 to 1,210 feet long, the collective capacity being 20,000,000 gallons. When precipitation is completed the supernatant fluid is run off and the deposited matter or sludge is collected and transported by ships specially designated for the work, and dumped into the sea. Six ships will be needed to perform this part of the service when the works are completed, but only two ships are now at work. The amount of sewage to be dealt with daily is 185,000,000 gallons, and the cost by this method is only 27s. 9d. per million gallons. The whole of the sewage is disposed of by this system without the realization of a penny, and this course seems to be the best, inasmuch as the only valuable constituent of ordinary sewage is ammonia, and the quantity of this agent present is too small to justify any attempt to utilize it as a fertilizer. Many schemes have been suggested from time to time with the object of converting sewage into a manurial agent, but they have miscarried for the reason stated—"sparsity of ammonia."

There are other processes than these, whose essential features are to destroy the harmful organic matter contained in it. This matter is either held in solution or suspension, and in the latter it is represented partly by living organisms. The suspended material may be deposited by subsidence, or by passing the sewage through large tanks in a slow but continuous flow.

Filtration effects the same object through filter beds of sand, gravel, cinders, ashes, etc., whose action is mainly mechanical, or through substances such as charcoal, metallic iron, polarite, manganic, carbide, or other compounds of manganese or iron, in addition to the mechanical and catalytic action upon the organic matter.

Precipitation may be brought about by electrolytic treatment, as in the Webster process. Organic matter may be destroyed by oxidation as well as by the potassium permanganate, or the microorganism may be attacked or destroyed as in the Animas process, or by the addition of chlorinated lime, carbolic acid, and other germicides to retard or prevent putrefactive changes.

Nitrification is the slow oxidation of organic matter by organisms in the surface soil by intermittent percolation of the sewage through specially prepared beds.

The disposal of house refuse of populous cities is a problem of extreme difficulty and a fruitful source of contention. Many schemes have been, therefore, brought forward from time to time for its solution. In rude times, before the importance of hygienic measures for the preservation of health and even the life of communities had been appreciated, such refuse materials were cast into the highways and streets or neighboring ditches and left to putrefy and pollute the air, earth, and water with their poisonous products. Under such conditions fatal epidemics were of frequent occurrence.

The first efforts to ameliorate these conditions were directed to the removal of the refuse to a distance in such conveyances as might be procurable. In the case of small communities this was easily done and more or less successful in attaining the object in view, but when individuals were massed in great towns and cities the difficulty and expense of removal of such refuse increased with the quantity and distance from the point of deposit. At present efforts are making to find some cheaper, safer, and more effective method for its removal than that by transportation by railroad or water carriage.

In Paris the liquid refuse is used as a manure, and any bad odor present is prevented by deodorants during removal.

In Berlin, under the contract system, the contractors sell the household and street refuse as manure, but it is proposed, from April, 1892, to spread out the street refuse over some waste land at a considerable distance from the city, so as to raise the low-lying and unproductive land to a higher level and otherwise improve it.

In London, forty years ago, furnaces were constructed for the purpose of destroying refuse, but they were of very crude forms, and there was a difficulty in dealing with the gases given off by the material in the first stage of burning, and the dust which escaped from the chimneys was the cause of serious complaints, and prevented the adoption of the burning system. These objections have now been overcome, and Jones's fume crematory is now in full operation at Ealing. If properly worked it may be used anywhere without any inconvenience. The gases are subjected to a temperature of from 1,100° to 1,500° F., at little expense of fuel.

The heat thus generated is used in a variety of ways in connection with tubular boilers for pumping, for pneumatic ejectors, driving dynamos, and working of various machinery for sanitary works, thus effecting considerable saving, and often paying principal and interest and leaving a balance. It is now considered in England that the old methods of getting rid of house refuse must be abandoned, as from every point of view its destruction by fire is the most satisfactory and some districts of London have adopted the destructors.

The refuse of populous cities does not vary much in quality nor in quantity per head, and viewed from the point of facility in burning, experiments have shown that house refuse without any special preparation was unsatisfactory; the mass did not burn continuously; but with the admixture of one part of fuel with four of refuse the results were satisfactory. Riddling the mass was also productive of good results by eliminating earthy matter, sand, and fine ashes, which impeded full combustion.

A refuse destructor, costing in the neighborhood of \$25, has been operated at Newcastle-upon-Tyne for five years. Its burning capacity is about 6½ tons per day, or 2,000 tons per annum; if forced beyond this the material thoroughly burned. There is about 30 per cent of residue of clinker and ashes, which may be utilized for various municipal purposes.

The cleaning of the streets of London is mostly done by manual labor, and it must be conceded that the work is so thoroughly accomplished that the metropolises of the world is, *facile princeps*, the sanitary queen city.

Paris stands close to London in the cleanliness of its thoroughfares. On the continent street cleaning, watering, and the removal of snow is carried out on the municipal system, that is to say, it is done by the authorities, but less frequently by the contract system.

Of twenty-six German towns, with a population of 1,000,000, thirteen employed municipal labor alone, six employed municipal and private labor, and seven employed private labor alone. The former system prevails in Berlin, Leipsic, Hamburg, and other cities, and the latter at Bremen, Cologne, and Munich. In some towns only a part of the thoroughfares are cleaned at the expense of the authorities, the householders (residents) being responsible for the remainder; in others the residents, not the owners, are responsible for the cleanliness of the streets. As a general rule street-car companies are assessed for part of the cost of cleaning the streets. Most commonly the work is done at night, as is also that of removal of the refuse.

The frequency with which each street is cleaned depends upon the amount of traffic. In Berlin one-third of the whole area is cleaned daily. Household refuse is usually removed three times a week.

DISPOSAL OF THE DEAD.

The question of the greatest importance to the health of communities is the disposal of the dead, so that no ill consequences shall flow periling the lives of the living. It is claimed that the ordinary method of interments in coffins is fraught with grave danger to the health of the living by the materials of decomposing bodies, especially those dying of zymotic diseases, being washed into the water and polluting the water used. To remedy this evil two courses are open, one the entire and speedy destruction of the body by fire or cremation, and the other, destruction of the body by a slow oxidation which occurs when the body is unprotected by coffin or casket, called the "earth to earth" burial. The former method is more especially indorsed by the educated classes, and is gaining

ground rapidly, as evidenced by the number of crematories springing up everywhere in Europe, and by the support given it by the advanced thinkers and sanitarians of the day. The latter method is defended on the sentimental idea that it is necessary to preserve the integrity of the form of the body and the conditions of its elements unaltered, and on biblical grounds, which experience has taught through all ages and in myriads of instances, to be untrustworthy and dangerous.

I studied the subject of cremation at London and Paris and the excellent arrangements and processes by which the bodies are burned.

