

# **Annual report of the Supervising Surgeon General of the Marine Hospital Service of the United States : 1873**

## **Contributors**

United States. Marine Hospital Service

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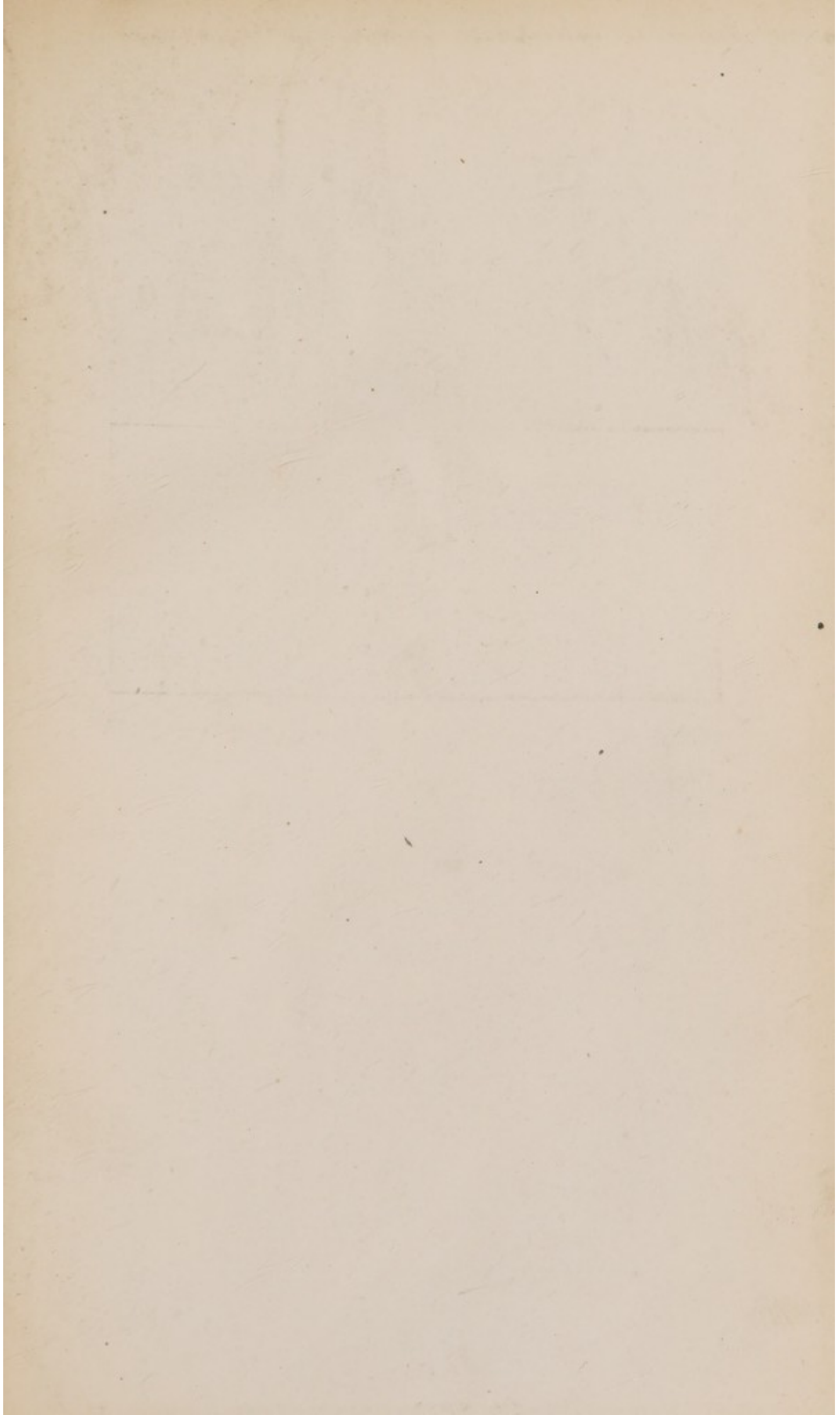


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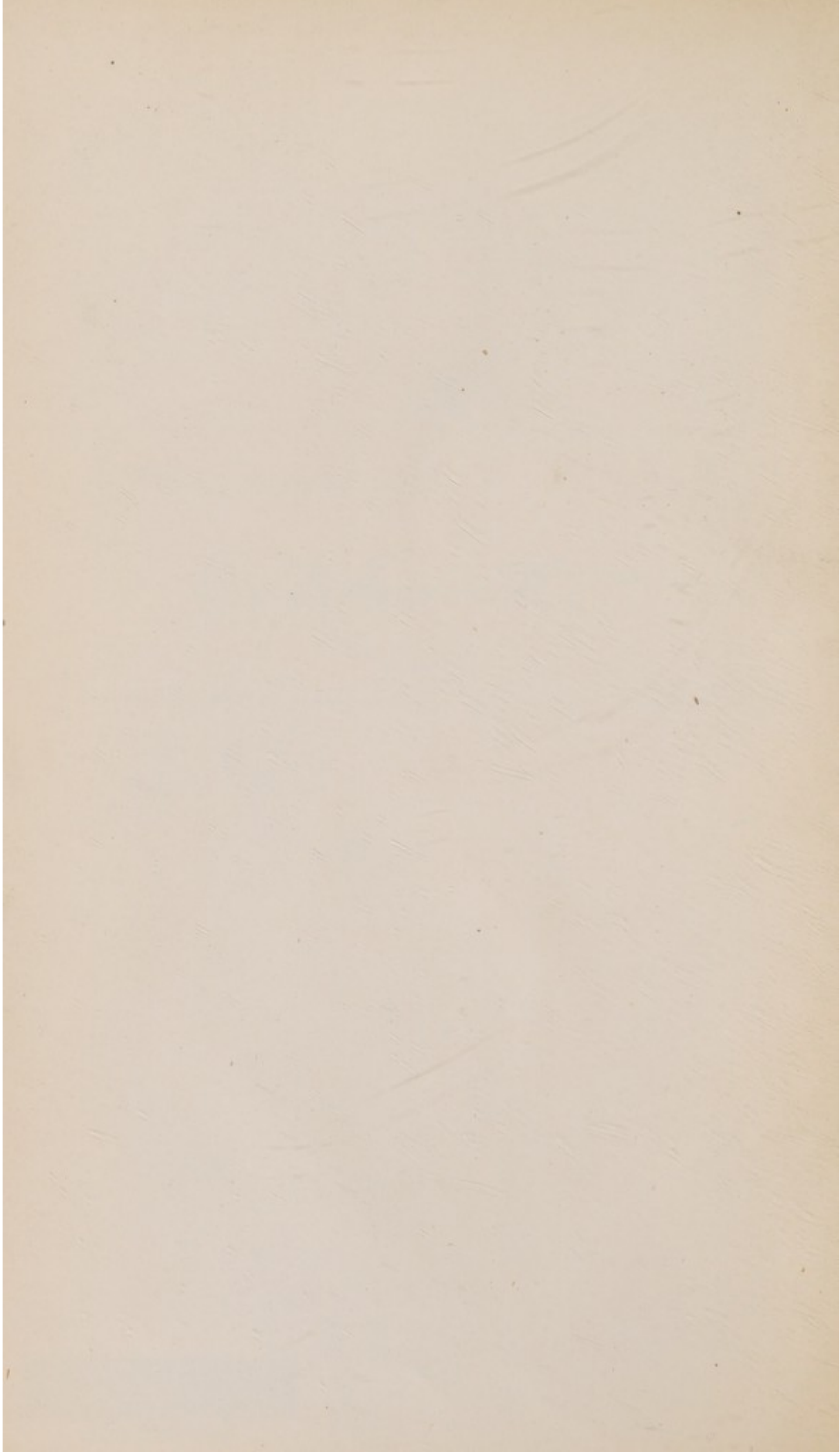
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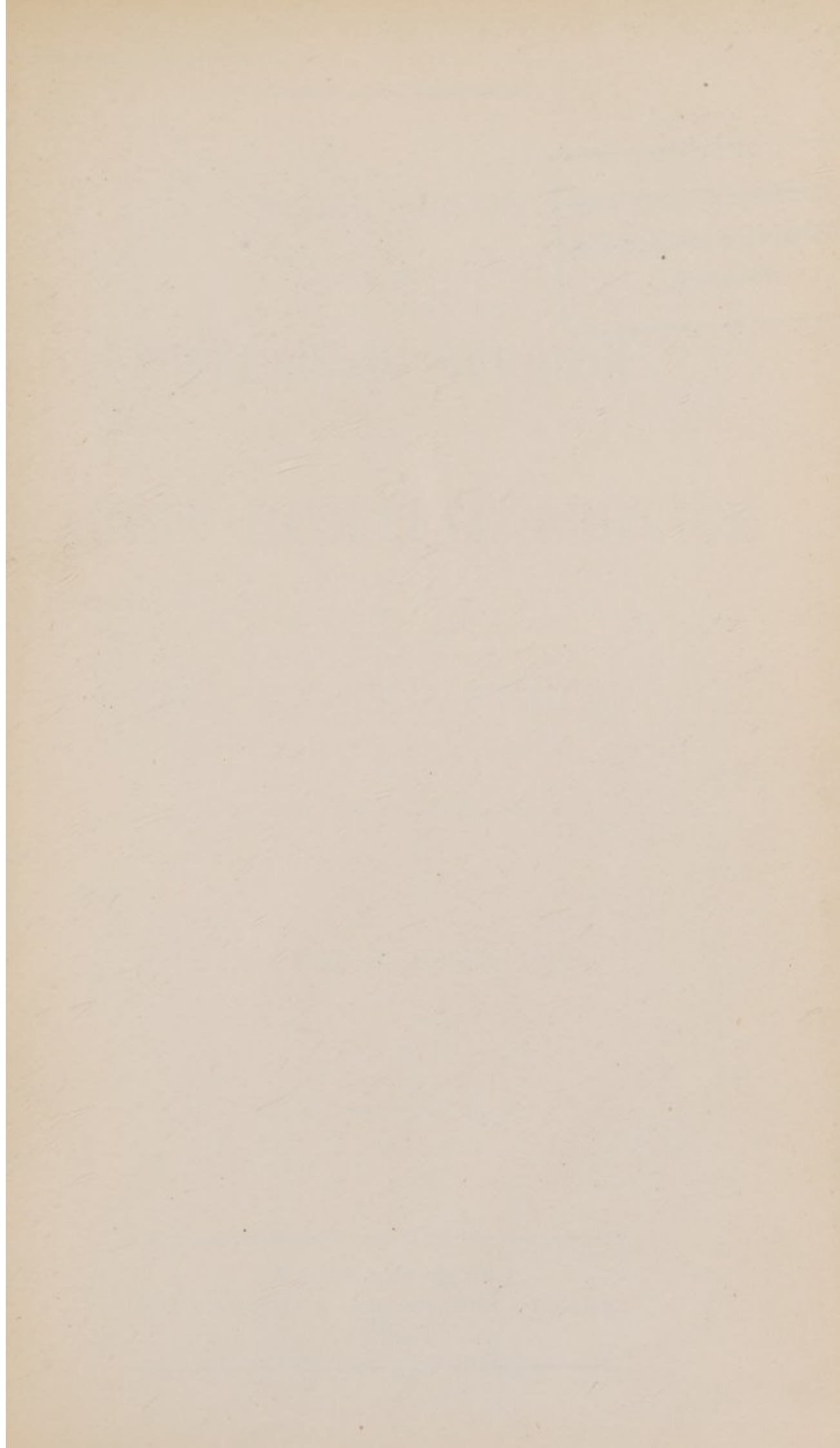


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ANNUAL REPORT

OF THE

SUPERVISING SURGEON

OF THE

MARINE-HOSPITAL SERVICE

OF

THE UNITED STATES

FOR THE FISCAL YEAR 1873.

1 JULY 1872 to 30 JUNE 1873.

(*John M. Woodworth, M. D.*)

WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1873.

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## TABLE OF CONTENTS.

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	Page.
Letter of Supervising Surgeon submitting Report.....	3
<b>REPORT:</b>	
Operations of the Marine-Hospital Service—1872-'73.....	7
Progress of the Re-organization of the Service.....	8
Regulations United States Marine-Hospital Service, 1873.....	9
Existing Laws.—Prospective Legislation.....	14
Tax-paying Seamen in Quarantine Hospitals.....	15
Medical Inspection of Seamen before Shipping.....	16
United States Marine-Hospital Buildings.....	17
Proposed new Hospitals—New York, Pittsburgh.....	19
Statistics.....	21
I.—Summary Statement of Operations of the United States Marine-Hospital Service for the fiscal Year 1873.....	22
II.—Statement of Hospital-relief and Hospital-money Collections and Expenditures, by Ports, 1873.....	22
III.—Receipts and Expenditures from 1798 to 1873.....	28
IV.—Summary Statement of Locations, Cost and Disposition of United States Marine Hospitals.....	30
V.—Table of Diseases and Injuries treated in Hospital during the fiscal Year 1873.....	32
VI.—Mortality Table, with Causes.....	40
<b>APPENDIX:</b>	
A.—Hospitals and Hospital Construction. By JOHN M. WOODWORTH, M. D., Supervising Surgeon United States Marine-Hospital Service. Illustrations.....	49
B.—Natural History of Yellow Fever in the United States. By J. M. TONER, M. D., President American Medical Association, with Chart.....	63
C.—The Yellow Fever Epidemic of 1873. Reports from the Medical Officers of the United States Marine-Hospital Service.....	99
D.—Report of a Case of Double Diaphragmatic Rupture and Hernia. By THOS. T. MINOR, M. D., Surgeon U. S. M.-H. S. With Note by the Supervising Surgeon, and Photograph.....	115
E.—Urethral Strictures. By C. N. ELLINWOOD, M. D., Surgeon U. M.-H. S.; with Notes of Cases by Drs. ELLINWOOD and CRAMPTON, U. S. M.-H. S....	123
F.—The Sailor and the Service at the Port of New York. By HEBER SMITH, M. D., Surgeon U. S. M.-H. S.....	131
G.—River-Boatmen of the Lower Mississippi. By ORSAMUS SMITH, M. D., Surgeon U. S. M.-H. S.....	143
INDEX :.....	147





TO  
THE HONORABLE  
THE SECRETARY OF THE TREASURY.

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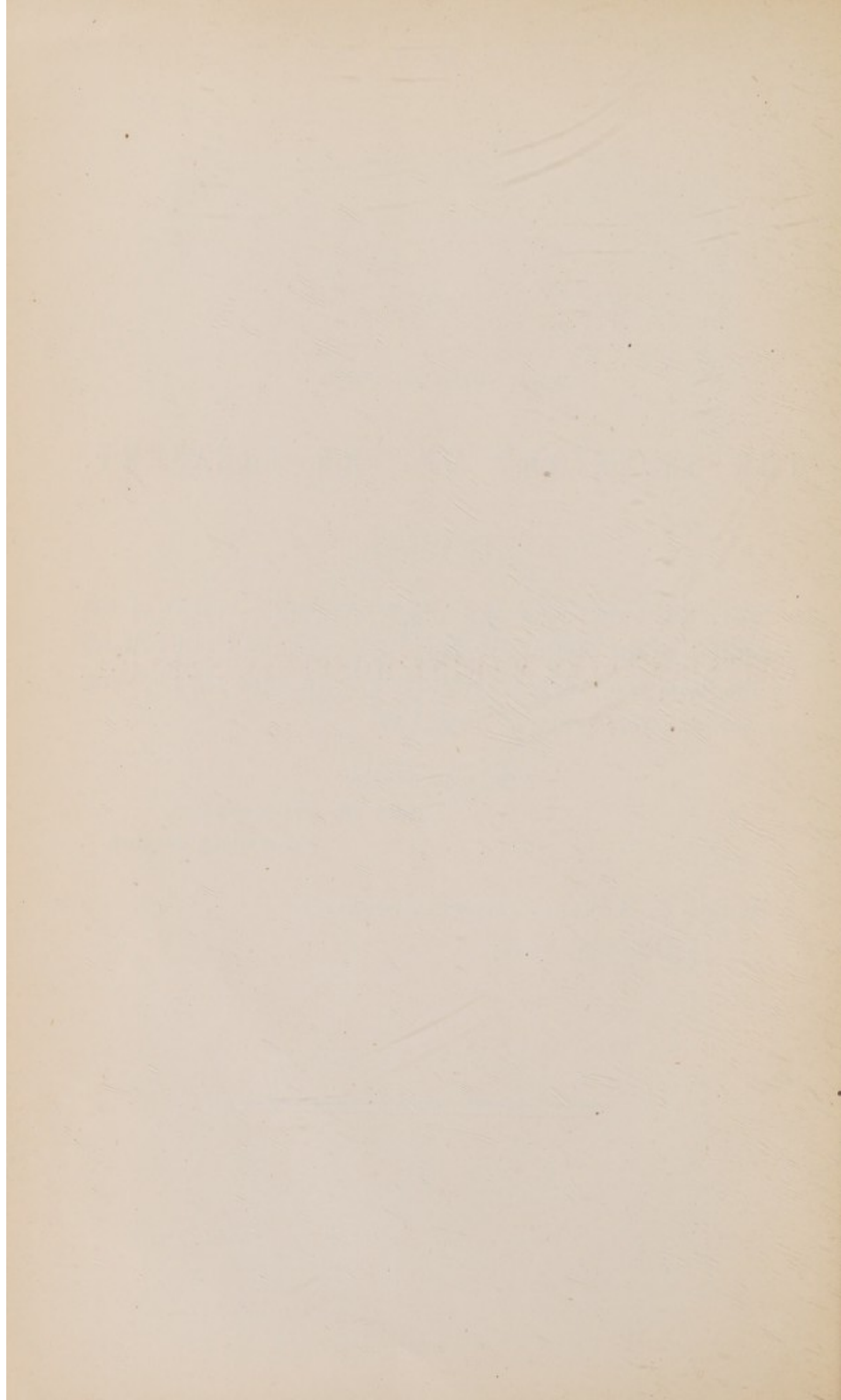
SIR: I have the honor to submit herewith a report of the operations of the Marine-Hospital Service of the United States for the fiscal year 1873, (1 July 1872 to 30 June 1873,) being my second annual report.

Very respectfully,

JOHN M. WOODWORTH,  
Supervising Surgeon.

BUREAU U. S. MARINE-HOSPITAL SERVICE,  
15 December 1873.

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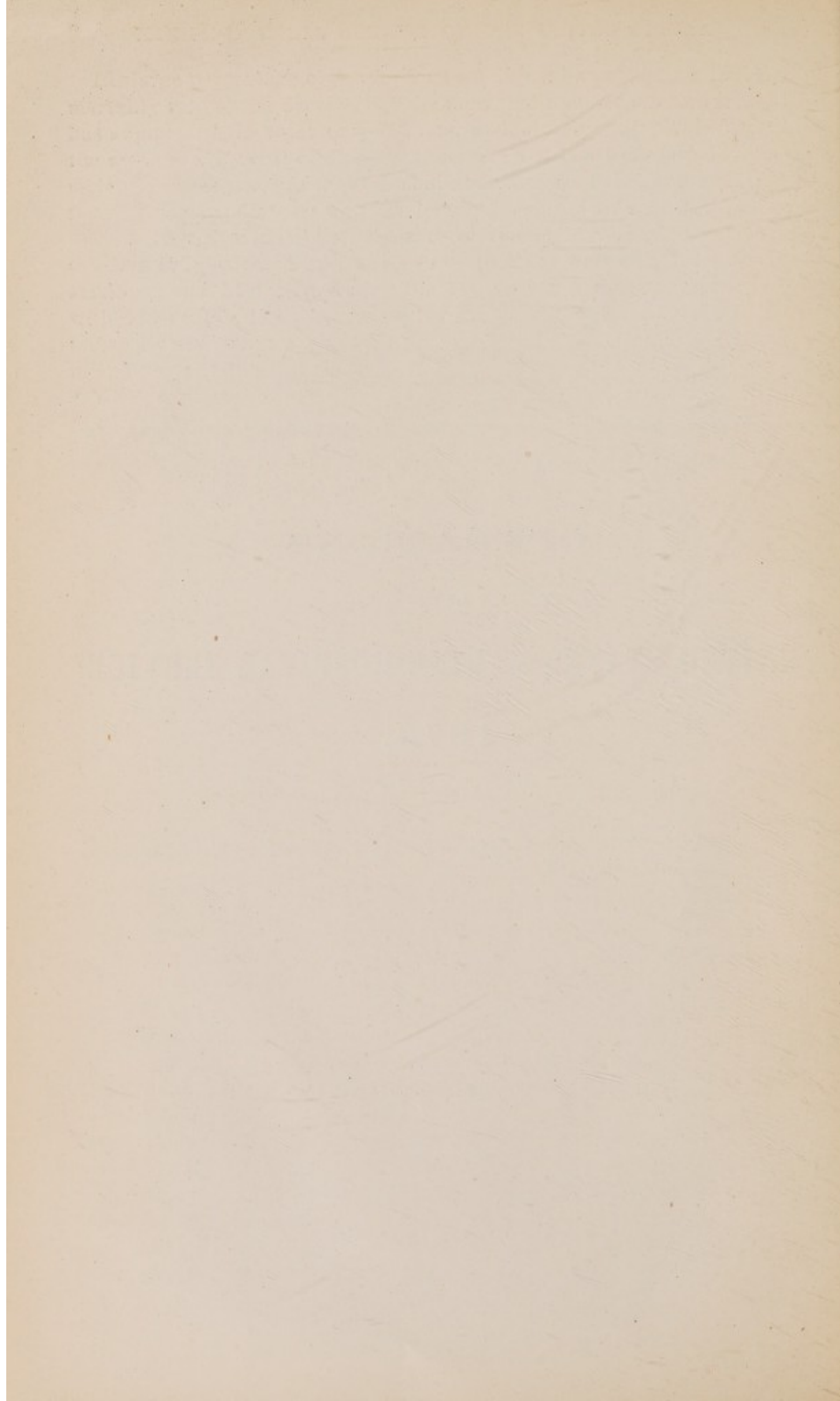




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OPERATIONS  
OF THE  
UNITED STATES MARINE-HOSPITAL SERVICE:  
1873.