The crematory at Pere-la-Chase in Paris was in operation the day I made my inspection, and nothing could be more perfect than all its appointments or less offensive in performance to the natural instincts and sensibility in this last sad rite to perished humanity.

The character of the scientific support of cremation can not be better set forth than by citing the two resolutions adopted by the congress almost unanimously: "First. That the cremation of the dead is a rational hygienic process which is especially called for when death occurs from epidemic diseases. Second. That it is desirable that all governments should remove legislative obstacles to cremation of bodies, and that all governments be recommended to adopt cremation of bodies on the battlefield."

The interest and importance of the subject is so great that I will present a condensed statement of what was said in the congress upon it by the advocates of cremation and by the advocates of the "earth to earth" burial.

It was maintained by the former that the bodies of those who have recently died by any or almost any of the diseases generally known as "zymotic," are charged with elements which have the property of communicating the same diseases to the bodies of the living if brought into contact with them, whether by inoculation or by admixture with the food. The diseases grouped as zymotic are smallpox, measles, scarlet fever, diphtheria, whooping cough, typhus and typhoid fevers, and some forms of diarrhea and cholera.

The mean mortality from zymotic diseases during the last three years in England and Wales alone amounts to 68,382 per annum, or more than one-eighth of the total mortality; each case furnishing not merely a focus of infection while living, but was capable of actually propagating disease after death.

Nearly 69,000 new foci of disease planted annually throughout the country.

Take the immense inoculation of the earth in connection with the fact of the existence of an intricate, continuous, and universally pervading natural network of water courses beneath the surface, connecting innumerable artificial wells, reservoirs, and channels of every description for distributing water and collecting sewage from a system unseen, yet scarcely imaginable in regard of its extent.

In a densely populated country this system presents perhaps the most formidable social health problem, which the sanitarian has to encounter. The history of the chief epidemics of the last sixty years in England, and of the local outbreaks of fever, diphtheria, scarlet fever, smallpox, etc., offer innumerable examples of propagation and extension of these diseases, due mainly, if not entirely, to the failure to prevent poisoning of the water courses, not only by excreta during life but by dead bodies committed to the soil. It is true that diseased bodies may, in certain light and dry soils, in exceptionally favorable elevated situations, be decomposed, and in three or four years, perhaps, the chief danger dissipated with ascertainable harm to others. It may also be feasible to adopt interment in perishable coffins or in close contact with the soil itself, and thus insure the quicker process of decomposition of the body than occurs in heavier soil or when it is confined in the more solid coffins hitherto in use. But in these exceptionable cases there is always danger of pollution of the great network of water courses. It is believed that everybody dying of zymotic diseases should be at once absolutely disinfected and rendered incapable of extending it; that is, as soon as possible after death, having due regard to conveniences and decorum. There is only one mode of affecting this object—by submitting the body to a sufficient high temperature. Heated in a chamber at a temperature of 1,500°C, all the fluids and gaseous matters are volatilized and escape as innocuous gases. The residue is a heap of dry, white ashes absolutely harmless. An hour suffices to complete the operation, and it is in fact a process of complete desiccation and disinfection by heat. When this process is effected in a furnace it is properly spoken of as cremation. There is contact with the burning fluid or applied flame. Cremation is much less expensive than desiccation.

The advocates for the "earth to earth" burial maintained that the natural destination of all organized bodies that have lived and that have died on the earth's surface is the earth; that the evils which the cremationists declare to be inseparable from the principle of interment are independent of the principle and are of our own creation; that the source of the evils is to be found, not in the burial of the dead, but in the unreasoning sentiment which prompts us to keep them unburied as long as possible, and then to bury them in such a way that the earth can have no access to them; that the principle of burial supposes the resolution of the body by the agency of the earth to which we commit it, and that the earth is competent to effect that resolution, and to effect it innocuously; that to seek to prevent the beneficent agency of the earth by inclosing the dead in imperishable coffins; brick graves and vaults, is in the highest degree irrational, since it engages us in a vain resistance to an inevitable dispensation, and has led us to accumulate in our midst a vast store of human remains in every stage and condition of decay; that the remedy for such evils is not in cremation, but in a sensible recognition of, and a timely submission to, a well-defined law of nature, and in legislative acts to enforce the provisions of that law. Cremation, which was unnecessary and in a medico-legal sense dangerous, should as a measure of public safety be declared a misdemeanor, and the whole subject of its management should be deferred, and dealt with by a bill which should contain the following provisions: "For burial within the earth as the only legal mode of disposing of a dead body. For a limitation of time beyond which it should be illegal to keep a dead body unburied." For the illegality of strong coffins, brick graves and vaults, and for all contrivances having for their effect to retard resolution, and to confer on the dead a tenure practically illimitable, of the soil which is necessary for the living.

THE ROYAL NAVAL EXHIBITION.

A section at the royal naval exhibition relating to the victualing and clothing of the royal navy is of interest to the naval hygienist. The victualing of the navy was formerly intrusted to contractors under the direction of a naval board; after a time abuses arose and this duty was assumed by the board itself until 1832, when it was abolished, and after several changes in the mode of administration, a director of victualing was appointed upon whom this duty devolved.

The three principal home victualing establishments are the Royal Victoria yard at Deptford, the Royal Clarence at Gosport, and the Royal William at Plymouth, and in addition to these there is one on a smaller scale at Queenstown, called the Royal Alexandra yard. There is also a victualing yard at Malta, and victualing depots at Gibraltar, Halifax, Bermuda, Jamaica, Cape of Good Hope, Trincomalee, Hongkong, Esquimalt, and Sydney.

Flour, biscuit, oatmeal, casks, etc., are manufactured at the three larger home yards, and in addition, at Deptford, the whole of the chocolate, mustard, and pepper used in the navy are prepared. The Deptford yard also receives a large proportion of the articles obtained by contract, such as clothing, rum, tobacco, lime juice, salt, preserved meats, medical supplies, and a few smaller articles. These stores are examined, packed, and distributed to the home yards, and to the various depots abroad.

All the exhibits in this section were handsomely gotten up and well displayed in tiers in cases. In the upper tier were arranged the tobacco and condiments; in the middle tier, the preparations of cocoa, chocolate, wheaten flour, oatmeal, and biscuit, and on the lower tier, cutlery, handkerchiefs, combs, clothing materials, comforts, etc. In another case the uniforms of petty officers and seamen were exhibited by lay figures dressed up. In another group are shown different cooperage articles manufactured at the Royal Victoria yard, such as harness casks, mess kegs, grog tubs, bread tubs, barrels for dry stores, etc. Besides the Government exhibits there were other contributions by various firms of tradesmen, showing every conceivable article in the way of food, clothing, outfits for messes in china, plated ware, and silver, desirable or necessary for seafarers.

THE PARKES MUSEUM.