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## THE MARINE-HOSPITAL SERVICE OF THE UNITED STATES DURING 1872-'73.

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DURING the year ended June 30, 1873, 13,529 sick and disabled seamen were furnished medical and surgical relief; 12,697 seamen were maintained in hospital 420,160 days, or an average of about 33 days for each hospital patient; and 832 others, who were suffering from diseases and injuries of a character not requiring treatment in hospital, were relieved by furnishing them with medicines and appliances without admission to hospital.

The results obtained in the treatment of the 12,697 hospital patients are as follows:

Discharged, cured .....	8,927
Discharged, improved.....	1,975
Discharged, not improved.....	161
Deserted while under treatment.....	108
Died .....	646
Remaining under treatment June 30, 1873.....	880
<hr/>	
Total .....	12,697

The average daily number of hospital patients throughout the year was 1,151.

The total cost of the Service for the year was \$422,502.98. This amount includes the whole cost of the administration of the Service; the maintenance, care, and treatment of patients, and the medicines furnished them; the expenses attending the burial of those who died, and the entire outfit of the new marine hospital at Chicago. The total expenditures from the fund, including all these items, makes the average cost of maintaining and treating each patient, \$1.002 per day.

The hospital-money collections from seamen during the year amount to \$335,845.95, which is an increase of \$12,145.90 over the amount so collected in 1872, and an increase of \$47,700.53 over the amount collected in 1871, under the operation of the same law. This increase of receipts of hospital-money is mainly due to a more faithful collection of the tax. It is believed, however, that a large percentage of the lawful tax is still lost to the fund, as masters of vessels who construe the law loosely, and make their hospital-money returns accordingly, (and such cases are not wanting,) have no fear of the penalty named in the law, since it does not provide that any part of the forfeit-money shall go to the informer.



The large percentage of deaths from small-pox has not only raised the mortality rate of the Service, but the increased number of cases treated has augmented the total expenditures, and correspondingly increased the average daily cost of hospital-relief, since it has been found impossible to furnish proper care and medical treatment to seamen suffering from contagious diseases without largely increased compensation over that usually demanded for the care of those affected with ordinary diseases or injuries. Thus, while in 1872 there were only 131 cases of small-pox and 54 deaths, during the last year 286 cases were treated, with 136 deaths, the disease having prevailed as an epidemic of an unusually malignant character at a number of the Atlantic, Gulf, and inland ports of the United States.

While foreign seamen are received into marine hospitals of the United States, in accordance with the provisions of the act of Congress, approved May 3, 1802, which fixes the charge for their care at 75 cents per day, it so happens that relief is asked for them at ports where the cost is much above the general average; as, for instance, at Boston, Mass., where the average daily cost for each patient treated in 1873 was \$1.26, and at Key West, Fla., where it was \$2.28. The loss to the fund on this account is considerable, and the average cost of maintaining our own seamen is thus correspondingly increased.

To the foregoing causes of augmented expenditure should be added the increase of facilities for affording hospital-relief during the last year, such relief having been furnished in 72 customs districts in 1871, 81 districts in 1872, and 91 in 1873, and a larger number of seamen were also furnished relief in 1873 than in 1872.

#### PROGRESS OF THE RE-ORGANIZATION OF THE SERVICE.

The Marine-Hospital Service has undergone such a radical change through the operation of the act of 1870, that it has been thought its present status would be but imperfectly appreciated without a brief summary of its origin and growth, which, as here furnished, may also serve to show the wisdom of the action of Congress in providing through this act for the re-organization of the Service and the correction of many of the defects which formerly existed.

By the act of July 16, 1798, (1 Stat., 605,) Congress imposed a tax of 20 cents per month on every seaman of the United States employed in the foreign and coasting trades, and out of the moneys collected by authority of this act the President of the United States was authorized to furnish temporary relief to sick and disabled seamen; provided the moneys should be expended in the districts wherein collected.

This resolution was so far amended by the act of March 2, 1799, (1 Stat., 729,) as to authorize the expenditure of hospital-money within any part of the State where collected, or in the State next adjoining. The same act also extended the operations of the law so as to embrace the officers and seamen of the Navy.



By the act of May 3, 1802, (2 Stat., 192,) hospital-money collections were constituted a general fund. This act also made provision for relieving sick and disabled foreign seamen in marine hospitals of the United States at a charge of 75 cents per day.

Collections of hospital-money from officers and seamen of the Navy were constituted a separate fund for the Navy, by the act of February 26, 1811, (2 Stat., 650.)

By the act of March 1, 1843, (5 Stat., 602,) the provisions of the act of 1798 were extended to officers of vessels, the seamen of which were subject to hospital-tax.

By the act of June 29, 1870, (16 Stat., 169, 170,) a plan of re-organization of the Marine-Hospital Service was adopted, the hospital-tax (dues) was increased from 20, to 40 cents per month, and the appointment of a Supervising Surgeon of the Marine-Hospital Service was provided for, "whose duty it is, under the direction of the Secretary of the Treasury, to supervise all matters connected with the service."

This office was first filled in April, 1871, by the appointment of the present incumbent, and among the duties which he has found devolved upon him in this supervision, has been that of the construction of a code of rules and regulations in consonance with the scope and intent of the act.

The following analysis of the new code will serve to indicate much of the progress which has been made in the re-organization of the Service :

#### REGULATIONS UNITED STATES MARINE-HOSPITAL SERVICE, 1873.

As was observed in the last Annual Report, "the more strict adherence to the regulations [enforced during the preceding year] disclosed many defects in them," and led to the conclusion that their thorough revision was highly desirable. This revision, as a matter of fact, has been going on during the entire period of the present administration of the Service by circular letters and orders correcting abuses and remedying defects whenever found to exist. So that many of the provisions embodied in the volume of *Regulations of the United States Marine-Hospital Service*, 1873, which volume, with the approval of the Secretary of the Treasury, has been prepared and distributed since the close of the fiscal year, were already in successful operation; and the late work performed in the preparation of the volume, has been mainly that necessary to a symmetrical completion of the code and a logical arrangement of the subject-matter.

Although this is nominally the fourth volume of regulations for the Marine-Hospital Service, it is really the first under the present act, the one which it immediately supersedes being, with a few modifications, substantially that first published in 1856. During the first year of his secretaryship (1852-'53) Mr. Guthrie had prepared and put in force a code of "by-laws and regulations for the government of the respective



[marine] hospitals, so modified as to suit each locality, \* \* \* and the charge of them in this Department so arranged that the accounts [were] required to be periodically rendered and a proper economy enforced." This appears to have been the first attempt to secure any systematic administration of the marine-hospital fund, and its principal result—as in the stricter adherence to the regulations during the present administration of the Service—seems to have been to reveal the abuses which had grown up under the previous *laissez faire* management. Thus, in his report for 1855-'56, Mr. Guthrie says: "The economical administration of the hospitals to the proper relief of the sailors who contribute to the fund is one of much interest, and has given the Department considerable anxiety, because of the tendency to improper and wasteful expenditure. It has been considered necessary to give new instructions as to the collecting and proper accounting for the hospital-fund, the provisions, medicines, and other supplies, the employment of stewards, nurses, and other servants, and the government and supervision of the hospitals."

These instructions were first published and carried into effect October 25, 1856, and were subsequently embodied in the *General Regulations under the Revenue and Collection Laws of the United States*, which laws were then, in accordance with a resolution of the Senate, undergoing revision for the first time since 1798. With but little modification, and this generally through the medium of an occasional circular, these regulations, first promulgated in 1856, and subsequently republished in 1861, remained in force until the passage of the present act re-organizing the Marine-Hospital Service, made it necessary to provide a new code of instructions for carrying the act into effect. Hence came the volume of *Revised Regulations* approved and enforced from August 2, 1870, but which was, as has been before remarked, with a few modifications, substantially that first published in 1856.

Acting for the proverbially improvident and reckless sailor as his fiduciary agent, in the direction and management of the trust-fund accruing from the tax on his wages, the Marine-Hospital Service is one of complex and delicate duties; dealing, on the one hand with the revenue-officers of the Government in the enforcement of the tax collection, and, on the other, with the various individuals through whom the fund is applied.

In the prosecution of these duties, it has been one of the objects of the present direction of the Bureau to secure as thorough a collection of hospital-moneys with as simple machinery as possible; and the multiplication of reports, etc., entailing unnecessary clerical labor on seafaring men unused to such work, is avoided by the new code. Through this simplification the number of *Forms* has been reduced nearly 25 per cent., while it is believed the efficiency of the Service has been increased in at least the same ratio by the reduction.

As from the nature of the case medical experience and skill must be



relied upon to determine the necessity for hospital-relief, the revenue officer, by the new *Regulations*, is relieved, as far as is practicable, from this duty, and his functions are limited to their legitimate sphere as fiscal agent of the Service. By this means it is hoped to relieve the fund of the burden of supporting malingerers and other imposters who have succeeded in the past, through lack of medical supervision, in making marine hospitals, to a large extent, mere eleemosynary institutions.

To aid the respective officers, fiscal and medical, in their specific duties, the *Regulations* are divided into sections, in which the subjects belonging to each are separately provided for, and their respective status and authority are clearly defined. Thus in Section I, (which treats of the Assessment and Collection of Hospital-dues, and Accounts and Reports of Hospital-money,) and in Section V, (which treats of Disbursements of the Marine-Hospital Fund,) the revenue officer, as fiscal agent, is paramount; while in Section II, (which treats of the Application of the Marine-Hospital Fund for the Relief of sick and disabled Seamen,) and in Section IV, (which treats of Hospitals for Seamen, their Organization, etc.,) the medical authority is superior. Such a natural and logical arrangement will, it is believed, inure to the good of the Service in preventing divided responsibility and conflicting authority.

Among the more important changes in the first section is one by which, while dispensing with triplicate returns, masters of vessels are required to preserve with their ship's papers, receipts filled out by the proper customs-officers, showing the due payment of hospital-tax for the enumerated officers and men of their respective crews. (Par. 5, 6, 7, and 8, *Reg. U. S. M-H. S.*, 1873.) These receipts are subject to inspection by the proper authorities, and the hope is entertained that through this measure a more uniform collection of the tax may be secured.

With the same end in view, *i. e.*, the increase of the fund from all legitimate sources, provision is now made that hospital moneys collected by United States consular officers shall, in the future, be accounted for to the Treasury Department. When the fact was made known to the Department of State that such collections were diverted to other than their legitimate uses through want of definite instructions, the Honorable the Secretary of State promptly authorized all consular officers to "keep separate accounts of hospital-money collected by them, and to make separate returns of the same to the Treasury Department in like manner as directed for customs-officers, except that said reports will be made quarterly, and will be forwarded through the Department of State." (Par. 18, *op. cit.*, p. 20.)

With the approval of the Secretary of the Treasury the application of the civil service system is now relied upon to secure in the corps proper of medical officers of the Marine-Hospital Service such a standard of attainments as will best subserve the interests of the Service and reflect credit upon the Department. To this end provision is made in Section III for the examination of applicants for appointment in the



corps of medical officers by "a board of surgeons, which will be convened from time to time by the Supervising Surgeon." (Par. 52, p. 25.)

To these medical officers is committed the immediate superintendence of the Service at ports where its extent is of sufficient magnitude to warrant their employment, either as surgeons in charge of hospitals (organized United States marine hospitals,) or as superintending surgeons at ports where relief is furnished in hospitals of the second class, (municipal or private hospitals.) In the rules for the assignment of these officers to duty it has been sought to remedy a serious defect of the previous system. Thus the custom-house being the most convenient place for the seaman at which to make application for hospital-relief, but being generally some distance, often several miles, from the hospital where the surgeon in charge is on duty, it is now provided that, "where the extent or exigencies of the service make it necessary, one additional medical officer will be assigned as assistant, *in which event one of the two medical officers shall be on duty at the custom-house* during the hours when it is open for the transaction of business." (Par. 56, p. 26.) And, in the same manner, "at large ports where no United States marine hospitals are established, a medical officer will be assigned to duty at the custom-house when the extent of the service makes it necessary." (Par. 57, p. 26.)

By this system, already successfully carried out to some extent, not only should the Service be more faithfully and intelligently administered than was possible under the old plan, but one source of great hardship to the sailor is removed by obviating the necessity which often formerly existed for his travel back and forth between custom-house and hospital. Under the new *Regulations* the sailor is enabled to apply directly to the medical officer for relief, and if, upon examination, his condition be found such as to require continued medical or surgical care, he is sent to hospital forthwith; while numbers of minor cases are relieved by medicines or appliances furnished at the surgeon's office without compelling the patient to go to hospital at all. In addition to these advantages the promptness with which medical or surgical assistance may be afforded in urgent cases, from the convenient location of the custom-house, is not to be overlooked.

In closing the consideration of this section concerning the administration of hospitals, etc., it may not be out of place to allude to the purely professional detail of the registration of diseases. The Marine-Hospital Bureau, under the sanction and approval of the Secretary of the Treasury, is the first organization in this country to adopt the "Provisional Nomenclature of the Royal College of Physicians," (London,) and so to aid in the attempt, approved by the American Medical Association at its last annual meeting, and by the American Public Health Association, at its session in May, 1873, to establish an international and standard nosology. In the preparation of this nomenclature "the most distinguished physicians and statisticians have recently lent their



aid," from which it is "expected that greater accuracy, certainty, and uniformity, for comparison, than heretofore will characterize the statistical records of disease alike in civil life and in the public services."\* By the adoption of this system the hospital-records, which, in the absence of any uniform nomenclature, have been heretofore valueless for comparative study and consequent profit, will be available in the future in determining many questions as to the effects of sea-faring pursuits on health and life, and may furnish the sanitariat the basis for important action concerning the seaworthiness of sailors.†

With reference to Disbursements of the Marine-Hospital Fund and Official Correspondence, which form, respectively, the subjects of the fifth and sixth sections of the new *Regulations*, the most important modifications consist in the simplification of routine duties and the dispensing with all unnecessary official papers. Prior to April 23, 1873, collectors of customs were required to forward to the Department monthly "estimates" of the amounts necessary to meet the expenses of each month, and upon these "estimates" remittances of funds were made from the Treasury. By circular order of above date the monthly estimates were abolished, and remittances of the sums actually needed were thenceforward made on receipt of a report of the transactions of the Service during the month. This plan having been found to work satisfactorily, it is embodied in paragraphs 106-111, inclusive, pp. 33, 34.

Mere formal letters of transmittal accompanying reports, etc., are no longer required; and throughout this portion of the work it has been attempted to secure the same directness and business methods as obtain in private mercantile affairs.

Among the minor changes may be noted the reduction in the period of duration of permits for hospital-relief. Notwithstanding that greater care is exercised in admissions, from which it follows that, as a rule, the character of hospital cases is graver than formerly, the average period of treatment is found to be not much over thirty-three days. Under these circumstances the permit for four months, which has been the rule since 1798, has been reduced to two months, and cases needing treatment for a longer period must be reported to the Department, thus enabling the Bureau to prevent, by its supervision, the unnecessary retention of patients in hospital.

Paragraph 62 (p. 27) may also be alluded to as correcting one of the minor evils. Since it is essential that a medical officer should be constantly in attendance with the sick and disabled, it has been customary to provide surgeons with quarters and subsistence in organized hospitals of Class I. This had gradually grown into furnishing household

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\*AITKEN.

† The classification of diseases in the Mortality Statistics of the IXth Census was based upon this *Nomenclature* by the advice of Drs. WOODWARD and BILLINGS, U. S. A., to whom the matter was referred, through the Surgeon-General of the Army, by the Honorable FRANCIS A. WALKER, Superintendent of Census.



servants and subsisting them, as well as the surgeon and his family, without regard to the extent of the family or restriction upon the number of servants. Such a custom could not fail to result injuriously by making unequal compensations of surgeons and increasing their cost to the Service. The paragraph above cited directs that medical officers of hospitals (Class I) will be provided with furnished apartments, fuel, and lights, where it can be done with convenience; but they will be required to supply subsistence for themselves, their families, and household attendants.

A synopsis of the various laws relating to the Service prefaces the regulations proper, and medical supply and diet tables, etc., are given in the Appendix.

While it is believed that these *Regulations* will, to some extent, facilitate the labors of those engaged, and obviate some of the difficulties which have been found to exist, in carrying out the designs of Congress in the administration of the Marine-Hospital fund, it is not claimed that they are perfect, or that they will not need supplementing and modifying in the future; for added experience and changed conditions will, undoubtedly, disclose shortcomings and defects. Even now, causes are apparent from which may arise the necessity for a revision; and among these may be mentioned some of the defects in

#### EXISTING LAWS.—PROSPECTIVE LEGISLATION.

Experience has shown that the laws governing the Marine-Hospital Service, and upon which these *Regulations* are based, are not so explicit as is to be desired, and that, consequently, they prove defective in operation in some respects, while in others they work manifest injury to the Service. Among the more prominent of these defects may be enumerated the following:

I.—The term "seaman" is not defined, and, therefore, the assessment and collection of hospital-dues is not uniformly enforced.

II.—The vessels of the Revenue Marine Service, Light-house Service, Coast-Survey Service, and of the Engineer Corps of the Army, are not included within the provisions of the law; hence the seamen employed on said vessels are excluded from the benefits of the hospital fund.

III.—The rate of charge for the care of foreign seamen, which was fixed by the act of May 3, 1802, is much less than the actual cost of the care and treatment of such patients, and the loss to the fund on this account amounts to several thousand dollars annually. It is but reasonable that the charge for such patients should cover the cost of medicines, subsistence, washing, and nursing.

The Supervising Surgeon would, therefore, in this connection, respectfully renew his former recommendations—

That the term "seaman," be so defined as to include all officers and employes on such vessels as are subject to hospital-tax;

That Congress be asked so to amend the act of June 29, 1870, (16 Stat.,



169, 170,) as to include within its provisions all officers and seamen of the vessels of the Revenue Marine Service, of the Light-house Board, of the Coast Survey Service, and of the Engineer Corps of the Army, who do not regularly belong to the Army or Navy.

Also, that section 5 of the act of May 3, 1802, (2 Stat., 193,) which fixes the rate of charge for the care of foreign seamen at 75 cents per day, be so amended as to subject such seamen, when admitted to marine hospitals of the United States, to a charge equal to the average daily expenditure for American seamen, at the hospital where such foreign seamen are maintained.

#### TAX-PAYING SEAMEN IN QUARANTINE HOSPITALS.

A much more serious evil than either of the foregoing, and one not so easy of solution, is the injustice to which tax-paying seamen are frequently subjected by being detained in State quarantine hospitals, and thence compelled to pay the local charges for care and treatment.

As quarantine deals almost exclusively with the mercantile marine, it follows that seamen furnish by far the largest number of quarantine patients, the port of New York—where, in some years, immigrants are detained in considerable numbers—alone excepted. A large majority of these seamen belong to registered, enrolled or licensed vessels of the United States which pay hospital-tax, and the crews of which are consequently entitled to relief without other charge or expense, the law expressly contracting to provide “for the care and relief of sick and disabled seamen employed” on such vessels. Hence, when one of these seamen is ordered into quarantine hospital by the health-officer of the port, and, at the termination of his treatment, a bill for the same is presented to the master or owner of his vessel, the latter naturally seeks the repayment of such bill from the marine-hospital fund; and it then becomes the duty of this Bureau to determine the validity of the claim, and to authorize or refuse its payment.

To the successful fulfillment of its obligations as trustee of the fund, and especially to secure an economical and equitable application thereof, the Bureau has found certain checks requisite. Of these the essential ones are the master's certificate of payment of hospital-dues, by which is established the right to relief, and the surgeon's certificate of sickness or disability, by which is shown the necessity for such relief; and when these are furnished a permit is at once issued, which becomes the recognized voucher for a claim upon the fund from the date, and for the period when granted.

The whole history of the Service shows the necessity for some such system; and the test of nearly a quarter of a century's experience has proven this to be the simplest and most efficient yet devised.

In deference, however, to what are claimed to be the exigencies of local quarantines, and with the view of securing, to the fullest extent practicable under the circumstances, the benefits of the fund to those



entitled to them, these requirements have been so modified as to accept the certificate of the local quarantine physician instead of that of the regular medical officer of the Service, as proof of necessity for relief, and every other proper concession has been made, but with only partial success.

Under the present administration of quarantine at the port of New York, and at one or two other ports, the necessary evidence is promptly presented by the quarantine officers, permits are as promptly issued by the Marine-Hospital Service, and no difficulty is experienced in furnishing relief through the hospital-fund to all who are entitled to it. This demonstrates that there is no unavoidable obstacle in the way of enforcing the necessary provisions of quarantine without infringing upon the equally necessary regulations of this Service. The quarantine of the port of New York is the most extensive and elaborate, as it is, at present, unquestionably the best administered and most efficient system in the world; the vessels of all nations throng the harbor bringing from all climes the most diverse cargoes and crews; the small-pox and typhus and cholera of an immense immigrant service, and the fevers of the tropics, continually threaten and demand an unremitting vigilance. And yet this vigilance is exercised, and the health of the port is perfectly protected, in entire harmony with the regulations necessary to insure the care and relief promised by the Government to the sick and disabled seaman.

But as there is no specific authority to compel the State quarantine official to such action, this has been assumed to be a voluntary matter entirely within his discretion. As a consequence of this assumption, when the health-officer at a port chooses to violate the rights of the tax-paying seaman by ignoring the simple but indispensable regulations established in the interest of the seaman himself, this Bureau is not only debarred all supervision of the relief furnished, but is deprived of the information which would enable it to audit claims for compensation for such relief.

During the discussion by Congress of the assumption of national control over quarantine, it is hoped that this phase of the subject may be considered, to the end that the Service may be relieved from a serious complication, as well as that a colorable cause of complaint may be taken away from masters of vessels and their men.

#### MEDICAL INSPECTION OF SEAMEN BEFORE SHIPPING.

While the Service, under the operation of the present act, gives promise of becoming eventually self-sustaining, the percentage of relief made necessary by causes which are, in a large measure, avoidable, is so great as to materially retard this desideratum. Aside from cases of such purely preventable diseases as small-pox, syphilis, scurvy, etc., it is at least worthy of consideration how far a medical inspection of seamen before shipping would operate to reduce the cost of the Service by



eliminating a class of patients who alternate between the hospital and the fore-castle, with a decided preponderance toward the former.

The attention of the Supervising Surgeon was attracted during his earliest inspections of hospital patients by the numbers among them who, obviously, had never been physically fit for the duties, the exposure, the hardships and privations of a sea-faring life. That such cases must prove an unjustifiable burden upon the marine-hospital fund, was an inference which has been abundantly sustained by subsequent experience.

A wider view of this subject of the "unseaworthiness of sailors," shows the above, however, to be a minor evil as compared with the loss of life from shipwreck due, as is alleged among other causes, to the physical incompetency of the crews. In the discussion following Mr. Plimsoll's agitation of this subject of frequent shipwreck, the London *Lancet* asserted that ten per cent. of all the men who ship are physically unfit for duty; while Captain Williams, in testifying as to the causes which led to the loss of the *Atlantic*, stated that "ten good seamen out of forty" would be an unusually sound crew. The English law providing for a medical examination of seamen is, according to a recent report of the Board of Trade to Parliament, practically a dead letter, because the provision is merely declaratory—the "examination can be made, provided the owner and the men agree to it, and the owner pays for it."

In view of the revival of American shipping, and of the fact already presented, viz., of an avoidable burden upon the Marine-Hospital Service, the suggestion is respectfully offered for consideration whether it may not yet be found advisable to forbid, by statute, hospital-relief at the expense of the fund in any case where it is evident that the applicant was physically unfit for sea-life when shipped. This would make a medical examination before shipping, a matter of course; and, in order to avoid the miscarriage of the measure, it is further suggested that the medical officers of the Service might be employed to make such examination without charge either to owner or men.

#### UNITED STATES MARINE-HOSPITAL BUILDINGS.

The magnificent structure for the marine hospital at the port of Chicago,\* which building was commenced in the early part of 1867, finished during the past summer, and opened for the reception of marine patients on the 17th of November, 1873, is the most important addition to the list of marine-hospital buildings for many years.

The building, which is located at Lakeview about five miles north of the harbor, is of stone; and, in addition to being the finest structure of its kind in the United States, is especially noteworthy as being the first innovation on the old defective plan, of wards divided by closed

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\*See Appendix A.



corridors, which had been followed by the Government since 1837. As Congress has indorsed the plan of hospital construction, recommended in the first annual report of the Supervising Surgeon, (1872,) by providing for the erection, at San Francisco and New Orleans, of pavilion hospitals to be constructed of wood and of simple architectural design, it is probable that the Chicago marine hospital will be the last one constructed on a scale of such magnificence.

Of the thirty-one hospitals which have been built by the Government since the organization of the Marine-Hospital Service, fourteen have been sold; one was transferred to the War Department; one abandoned; one burned; one destroyed by a flood, and one by a hurricane; one was injured by an earthquake and abandoned; one remains unfinished, its completion being impracticable; and ten remain in use, located as follows: at Chelsea, Mass., Chicago, Ills., Cleveland, Ohio, Detroit, Mich., Louisville, Ky., Mobile, Ala., Pittsburgh, Pa., Portland, Me., Saint Louis, Mo., and Key West, Fla.\*

The pavilion marine hospital, authorized by the last Congress to be erected at San Francisco, has not yet been commenced, for the reason that the War Department decided not to relinquish its control of the site selected on Angel Island, in the Bay of San Francisco. Another site at Mountain Lake, a Government reservation on the main land, four miles from the port, has been selected, pending the formal consent of the War Department.† A detailed description, with plans of the proposed hospital, is given in the Appendix A, *Hospitals and Hospital Construction*.

The condition of the marine hospital at Pittsburgh is unchanged since the last annual report. The building is entirely unfit for use as a hospital, and its surroundings are disagreeable and unhealthy.

Despatches from Key West bring intelligence of extensive injury done to the roof of the marine hospital of that place by a recent hurricane.

The marine hospitals at Detroit, Cleveland, Louisville, and Portland are in need of extensive repairs. All of these hospitals are constructed with closed corridors dividing the wards, obstructing the light and ventilation, and complicating the administration. None of them can be reconstructed and made into healthful hospital-buildings. The suggestion is, therefore, offered that it would be unwise, both in a sanitary and an economical point of view, to make any extended alterations in, or repairs upon, these buildings, unless for the purpose of converting them into administrative buildings, with pavilion wards for the sick built on the adjoining grounds and connected with them by corridors.

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\* At the other principal ports of the United States, where hospital-relief is furnished, (eighty-one in number,) sick and disabled seamen are cared for in private or municipal hospitals at rates authorized by the Treasury Department.

† Since writing this report the War Department has also declined to relinquish its claim to the Mountain Lake site.



## PROPOSED NEW HOSPITALS.

Under the old system of furnishing hospital-relief by contract with the lowest bidder, it occasionally happened that the per capita cost of relief so furnished at a given port was less than the cost in marine hospitals built and maintained by the Government at adjoining ports. Such an impression was this apparent economy allowed to produce in the incidental attention then paid to the Service, that a sentiment of decided opposition developed against the construction and maintenance of hospitals by the Government; and as early as 1854-'55 the Report of the Secretary of the Treasury, the Hon. James Guthrie, contained a recommendation to Congress urging the consideration of the question, "whether the contract-system might not be advantageously extended to many places where the United States have hospitals."

This view of the subject continued to obtain under Mr. Secretary Cobb, and the contract-system was gradually substituted wherever it was practicable to do so.

It is probable that the resort to this system was induced to a still greater extent by the character and location of the marine hospitals then constructed or in process of construction, and of which the following may be taken as representative specimens:

Hospital at Burlington, Iowa, authorized in 1854; site purchased in January, 1856; building completed, and surgeon and employés appointed, in March, 1858; first patient admitted during the period between May 1 and December 31, 1861; four more admitted between September, 1863, and January, 1864: August, 1864, the management was transferred to the Army for the use of sick and wounded soldiers; building and grounds sold in 1867 for \$6,000; aggregate cost, \$29,996.84.

Hospital at Burlington, Vt., erected during 1856-'58; never occupied "in consequence of the lack of patients;" sold in 1866 for \$7,164.41; cost \$39,572.30.

Hospital at Wilmington, N. C., built during 1858-'60; cost, \$43,897.44; sold in 1870 for \$4,020, never having been used as a marine hospital.

Hospital at Galena, Ill., completed in 1859; organized and opened in the spring of 1861; organization maintained four and a half years, with rarely more than one or two patients, and often with empty wards; sold in 1868 for \$7,321.68: cost, \$47,797.58.

With such an exhibit it is hardly to be wondered at that the contract-system should have been resorted to; but even then its evils were beginning to attract attention, and Mr. Secretary Chase, in his report for 1860-'61, though repeating that "the number [of marine-hospital buildings] has been increased beyond necessity or utility," and urging "that no new structures be undertaken except in cases of the clearest expediency or necessity," nevertheless studiously avoids any recommendation of this system. Subsequently, the complaints and exposures of the evils to which seamen were subjected by being thus farmed out to the lowest bidder, increased to such an extent as to lead to the passage of the act of 1870, re-organizing the Service, and, finally, to the insertion of a clause in the act of June 10, 1872, (17 Stat., 417,) forbidding any expenditure in this manner.



This retrospect seems proper in respectfully renewing the recommendation made in the report of the Supervising Surgeon last year, for the erection of a pavilion marine hospital, of two-hundred-bed capacity, at the port of New York; which renewal is made with a full appreciation of the bearing of the foregoing facts. The Supervising Surgeon, from a careful study of the subject, is led to believe that the comparative increased cost of the Service at organized hospitals is due, intrinsically, to their location at ports where the number of patients is not great enough to warrant the maintenance of a hospital staff and establishment. But where the number of patients is sufficient to fairly employ such a staff and establishment as it was at Cleveland, Detroit, and Saint Louis, during 1871-'72, and at Saint Louis during 1872-'73, the returns show that the Service is more economically administered under such auspices than under any other. The average per diem cost of the relief furnished at the ports mentioned, for the past two years under the present supervision, is 94 cents, as against a general average of 99 cents per diem for all relief furnished.

And this is entirely apart from the question of efficiency, and of freedom from the complications which are almost inseparable from the administration at a large port, where relief is furnished in a number of separate private or municipal hospitals, often remote from each other. At the port of New York, for example, over 38,000 days of hospital relief were furnished last year, in six different hospitals, widely scattered, and necessitating an immense amount of detail labor from the superintending surgeon at the port. This labor involves, among other duties, the responsibility of seeing that patients are properly and skillfully treated; that they are not exposed to epidemic or hospital diseases while in hospital;\* and that they are not detained in hospital longer than necessary, to become a burden upon the fund. This responsibility, which would, of course, exist in the conduct of an organized hospital, is increased six-fold in this case by the multiplication of hospitals to be supervised.†

A pavilion hospital, suitably located at the port of New York, so as to be readily accessible, constructed upon the principles set forth in Appendix A, and administered with the same zeal, economy and skill that the superintending surgeon at that port has already manifested in the more complex and onerous duties of his present position, comes, it is conceived, within the category of "cases of the clearest expediency and necessity."

In renewing the recommendation, it is further suggested that the hospital be located on Oyster Island, a reef in New York Bay, south of Bedloe's Island, and which was ceded to the United States A. D. 1800.

\* In this connection see page 50 *et seq.* of Appendix to this Report.

† Patients are sent to more than one hospital, sometimes to avoid local jealousies and ill-feeling; sometimes to secure the benefits of competition; but, generally, because it is impracticable to provide for the accommodation of all the marine patients at a port in any one private or municipal hospital.



Only small portions of the island are visible at low water, which would necessitate "filling in" to make the requisite ground; but the expense attending this would not be nearly so great as the purchase of a site, even if one could be obtained convenient to the port which would be free from malarial influences.

The recommendation is also renewed for the sale of the old marine hospital and grounds at Pittsburgh, and the use of such portion of the proceeds as may be necessary for the purchase of a site in a more healthful locality, for the erection thereon of a pavilion hospital of thirty-bed capacity, with a small detached ward for the treatment of seamen suffering from contagious diseases.

An organized hospital at this port is a necessity, because there are no private or municipal hospital facilities in Pittsburgh adequate to the demands of the Service. The grounds are so valuable for manufacturing establishments—the proximity of existing rolling-mills and blast-furnaces, in fact, renders the site untenable for hospital purposes—that they would probably sell for double the amount necessary to secure a suitable location, and to erect thereon a hospital constructed on the principles already indorsed by Congress. So that this measure, instead of calling for expenditure, would in reality be a source of addition to the marine-hospital fund.

The maintenance of such hospital might, if it be deemed advisable, be made contingent upon the provision that if the average per diem cost of relief at such hospital in any year shall exceed the general average cost of all relief furnished during the same year—surgeon's salary and wages of employés to be included in estimating such cost in the first instance, and the total cost of the Service to be, in like manner, and as it is now, included in determining the general average cost—then it shall be lawful for the Secretary of the Treasury to lease said hospital to any suitable person or persons who will agree to furnish relief as required for marine patients at rates not to exceed the general average per diem cost of relief, year by year.

#### STATISTICS.

The following statements and tables embrace a summary statement of operations of the Service for the past year; a detailed statement of hospital-relief furnished, daily per capita, and total cost of the same, and amount of hospital-dues collected during the year; a table showing the amounts of hospital-money collected, the appropriations made by Congress to supply deficiencies, and the annual expenditures on account of the Marine-Hospital Service from October 1, 1798, to June 30, 1873; a summary statement of the locations, cost, and disposition of United States marine hospitals; a classified statement of the diseases and injuries of seamen treated in marine hospitals; and a supplementary table showing the causes of mortality among seamen in hospital during the year; all of which, with the foregoing, are respectfully submitted.

I.—*Summary Statement of Operations of the United States Marine-Hospital Service for the fiscal Year ended June 30, 1873.*

Number of sick and disabled seamen cared for at the expense of the Marine-Hospital fund in marine and other hospitals.....	12,697
Number of sick and disabled seamen cared for at the expense of the Marine-Hospital fund without admission to hospital, (office-relief).....	832
Total number of seamen furnished relief.....	13,529
Number of days' hospital-relief furnished .....	420,160
Number of days' office-relief furnished .....	1,215
Total number days' relief furnished.....	421,375
Average per diem number of patients maintained in hospital.....	1,151
Average number of days' treatment for each hospital-patient.....	33
Percentage of deaths of hospital-patients.....	5.09
Total expenditures and indebtedness incurred on account of Marine-Hospital Service.....	\$422,502 98
Average per diem cost for each patient, calculated on the basis of total cost of the Service for the year.....	\$1.002
Amount of hospital-money (dues) collected *.....	\$335,845 95
Increase of hospital-money collections over previous year, 1872.....	\$12,145 90
Increase of hospital-money collections over the year 1871.....	\$47,700 53
Number of ports at which relief was furnished either in United States marine, local, or extemporized hospitals.....	91
Number of ports at which hospital-money (dues) was collected.....	127

\* Includes all collections of dues for the year, a few of which, at some remote ports, had not been deposited and covered into the treasury at the close of the fiscal year.



II.—Statement of Hospital-relief furnished during the fiscal Year ended June 30, 1873, showing the daily per capita, and the total Cost of Relief, and the Amount of Hospital-dues collected at the various Ports.

States and ports.	Patients in hospital July 1, 1872.	Admitted during the year.	Discharged.	Died.	Remaining in hospi- tal June 30, 1873.	Relieved, not sent to hospital.	Aggregate number furnished relief.	Number days' relief in hospital.	Number days' office- relief.	Aggregate number days' relief fur- nished.	Total cost.	Daily per capita cost.	Tax collected.
MAINE.													
Bangor .....	6	44	48	2	56	106	2,214	57	2,271	\$2,142 71	\$0 94	\$1,337 98	
Bath .....		5	3	1	7	12	128	7	135	108 45	80	1,289 50	
Belfast .....		19	18		1	19	532		532	565 00	1 06	1,139 19	
Castine .....		7	5		2	7	341		341	141 41	42	1,659 81	
Eastport .....		21	19	1	1	23	676	2	678	753 30	1 11	2,457 08	
Ellsworth .....		42	32	4	6	42	1,675		1,675	2,232 83	1 33	1,682 31	
Kennebunk .....												108 50	
Machias .....		3	1	1	1	3	95		95	71 30	75	1,413 01	
Portland .....	5	164	156	5	8	169	4,387		4,387	6,375 96	1 45	3,575 75	
Saco .....												130 51	
Waldoborough .....	4	52	50		6	56	2,294		2,294	1,158 50	51	3,314 42	
Wiscasset .....	1	5	4		2	6	341		341	259 35	76	480 65	
York .....												79 93	
Total .....	16	302	336	14	28	65	443	12,683	66	12,749	13,808 81		18,668 64
NEW HAMPSHIRE.													
Portsmouth .....	2	6	6	1	1	8	380	1	381	411 70	1 08	480 61	
VERMONT.													
Burlington .....	1	5	5		1	6	233		233	147 25	63	342 22	
MASSACHUSETTS.													
Boston .....	58	846	803	37	64	904	24,158		24,158	30,497 45	1 26	16,356 42	
Barnstable .....	14	186	176	8	16	200	6,529		6,529	6,553 00	1 00	3,004 36	
Edgartown .....		86	70	8	8	86	5,156		5,156	4,514 69	87	464 03	
Fall River .....		1	1			1	14		14	11 60	82	1,348 99	
Gloucester .....												1,147 73	
Marblehead .....												64 45	
Newburyport .....		2	1		1	2	107		107	132 71	1 24	265 52	
Nantucket .....												81 05	
New Bedford .....		1	1			1	21		21	85 02	4 04	1,253 02	
Plymouth .....												100 46	
Salem .....												324 06	
Total .....	72	1,122	1,052	53	89	1,194	35,985		35,985	41,794 47		24,410 09	
RHODE ISLAND.													
Bristol .....													184 18
Newport .....	1	8	8	1		9	326		326	269 60	83	1,841 53	
Providence .....	8	162	152	5	13	170	4,726		4,726	5,441 12	1 15	2,523 53	
Total .....	9	170	160	6	13	179	5,052		5,052	5,710 72		4,549 24	
CONNECTICUT.													
Bridgeport .....		1	1			1	40		40	40 00	1 00	1,717 30	
Middletown .....	1	10	11			11	588		588	430 55	73	2,229 19	
New Haven .....	5	55	55	2	3	60	1,700		1,700	1,700 00	1 00	2,435 46	
New London .....	1	9	10			10	332	7	339	303 60	89	1,072 41	
Stonington .....												984 38	
Total .....	7	75	77	2	3	82	2,660	7	2,667	2,474 15		8,438 74	
NEW YORK.													
Albany .....		1	1			1	70		70	56 00	80	2,920 25	
Buffalo .....	14	127	129	4	8	141	4,996		4,996	3,592 34	72	5,582 04	
Cape Vincent .....		1	1			1	28		28	23 00	82	397 29	
Dunkirk .....												70 99	