The Parkes Museum of Hygiene was made an object of special study, with a view of gleanings whatever of value in its organization and workings that might be turned to the advantage of the National Museum of Hygiene at Washington, D. C.

The institution was founded on July 18, 1876, in memory of the late E. A. Parkes, who was the first professor of hygiene appointed in England. It was located in

the university college buildings until it removed to its present permanent quarters in Margaret street. The entire enterprise was begun and is now carried on by voluntary donations and subscriptions of members, and in August, 1888, the museum was incorporated with the Sanitary Institution of Great Britain. The museum is open free to the public from 10 a. m. to 6 p. m. in order to afford all classes an opportunity of availing themselves of its instructions. The design of the museum is not to supply an attractive and pleasing exhibition, but to serve as a means of practical demonstration and teaching of sanitary science. In the matter of drainage, defects in material or construction, dress, food, and many other subjects pertaining to health, sessional meetings are held in the museum, in which papers are read and discussed. In 1891 Lenten lectures were held for ladies on domestic hygiene, and two courses of lectures for sanitary officers were delivered. Two hundred and forty-seven students entered their names for these lectures. Examinations for inspectors of nuisances and local surveyors are held by the authorities of the museum, who issue certificates of competency as regards the sanitary knowledge of these officers to discharge their duties.

Annual congresses at different places in England are held under the same auspices, in which papers are read and discussed, in connection with a sanitary exhibition. The last one was held at Brighton and was visited by about 35,000 persons. There were 108 exhibitors, and the judges awarded 23 medals and 67 certificates. The members of the sanitary institute scrutinize all measures introduced into Parliament having a bearing on matters of health, and either promote or oppose them, as in their opinion they serve or disserve the national interest. Considerable use is made of the museum by professors and teachers for the purpose of practical demonstrations in their classes. Twenty-four classes of this kind have been held, mustering altogether 276 students. There is a small library of about 5,000 volumes belonging to the museum. There were 252 volumes and pamphlets added during the year, and in the same period there were 475 readers and their number has been steadily increasing. For the current year the expense in supporting the museum has been \$12,270, which is in strong contrast with the pittance of dollars doled out to the Museum of Hygiene at Washington, whose exhibits and library very much exceed in value and numbers those of Parkes Museum, the total number of which latter, as set forth in the catalogue, is 1,174 volumes.

HASLAR HOSPITAL.

Several hours were spent in the inspection of the Portsmouth navy-yard and Haslar Hospital. The former place presented no objects of interest to either the sanitarian or medical observer. There was the usual dispensary arrangement for the treatment of emergency cases, found in all naval establishments of a similar character.

Haslar Hospital is the great naval medical depot of England for the reception of the sick and wounded of the station as well as of the home, the Mediterranean, and other squadrons.

The hospital was built in 1800, and has been continuously occupied since that date, being made tenable by keeping up repairs and making alterations conformable to the advancing teachings of sanitary science. The ventilation and drainage of the buildings are in an entirely satisfactory condition. The form of the hospital is that of a quadrangle, open to the rear; three stories high, with galleries running around the court or central area. It is located in spacious grounds, beautified with trees and shrubbery pleasingly arranged. The arrangement of the interior of the building in wards of moderate size is well adapted for the convenient and economical management of the large number of patients that is admitted, which at the time of my visit was 600, but in an emergency accommodations for 800 can be provided. An interesting and important feature of the administration of the hospital is the provisions made for cooking and distributing the food. The kitchen occupies spacious rooms on the topmost floor, which are connected with the wards by elevators. The food is delivered in this way to the head man in each ward, who serves it to the patients. All the cooking as far as possible is done by steam and gas. Coffee, tea, and soups are made in the coppers, into which the steam is directly delivered by perforated and suitably arranged pipes. The grill or boiling range is supplied with heat by numerous gas jets, so that there is little coal required in any of the work carried on here. The dishes are kept warm on iron tables heated with steam from below. Under this system of cooking there is no annoyance from kitchen odors pervading the wards of the hospital, and other advantages are obtained in the

way of economy of attendants, saving time, etc. The food that I saw distributed to the inmates was of excellent quality and well served; and to save tray service tea is served ready prepared with sugar and milk.

Haslar Hospital in recent years has been resorted to by young surgeons to receive their finishing touches preparatory to assignment to active service in the navy.

This training was formerly done at the army hospital at Netley, but for several reasons it was not thought advantageous to thus combine the two services. The facilities at Haslar for acquiring valuable preliminary experience for naval medical officers are very ample. Besides the large number of patients coming from all parts of the globe and gathered here, there is a small but excellent museum of natural history and pathology, models of ships, and other instructive objects.

The great Portsmouth navy-yard is near at hand, to which resort is had for learning the manner and course of construction of war vessels. The class of assistant surgeons numbered 20 at the time of my visit, and I was informed that it sometimes reaches a higher figure. The regular staff of the hospital consists of seven naval medical officers of various rank, who perform the duties of attending the inmates and teaching the class of naval medical officers. There are regular lectures delivered on subjects of chiefest interest to naval practitioners, especially hygiene in its application to ventilation, foods, analysis, filtration and purification of water, and to nautical construction. There is a well-equipped laboratory, in which bacteriological research may be carried on.

The Congress of Hygiene and Demography was opened on the 10th of August, at St. James Hall. An address was delivered by His Royal Highness the Prince of Wales, and responses were made by prominent men representing various European countries. The United States was not represented in the list of speakers called, as the programme had evidently been made up previously with the omission mentioned.

On the 11th work began in earnest; the ten sections in which the congress was divided meeting in different rooms in the Burlington House and in the theater and examination halls of the university, tendered for the occasion. The sections were opened by the several presidents with appropriate addresses; and then those who were favored by the committee in having their names entered on the list of speakers were called for papers, which were read and briefly discussed; other papers were read by title only, and some not at all, and thus the business of the sections flowed on smoothly and pleasantly enough.

In section I (preventive medicine) important papers were read on the mode of preventing the spread of epidemic diseases from one country to another, and an instructive discussion followed.

These measures may be classed under the headings quarantine, medical inspection, and sanitary improvement. The general sentiment was a condemnation of both land and sea quarantine as wrong in theory, pernicious, and faulty in practice. Some advantages were conceded to the method of medical inspection of vessels arriving in port in the way of benefiting the sick, but it could not prevent the introduction of such an epidemic as cholera. Still more decidedly advantageous and of real service was the plan of sanitary improvement, which simply means that the best defense of a city or country against the invasion of an epidemic is in its own cleanliness, so that no nidus or favorable condition shall be furnished the efficient factors to hold a footing. The diffusion of an epidemic such as cholera, it was asserted, depended little upon personal communication between healthy and infected districts, but rather upon atmospheric currents, not necessarily those experienced on the earth's surface, but by others at some elevation, often moving in contrary directions. This view is sustained by the experience of ships at sea, which shows that the epidemic cause is air-borne and active in the middle of the ocean, as well as on land, wherever it meets with the necessary conditions to develop it. This being the case, epidemics can not be excluded from any country by general quarantine. All that can be done is by hygienic measures that dissipate the conditions that favor the formation of foci. Holding ships which arrive with cholera on board under observation, removing the passengers and crews to suitable localities on shore until the disease ceases among them, are proper precautions, and may prevent a small amount of the disease among the surrounding population, but can never prevent an epidemic if the necessary factors be present.