## II.—Statement of Hospital-relief furnished during the fiscal Year, &amp;c.—Continued.

States and ports.	Patients in hospital July 1, 1872.	Admitted during the year.	Discharged.	Died.	Remaining in hospital June 30, 1873.	Relieved, not sent to hospital.	Aggregate number furnished relief.	Number days' relief in hospital.	Number days' office-relief.	Aggregate number days' relief furnished.	Total cost.	Daily pre capita cost.	Tax collected.
<b>NEW YORK—Con'd.</b>													
New York.....	68	1,174	1,109	60	73	447	1,689	38,023	481	38,504	\$34,069 28	\$9 88	\$56,905 38
Niagara.....													107 93
Oswego.....	3	18	19	1	1		21	387	8	395	901 00	2 28	1,556 95
Ogdensburg.....		3	2		1		3	110		110	95 00	86	269 92
Plattsburg.....		1	1				1	9		9	9 00	1 00	406 70
Rochester.....													163 26
Sag Harbor.....		7	7				7	686		686	473 50	69	871 96
Total.....	85	1,332	1,269	65	83	447	1,864	44,309	489	44,798	39,219 12		69,252 60
<b>NEW JERSEY.</b>													
Bridgeton.....													2,788 00
Bargaintown.....		5	3		2		5	158		158	\$158 00	\$1 00	1,496 39
Jersey City.....		19	15	3	1		19	593		593	474 50	80	
Lambertown.....													431 30
Newark.....													1,036 27
Perth Amboy.....													2,905 85
Tuckerton.....	2	39	39	1	1		41	1,410		1,410	1,437 60	1 01	693 01
Total.....	2	63	57	4	4		65	2,161		2,161	2,070 10		9,350 82
<b>PENNSYLVANIA.</b>													
Erie.....						10	5		5	5	15 75	3 75	1,308 87
Philadelphia.....	37	432	409	21	39	1	470	11,807	1	11,808	13,941 88	1 18	17,336 39
Pittsburg.....	5	166	155	5	11		171	5,390		5,390	6,775 94	1 26	4,895 54
Total.....	42	598	564	26	50	11	646	17,197	6	17,203	20,733 57		23,540 80
<b>DELAWARE.</b>													
Wilmington.....													1,918 77
<b>MARYLAND.</b>													
Annapolis.....													391 14
Baltimore.....	35	479	465	27	22		514	14,542	4	14,546	10,584 40	73	16,791 07
Crisfield.....		1		1			1	4		4	64 00	16 00	5,755 24
Town Creek.....													174 60
Total.....	35	480	465	28	22		515	14,546	4	14,550	10,648 40		23,022 05
<b>DIST. OF COLUMBIA.</b>													
Georgetown.....	9	85	87	5	2		94	4,060		4,060	2,942 50	72	2,008 69
<b>VIRGINIA.</b>													
Alexandria.....		6	4		2		6	300		300	306 00	1 02	632 81
Eastville.....													2,123 73
Norfolk.....	36	314	293	22	35	6	356	13,365	6	13,371	13,532 50	1 01	3,659 36
Petersburg.....													137 47
Richmond.....	2	35	32	2	3		37	1,412		1,412	1,425 00	1 01	720 10
Tappahannock.....													487 50
Yorktown.....													774 50
Total.....	38	355	329	24	40	6	399	15,077	6	15,083	15,263 50		8,535 47
<b>WEST VIRGINIA.</b>													
Parkersburg.....													1,166 85
Wheeling.....	1	17	14		4		18	848		848	74,907 00	88	1,232 18
Total.....	1	17	14		4		18	848		848	74,907 00		2,399 03

## II.—Statement of Hospital-relief furnished during the fiscal Year, &amp;c.—Continued.

States and ports.	Patients in hospital July 1, 1872.	Admitted during the year.	Discharged.	Died.	Remaining in hospital June 30, 1873.	Relieved, not sent to hospital.	Aggregate number furnished relief.	Number days' relief in hospital.	Number days' office-relief.	Aggregate number days' relief furnished.	Total cost.	Daily per capita cost.	Tax collected.
<b>NORTH CAROLINA.</b>													
Beaufort .....		1	1				1	15		15	\$14 57	\$0 97	\$620 33
Edenton .....											a1 00		565 82
New Berne .....	42	20	20	1	1		22	309		309	1,006 88	3 25	981 82
Wilmington .....	5	82	80	5	2		87	3,006	1	3,007	1,898 70	63	1,420 06
Total .....	7	103	101	6	3		110	3,330	1	3,331	2,921 15		3,588 03
<b>SOUTH CAROLINA.</b>													
Beaufort .....		3	3				3	14		14	18 00	1 29	96 94
Charleston .....	11	178	167	5	17	2	191	5,389	4	5,393	5,433 50	1 01	2,838 81
Georgetown .....						2	2		2	2	10 00	5 00	227 01
Total .....	11	181	170	5	17	4	196	5,403	6	5,409	5,461 50		3,162 76
<b>GEORGIA.</b>													
Brunswick .....		1	1				1	26		26	54 00	2 08	427 21
Savannah .....	12	245	231	12	14		257	9,480		9,480	9,576 00	1 01	2,698 80
Saint Mary's .....													150 84
Total .....	12	246	232	12	14		258	9,506		9,506	9,630 00		3,276 85
<b>FLORIDA.</b>													
Appalachicola .....	3	22	23	1	1		25	954		954	950 28	1 00	769 41
Cedar Keys .....						2	2		10	10	10 00	1 00	301 50
Fernandina .....													635 77
Jacksonville .....		78	73	1	4	1	78	1,771	1	1,772	2,974 65	1 62	1,279 86
Key West .....	8	107	104	9	2	43	115	2,466	68	2,534	5,738 37	2 27	2,113 92
Pensacola .....	5	184	171	9	9	5	189	6,599	5	6,604	7,354 90	1 11	1,368 62
Saint Augustine .....													25 92
Total .....	16	391	371	20	16	51	409	11,790	84	11,874	17,028 20		6,495 00
<b>ALABAMA.</b>													
Mobile .....	36	285	271	17	33		321	18,530		18,530	14,303 25	77	2,545 59
<b>MISSISSIPPI.</b>													
Natchez <i>b</i> .....		3	1	1	1		3	28		28			51 63
Shieldsborough .....													879 65
Vicksburg .....	2	161	130	27	6		163	4,296		4,296	4,512 00	1 05	805 99
Total .....	2	164	131	28	7		166	4,324		4,324	4,512 00		1,737 27
<b>LOUISIANA.</b>													
Franklin .....													868 69
New Orleans .....	44	633	579	51	47	89	766	24,973	159	25,132	28,722 50	1 10	17,199 14
Shreveport .....		102	79	8	15		102	5,001		5,001	7,110 00	1 42	
Total .....	44	735	658	59	62	89	868	29,974	159	30,133	35,832 50		18,067 83
<b>TEXAS.</b>													
Brownsville .....		4	4				4	174		174	174 00	1 00	252 54
Corpus Christi .....													300 31
Galveston .....	25	473	458	20	20		498	12,770	3	12,773	9,863 60	77	3,592 42
Indianola .....	1	19	18	2			20	624		624	956 00	1 53	640 61
Total .....	26	496	480	22	20		522	13,568	3	13,571	10,993 60		4,785 88

*a* This charge is for medical examination and transportation of patient to Wilmington, N. C.

*b* The State authorities care for patients at Natchez in the United States Marine Hospital without cost to the Department in consideration of the use of the hospital free of charge.



## II.—Statement of Hospital-relief furnished during the fiscal Year, &amp;c.—Continued.

States and ports.	Patients in hospital July 1, 1872.	Admitted during the year.	Discharged.	Died.	Remaining in hospital June 30, 1873.	Relieved, not sent to hospital.	Aggregate number furnished relief.	Number days' relief in hospital.	Number days' office-relief.	Aggregate number days' relief furnished.	Total cost.	Daily per capita cost.	Tax collected.
<b>TENNESSEE.</b>													
Memphis.....	6	269	231	40	4	.....	275	4,984	.....	4,984	\$5,275 50	\$1 06	\$1,637 99
Nashville.....	1	52	36	5	12	.....	53	2,811	.....	2,811	2,557 90	91	760 10
Total.....	7	321	267	45	16	.....	328	7,795	.....	7,795	7,833 40	.....	2,398 09
<b>KENTUCKY.</b>													
Louisville.....	69	591	573	29	58	60	720	31,674	217	31,891	28,132 12	88	1,548 53
Paducah.....	.....	7	1	6	.....	.....	7	173	.....	173	241 50	1 39	551 68
Total.....	69	598	574	35	58	60	727	31,847	217	32,064	28,373 62	.....	2,100 21
<b>OHIO.</b>													
Cleveland.....	22	212	212	7	15	.....	234	5,788	.....	5,788	7,837 89	1 35	4,660 52
Cincinnati.....	37	486	458	26	39	.....	523	17,125	2	17,127	9,941 58	58	6,266 50
Sandusky.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	α5 10	.....	1,339 24
Toledo.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	α3 00	.....	764 91
Total.....	59	698	670	33	54	.....	757	22,913	2	22,915	17,787 57	.....	13,031 17
<b>INDIANA.</b>													
Evansville.....	12	253	242	8	15	1	266	7,300	1	7,301	4,921 97	67	2,296 00
<b>ILLINOIS.</b>													
Alton.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3 55
Chicago.....	38	493	470	17	44	15	546	18,012	14	18,026	25,259 99	1 40	7,928 66
Cairo.....	29	420	402	34	13	.....	449	13,683	.....	13,683	11,826 05	86	1,132 91
Galena.....	.....	1	1	.....	.....	.....	1	10	.....	10	11 00	1 10	709 98
Quincy.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	94 40
Total.....	67	914	873	51	57	15	996	31,705	14	31,719	37,097 04	.....	9,869 50
<b>MICHIGAN.</b>													
Detroit.....	26	256	241	11	30	2	284	7,395	2	7,397	9,201 69	1 24	6,356 49
Grand Haven.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	α6 00	.....	1,945 09
Marquette.....	.....	42	41	1	.....	.....	42	1,243	.....	1,243	1,559 75	1 25	454 73
Port Huron.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	α9 80	.....	2,847 41
Total.....	26	298	282	12	30	2	326	8,638	2	8,640	10,777 24	.....	11,603 72
<b>WISCONSIN.</b>													
Milwaukee.....	11	135	133	2	11	.....	146	4,882	.....	4,882	3,477 35	71	4,467 81
<b>MISSOURI.</b>													
Saint Louis.....	40	509	469	32	48	.....	549	15,475	.....	15,475	13,759 76	.....	11,173 84
Saint Joseph.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	124 72
Total.....	40	509	469	32	48	.....	549	15,475	.....	15,475	13,759 76	.....	11,298 56
<b>IOWA.</b>													
Burlington.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28 68
Dubuque.....	2	53	48	1	6	5	60	1,609	1	1,610	1,558 42	98	253 60
Total.....	2	53	48	1	6	5	60	1,609	1	1,610	1,558 42	.....	282 28
<b>MINNESOTA.</b>													
Saint Paul.....	4	25	21	3	5	.....	29	897	.....	897	879 40	97	1,247 75
Duluth.....	.....	2	2	.....	.....	.....	2	29	.....	29	35 20	1 21	57 60
Total.....	4	27	23	3	5	.....	31	926	.....	926	914 60	.....	1,305 35
<b>NEBRASKA.</b>													
Omaha.....	.....	1	1	.....	.....	.....	1	150	.....	150	150 00	1 00	566 53

α This charge is for medical examination and transportation of seamen.

## II.—Statement of Hospital-relief furnished during the fiscal Year, &amp;c.—Continued.

States and ports.	Patients in hospital July 1, 1872.	Admitted during the year.	Discharged.	Died.	Remaining in hospital June 30, 1873.	Relieved, not sent to hospital.	Aggregate number furnished relief.	Number days' relief in hospital.	Number days' office-relief.	Aggregate number days' relief furnished.	Total cost.	Daily per capita cost.	Tax collected.
CALIFORNIA.													
San Francisco.....	61	542	536	21	46	82	685	24,919	146	25,065	\$28,537 12	\$1 14	\$29,918 15
OREGON.													
Astoria.....	5	36	39	....	2	....	41	965	....	965	1,158 00	1 20	575 03
Portland.....	....	....	....	....	....	....	....	....	....	....	....	....	1,317 06
Total.....	5	36	39	....	2	....	41	965	....	965	1,158 00	....	1,892 09
WASH. TER.													
Port Townsend....	18	185	177	6	20	....	203	9,343	....	9,343	9,373 00	1 00	3,935 12
ALASKA TER.													
Sitka.....	1	1	2	....	....	....	2	77	....	77	128 33	1 67	284 39

## RECAPITULATION.

States.	Total treated in hospital during the year.	Discharged.	Died.	Number days' relief in hospital.	Number days' office-relief.	Aggregate number days' relief furnished.	Total cost.	Tax collected.
Maine.....	378	336	14	12,683	66	12,749	\$13,808 81	\$18,668 64
New Hampshire.....	8	6	1	380	1	381	411 70	480 61
Vermont.....	6	5	....	233	....	233	147 25	342 22
Massachusetts.....	1,194	1,052	53	35,985	....	35,985	41,794 47	24,410 09
Rhode Island.....	179	160	6	5,052	....	5,052	5,710 72	4,549 24
Connecticut.....	82	77	2	2,660	7	2,667	2,474 15	8,438 74
New York.....	1,417	1,269	65	44,309	489	44,798	39,219 12	69,252 60
New Jersey.....	65	57	4	2,161	....	2,161	2,070 10	9,350 82
Pennsylvania.....	640	564	26	17,197	6	17,203	20,733 57	23,540 80
Delaware.....	....	....	....	....	....	....	....	1,918 77
Maryland.....	515	465	28	14,546	4	14,550	10,648 40	23,022 05
District of Columbia.....	94	87	5	4,060	....	4,060	2,942 50	2,008 69
Virginia.....	393	329	24	15,077	6	15,083	15,263 50	8,535 47
West Virginia.....	18	14	....	848	....	848	749 07	2,399 03
North Carolina.....	110	101	6	3,330	1	3,331	2,921 15	3,588 03
South Carolina.....	192	170	5	5,403	6	5,409	5,461 50	3,162 76
Georgia.....	258	232	12	9,506	....	9,506	9,630 00	3,276 85
Florida.....	407	371	20	11,790	84	11,874	17,028 20	6,495 00
Alabama.....	321	271	17	18,530	....	18,530	14,303 25	2,545 59
Mississippi.....	166	131	28	4,324	....	4,324	4,512 00	1,737 27
Louisiana.....	779	658	59	29,974	159	30,133	35,832 50	18,067 83
Texas.....	522	480	22	13,568	3	13,571	10,993 60	4,785 88
Tennessee.....	328	267	45	7,795	....	7,795	7,833 40	2,398 09
Kentucky.....	667	574	35	31,847	217	32,064	28,373 62	2,100 21
Ohio.....	757	670	33	22,913	2	22,915	17,787 57	13,031 17
Indiana.....	265	242	8	7,300	1	7,301	4,921 97	2,296 00
Illinois.....	981	873	51	31,705	14	31,719	37,097 04	9,869 50
Michigan.....	324	281	12	8,638	2	8,640	10,777 24	11,603 72
Wisconsin.....	146	131	2	4,882	....	4,882	3,477 35	4,487 81
Missouri.....	549	469	32	15,475	....	15,475	13,759 76	11,298 56
Iowa.....	55	41	1	1,609	1	1,610	1,558 42	282 28
Minnesota.....	31	23	3	926	....	926	914 60	1,305 35
Nebraska.....	1	1	....	150	....	150	150 00	566 53
California.....	603	536	21	24,919	146	25,065	28,537 12	29,918 15
Oregon.....	41	39	....	965	....	965	1,158 00	1,892 09
Washington Ter.....	203	177	6	9,343	....	9,343	9,373 00	3,935 12
Alaska Ter.....	2	2	....	77	....	77	128 33	284 39
Grand totals.....	12,697	11,171	646	420,160	1,215	421,375	422,502 98	335,845 95



III.—*Showing the Amounts of Hospital-money collected, the Appropriations made by Congress to supply Deficiencies, and the annual Expenditures on account of the Marine-Hospital Service from October 1, 1798, to June 30, 1873.*

[The act of May 3, 1802, (2 Stat., 192,) provides that all hospital-money collected shall be paid into the Treasury; and from June 30, 1802, when this provision went into effect, this statement is by warrants; prior to that date the statement is made from collectors' accounts.]

Year.	Collections.	Appropriations.	Available.	Expenditures.
1798 } .....	<i>a</i> \$141,690 25	.....	\$141,699 25	<i>b</i> \$74,636 51
1801 } .....	<i>c</i> 47,635 09	.....	47,635 09	38,500 74
1802 } .....	33,766 47	.....	33,766 47	250 00
1803.....	54,933 21	.....	54,933 21	31,087 36
1804.....	58,210 98	\$1,000 00	59,210 98	<i>d</i> \$84,027 50
1805.....	57,928 20	.....	57,928 20	59,828 41
1806.....	66,820 01	.....	66,820 01	<i>f</i> 53,281 98
1807.....	61,474 47	.....	61,474 47	65,571 51
1808.....	36,515 44	.....	36,515 44	60,383 16
1809.....	<i>g</i> 74,192 42	.....	74,192 42	70,901 75
1810.....	53,715 20	.....	53,715 20	36,793 60
1811.....	54,586 34	.....	54,586 34	57,109 08
1812.....	42,421 46	.....	42,421 46	<i>h</i> 57,723 11
1813.....	21,789 58	20,000 00	41,789 58	53,376 87
1814.....	10,191 97	20,000 00	30,191 97	45,226 50
1815.....	28,374 74	20,000 00	48,374 74	43,651 55
1816.....	43,864 21	.....	43,864 21	<i>i</i> 82,555 68
1817.....	48,081 88	.....	48,081 88	<i>j</i> 81,749 28
1818.....	46,911 27	.....	46,911 27	87,230 62
1819.....	50,405 84	.....	50,405 84	84,097 61
1820.....	48,765 01	81,319 34	130,084 35	87,217 39
1821.....	48,569 99	50,000 00	98,569 99	66,845 48
1822.....	51,923 72	30,000 00	81,923 72	44,324 61
1823.....	53,062 91	.....	53,062 91	44,761 13
1824.....	51,877 52	<i>k</i> 12,875 00	64,752 52	47,861 77
1825.....	56,992 39	.....	56,992 39	<i>l</i> 54,938 51
1826.....	58,133 10	.....	58,133 10	51,236 98
1827.....	58,233 67	.....	58,233 67	<i>m</i> 89,137 42
1828.....	56,217 27	.....	56,217 27	69,259 61
1829.....	58,361 34	.....	58,361 34	63,562 28
1830.....	57,447 13	.....	57,447 13	68,996 96
1831.....	59,182 17	.....	59,182 17	65,563 98
1832.....	58,942 56	.....	58,942 56	76,877 87
1833.....	62,901 15	15,750 00	78,651 15	68,948 73
1834.....	64,532 98	.....	64,532 98	74,668 96
1835.....	66,621 77	25,000 00	91,621 77	86,268 43
1836.....	67,961 02	15,000 00	82,961 02	89,370 70
1837.....	27,021 24	175,000 00	202,021 24	97,935 75
1838.....	35,234 52	.....	35,234 52	109,229 59
1839.....	66,311 83	.....	66,311 83	121,653 31
1840.....	71,675 91	.....	71,675 91	130,561 07
1841.....	72,760 20	97,000 00	169,760 20	109,758 82
1842.....	72,429 36	46,500 00	118,929 36	100,112 57
1843, (half year).....	37,417 18	58,500 00	95,917 18	49,430 86
1844.....	85,864 42	25,000 00	110,864 42	62,148 67
1845.....	88,074 34	25,000 00	113,074 34	168,016 20
1846.....	90,675 68	.....	90,675 68	68,678 70
1847.....	95,216 73	25,000 00	120,216 73	123,257 42
1848.....	97,989 26	12,000 00	109,989 26	140,995 50
1849.....	103,496 38	12,000 00	115,496 38	103,167 65
1850.....	106,437 49	15,000 00	121,437 49	162,379 67
1851.....	133,447 07	200,000 00	333,447 07	139,220 43
1852.....	134,393 26	200,000 00	334,393 26	203,115 23
1853.....	133,718 08	100,000 00	233,718 08	280,750 10
1854.....	146,576 31	.....	146,576 31	292,825 69
1855.....	148,733 43	200,000 00	348,733 43	345,987 46
1856.....	155,068 14	150,000 00	305,068 14	368,520 86
1857.....	167,325 29	250,000 00	417,325 29	354,053 90

*a* Includes \$15,635.33 hospital-money received from the Navy Department.

*b* Includes \$6,185.33 for purchase of Norfolk hospital.

*c* Includes \$2,500 hospital-money received from the Navy Department.

*d* Includes \$14,842.34, cost of Charlestown hospital, at the port of Boston.

*e* Includes \$157.66 carried to surplus fund.

*f* Includes \$379.66 carried to surplus fund.

*g* Includes \$38,513.96 hospital-fund received from Navy Department.

*h* Includes 1 cent carried to surplus fund.

*i* Includes \$6,500 expended for repairs of Norfolk hospital.

*j* Includes \$5,500, cost of site of Charleston (S. C.) hospital.

*k* Received from sale of hospital at Charlestown, Mass.

*l* Includes \$4,068, cost of site, &c., for marine hospital at Chelsea, Mass.

*m* Includes \$27,603.39, cost of Chelsea hospital.