Papers on diphtheria were read by several delegates. It was stated that the registration system pursued in Belgium had developed the fact that this disease and typhoid fever run concurrently. When one is severe the other is severe; when one is mild the other is mild; which led to the belief that the connection

between these two diseases must be their origin from faecal matter, and that the bacteriological researches of Löffler and Eberth agree with this view. If another proof is wanting, we must look to the soil for the cause of diphtheria, as the mortality is not commensurate with the density of the population, but is much higher in the country, where the surface soil is not so carefully looked after, as in a well-drained town. An opinion was delivered that certain fowls have a great tendency to harbor germs of diphtheria.

In France the disease during the last thirty years has been so generally on the increase as to become a veritable calamity; it spreads more rapidly, and has become more contagious.

To prevent its spread we must have recourse to disinfection and isolation, and as the contagious principle is believed by many to reside in the false membranes, it follows that all the emanations and discharges should be destroyed. It is not determined at what time diphtheria becomes dangerous to others, nor how long the period of danger endures. It is believed that the incubation period is very short, and that the disease is transmissible from the moment that the white pellicle makes its appearance. There is a danger of contagion as long as there is discharge from the nose and throat, and the period of isolation will depend somewhat upon this continued condition, and seldom or never occurs after six weeks. The conclusions arrived at in one of the papers was that diphtheria is an eminently contagious disease, also infectious by direct exposure of the sick to the well, and through clothing and other articles that have come into contact with the sick. Overcrowding, defective ventilation, and filth favor the spreading of the disease. The influence of defective plumbing and polluted water supplies, as causative agents is not proven. Its propagation by soil, moisture, damp cellars, and general dampness of houses was conceded, and evidence was presented of a close relationship between the occurrence of diphtheria and the movement of the subsoil water. The microorganisms of diphtheria inhabit organically polluted surface soil, and that, subject to suitable conditions, environment especially, as respects moisture, temperature, and food, it thrives and multiplies in the soil, and the microorganisms thus produced being liable to displacement from the interstices of the polluted surface soil, and to dispersion into the superincumbent air. The poison may remain unaffected in houses for a long period.

The third question that evoked a good deal of discussion was the use and abuse of alcohol, and the measures to be taken for their regulation. The fact could not be contested that immense evil followed the abuse of alcohol, but the majority of the speakers seemed to think that all attempt to suppress the sale by direct interference would be unsuccessful. Indirect measures, however, should not be relaxed to make the way of the drunkard difficult. Much good had been accomplished by private efforts, as public coffee rooms, temperance societies, bands of hope, and the houses for the cure of habitual inebriates, with or without state assistance. Inebriates might be classed under two heads—the foolish, callous, vicious drunkards, and the victim of inherited, or in some cases acquired, nervous disease.

The latter class should be made the subjects of medical treatment in asylums, entering them either voluntarily or compulsively, and the former class should be stringently treated.

The drunkard should lose his rights of franchise, and if it is found impossible to make him smart in conscience or self-esteem he must be made to smart bodily.

It was stated that the number of deaths prematurely occurring in the United Kingdom of Great Britain and Ireland every year was 40,000 from personal intemperance. To this fatality of 40,000 there must be added double that number of deaths of individuals occurring not directly from their own habits but indirectly through accident, violence, starvation, neglect, and disease. The average worth of an adult to the community has been reckoned at 2s. per day, and this means a loss of £6,260,000 to the nation every year.

The waste from alcoholic diseases, over and above the waste from alcoholic deaths, was most serious, and the loss to the natural wealth during twelve months was put at £2,880,000, leaving out of the reckoning altogether the considerable number of premature deaths and of attacks of nonfatal maladies arising from alcoholic indulgence in quantities commonly called "moderate," "free and generous." To these expenses there must be added a large proportion of expenditure on pauperism, the administration of justice, the police, and other expensive charges. Still further, there was a mass of mental unsoundness, moral disorder, and social tumult. Looking yet further ahead and reading the future from the experiences of the past and present, there could be discerned an enormous increase in the next and succeeding generations of mental impairment, defective control, paralyzed will, and degraded morale from inherited brain degeneration through the poisonous influences of alcohol on parental organ and tissue.

On the other hand it was asserted that there was no evidence to show that the moderate use of alcohol was injurious. Moderate use was defined to be from an ounce to an ounce and a half per diem; children required none. This amount should be taken only with a meal, and preferably when the work is done. "Alcohol is a good gift to man; it is a good servant, but a bad master;" but a man who is worth the name can guide himself by moral law, and can indulge to the legitimate degree any lawful appetite without fear of the results following such indulgence. Total abstinence is for the use of the chronic drunkard. The sale of alcohol to children under the age of puberty should be made penal.

For others it is too violent a measure to take for the benefit of weaker vessels. The habit of a certain amount of alcohol is woven in us, coming from generations of alcoholic-using ancestors, and in the present state of our civilization is for our benefit, and it would be a serious thing to upset this nutritional rhythm. Alcohol is a good anæsthetic, a valuable food in sickness, and of great assistance to digestion, especially where food is coarse and ill-cooked."

Other indirect measures for diminishing alcoholism were spoken of besides those already mentioned. There should be a fine imposed for adulterating alcoholic drinks. An increase of the tax seems to diminish the consumption, but not in proportion to the increase of the duty. The state monopoly in Switzerland, which is a part of the surplus to the customs for the counteracting of alcoholism has had a good sanitary effect and decreased consumption.

Prohibitory laws (Maine laws) against the manufacturing and selling of intoxicating liquors, but usually allowing the import and sale of same in the original packages, was not a good one. The system is ineffective and tempts to a surreptitious liquor traffic. The same objections may be further raised against the "local option," but fraud is more easily detected under this system. The high-license system (American) seems to be more effective, as it lessens the opportunity for intemperance by reducing the number of drinking saloons and causing those who pay the high license to help the authorities in the conviction of the breakers of the law. Limitation of the number of licenses (Dutch system) is advantageous. The Gothenburg system, adopted in Sweden, Norway, and Finland, consists in giving licenses to companies, which are only allowed to return to the shareholders a fixed rate of interest, leaving the surplus for the benefit of charitable institutions: which plan it was said had transformed Norway from the most drunken to the most sober nation in Europe. A limitation of the hours during which the saloons are allowed to open is quite necessary, especially on Sundays; in Norway the sale of spirits is forbidden from Saturday afternoon till Monday morning.