## C.—Showing the Amounts of Hospital-money collected, &amp;c.—Continued.

Year.	Collections.	Appropriations.	Available.	Expenditures.
1858.....	\$164,161 82	\$150,000 00	\$314,161 82	\$379,214 86
1859.....	178,195 59	150,000 00	328,195 59	349,890 36
1860.....	173,073 09	275,000 00	448,073 09	455,593 10
1861.....	155,172 43	175,000 00	330,172 43	368,918 13
1862.....	128,526 97	200,000 00	328,526 97	299,447 41
1863.....	118,307 74	200,000 00	318,307 74	198,933 60
1864.....	117,824 05	100,000 00	217,824 05	260,911 84
1865.....	128,656 30	150,000 00	278,656 30	348,472 82
1866.....	142,292 81	170,000 00	312,292 81	<i>n</i> 335,958 39
1867.....	231,596 91	200,000 00	431,596 91	<i>n</i> 415,580 53
1868.....	184,530 35	250,000 00	434,530 35	<i>n</i> 443,646 53
1869.....	176,957 95	200,000 00	376,957 95	<i>n</i> 391,296 89
1870.....	168,153 70	200,000 00	368,153 70	<i>n</i> 353,277 54
1871.....	293,592 14	250,000 00	543,592 14	<i>n</i> 437,493 86
1872.....	319,823 16	<i>a</i> 154,050 00	473,873 16	421,897 03
1873.....	333,003 03	125,000 00	458,003 03	398,778 69
Total .....	7,096,968 89	4,830,994 34	11,927,963 23	11,639,934 66
Amount carried to surplus fund .....				537 33
Balance remaining to credit of available fund of 1871.....				131,926 59
Balance remaining to credit of available fund of 1872.....				80,778 32
Balance remaining to credit of available fund of 1873.....				74,786 33
Total .....				11,927,963 23

*n* The expenditures from 1866 to 1871, as represented in this statement, are less than the actual expenditures for those years by \$91,250.11, in consequence of various sums, aggregating that amount, received on account of sales of marine hospitals, having been erroneously credited as repayments.

*a* Includes \$4,050, being a part of the proceeds from the sale of the marine hospital at Vicksburg, Miss., sold by authority of the act of April 20, 1866.

A comparison of the collections and expenditures for 1873, as shown in the above table, (III,) with the statement of collections of hospital-dues, and expenditures of the fund as given in the summary statement, I, discovers an excess in the latter as follows, viz: Collections, \$2,842.92; expenditures, \$23,724.29. This discrepancy is explained by the facts that table III shows only the amount of collections covered into the Treasury at the time of closing the accounts of the fiscal year, together with the net amount paid out on warrants between July 1, 1872, and June 30, 1873, (from which are deducted the repayments made during the fiscal year 1873, some of which were applicable to the years 1871 and 1872,) while statement I shows the actual collections of hospital-dues within the year by customs-officers, a few of which at some of the remote ports had not been covered into the Treasury at the close of the year; it also shows the actual cost of the Service between those dates, July 1, 1872, and June 30, 1873, including the paid and unpaid bills.



IV.—Statement showing the Location of Marine Hospitals; Date of purchase of Site or commencement of Construction; Date when first occupied; Amount expended during past Year in Construction or Repairs; total Cost to June 30, 1873; present Condition or final Disposition of the Buildings; and Amounts received from the Sales of those disposed of.

Location.	Purchased or commenced.	Occupied.	Amount expended in 1873.	Cost to date.	Condition or disposition.	Proceeds of sales.
Norfolk, Va.....	1800			\$22,395 10	Sold, 1869.....	\$15,613 80
Newport, R. I.....					(a).....	
Boston..... { 1.....	1802	1804		14,842 34	Sold, 1824.....	12,875 00
{ 2.....	1825	1827		32,168 06	Sold, 1867.....	54,803 38
{ 3.....		{ about 1860 }	\$595 43	394,047 91	In use.....	
Charleston, S. C.....	{ 1815	{ 1834		26,685 77	Sold, 1866.....	9,500 00
{ 1832						
New Orleans. { 1.....	1837	1849		122,772 70	Sold, 1866 (b).....	
{ 2.....	1855			530,090 84	Unfinished (c).....	
Mobile, Ala.....	d1838	1843	799 71	55,339 71	Leased for seamen.....	
Pittsburg, Pa.....	1842	1851	109 46	72,554 57	In use.....	e20,550 96
Louisville, Ky.....	f1843	1852		98,452 47	Leased for seamen.....	
Cleveland, Ohio.....	f1844	1852	319 25	119,291 84	In use.....	
Natchez, Miss.....	f1845	1852		66,750 00	(g).....	
Key West, Fla.....	1844	1845		34,174 84	In use.....	
Ocracoke, N. C.....	1843	1847		9,227 07	Abandoned (h).....	
Paducah, Ky.....	1842	1852		58,525 77	Burned, 1868.....	46,571 34
Napoleon, Ark.....	f1842	1855		62,290 83	Destroyed, 1868 (j).....	30 00
Chicago..... { 1.....	k1849	1852		64,070 98	Sold, 1864.....	132,000 00
{ 2.....	1867	1873	61,432 94	422,107 03	In use.....	
Saint Louis, Mo.....	l1850	1858	121 60	109,302 12	In use.....	
San Francisco, Cal.....	m1851	1854		231,871 10	In ruins.....	
Evansville, Ind.....	1853?	1856		59,899 02	Sold, 1867.....	10,507 11
Portland, Me.....	1852	1859	234 25	122,825 13	In use.....	
Vicksburg, Miss.....	1853	1856		67,775 16	Sold, 1870.....	20,257 52
Pensacola, Fla.....	(n)			1,052 96		
Detroit, Mich.....	1855	1857	57 35	108,987 98	In use.....	
Cincinnati, Ohio.....	1856	(o)		182,665 48	Sold, 1866.....	70,500 00
Burlington, Iowa.....	1856	1858		29,996 84	Sold, 1867.....	6,000 00
Saint Mark's, Fla.....		1859		25,758 00	Transferred, 1867 (p).....	
Burlington, Vt.....	1855	(o)		39,572 30	Sold, 1866.....	7,164 41
Wilmington, N. C.....	1857	(o)		43,897 44	Sold, 1870.....	4,020 00
Galena, Ill.....	q1857	1861		48,797 58	Sold, 1868.....	r6,321 02
Port Angeles, Wash. Ter.....	(s)				Sold, 1868.....	165 00
Total.....			63,669 99	3,278,188 94		376,879 60

a Reported by the Secretary of the Treasury, February 16, 1802, to have been discontinued. No other record found.

b Reported as sold in 1866 for \$300, but the amount does not appear to have been received.

c Completion of the hospital building impracticable.

d First site selected in 1837. Abandoned on account of defective title.

e From sale of a portion of hospital grounds in 1870.

f Sites selected by the medical board of the Army in 1837.

g Building injured by a hurricane in 1873, so as to be unfit for use; not required for a marine hospital.

h Unoccupied and not required.

i From sale of land.

j Building and grounds washed away by the river.

k Site ceded by War Department. Hospital burned, October 10, 1871, before the property was delivered.

l Site ceded by War Department.

m Site set apart from Government land. Hospital injured by an earthquake in 1868, and abandoned.

n Work not commenced. Expenditures made from 1855 to 1858.

o Never occupied as a marine hospital.

p Transferred to the War Department.

q Includes the sum of \$1,011.09 for furniture.

r Note of \$1,000 outstanding.

s No record of the establishment of a marine hospital at Port Angeles, Wash. Ter., has been found.

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(V.)—DISEASE AND INJURY,

AND

(VI.)—MORTALITY TABLES.

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TABLE V.—*Classified Table of Diseases and Injuries of Patients of the United States*

STATES.	GENERAL DISEASES—														
	Varicella.	Varicella modificata.	Morbilla.	Febris rubra.	Febris typhus.	Febris cerebro-spinalis.	Febris enterica.	Febris flava.	Febricula.	Febris intermittens quotidiana.	Febris intermittens tertiana.	Febris intermittens quartana.	Febris intermittens biliosa.	Febris remittens.	Febris remittens perniciosa.
Maine.....	20		1	1	2		22			12	25		7	9	11
New Hampshire.....							2								
Vermont.....											2				
Massachusetts.....	29		2			1	49			6	181			10	16
Rhode Island.....			1				3				11			1	1
Connecticut.....							9				9			2	
New York.....	5	1	3				15		1		104	51		83	2
New Jersey.....	2		2				4				2			1	11
Pennsylvania.....	2		4			3	8			2	74			4	11
Maryland.....	30				1	1	5		2		50			8	
District of Columbia.....	3										16			7	
Virginia.....	13	1	7				1			31	73			2	1
West Virginia.....			1				4				5				
North Carolina.....							10				20		6		
South Carolina.....							1			4	20			7	
Georgia.....		1					1				34			1	58
Florida.....	3		1		1		6	1			82			23	5
Alabama.....											112			4	3
Mississippi.....	25					2	1				23			2	4
Louisiana.....	29						1			102	2	1		97	
Texas.....										55	61			43	
Tennessee.....	38	3	2		1	2	4				20			24	
Kentucky.....	9	1					12				40			32	33
Ohio.....	8		6			1	2				78			16	2
Indiana.....			1							10	57			5	1
Illinois.....	40		4			5	6				106			82	
Michigan.....	3						5				30		1	13	23
Wisconsin.....	2						4			8	22			9	
Missouri.....	24					2	5				48			41	
Iowa.....							1				22			3	1
Minnesota.....	1						1				5				1
Nebraska.....															
California.....					1						31			1	
Oregon.....											4				
Washington Ter.....										2					
Alaska Ter.....															
Totals.....	286	7	35	1	6	17	188	1	3	232	1,369	52	14	530	6





TABLE V.—*Classified Table of Diseases and Injuries of Patients of*

STATES.	GENERAL DISEASES— ( <i>Morbi corporis uni- versi.</i> )					DISEASES OF THE NERVOUS SYSTEM—( <i>Morbi nervorum</i> )												
	Hæmoptysis.	Diabetes.	Scorbutus.	Anæmia.	Anasarca.	Cephalalgia.	Meningitis.	Inflammatio cerebri.	Concussio cerebri.	Apoplexia.	Solis ictus.	Paralysis.	Hemiplegia.	Epilepsia.	Paralysis agitans.	Chorea.	Neuralgia.	Sciatica.
Maine . . . . .	1		1		1							5		1			5	1
New Hampshire . . . . .																		
Vermont . . . . .												1						
Massachusetts . . . . .	1		10	9			1		1		1	5	1				8	3
Rhode Island . . . . .											2			1				
Connecticut . . . . .												1						
New York . . . . .		1	6	12				2			3	13		1			12	1
New Jersey . . . . .												3						1
Pennsylvania . . . . .	2		3									2	1				9	
Maryland . . . . .				2		2			1		1	1		2			2	
District of Columbia . . . . .	1			1								1						
Virginia . . . . .				2			1			1	1			3				
West Virginia . . . . .																		
North Carolina . . . . .											1							
South Carolina . . . . .				1					1	1		1					1	
Georgia . . . . .				1				1				1	1				1	
Florida . . . . .				11			1		1			2					4	
Alabama . . . . .				1		3					1			1			5	2
Mississippi . . . . .												1					1	
Louisiana . . . . .								1			1	2		2			2	
Texas . . . . .				14		2	1	3			1	4					39	
Tennessee . . . . .							3							1				
Kentucky . . . . .												2					5	
Ohio . . . . .				4			2				1	4		1			2	
Indiana . . . . .				1			1											
Illinois . . . . .	1			5								4		1		1	7	3
Michigan . . . . .				6					1									
Wisconsin . . . . .									1								1	1
Missouri . . . . .				2			1	2			1	1		2			1	2
Iowa . . . . .																		
Minnesota . . . . .																		
Nebraska . . . . .																		
California . . . . .		1	27					2				2		1	1		15	
Oregon . . . . .																	1	
Washington Ter. . . . .												2					7	
Alaska Ter. . . . .																		
Total . . . . .	6	2	47	72	1	7	11	11	6	2	14	58	3	17	1	1	128	14

the United States Marine-Hospital Service, &c.—Continued.

apparatus.)					DISEASES OF THE ORGANS OF THE SPECIAL SENSES— ( <i>Morbi sensuum singularum apparatus.</i> )													DISEASES OF THE CIRCULATORY SYSTEM—( <i>Morbi sanguinis apparatus.</i> )														
Pleurodynia.	Alcoholismus chronicus.	Delirium alcoholicum.	Dementia.	Insanitas.	Inflammatio conjunctivæ.	Ophthalmia gonorrhoeicus.	Chemosis.	Uva.	Iritis.	Iritis syphiliticum.	Choroiditis.	Amaurosis.	Suffusio.	Hydrophthalmia.	Hemeralopia.	Nyctalopia.	Otorrhea.	Otitis.	Surditas.	Epistaxis.	Morbus cordis.	Pericarditis.	Hydrops pericardii.	Endocarditis.	Hypertrophia cordis.	Carditis.	Morbus valvulorum cordis.	Angina pectoris.	Aneurysma.	Varices.		
		3			1																											
1	3	1		2	7				1						1		1	1					1		1	3		5		2	3	
1	5	4		1	1				1		1			1														7		2		
	3				2																1	3						1				
	1				3	1			1		1		2							1							1		2			
					1																											
	3	1		1	1			1																		1						
	1	2																		2	1								1			
1	1				3					1		1				3			1						1							
	1	3			6				1		1		1															1			3	
	2	4	1		1				1			1																		1		
					3																											
	6				2				6																							
	2				4	1				1							1				1											
					1														2						1							
	2	2			6				1								1	2					1	1							1	
					6																	1										
1		1			2																	1								1		
		4			2	1			3														1									
					1																											
	1				5																				1			4				
4	31	27	1	4	67	4	1	1	16	2	4	2	3	1	1	3	3	3	3	3	5	3	2	1	4	4	19	1	7	9		



TABLE V.—Classified Table of Diseases and Injuries of Patients of

STATES.	DISEASES OF THE RESPIRATORY ORGANS— ( <i>Morbi spiritus organorum.</i> )										DISEASES OF THE DIGESTIVE SYSTEM—													
	Catarrhus.	Tonsillitis.	Laryngitis.	Bronchitis acuta.	Bronchitis longa.	Asthma.	Pneumonia.	Emphysema.	Abscessus pulmonis.	Pleuritis.	Hydrothorax.	Stomatitis.	Gastritis.	Dyspepsia.	Gastro-enteritis.	Enteritis.	Duodenitis.	Perityphilitis.	Melena.	Ascaris lumbricoides.	Tenia solium.	Hernia inguinalis.	Hernia strangulata.	
Maine.....	1	3		10	7	1	19			1			1	9		1							1	
New Hampshire.....							1																	
Vermont.....																								
Massachusetts.....		1	1	10	6	1	26			9			3	15	1		1						3	
Rhode Island.....		2		3			2			1				2				1						
Connecticut.....		1					5																	
New York.....		5	4	37	3	2	18	1	7	1			8	3		1				1	2			
New Jersey.....				1			4																	
Pennsylvania.....		6		33	4	1	11			8				12									2	
Maryland.....		1	1	12	6		11			10				3										
District of Columbia.....							4	1		2			1			7								
Virginia.....		1		20	1		10						2	1									1	
West Virginia.....							1																	
North Carolina.....	4	2		1			1			1			1											
South Carolina.....	7			3	4	1	1			1						2						1		
Georgia.....	1	1		3			5						2		1	1								
Florida.....		1		6	2	2	6			6			2	3									1	
Alabama.....	1				12		2			2			1											
Mississippi.....				1			12			2														
Louisiana.....	1	3		31		6	10			3			1	3										
Texas.....	11			1	1	1	9						1	8							1		3	
Tennessee.....		3					22			2			2	3									3	
Kentucky.....		3		12	18		14			3				5										
Ohio.....	1		2	18	10		11			13				8		2			1					
Indiana.....	4	1		9			11			3				1										
Illinois.....	4		6	21	22	1	26			2			6	2							1		1	
Michigan.....	1			2	3	2	18						1										1	
Wisconsin.....				5		1	2			1														
Missouri.....	1	2		12	1	1	6			6				2										
Iowa.....																								
Minnesota.....				1						1														
Nebraska.....																								
California.....			1	12	8		3			3	1		2	1						1	1	1	1	1
Oregon.....										1													1	
Washington Ter.....		2			8		3			9			1	1									1	
Alaska Ter.....																								
Total.....	37	44	15	264	116	20	280	1	1	97	1	1	35	82	2	14	1	1	1	2	5	19		2





TABLE V.—Classified Table of Diseases and Injuries of Patients of

STATES.	DISEASES OF THE URINARY ORGANS—( <i>Morbi urinæ apparatus.</i> )										DISEASES OF THE BONES AND JOINTS— ( <i>Morbi ossium et articulorum.</i> )							DISEASES OF							
	Paraphimosis. Urethritis.	Stricture urethræ.	Fistula urethræ.	Divertio urethræ.	Hydrocele.	Hæmatocele.	Cirsocele.	Orchitis.	Epididymitis.	Sarcocoele.	Spermatorrhœa.	Periostitis.	Caries.	Necrosis.	Coxarum morbus.	Anchylosis. Hydrops articulorum.	Synovitis.	Cellulitis.	Abscessus.	Morbuscus.	Erythema.	Urticaria.	Prurigo.		
Maine		3							1										6	1					
New Hampshire																									
Vermont																									
Massachusetts		40			3			13	1		1			1		1		2	31		1	1			
Rhode Island								4													1				
Connecticut		2						2												2					
New York		15	1		3			11	14			1	2		6	1		2	57	3					
New Jersey																			1						
Pennsylvania	1	5	1	1	1		1	8	1					2		1		1	10						
Maryland	3	4			1	1				5				1				2	25						
District of Columbia								3							1			1	3						
Virginia		3			1			7											8						
West Virginia																									
North Carolina								1	1																
South Carolina					1			3	2																
Georgia		2			1			1			2							1	1	1					
Florida		5						2											2				1		
Alabama		4		1				1			1	2		3					2						
Mississippi								5											2						
Louisiana		2					1	4					2	1	2		2		10	1					
Texas		3			1			3								1		2	4						
Tennessee					1			2										1							
Kentucky		1						10	1										16						
Ohio		11	3		1			4	3				2	1				1	10			1			
Indiana																									
Illinois		6			1			12											7						
Michigan								7	5									1	4						
Wisconsin			1						3									2	1						
Missouri								5	2					1					5			1			
Iowa																									
Minnesota								1		1															
Nebraska																									
California	1	12			1			24			5			2					6	18					
Oregon		1						3			1														
Washington Ter		4						8											24		1				
Alaska Ter																									
Total	4	1	124	6	2	16	1	2	112	66	6	3	10	7	18	1	5	2	20	3	243	25	3	3	1

the United States Marine-Hospital Service, &amp;c —Continued.

THE SKIN—( <i>Morbi cutis apparatus.</i> )														NOT CLASSIFIED—( <i>Injurie singulares.</i> )																				
Portigo.	Psoriasis.	Herpes zoster.	Herpes preputii.	Eczema.	Rupia.	Scabies.	Perino.	Ambusta ex frigore.	Ulcus.	Furunculus.	Carbunculus.	Paronychia.	Elephantiasis.	Venena hydrargyri.	Venena camphora.	Injuria.	Ambusta.	Contusum.	Concussio.	Stremma.	Luxatio.	Fractura simplex.	Fractura foraspatens.	Venena infecta.	Vulnus sclopetica.	Vulnus incisum.	Vulnus lacerata.	Vulnus punctata.	Humanus morsus.	Porcinus morsus.	Malingeria.	Amputatio.	Pregnatio.	Totals.
..	..	..	..	..	1	..	..	6	3	..	1	3	1	..	..	..	2	13	1	4	1	11	3	3	2	..	..	..	..	1	..	..	362	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	1	..	..	..	..	..	..	..	..	..	..	6	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	
..	..	..	1	2	..	..	..	35	15	7	..	12	..	..	..	..	8	44	2	6	3	26	..	1	9	9	2	..	..	..	..	..	1,122	
..	..	..	..	1	..	..	..	5	2	1	..	3	..	..	..	3	..	2	1	3	..	2	..	..	..	..	..	..	..	..	..	..	170	
..	..	..	..	..	..	..	..	1	3	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	..	..	..	..	..	..	..	..	75	
..	..	1	..	..	..	..	..	11	47	4	3	19	..	..	..	20	6	37	2	6	2	25	6	2	6	21	1	..	..	..	3	1	1	1,322
..	..	..	1	1	..	..	..	..	..	..	1	1	..	..	..	3	..	21	1	2	2	12	1	1	1	4	..	..	..	..	..	..	63	
..	1	..	..	1	..	..	..	2	24	..	..	4	..	..	..	..	..	11	1	2	2	4	..	..	2	4	1	..	..	..	..	..	598	
..	..	..	1	1	..	..	..	22	7	1	..	4	..	..	..	..	..	3	..	5	2	4	..	..	2	4	1	..	..	..	2	..	480	
..	..	..	..	1	..	..	..	4	2	11	..	..	..	..	..	..	2	10	..	..	..	5	5	2	..	3	..	..	..	..	..	..	85	
..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	1	..	..	1	..	..	..	..	..	..	..	355	
..	..	..	..	..	..	..	..	1	2	..	1	2	..	..	..	..	1	3	..	1	2	2	..	..	1	1	..	..	..	..	..	..	17	
..	..	..	..	..	..	..	..	2	6	..	1	3	..	..	..	..	..	6	..	1	..	1	2	..	1	..	..	..	..	..	..	..	103	
..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	7	1	4	..	1	..	10	1	2	1	1	..	..	..	..	..	..	181	
..	2	..	..	1	..	..	1	1	9	8	2	10	..	..	..	1	3	10	3	5	1	1	1	5	2	4	1	..	..	..	..	..	246	
..	..	..	..	..	..	..	..	12	..	..	..	..	..	..	..	..	..	4	4	1	3	3	..	1	1	1	..	..	..	..	..	..	391	
..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	1	14	..	1	..	..	..	3	8	1	..	..	..	..	..	..	285	
..	..	2	1	..	..	..	..	23	2	..	3	..	..	..	..	..	6	64	1	6	4	12	4	6	9	7	5	..	..	..	..	..	164	
..	..	..	..	..	..	..	..	37	3	1	..	..	..	..	..	..	1	29	12	..	1	2	2	4	4	3	..	..	..	..	..	..	735	
..	..	..	..	..	..	..	3	2	4	..	1	..	..	..	..	..	1	27	..	1	1	11	2	1	5	1	1	..	1	..	..	..	496	
1	..	..	..	..	..	1	..	13	10	1	..	7	..	..	10	1	53	..	5	1	3	2	1	6	9	..	..	..	..	..	1	..	598	
..	..	..	..	..	..	..	3	1	23	1	..	1	..	..	1	4	11	32	..	2	13	1	1	6	9	..	..	..	..	..	1	..	698	
..	2	..	1	1	..	..	..	6	5	..	1	..	..	..	..	5	30	..	1	2	..	2	..	1	2	..	..	..	..	..	..	..	253	
..	..	..	..	..	..	..	..	9	20	2	2	7	..	..	17	3	92	1	6	4	12	..	1	2	1	1	..	..	..	..	..	1	914	
..	..	..	..	..	..	..	..	8	1	1	1	..	..	..	3	2	31	2	7	2	11	2	..	3	1	..	..	..	..	..	1	..	298	
..	..	2	..	..	..	..	..	6	4	1	..	2	..	..	..	1	10	..	1	..	2	1	1	1	5	..	..	..	..	..	..	..	135	
..	1	..	..	..	..	..	..	2	9	..	..	..	..	..	..	5	18	..	2	1	7	1	1	6	4	..	..	..	..	..	..	..	509	
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	8	..	1	..	..	..	2	..	..	..	..	..	..	..	..	53	
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	5	..	..	..	..	1	..	..	..	..	..	..	..	..	..	27	
..	..	..	..	..	..	..	..	..	24	..	..	1	..	..	..	3	22	..	13	4	13	..	1	..	1	2	3	1	..	..	..	..	542	
..	..	..	..	..	..	..	..	..	8	..	..	1	..	..	..	6	..	26	..	1	..	5	..	2	2	..	..	..	..	..	..	..	36	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	185	
1	7	5	1	9	2	1	7	137	302	43	12	90	1	1	1	79	66	635	9	89	40	204	34	2	35	70	90	18	1	1	9	5	1	11,832



TABLE VI.—*Supplementary Table showing Causes of Mortality among Patients of the*

STATES.	MORBI CORPORIS UNIVERSI.																	
	Variola.	Variola confluens.	Morbilli.	Febris typhus.	Febris cerebro-spinalis.	Febris enterica.	Febris intermittens.	Febris intermittens quotidiana.	Febris intermittens perniciosa.	Febris remittens.	Febris congestiva.	Febris typho-malarialis.	Febris biliosa.	Cholera simplex.	Cholera pestifera.	Phagadæna putris.	Erysipelas.	Pyæmia.
Maine.....	3			1		1				1	1							
New Hampshire.....																		
Massachusetts.....	10				1	5	1		1	1	2	1	3					
Rhode Island.....						1			1									
Connecticut.....						1												
New York.....	3					4				7		1					1	
New Jersey.....																		
Pennsylvania.....					3	3										1		
Maryland.....	8					3			1									1
District of Columbia.....	2						1											
Virginia.....	7					1					1	1						
North Carolina.....						2	1											
South Carolina.....										1								
Georgia.....											3		4					
Florida.....	1	1		1		4			3									
Alabama.....											6							1
Mississippi.....	16				3										2			
Louisiana.....	12							3	1	4	2			1	2		1	
Texas.....										1	3							1
Tennessee.....	23	1			1	2				1	1				2			
Kentucky.....	8	3				1	2			1		2			6			
Ohio.....	6		1		1									2				3
Indiana.....										1		1		1				
Illinois.....	23				3					1							1	
Michigan.....						1							2			1		
Wisconsin.....	1																	
Missouri.....	7				1	3	1							1			1	
Iowa.....																		
Minnesota.....	1																	
California.....																		
Washington Ter.....																		
Total.....	131	5	1	2	13	32	6	3	7	18	19	6	9	5	12	2	4	6





TABLE VI.—*Supplementary Table showing Causes of Mortality among Patients*

STATES.	MORBI SPIRITUS ORGANORUM.							MORBI CONVECTIONIS APPARATUS.														
	Laryngitis.	Bronchitis acuta.	Bronchitis longa.	Pneumonia.	Abscessus pulmonis.	Pleuritis.	Hydrothorax.	Gastritis.	Carcinoma ventriculi.	Dyspepsia.	Dysenteria acuta.	Dysenteria longa.	Hernia strangulata.	Diarrhoea acuta.	Diarrhoea longa.	Hepatitis.	Hepatitis chronicus.	Abscessus hepatis.	Cirrhosis hepatis.	Icterus.	Peritonitis.	Ascites.
Maine.....			1	2																		
New Hampshire.....				1																		
Massachusetts.....				5					1			1			2				1		1	
Rhode Island.....																						
Connecticut.....				1																		
New York.....	1			5				1			1				1	1						
New Jersey.....																						
Pennsylvania.....		1		3																	1	
Maryland.....				2		3					1			1							1	2
District of Columbia.....				1																	1	
Virginia.....		1		3							1											
North Carolina.....				1																		
South Carolina.....																						
Georgia.....				2																		
Florida.....				2							1											
Alabama.....				1					2												1	
Mississippi.....				2							1	1										
Louisiana.....		3		2		2				1	4	1	2	4	1	2						1
Texas.....				3		1								1	1						2	
Tennessee.....				2						1	1				2	1						
Kentucky.....		1	1	1						1					2		1					
Ohio.....			1	1										2	2		1					
Indiana.....							1				1			1								
Illinois.....	2		2	4		1		1			3											1
Michigan.....		1	1	3																1		
Wisconsin.....																						
Missouri.....		1															1	1				
Iowa.....																						
Minnesota.....																						
California.....					1									1				1	1			1
Washington Ter.....			1																			
Total.....	3	8	7	47	1	7	1	2	3	3	15	9	1	9	12	2	4	2	2	1	6	5

of the United States Marine-Hospital Service, &c.—Continued.

MORBI URINÆ APPARATUS.									INJURIE SINGULARES.													
Morbus Brightii.	Lithia renalis arenosa.	Nephritis.	Cystitis.	Hæmaturia vesicae.	Prostatitis et cystitis.	Diruptio urethrae.	Ulcus.	Abscessus.	Coxarum morbus.	Synovitis.	Necrosis.	Contusum.	Injuria.	Injuria interna.	Ambusta.	Contusio spinalis.	Fractura calvariae.	Fractura foras patens.	Vulnus incisum.	Vulnus laceratum.	Vulnus sclopetica.	Totals.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	14
3	.....	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	53
6	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	6
.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
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1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12
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.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
15	1	1	1	1	1	1	4	4	1	1	1	2	3	1	1	2	3	4	1	2	4	646



TABLE I									
Summary of the results of the experiments on the effect of the concentration of the solution on the rate of the reaction									
Concentration of the solution (M)	Rate of the reaction (M/min)	Concentration of the solution (M)	Rate of the reaction (M/min)	Concentration of the solution (M)	Rate of the reaction (M/min)	Concentration of the solution (M)	Rate of the reaction (M/min)	Concentration of the solution (M)	Rate of the reaction (M/min)
0.1	0.01	0.2	0.02	0.3	0.03	0.4	0.04	0.5	0.05
0.6	0.06	0.7	0.07	0.8	0.08	0.9	0.09	1.0	0.10
1.1	0.11	1.2	0.12	1.3	0.13	1.4	0.14	1.5	0.15
1.6	0.16	1.7	0.17	1.8	0.18	1.9	0.19	2.0	0.20
2.1	0.21	2.2	0.22	2.3	0.23	2.4	0.24	2.5	0.25
2.6	0.26	2.7	0.27	2.8	0.28	2.9	0.29	3.0	0.30
3.1	0.31	3.2	0.32	3.3	0.33	3.4	0.34	3.5	0.35
3.6	0.36	3.7	0.37	3.8	0.38	3.9	0.39	4.0	0.40
4.1	0.41	4.2	0.42	4.3	0.43	4.4	0.44	4.5	0.45
4.6	0.46	4.7	0.47	4.8	0.48	4.9	0.49	5.0	0.50
5.1	0.51	5.2	0.52	5.3	0.53	5.4	0.54	5.5	0.55
5.6	0.56	5.7	0.57	5.8	0.58	5.9	0.59	6.0	0.60
6.1	0.61	6.2	0.62	6.3	0.63	6.4	0.64	6.5	0.65
6.6	0.66	6.7	0.67	6.8	0.68	6.9	0.69	7.0	0.70
7.1	0.71	7.2	0.72	7.3	0.73	7.4	0.74	7.5	0.75
7.6	0.76	7.7	0.77	7.8	0.78	7.9	0.79	8.0	0.80
8.1	0.81	8.2	0.82	8.3	0.83	8.4	0.84	8.5	0.85
8.6	0.86	8.7	0.87	8.8	0.88	8.9	0.89	9.0	0.90
9.1	0.91	9.2	0.92	9.3	0.93	9.4	0.94	9.5	0.95
9.6	0.96	9.7	0.97	9.8	0.98	9.9	0.99	10.0	1.00

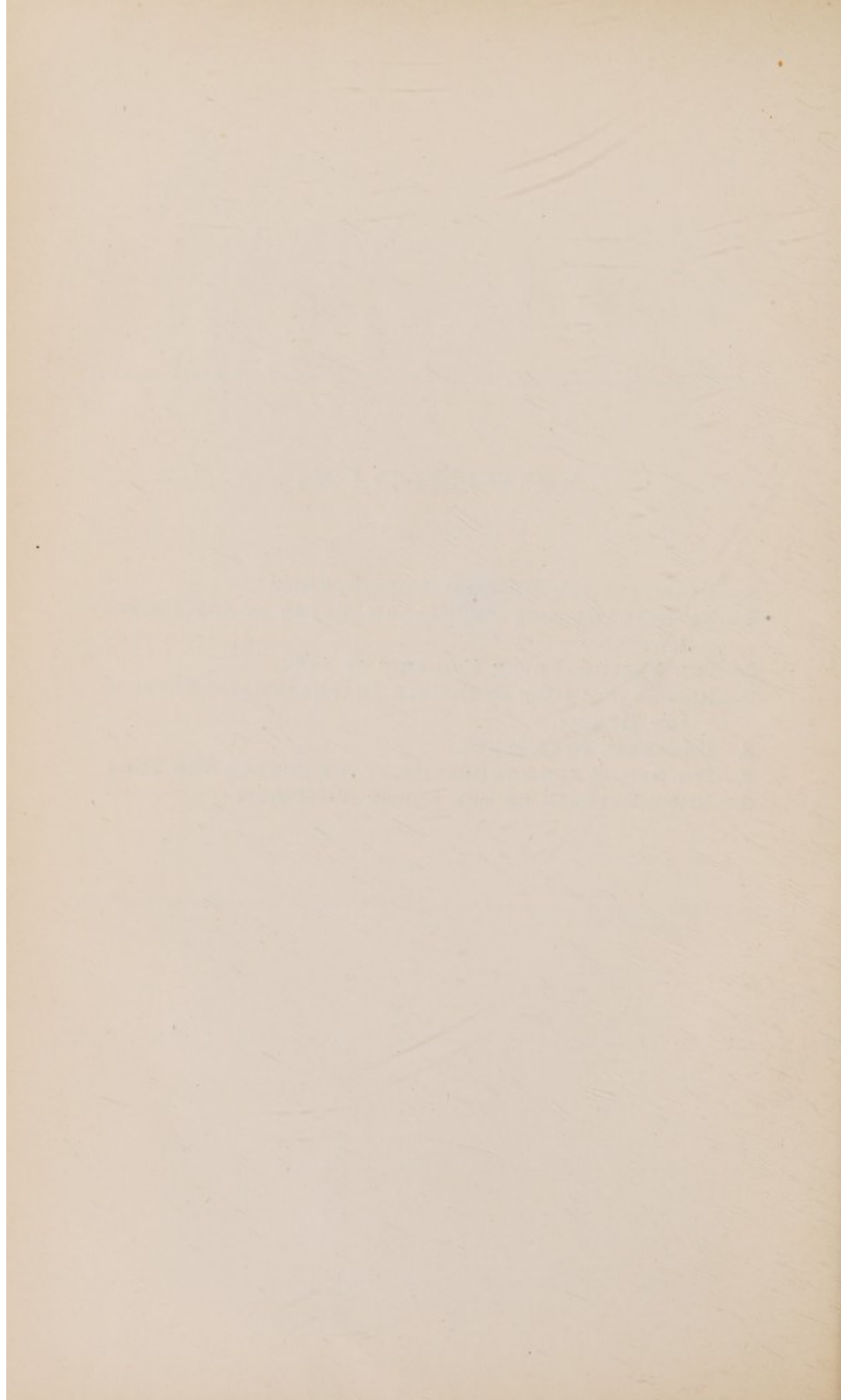
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## APPENDIX.

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- A.—HOSPITALS AND HOSPITAL CONSTRUCTION.
  - B.—NATURAL HISTORY OF YELLOW FEVER IN THE UNITED STATES.
  - C.—THE YELLOW FEVER EPIDEMIC OF 1873.
  - D.—REPORT OF A CASE OF DOUBLE DIAPHRAGMATIC RUPTURE AND HERNIA.
  - E. URETHRAL STRICTURES.
  - F.—THE SAILOR AND THE SERVICE AT THE PORT OF NEW YORK.
  - G.—RIVER-BOATMEN OF THE LOWER MISSISSIPPI.
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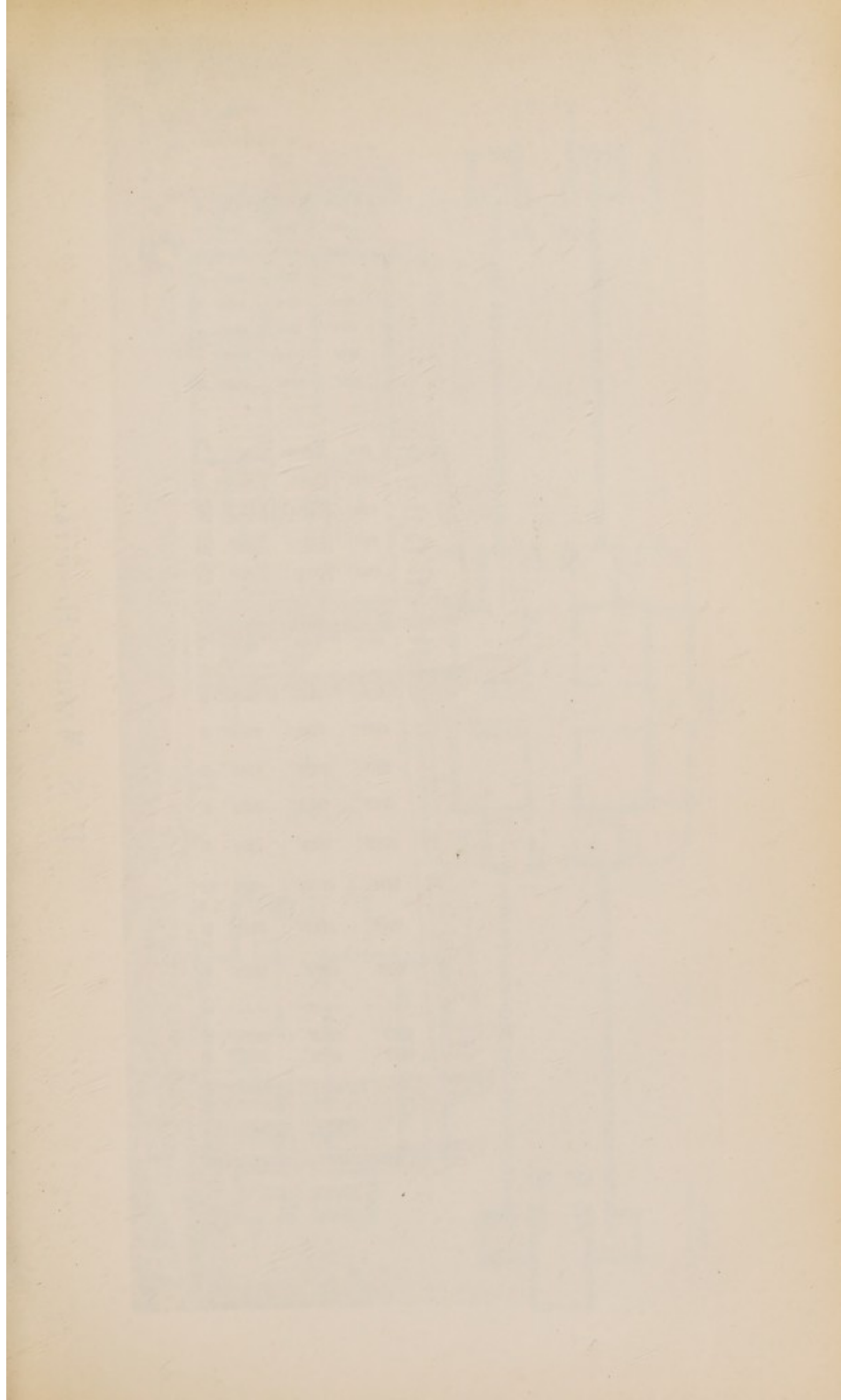
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HOSPITALS AND HOSPITAL CONSTRUCTION.