Another topic was discussed in which I took a deep interest: "Epidemic influenza."

It was believed that the mortality was large, but no exact figures could be obtained, principally for the reason that during an epidemic many people who already suffered from organic disease which would ultimately prove fatal, die sooner than they otherwise would, because they are not strong enough to overcome the depressing effects of influenza, in addition to those of the preëxisting disease, and that it is common for disease of the respiratory organs to follow attacks of influenza, and the maladies thus set up may not end fatally for weeks, months, or even years. Nothing is known of the origin of the disease; it is neither sporadic nor endemic in England, but is well known to occur both in Mongolia and China.

The epidemic which affected England in 1889-'90 apparently originated in Bokhara in the summer of the former year, and reached England after affecting the inhabitants of intervening countries, Russia, Germany, and France.

The modes of its conveyance have long been discussed, and very different views promulgated; the older writers were of the opinion that direct contagion plays a great part in the spread of the malady. Other observers maintain that the air is the vehicle of the specific poison. It is not impossible that an epidemic may depend upon both these modes of dissemination, as it actually happened in England in the last epidemic that the towns were affected first and afterwards the villages; the towns seeming thus to be the center of infection. To prevent its spread most potent means at command were, the utmost cleanliness of localities invaded and the free use of infectants, avoidance of infection as far as possible by not coming within range of those affected. When influenza exists in North China the natives will warn the stranger away, and say "Dismount my tent another time."

As to prophylactics several things were suggested; the claims of quinine as such was open to doubt, for patients are affected while under the full influence of the drug. It was advised that the eyes of people exposed to infection should

be bathed with a solution of boric acid, as none of those who adopted this practice suffered from the disease. The ferric periodate was also believed to be a remarkable prophylactic as well as a curative drug.

An important feature of the sanitary system of London is the hospital and ambulance organization of the Metropolitan Asylum board for the removal and isolation of infected cases. Every inhabitant of London is legally entitled when suffering from fever, diphtheria, or smallpox to claim admission into one of the six hospitals under the control of the board or to call upon the board to carry him to any of the hospitals or place within the metropolitan district. The six hospitals have 2,383 beds and serve a population of 4,211,056. Five are in London and the sixth 4 miles outside the northern boundary of the district and is for convalescents. The average length of the journey a patient has to be carried to reach the nearest hospital to his home is $3\frac{1}{2}$ miles. Besides these hospitals there are accommodations for smallpox in the floating hospital at Long Beach, 15 miles below London Bridge. It contains 350 beds for acute and severe cases on board the *Atlas* and the *Castalia* and 800 in the convalescent hospital at Gore Farm, 4 miles distant from the ships, giving a total of 1,150 beds. Patients are carried to wharves in ambulances and from thence by team to the floating hospital. As an example of the work it may be stated that during the smallpox epidemic of 1884-'85, 11,060 cases were removed from their houses to the floating hospital. The largest number of patients taken down in one day was 104, in three trips of the steamer.

At the close of the epidemic the ambulance committee reported the satisfaction they felt that so large a number of persons of both sexes and all ages, most of them in physical suffering and many helpless from disease, had been carried in all weathers, throughout all seasons of the year, and to a great extent during the hours of darkness, without discomfort or detriment to the patients and without mishap to any person whatever. From February, 1884, until the end of 1890 the steamers have carried 11,337 smallpox patients to the hospital ships and have brought back 10,358 recovered patients.

The asylum board, fully appreciating the dangers of an invasion of the metropolis by infectious diseases, and believing that prompt removal is of the utmost importance, maintain an organization by which they are able to place, at any hour of the day or night, a fully equipped ambulance at the door of any house in the metropolitan district, a district extending over an area of 121 square miles and containing three-quarters of a million dwellings, inhabited by 4,211,056 people.

SECTION II.—*Bacteriology.*

An interesting feature in connection with the Congress was the bacteriological museum opened at London University, where were shown cultivations and microscopic specimens of bacteria of tuberculosis, glanders, diphtheria, cholera, actinomycosis, and other diseases now recognized to be of microörganismic origin.

The first paper read in this section was "The etiology of malaria."

The evidence elicited was thought to be in favor of the view that malaria depends upon the presence of an hæmatozoon.

Among the chief forms in the morphology of the microörganisms are spherical bodies, from $1\ \eta$ to $10\ \eta$ in diameter, pigmented and possessing amæboid movement, which, in fresh blood, sometimes presents a varying number of mobile flagellas.

They adhere to the red corpuscles, which lose their color with the progressive development of the microörganisms.

The flagella finally drop away from the spherical bodies and are lost among the red corpuscles. There are cruciform bodies, cylindrical, pointed at the extremities, and nonmotile, deeply colored, and measuring from $8\ \eta$ to $9\ \eta$.

A third form presents itself as a rosette, that is regularly segmented, containing a little pigment in the center, which, after a time, becomes spherical and then disintegrates, and lastly, deeply pigmented leucocytes. Similar forms have been seen in the blood of frogs and lizards and in many species of birds, but there are special features that differentiate them from the former form, such as the less active amæboid movement of the spherical forms of the bird, the absence of the cruciform bodies and the entozoon in endoglobular, and are formed in birds living elsewhere than in marshes. These forms have not as yet been found in the watery soil or air of marshes.

As to the origin and extension of epidemic cholera it was stated that the phenomena seems to indicate the dependence of the disease upon a parasitic germ,

but as none of the inferior animals proved to be innocuable with the choleric detector, which were known to contain a multitude of harmless bacteria, the question remained unsolved experimentally, but at the same time it was believed by many that the comma bacillus was the active agent. Its cultivation on different media and its behavior under various conditions were described and experiments related in which lower animals were killed by the inoculation of these cultures. The effects produced by the poisons elaborated by intestinal bacilli were also enumerated. It was noted also that at least eight different species of the comma bacillus had been cultivated and that their distinctive character had been maintained in subcultures.

A paper was read in which cancer is treated of as an infective disease originating in a microorganism, and some transplanting experiments were described which were attended with negative results as far as transplanting the disease from man to animals was concerned, but on several occasions transplantation was successfully effected from dog to dog. Cancer has been increasing rapidly in the last few years. It is especially prevalent along rivers which overflow their banks.

The origin of acquired immunity against certain diseases and the cause of infectious diseases elicited an able debate. It was stated that immunity arose when substances obtained the bacilli, determining the disease were inoculated, and also by inoculating certain inorganic chemical substances.

The virus is poisonous in large doses, but is innocent and preventive when properly attenuated, which may be effected either by prolonged exposure to the air or by passing it through virus animals. It may also be weakened in several ways, as by chemical agencies, heat, and cold. Microorganisms in their development elaborates different substances, some of which were preventive and others injurious. The mode of action of the virus in conferring immunity has been explained in many ways. One view is that there is determined a peculiar alteration of the metabolism of the tissue cells, either in general or at the seat of infection. The bacilli is designated by the learned term of phago-cytosis.

Another view assumes that the action of cellular elements altogether and ignoring both natural and acquired immunity is due to the presence of substances which are formed by the metabolism of the animals rather than that of the microbe, and which have the power of destroying, either the microbe, against which immunity is possessed, or the products in which their pathogenic action depends. This supplants the supposition once held that immunity was established by the presence of some unknown substance of bacterial origin.

Several years ago it was discovered that bacteria are destroyed when mixed with fresh blood or blood serum, and later that this result is to be ascribed to the fluid part of the blood. It was shown that the blood serum of rabbits will serve as a culture medium for the bacillus pyocyaneus, but should the rabbit be made immune against the disease produced by the bacillus, the blood serum acquires the power of attenuating and even destroying the microbe in question. Similar results have been obtained with the microbe of cholera, anthrax, and other diseases. The pig typhoid microorganisms are killed by the blood serum of rabbits that have been rendered immune against it, and the disease has been cured after its appearance in susceptible animals with the serum.

The nature of this bacteriological substance contained in blood serum is not certainly known, although the action of each of its known constituents was tested, but all the experimental evidence points to the presence of a peculiar fermentable alkaline proteid, possessing diastatic power known as cell globulin B. It is known that the rat immune against anthrax and that its blood serum is alkaline, and lethal to the bacilla of anthrax; when the serum is neutralized this action is lost.

The amount of this may be decreased by feeding the rats on vegetable matter so that they become susceptible to anthrax. This matter, inimical to bacteria, can be introduced into the body by vaccination, but it is also possible that the same substance may be formed from the body cells themselves by the stimulus of an invasion of bacteria, or it may be a soluble chemical combination which the bacteria form through the neutral reaction of a peculiarly modified decomposition product of the body cells; and is produced by all infected diseases are parenchymatous swellings and fatty degenerations. In the first the cells contain albuminoid material, which decomposes and in part passes into fat. It is possible that the protective protein bacteria cide may be intermediate products of retrograde metamorphosis of albumen into fat, however produced, the blood and tissue of animals containing the proteids must act protectively in infectious diseases if injected hyperdermically. Swine erysipelas and croupous pneumonia are curable by the injection of the blood or tissue juice of immunized animals.

Rabbits are injected with pneumonia, which terminate fatally in from two to four days. If, however, they are first rendered immune by the hypodermic injection of 2,025 cubic centimeters of a very dilute diplococcus culture of immune rabbits. The broth culture may be inhaled for three hours with impunity. It is highly probable that croupous pneumonia in the animal is caused by Frankel's diplococcus, so that the hope is justified that by the use of this process of immune animals this terrible malady may be cured.

The most important subject brought before the congress was that of tuberculosis and its transmissibility. That human and bovine tubercle are identical, and that the tubercle bacillus is an important factor of tuberculosis was generally conceded.

It was stated that about one carcass out of every six was tuberculous, and that about 5 per 1,000 cattle are generally condemned as tuberculous. The determination of the disease was, in its early stages, very difficult and required a trained expert, although there was a good deal of conflicting evidence as to the transmissibility of tuberculosis by entering the flesh of diseased cattle, yet the affirmative side seemed more weighty. There is some difficulty in arriving at uniform results in this matter, from the fact that bacilli are sometimes, though rarely, pretty well disseminated through the organ and tissues of the animals while they are restricted to the viscera, the muscles, and intermuscular connective tissue are generally free of their presence, while the entering of the flesh of animals generally invaded with bacilli might furnish the observer with proofs of transmission, that of animals partially invaded may be entirely negative. There are evidences also of human beings who have a greater resistance to bacilli, after admission to the body concentric rings of hardened inflammatory tissues, first forming around and absorbing the bacilli, and finally calcareous degeneration. The juice of the meat does not, in most cases, contain a sufficiently large number of bacillus to set up tubercle. Spontaneous tubercle in the pig is rare, in the sheep never, and the same may be said of the goat, and the flesh of these animals could be eaten in safety. It was the general opinion that there should be a strict system of inspection extending over the whole country.

There is great danger of transmission in using the milk of tuberculous animals; such milk from 58 cows was inoculated into rabbits and Guinea pigs. In none of these the milk proved virulent. A bacterial action of milk as basilli of tubercle has not yet been proven.

Different results having been obtained in different cases by various observers, thirteen different microorganisms, presumably innocuous, have been identified in milk collected with antiseptic precautions from a perfectly healthy cow.

The opinion was entertained that the milk supply should be under control of Government officials. Milk containing colostrum, or of a blue, red, or yellow color, as well as stringy, thready, bitter, salt, or abnormally smelling, should be condemned.

The milk of animals that have been fed on poisonous fodder, or that have been treated with certain medicaments, and of those suffering from tuberculosis, malignant pustule, cowpox, apthae, or generally ill in consequence of some process inducing ulceration or ichor, must be regarded as prejudicial to health.

The possibility of milk being of a hurtful nature is suggested in all the other feverish ailments common to milk-yielding animals, as also by the different forms of inflammation of the udder. Again, milk which has already been drawn may become infected by immediate contact with sick persons, or become polluted with their defections (typhoid, cholera, diphtheria), or by dirty vessels into which it is poured.

In order to guard against all of these dangers, it is requisite that all dairy farms be licensed; that all animals kept for milking be examined by a veterinary surgeon from time to time; that the owners of dairy farms be bound to provide only good undamaged food; further to give immediate notice of the illness of any milch cow to the attending veterinary surgeon, and until he gives leave not to send the milk of the deceased animal to market; that the business of milking be performed with the most punctilious cleanliness, and that no person suffering from any infectious illness be employed to milk; that the unused milk obtained by milking be cooled and stored in special rooms; that at the outbreak of any epidemic in a house where dairy farming is carried on the sale of milk be forbidden. Advice should be given to the public to boil the milk before using it. In Germany this is the regular custom, and people no more think of taking raw milk than raw beef or pork.

Very respectfully,

PHILIP S. WALES,
Medical Director U. S. Navy, in Charge.

NINTH ANNUAL REPORT OF THE MUSEUM OF HYGIENE.

Surgeon-General J. MILLS BROWNE, U. S. Navy,
Chief of Bureau of Medicine and Surgery.

SIR: In making the ninth annual report, and in reviewing the past history of the Museum of Hygiene from the day of its projection in 1882 as a laboratory of a single room to the present time, when it has developed into an institution embracing several departments well equipped for scientific research, it is gratifying to be able to state that, despite the small number and frequent changes in its personnel, and the slender pecuniary assistance accorded it, some progress has been made in enlarging its usefulness and importance. It is becoming more widely known, and with proper encouragement it is destined to reach a markedly prominent position among the scientific institutions of the country.