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THE UNIVERSITY OF CHICAGO

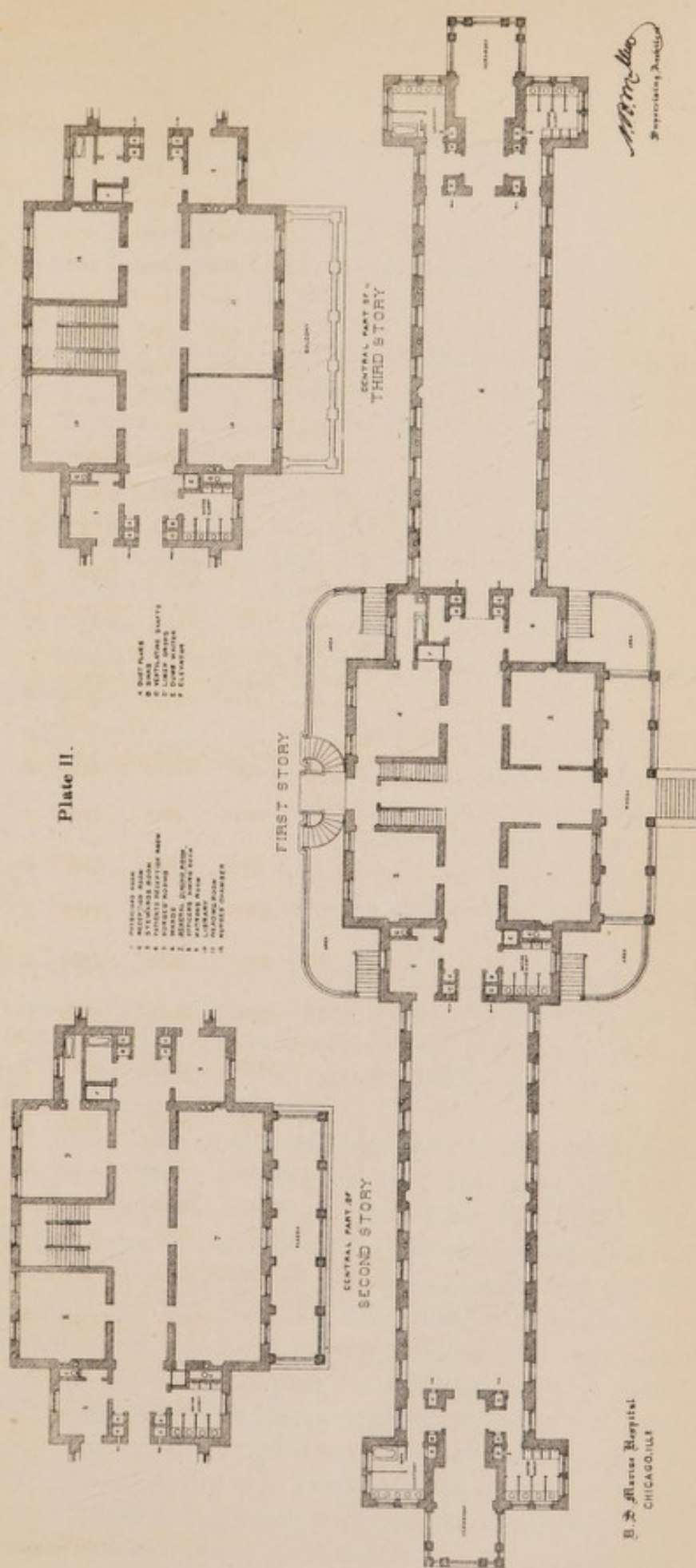




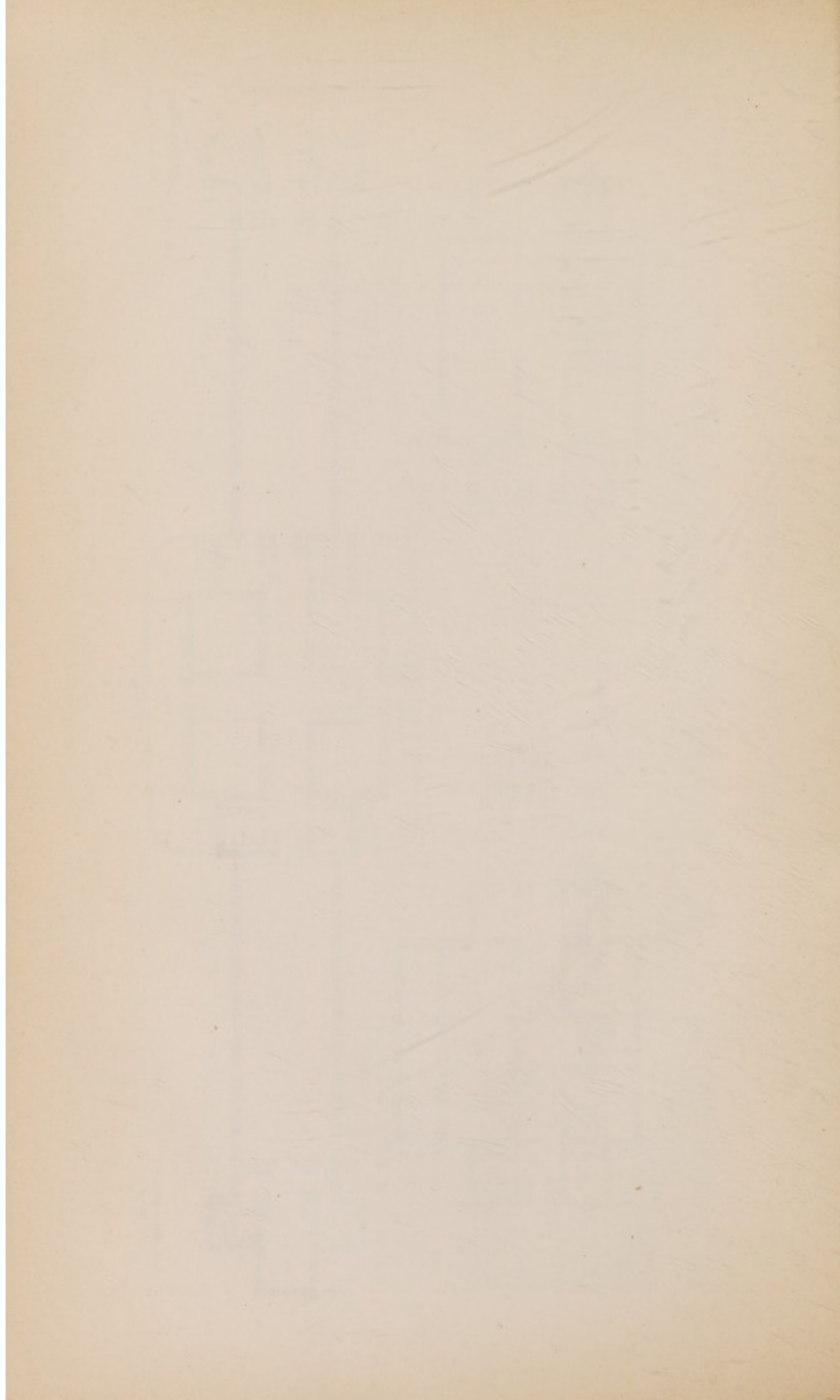


U. S. MARINE HOSPITAL,

CHICAGO, ILL.







## A.—HOSPITALS AND HOSPITAL CONSTRUCTION.

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By JOHN M. WOODWORTH, M. D.,  
*Supervising Surgeon United States Marine-Hospital Service.*

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THOUGH the following is but an outline of the subject of the above title, sketched amid the pressure of official duties and the details of a service extending from the Atlantic to the Pacific, and from the Great Lakes to the Gulf, it is offered in the belief that the adoption of the pavilion hospital plan, alluded to in the pages of the preceding report—and which marks the inauguration of a new era in hospital construction, at least so far as the Marine-Hospital Service is concerned—renders necessary an explanation of the details of the plan adopted, and, incidentally, some consideration of the principles which, it is conceived, should govern hospitals, their design, location, material, general arrangement, duration of use, etc.

Hospitals are established primarily to facilitate the recovery of the sick and disabled. But while this is the first and fundamental principle, to the enforcement of which all others should be subservient, the essential reason for the existence of a hospital, as such, is the aggregation of patients under such conditions as that a relatively small number of medical attendants and nurses may suffice for their treatment and care.

With this aggregation of patients, however, come certain evils, which if not met and counteracted in the mode of construction and in the general administration of the hospital, frustrate the primary object, and even become the cause of other and graver disease, and of a consequently increased percentage of mortality.

What these evils are will be described more fully in the context; but it may be here remarked that it so happens that the most economical mode of hospital construction is really the safest for the sick. When this fact comes to be as clearly recognized by the profession generally, as it is now by a few close observers of hospital practice, the old magnificent hospitals, built as “monuments for all time,” will be abandoned for the simple pavilion, of indefinite existence; and the only strictly permanent parts of the modern hospital, constructed on wise sanitary principles, will be the executive building, kitchen, laundry, and engine-house. For although we are accustomed to regard the hospital as an asylum designed for the benefit of the sick, yet it not unfrequently occurs that patients enter great general hospitals with simple diseases or trivial injuries, and contract therein other maladies of a more serious charac-



ter, of which, indeed, they often die. What is true of the large general hospitals referred to, is unfortunately true of every marine hospital now in use, the new Chicago Marine Hospital\* alone excepted.

#### EVILS OF BADLY CONSTRUCTED HOSPITALS.

The causes which render a badly constructed hospital unhealthful are due to those natural influences which are continually at work in the body, suffering from disease, to restore it to the normal condition of health. The lungs and skin are two great channels through which constantly escape from the system, even in health, the most deleterious or poisonous elements. In disease these emanations become more actively, and even specifically, poisonous; hence a number of patients congregated in a common ward generate a miasm which accumulates, if not rapidly removed by adequate ventilation, until every part of the room is pervaded, and after a longer or shorter period, depending upon the persistency and degree of cumulation, the floor, walls, furniture, and bedding of the ward become saturated with a miasm which is capable of poisoning a large percentage of those who are exposed to its influence.

The phases of hospital disease produced by hospital miasm vary under different conditions of the victims exposed to it. Thus one is attacked with erysipelas; another with pyæmia, or with gangrene, or with puerperal fever, etc. While wounded or suppurating surfaces appear to furnish the conditions most favorable to the reception and activity of the poison, it cannot be doubted that most diseases are aggravated by its influence, although the patients may not show the characteristic evidences of it.

The record of pyæmia and erysipelas in Bellevue Hospital, of New York, strongly exemplifies the influence of an old building on hospital patients. The results of an examination "into the relative prevalence" of these diseases in that hospital "during the year [1871] as compared with former years," furnish the following tables, as given in *The Medical Record* of September 1, 1872:

Table No. 1 shows the absolute frequency (as nearly as is attainable)

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\* Of the massive and imposing architecture of this hospital the accompanying heliograph gives but an imperfect idea. Like all of the work of Mr. MULLETT, it is thoroughly honest and complete, and it is certainly no reflection upon his professional ability to say that the chief blemish of the Chicago hospital, in the eye of the modern hospital-surgeon, is the architectural merit in its promise of solid endurance and permanence. But while thus showing his pre-eminent ability in dealing with the old standards, Mr. MULLETT has been equally prompt to recognize and respond to the requirements of the new; and the writer desires here to acknowledge his indebtedness for the ready and intelligent interest with which his suggestions in regard to wooden pavilion-hospitals have been met by the Supervising Architect. The presentation of the perspective view and of the block plan of the Chicago marine hospital in connection with the plans of the San Francisco pavilion-hospital will serve to show how widely the old and the new differ, and how thoroughly the architectural treatment of both has been mastered.



of erysipelas and pyæmia from 1861 to 1871, inclusive, and their relative frequency in the several years, as compared with one another in the same year.

TABLE No. 1.

Years.	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	Total.
Erysipelas .....	61	51	109	100	88	87	30	52	97	76	100	852
Pyæmia .....	20		10	11	10	5	14	33	14	37	39	193

Table No. 2 shows the relative frequency of occurrence of erysipelas and pyæmia during the different months of the year, deduced from the records of the hospital for the time mentioned.

TABLE No. 2.

Months.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sep.	Oct.	Nov.	Dec.	Total.
Erysipelas.	87	75	110	123	122	68	49	32	23	40	63	67	859
Pyæmia ...	12	13	19	23	32	30	20	11	14	17	9	19	219

The facts reported were taken from the hospital register, and not from notes of cases, and are therefore but approximative in the case of erysipelas, since the tabulated ones are those only in which the disease was either present on the patient's admission, or in which it had an unfavorable termination. Cases of erysipelas complicating wounds or other injuries, and terminating in recovery, would not be found recorded in the register. The number of cases of erysipelas, therefore, which have been treated in the hospital during the period mentioned, must be considerably larger than that which appears in the report.

In collecting the cases of pyæmia this source of error was avoided, inasmuch as this disease being uniformly fatal, almost every case must have been entered in the register as a cause of death. There is reason to suspect, however, that owing to the imperfect manner in which pathological inquiries were made in former years a certain number of cases of pyæmia were overlooked, having been neither recognized during life nor detected on post-mortem examination. Such cases would, therefore, be recorded under a false name in the hospital register, and would not appear in the table.

Dr. T. K. Cruse, late house surgeon of Bellevue, in an article on "The Treatment of Compound Fractures of the Leg," which also appeared in *The Record*, states that "Bellevue Hospital has reached a period in its existence when, in the words of Billroth, the building is a mere slaughter-pen of the wounded. Spite of the most careful and judicious sanitary arrangements, recovery from an amputation of the thigh for injury is without the recollection of the oldest inhabitant; and when the surgeon finds pyæmia follow exsection of the elbow, and in fact the most



trifling operation whereby the medullary canal of a bone is in any wise invaded, he is sorely tempted to refrain from interfering in such cases, not willing to subject himself to the imputation of hastening a termination which he knows must be death, whatsoever course be followed.\*

The Marine Hospital at Chelsea, Mass., although in use only about thirteen years, has scarcely ever been free from erysipelas for several years, and cases of pyæmia, though not reported as such, are believed to have occurred. On the 1st of May last erysipelas broke out in the Marine Hospital at Saint Louis as the result of overcrowding; the wards, like those of Chelsea Hospital, being badly planned and poorly ventilated. In a very few days nearly every patient showed evidences of the poisonous influences to which they were exposed. The Supervising Surgeon, visiting the hospital at this time, directed that the patients should be removed from the building, and the wards cleansed and thrown open for a number of days to the free circulation of the winds.

An outbreak of pyæmia or erysipelas should be the signal for prompt, decided action. The patients who are attacked with the disease should be removed at once and the ward emptied, thoroughly cleaned, exposed to sunlight if possible, and to the free circulation of air day and night; the walls and ceilings should be scraped and whitened with lime, or, if they are painted, thoroughly washed with soap and water. If this does not prevent the recurrence of the dreaded diseases, the plastering should be removed and replaced by new; and if this does not prove effectual, it would, in my opinion, be wise to tear down the infected building or burn it up.

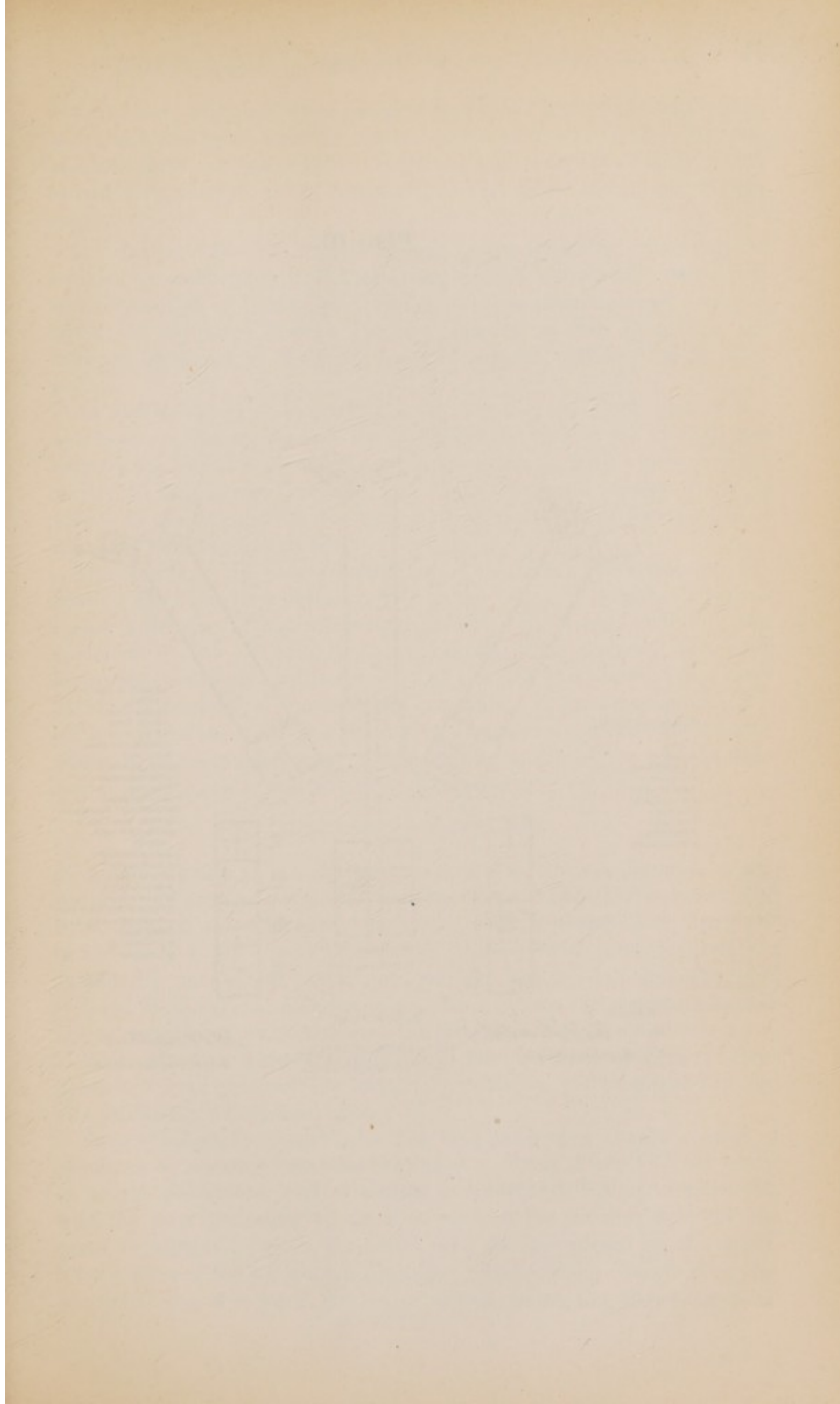
That the Jews were familiar with some of the practical measures herein proposed is shown by the following passage from the Old Testament:

And the priest shall come again the seventh day, and shall look; and, behold, if the plague be spread in the walls of the house; then the priest shall command that they take away the stones in which the plague is, and they shall cast them into an unclean place without the city; and he shall cause the house to be scraped within round about, and they shall pour out the dust that they scrape off without the city into an unclean place: and they shall take other stones, and put them in the place of those stones; and he shall take other mortar, and shall plaster the house. And if the plague come again, and break out in the house, after that he hath taken away the stones, and after he hath scraped the house, and after it is plastered; then the priest shall come and look; and behold, if the plague be spread in the house, it is a fretting leprosy in the house: it is unclean. And he shall break down the house, the stones of it, and the timber thereof, and all the mortar of the house; and he shall carry them forth out of the city into an unclean place.—*Lev. xiv., 39, 45.*

Florence Nightingale, in her *Notes on Hospitals*, says: "No stronger condemnation of any hospital or ward could be pronounced than the simple fact that any zymotic disease has originated in it, or that such

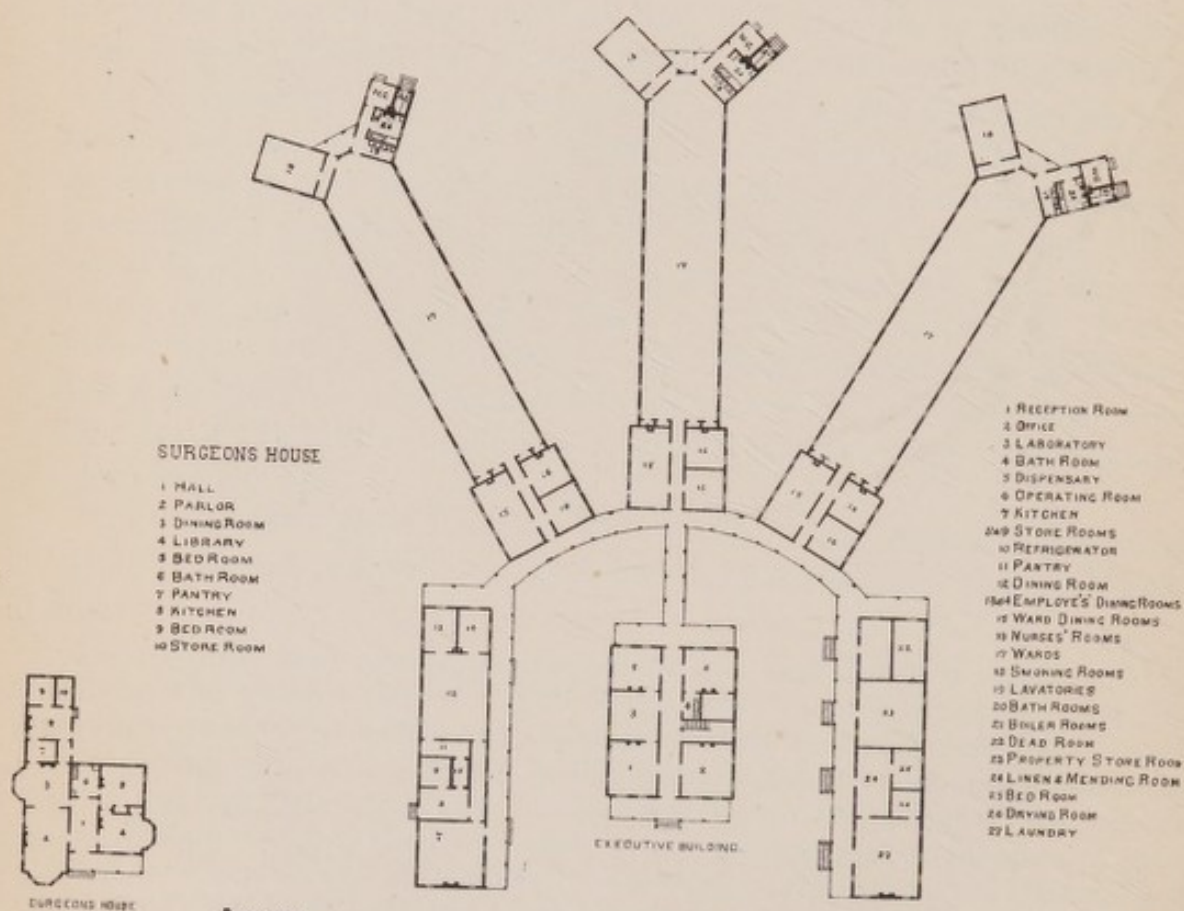
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\* Patients of the Marine-Hospital Service were formerly treated in this hospital, but owing to the large percentage of mortality among them it was deemed wise to discontinue sending seamen there.





# Plate III.



Approved

*Chas. M. Woodward*  
 Supervising Engineer

BLOCK PLAN  
 OF  
 U.S. MARINE HOSPITAL  
 SAN FRANCISCO, CAL.

*A. M. McCall*  
 Supervising Architect

diseases have attacked other patients than those brought in with them. And there can be no stronger condemnation of any town than the outbreak of fatal epidemics in it. Infection and incapable management, or bad construction, are in hospitals, as well as in towns, convertible terms."