The character of its work is both practical and useful, and has met with gratifying appreciation in many parts of the United States. The laboratories have been fully occupied with investigations into the matters referred to the Museum by State boards of health, State institutions, corporations, business firms, and individuals, as well as by several Departments of the General Government, and the value of the information furnished is certified by the number and flattering character of letters on file conveying thanks for services rendered.

This recognition, it is gratifying to state, is gaining ground in several departments of the Navy which have sought from time to time for sanitary information; as an illustrative example of what may be cited, the recent chemical analyses furnished the Bureau of Yards and Docks of the water supplied by the water company of Norfolk, Va., and of that which has been secured by the Government from the wells recently driven at the Portsmouth navy-yard which show the marked superiority in quality of the latter. Investigations of a similar nature of the water supply of the Naval Observatory were made, in which the dangers of one source of supply was made known. In this connection it seems opportune to suggest the advisability of making a complete and careful examination into the sanitary condition of our various naval stations, which is but imperfectly known, with a view of preparing a sanitary history of each.

Some material suitable for this purpose has already been secured from the Bureau of Yards and Docks, and it is hoped that in time a sufficient amount shall be accumulated for the purpose indicated.

The most important subject just now engaging attention to the Museum is that of the purification of water by rapid filtration, which will be made the subject of a special and exhaustive report.

Experiments have been made with the Potomac water, using four filters: "The Duplex," "The Loomis," "The Hyatt" and "Bowden," which were generously furnished by the several companies for this purpose, and connected with the water main of the Museum. Before the experiments were begun every filter company and firm in the United States of whose existence we had any knowledge were communicated with and requested to coöperate, but only four companies were willing to supply their machines for the purposed investigation.

It is deemed advisable, in justice to the above-mentioned companies, to anticipate the final report by giving a summary of the performances of these four machines.

They are the best types of the machines in the market, and have done their work of the purification of the water, as far as it can be accomplished by filtration on a large scale, with entire satisfaction. It was found that albuminoid ammonia is reduced on an average of about 69 per cent. This is the average of the four filters, and shows that filtration has a marked effect in removing organic matter. Free ammonia is frequently increased; this, of course, is readily understood by the breaking up of the albuminoid ammonia. When ammonia alum is used as a coagulant this is markedly the case, and should be borne in mind when estimating the efficiency of a filter. Nitrites and nitrates are occasionally reduced, but for all practical purposes it is not worthy of consideration beyond the fact that they are reduced in some cases and occasionally increased, but in

an increase would not be expected, as very little time is allowed for diffusion to take place in the organic matter which is necessary for an increase in these substances.

Hardness is not appreciably affected, but the amount in the water we have been using is so small (1.7) that more extended investigations are required to determine the question.

The hardness is reduced about 1 per cent, but our observations were made on Potomac water, which is very soft (67 parts per million). With water of a higher degree of hardness filtration might make a greater reduction. The suspended matter is reduced 50 per cent; the Potomac when turbid carries a large amount of fine particles of aluminous and silicious matter, which (without the use of a coagulant) even the finest filter paper fails to remove; only asbestos finely packed will clean it; then the filtration is too slow for any practical use. The mineral matter in solution is slightly reduced.

The filters removed 90 per cent of the microorganisms, as found by direct experiments in plate culture. It is believed that no filter is perfectly and continuously germ proof—spores readily pass through the filtering material.

In regard to the alum used in three of these filters, it was shown that the largest amount of this salt that passed through the filtering beds of any one of them was 5.958 grains per gallon, and the average amount was 0.779 grain per gallon, while the average amount found in the wash water was 452.81 grains per gallon, which indicates that the alum is largely retained in the filter beds.

It would be a matter of considerable satisfaction if some contrivance were devised by which the dosage of alum could be regulated with greater certainty as to quantity than can be done at the present time; but as this is simply a matter of time, the desired improvement will doubtless be made.

The machines representing the four different types were of different capacities, that is to say, were constructed to purify just so many gallons of water in a given time, so that no trustworthy comparison of their respective merits could be made.

This plan of rapid filtration is destined to supplant before long that now in use in Europe known as the filter-bed system, which involves great expense in construction and maintenance of the beds, and the results are in no wise superior to that obtained by these machines.

The introduction of these filters into every household, when it is possible, would undoubtedly prove an important sanitary measure against the dangers of polluted water, especially during the time of an epidemic. It is true that all germs are not strained out by filters, but the large numbers that are so gotten rid of are just as liable as not to embrace some of disease-producing character, and this much is a substantial gain as averting so many possible cases of infection.

The work of the chemical laboratory has been carried on as usual, the field of investigation being broad, varied, and useful. Analyses have been made of various organized substances, as well normal as pathological, of food and drinks, medicines, ores, minerals, cements, and deposits in drainpipes. The number of analyses are less than last year, but that is accounted for by the fact that this year's work has been of a more important and difficult nature.

The laboratory has been improved by the addition of a larger wood and water bath, by a more convenient distribution of the water and gas, a rearrangement of the urinary room, the fitting of a chemical storeroom in place of the old lockers, which were almost inaccessible, the addition of glass doors to the open shelves, the introduction of water and a sink to the furnace room; also improvements and additions to the photographic room.

All these changes have greatly contributed to the success of the work, and in protecting the apparatus from injury, keeping it clean, and greatly adding to its appearance.

The bacteriological and microscopic departments are in a satisfactory condition, and some work has been done, but it has not received the attention it demands from the limited force. Greater progress could be made if an officer should be detailed for this line of investigation alone, and the importance of this branch can not be too strongly urged on the notice of the Bureau.

The belief is entertained that a daily, or at least a frequent, examination of all water supplies would furnish most important knowledge of their purity and will enable an observer to identify and thoroughly study the different species of bacteria that occur under ordinary circumstances, and he will also be best prepared to recognize new, and perhaps pathogenic microorganisms occurring in time of an epidemic. These examinations of the Potomac water are now making at the Museum, and the results recorded daily for future reference.

The library is still without a catalogue, and the call for books which can not be quickly found is a constant annoyance and cause of great loss of time. About 400 volumes are now ready for the binder. The contributions and addition of books, pamphlets, etc., to the library has been very gratifying, as we have received during the year about 1,796 volumes, mostly reports, and which have been donated. No important purchase of books has been made for several years, and hence the library is poor in recent and current publications of every description.

The exhibit department is rapidly augmenting; 126 new exhibits bearing on sanitation have been donated. No purchases have been made for several years.

The rooms and halls have been utilized as far as possible in displaying them to the best advantage, but they are necessarily much crowded in consequence of lack of space.

The Naval Dispensary occupies one-fourth of the entire building, and if this space could be acquired by the Museum the overcrowding which now exists would be somewhat relieved. This growth indicates that at no distant day the question of new and permanent quarters for the Museum will demand consideration. I would recommend that an attempt be made to secure a portion of the quarters soon to be vacated by the Naval Observatory for the permanent establishment of the Museum, and not only should sufficient ground for a building be secured, but, besides, a sufficient space should be given to enable experiments that are required to be made outdoors.

Difficulty has been encountered in securing the services of a competent chemist, as the present pay is inadequate compensation for such a person, and I suggest that it be increased to fifteen hundred dollars at least, which is much less than is paid to chemists in the other departments of the Government. The present pay secures a chemist only until he can obtain a more lucrative position elsewhere, and when he has become invaluable from the experience gained in this laboratory.

An extra laborer is much needed for general work, and I would also recommend an increase of \$10 per month to the pay of W. B. Scrivener, who has grown up with the institution and is a capable carpenter and machinist, and has knowledge of every department; besides being invaluable, he is ever ready for any work before or after office hours, so that the Bureau would only be showing a proper appreciation by allowing this small increase in his pay.

I would also recommend that a permanent appropriation of \$5,000 per annum be asked for the Museum for the purchase of exhibits, books, apparatus, etc., and the support of a course of popular lectures from competent men on the various subjects pertaining to sanitary science, which is the custom of similar institutions abroad.

By direction of the Bureau, letters were addressed to all medical officers having in their possession microscopes, and replies have been received from nearly all, which enables the Museum to locate most of the microscopes issued. There are a number in charge of the medical officer at Mare Island, of which the Museum has an imperfect record.

Very respectfully,

PHILIP S. WALES,
Medical Director U. S. Navy, in charge.

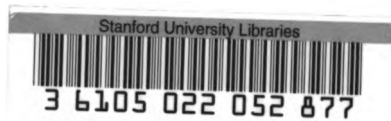
LIST OF DONATIONS TO THE MUSEUM OF HYGIENE.

- Albany Steam Trap Company, Albany, N. Y.: Two models of filters; two filtering cylinders; plans and drawings; one strainer; samples of filtering materials.
- Ames, Howard E., surgeon U. S. Navy, Museum of Hygiene: Chinese foods; palmetto log and brushes; defective plumbing; pine-leaf fiber, with specimens of cotton-seed meal.
- Ale and Beer Company, Dayton, Ohio: Samples of ale and beer.
- Agricultural Department: Collection of various soils.
- Baker, Walter, & Co., Dorchester, Mass.: Collection of various preparations of cocoa.
- Bush, E., M. D., Mount Vernon, N. Y.: Exhibit of kumys, or Russian milk-wine.
- Mr. Brust, superintendent Lemon Building, Washington, D. C.: Specimens of exposed copper, damp course.
- Central Expanded Metal Company, Pittsburg, Pa.: Exhibit of metallic lath.
- Cincinnati Corrugating Company, Piqua, Ohio: Exhibit of metallic lath.
- Conn, G. P., M. D., Concord, N. H.: Exhibit of block of Concord granite.

O'Donoghue, Baltimore, Md.: Peach and potato parers, cherry and peach pit-
 openers, vegetable graters.
 Peat Coal Company, New York: Sample of charcoal for filters.
 E. H. Pease, Thomas B., building inspector, Washington, D. C.: Plans of modern
 schoolhouse.
 Fairchild Bros. & Foster, New York City: Samples of digestive preparations.
 Fehr, Julius, Hoboken, N. J.: Samples of talcum (infant powder).
 Fleming, R. I., architect, Washington, D. C.: Section of flooring of Shoreham
 Hotel.
 Frames Food Company, London, England: Samples of food preparations.
 Fouquet, Leon C., Andale, Kans.: Cooling apparatus.
 Ghlon, Albert, medical director U.S. Navy, hospital, Brooklyn: Six specimens of
 defective plumbing, erosions, and faulty construction.
 Hygienic Wood Wool Company, New York: Samples of wood wool.
 Hastings Pavement Company, New York: Samples of paving blocks.
 Hilyer, A. F., Washington, D. C.: Two evaporating pans.
 Hyatt Pure Water Company, Newark, N. J.: Plans of their filter and material.
 Imperial Granum Company, New Haven, Conn.: Samples of food.
 International Paving Company, New York City: Samples of paving blocks.
 Indurated Fiber Company, Oswego, N. Y.: Bath tub.
 Jaros, J., New York City: Sanitary wear.
 Johns, W. H., New York City: Case asbestos material.
 Light-House Board, Treasury Department: Photographs of light-houses, ships,
 etc.
 Loomis, B. F., Baltimore, Md.: Model of filter.
 Lovell Washing Machine Company, Erie, Pa.: Washing machine.
 McCotter, A. G., New York City: Samples animal charcoal.
 Michigan Carbon Works, Detroit, Mich.: Samples of animal charcoal.
 Mulford & Co., Philadelphia, Pa.: Tablets.
 Norton, O. D., passed assistant surgeon U. S. Navy: Specimens of tinea imbric-
 ata.
 Pasteur Chamberlin Filter Company, Dayton, Ohio: Filter.
 Park, Davis & Co., Detroit, Mich.: Samples of triturates and two samples of beef
 meal.
 Parker, Edwin, New York City: Samples carved wood.
 Pine Leaf Fiber Company, Aiken, S. C.: Samples of fiber and matting.
 Platt, H. B., New York City: Disinfecting fluids.
 Potts, Isaac B., Company, Columbus, Ohio: Set of pipe fittings.
 Robinson, S. A., inspector of plumbing, Washington, D. C.: Samples of defective
 traps, plumbing, etc.
 Roebling Wire Lath Company, Trenton, N. J.: Wire and fireproof lath.
 Siegfried, C. A., surgeon, U. S. Navy: Specimen of rat-gnawed pipe.
 Seabury & Johnson, New York City: Disinfecting sulphur candles and cuspi-
 dors.
 Silkman, F. W., New York City: Animal charcoal.
 St. Louis Dairy Company, St. Louis, Mo.: Samples condensed milk.
 Salutaris Company, St. Clair Springs, Mich.: Samples Salutaris water.
 Sanitas Company, New York City: Samples Sanitas disinfecting preparations.
 United States Water Purifying Company, New York City: Filter.
 Wales, Philip S., medical director U. S. Navy, Museum of Hygiene: Samples
 filtering material, Japanese tobacco, and food.
 Wagner, Wm. G., Brooklyn, N. Y.: Infant food.
 Wilmott-Castle Company, Rochester, N. Y.: Sterilizing apparatus.
 Wyeth, John, & Bro., Philadelphia, Pa.: Samples liquid malt extract.
 Woodward & Lathrop, Washington, D. C.: Folding pillow.
 Ziller, Max: Malt extract and Alpine milk.

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