It is believed that the evils described in the foregoing pages may be avoided by conforming to the following general system of construction and disposition of hospitals, of which, as to construction and arrangement, the proposed Marine Pavilion-Hospital at San Francisco, authorized by an act of the Forty-second Congress, will serve as an illustration.

As will be observed in Plate III, representing the block plan of the new hospital, the wards and the buildings devoted to the kitchen and laundry are grouped around the executive building, with which they are connected by a covered corridor, provided with a sunk railway-track, on which to run a hand-car for the easy transportation of heavy articles from one building to another.

The buildings are to be constructed of California red-wood, and, excepting the executive building, will be one story in height. The estimated total cost of the wards and associate buildings, including the residence of the surgeon, is about \$58,000; thus securing the most favorable conditions for the recovery of the sick and disabled in a comparatively economical manner, and combining, in the arrangement, the advantages of three distinct hospitals with the greatest convenience and efficiency of administration. Some of the details of the plan of this hospital are given in the following discussion of

#### HOSPITAL CONSTRUCTION,

as a prerequisite to which, the selection of a suitable *Location* is important. A hospital designed for the treatment of acute diseases should be so located as to be easily accessible. The site should be free from nuisances of every kind; abundantly supplied with pure fresh water; sufficiently elevated to insure good surface and sub-soil drainage, and isolated to an extent sufficient to give the grounds the necessary exposure to currents of air. Although the San Francisco Hospital is not yet located, owing to causes stated in the Report to which this paper is appended, it is to be hoped the foregoing desiderata will be secured in the site ultimately determined upon.

*Basis of hospital arrangement.*—The hospital proper should consist of pavilions or separate detached buildings of wood, (Plate IV,) one story in height preferable, and of simple architectural design, constructed with the view of destroying them so soon as the peculiar hospital diseases, erysipelas, pyæmia, gangrene, etc., are engendered by the cumulated miasm of the patients, a condition which usually obtains after the continued use of a ward for ten or fifteen years, the time depending



mainly upon the amount of air-space to each patient and the character of the ventilation.

*Ground arrangement of wards.*—The pavilions for the sick should be arranged on parallel or radiating (fan-shaped) lines, running as nearly as possible north and south, thereby receiving the direct rays of the sun during the larger portion of the day.

*Distance between the wards.*—In determining the distance between the pavilions, the elevation of the site and the natural exposure to sunlight and currents of air should be taken into account. An intervening distance, between the buildings, of double the height of the pavilions will usually be found to be sufficient.

*Number of floors.*—The most healthy hospitals are pavilions with one floor; this is because they require less practical care to secure good ventilation. A pavilion with two floors is not seriously objectionable, provided the system of ventilation is distinct for each floor. Beyond this the ventilation is apt to be imperfect, and the care and proper supervision greater than is likely to be given.

*Number of wards to a floor.*—There should be but one ward to a floor. Cross-walls or partitions obstruct the ventilation, and it is not probable that the strictest care can prevent the foul air passing from one ward into another on the same floor where there is a communicating door. The only plan in which two wards on one floor are admissible is where the administrative offices and the stairway to the upper wards are in the center of the building, with access to wards right and left, as in the new Marine Hospital at Chicago, (see Plate II.)

*Size of wards.*—The larger the ward the greater the number of patients that can be accommodated, and the fewer the number of attendants required in proportion, as well as the greater the facility of supervision. There is a limit, however, to the size of the ward fixed by sanitary and economical conditions. The ventilation is found to become impeded if the length of the ward is over five times the width. As a general rule the length should not exceed four times the width. The most desirable width is 28 feet, but in no case should it be less than 25 nor more than 30 feet, and the height should be about 17 feet; the latter will, however, be governed in a measure by the length of the ward, but should not be less than 15 nor more than 20 feet.

*Cubic space.*—The amount of cubic air-space necessary to each patient depends, first, upon the effectiveness of the ventilation, and, consequently, upon the size of the ward; and next, upon the location of the hospital, whether it be located in the centre of a large city or in the open country. In a city, the allowance should not be less than 1,800 feet per patient for large wards; while small wards should have a capacity of about 2,500 cubic feet per patient, for the reason that the severe cases are usually placed in the small wards, and also because of the greater difficulty of ventilating them.

*Superficial space.*—A matter quite as important as the cubic air-space



is the superficial area allowed to each bed, which, as a rule, should not be less than 100 feet.

*Number of patients to the ward.*—In accordance with the foregoing rules a ward 28 feet wide, 17 feet high and 120 feet long will accommodate thirty-two patients, giving to each 105 feet of surface area, and about 1,800 cubic feet of air-space.

*Small wards.*—Small wards are necessary in connection with a large hospital, for the purpose of isolating certain patients; but, as far as possible, such wards should be independent of the large ones.

*Bath and wash-rooms and water-closets.*—These should be separated from the ward by a well ventilated passage. In Plate IV the building for these purposes is shown attached to one corner of the ward, nearest to which is the wash-room, provided with porcelain basins supplied with hot and cold water; next beyond is the bath-room, which has a bath-tub, sitz- and steam-bath, and a marble table, which is convenient in treating cases of sun stroke, etc. The room containing the water-closets should be separated from the passage to the ward by a door fitted to swing both ways, and which should always remain closed when not in use. The basins with syphon traps should be well supplied with water, and arranged with close-fitting covers and a steam-pipe opening within the enclosure to enable the basin to be disinfected from time to time by steam. The sink for ward slops, etc., should be in the same apartment with the water-closets. The water-system for closets, although attended with many disadvantages, is believed to be preferable in large hospitals, provided the sewerage is good and the drain properly ventilated. The latter can be accomplished by carrying the soil-pipe, full size, through the roof and leaving it open for the escape of all gases. The use of the dry-earth system in the marine hospitals has not been attended with fully satisfactory results; the partial failure being due, no doubt, to want of care. The conditions for the successful use of dry earth are simple, being merely the application of a sufficient quantity of dry powdered earth to completely cover the excretions and absorb all the fluids; but it has not been shown that the resulting mixture, although rendered inodorous, may not, under certain circumstances, emit poisonous exhalations.

*Reading and smoking-room.*—It is desirable to have a room connected with each ward where the patients, who are well enough to leave their beds, can sit during the day to read and smoke. Room 18, in Plate IV, is designed for these purposes.

*Nurses' rooms.*—In the plan of the San Francisco Marine Hospital, (Plate IV, 16,) the principal nurses' room is placed near the entrance of the ward, and is provided with a window which commands a view of its entire length. By this means the supervision of the nurse is made easy and more effectual, which is quite essential to proper care of the sick. Patients are often saved from serious mischances by the timely intervention of the nurse, so that the importance of this is obvious.



*Ward dining-room.*—This is located opposite the nurses' room in the accompanying plan, (Plate IV, 15,) and is provided with a small range for special-diet cooking, preparing fomentations, etc.

*Material for floors.*—One of the uniform defects in the old marine hospitals are the poor floors. Hospitals floors should be made of a compact, close-grained wood, such as cherry, oak, or ash, and with the joints filled with white lead in oil to insure an impervious surface. The floors of the new Marine Hospital at Chicago are laid on cement which is filled in between the iron joists. This prevents the possibility of any filth accumulating under the floor. It is important to fill the pores of the wood to prevent the floor from absorbing or holding water. This may be accomplished by laying on, with a brush, either paraffin dissolved in one of the cheap hydrocarbon oils, or boiled linseed oil or beeswax. The old custom of scrubbing or scouring the ward floors should be abolished.

*Walls and ceilings.*—Scarcely less than the floors the walls and ceilings of a hospital require a smooth, hard, non-absorbent surface. That plastered walls absorb organic effluvia and become poisonous to the occupants of the building, abundant examples prove.

A case was reported to the French Academy of Medicine in 1862, in which an analysis of the plaster of a hospital wall gave 46 per cent. of organic matter.\* As has been already shown, the Jews, the earliest sanitarians, understood this subject and applied a practical remedy. They scraped the walls and carried the dust "without the city into an unclean place;" and when this did not suffice they tore down their stone houses and disposed of the stones, mortar, and timbers in the same way.

Walls of Parian cement are recommended and used abroad; but as the cement, from its hardness, is liable to crack when applied to the lathed walls and ceilings of wooden buildings, its use would not be practicable for such hospitals as are now recommended. Until some better material for covering walls is discovered or invented, it is believed that a smooth lime and sand plastered surface, painted with several coats of lead in oil, and frequently washed with soap and water; or such a wall frequently "white-washed" with lime, and periodically scraped, will give as good results as any plan now in use, excluding those which would be considered too expensive.

The process of painting or scraping and "white-washing" the walls would necessitate the vacating of the ward for a time; but this is desirable, since the vacating of a ward from time to time and opening wide the windows to admit free currents of the outer air will remove the peculiar hospital odor, a fact which I have observed in examining some of the old marine hospitals which have been abandoned for a time. It seems almost superfluous to add that the walls should be free from all unneces-

\*Galton, 1869, p. 23. Plastering-hair must have formed a large portion of this enormous percentage.



sary angles and ornamentation upon which dust would be liable to lodge. The wood-work of a ward should be severely plain, so as to be easily cleaned. Pine, covered with several coats of shellac varnish, answers the purpose well, and is economical.

*Light, heat, and ventilation.*—The windows of a ward should be opposite each other, and should be arranged at such intervals as that not more than two beds need be placed between any two windows. Such an arrangement affords abundant light, which is as necessary for man as for plants, and, in addition to its physical sanative effects, the patients are enabled to read in bed, thus affording healthy exercise to their minds—an employment worthy of encouragement as a sanitary measure. In the plan of the San Francisco Marine Hospital the windows are 3 feet wide, 7 feet apart, and come within 3 feet of the floor. Over each window there is a large transom, which may be opened to any degree, or closed, by means of a cord working over a pulley. By opening every other transom and raising the opposite corresponding window from the bottom a few inches, and placing vertically on the sill a board, which should be about twice as wide as the opening and a few inches removed from the window, a free interchange of the outer and inner air may be obtained without exposing the patients to direct draughts of air.

This mode of ventilation can be used to any considerable extent only when the temperature of the outer air is mild. The open fire-place is the best ventilator of a ward when the weather without is such as to render it necessary to keep the windows and doors closed, and no ward should be without an open grate, no matter what other mode of heating is adopted.

It is intended to warm the San Francisco Hospital by two open fire-places placed along the centre of each ward, a plan adopted in the Herbert Hospital, Woolwich, England. The chimney will pass under the floor, and, on reaching the outer wall, enter and pass up through the centre of the fresh-air flue, opening into the ward near the ceiling. By this arrangement the outer fresh air will be warmed several degrees in its passage to the ward, thus utilizing, to some extent, the escaping heat of the chimney. The fire-place is lined with fire-brick, and arranged with cast-iron grating for the coal to rest on. "A clear space, half an inch deep, is formed between the back lump and iron back to receive a supply of air through the ash-pit under the grate, which passes through a slip in the fire-lump immediately above the fire. The air thus brought into contact with the heated coal is received at a high temperature, in consequence of passing through the heated fire-lump, and is forced into contact with the gases from the coal by means of the piece of fire-lump which projects over the fire at the back of the grate, and thus a more perfect combustion of smoke is effected than with an ordinary grate; in fact, with care, almost perfect combustion of the fuel and consequent utilization of the heat can be obtained."\* In

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\* Galton, pp. 87, 88.



the use of this grate the air of the ward is warmed by direct radiation from the fire in the open grate; by radiation from the sides, back, and top of the iron casing of the fire-bricks, (which casing, owing to its extent and to the intermediate air-chamber between it and the fire-bricks, does not become so heated as to burn the air;) and by the heat in the chimney, which warms the incoming fresh air.

*Drainage and sewerage.*—All drains should be ventilated. This is best accomplished by continuing the main drain-pipe (into which the lesser ones enter) straight up through the top of the building. The drains should not pass under any portion of the hospital, and consequently should be placed in the outer walls. Care should be taken that no fresh air supply-flue opens near the sewer.

*Kitchen.*—The kitchen and provision store-room should be separated from the wards. In the plan of the San Francisco Hospital, (Plates III, 7 to 14, and V,) the kitchen, provision store-room and general dining-rooms are located in a distinct building, connected with the wards and other buildings by a covered corridor. Each ward is also provided with a small dining-room for the accommodation of such patients as are unable to walk to the general dining-room, and for other purposes already mentioned. Properly cooked food is a desideratum of primary importance in a hospital, and in order to secure it the kitchen should be provided with adequate facilities for cooking the food in the best manner. The kitchen of the new Marine Hospital at Chicago, recently fitted out, contains an 8-foot range provided with the usual accompanying utensils; a 28-inch broiler; a 40-gallon stock-boiler, fitted with a steam-coil inside, for preparing the "stock" for soups; a steam-tank, in which to cook vegetables; a hot-water boiler in which the water is heated by steam, etc. The special-diet kitchen contains a 4-foot range, on which to prepare articles of special diet, and a galvanized iron bake-oven of sufficient capacity to keep the hospital supplied with good, fresh bread.

*Laundry.*—While it may be admissible, under certain circumstances, to place the kitchen in the same building with the wards for the sick, the laundry should never be so located, but should be sufficiently remote from the wards as to avoid contaminating the air breathed by the patients. The room devoted to washing the linen should be of ample size, well supplied with water, and provided with means of ventilation adequate to the speedy removal of the steam. The soiled linen should be removed to the wash-house as soon as taken from the beds or persons of the patients; and, as soon as washed, dried, and mended, should be classified and laid on an open frame-work to admit of a thorough airing. In the plan of the San Francisco Hospital, (Plate III,) the laundry has the same relative position to the wards and executive building as the kitchen and dining-rooms. For the sake of convenience, the building (Plate VI) is made to serve the three-fold purpose of laundry, property store-room, and dead-room; but it will be observed that each is entirely



separated from the other. Connected with the wash-room (27) is a drying-room, (26,) and a linen- and mending-room, (24.)

*Executive building.*—The executive building should be centrally located so as to admit of easy and rapid communication with all of the other buildings. It should contain the office of the surgeon; a reception-room; a dispensary and laboratory, and may accommodate the operating-room. The executive building, as provided in the plan of the San Francisco Hospital, (Plates III and VII,) contains the rooms named, and connected with the operating-room is a wash- and bath-room, and a small ward for the temporary use of patients after operations. In the second story of the executive building are the sleeping apartments of the steward, apothecary, matron, etc.

*The surgeon's house.*—The surgeon, or an assistant, should reside in the hospital or live on the premises, so as to be within easy calling-distance at all times. The old practice of subsisting the surgeon and his family in hospital, without regard to the extent of such family, and which had grown into a serious abuse, is abolished by the regulations approved by the Secretary of the Treasury, October 1, 1873. Anticipating this desirable change, a surgeon's house was added to the plan of the San Francisco Hospital, (Plates III and VIII,) with the belief that such provision will not only work economy to the Service, but add to the efficiency and comfort of the surgeon.

*Cost of the pavilion-hospital.*—The economy of the proposed plan of the pavilion-hospital is best exemplified by a comparison of the cost of the old-fashioned hospital of the same capacity with the estimated cost of the one built according to the accompanying plans. The old hospital at San Francisco, which this is intended to replace, cost \$231,871; the one now in use at Chelsea, (port of Boston,) cost \$394,047; that at Chicago, just completed, cost \$422,107; while upon the unfinished one at New Orleans \$530,000 has been expended; being an average cost of nearly \$400,000 for every hospital now owned by the Government of equal capacity with the one proposed.

The estimated total cost of the San Francisco Marine Pavilion-Hospital, including the surgeon's house and all other buildings, is \$58,789.56.



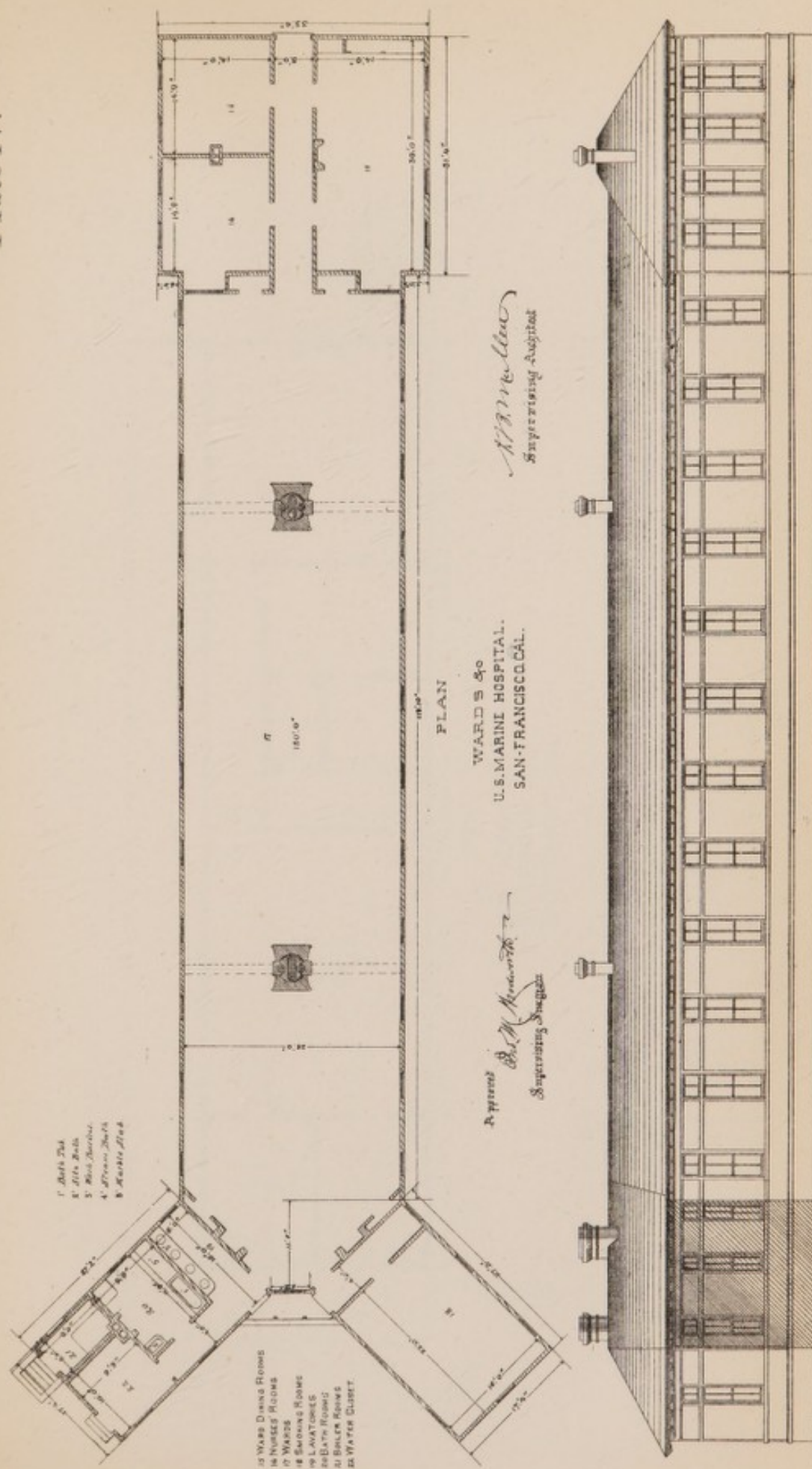
1. The first part of the paper is devoted to a general discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The author discusses the various theories of the origin of life, and shows that the most probable one is the theory of spontaneous generation. This theory states that life originated from non-living matter, and that it has since developed into the various forms of life that we see today. The author also discusses the evidence in support of this theory, and shows that it is the most consistent with the facts of the case.

2. The second part of the paper is devoted to a detailed discussion of the theory of spontaneous generation. The author shows that this theory is based on the fact that life is a complex of many different parts, and that these parts are all derived from a common ancestor. This ancestor is the simple organic matter that is found in the soil, and from which all life has since developed. The author also shows that the theory of spontaneous generation is supported by the facts of the case, and that it is the most probable one.

3. The third part of the paper is devoted to a discussion of the evidence in support of the theory of spontaneous generation. The author shows that this evidence is of two kinds: first, the evidence of the fossil record, and second, the evidence of the present-day world. The fossil record shows that life has existed on the earth for a very long time, and that it has since developed into the various forms of life that we see today. The present-day world shows that life is still being produced from non-living matter, and that it is still developing into the various forms of life that we see today.

4. The fourth part of the paper is devoted to a discussion of the conclusions of the author. The author shows that the theory of spontaneous generation is the most probable one, and that it is supported by the facts of the case. He also shows that the theory of spontaneous generation is the only one that is consistent with the facts of the case, and that it is the only one that is supported by the evidence.

Plate IV.



1' *Bath Tub*  
2' *Side Bed*  
3' *Ward. Closet*  
4' *Stairs Bath*  
5' *Marble Sink*

- 15 Ward Dining Rooms
- 16 Nurses' Rooms
- 17 Wards
- 18 Smoking Rooms
- 19 Lavatories
- 20 Bath Rooms
- 21 Boiler Rooms
- 22 Water Closet

PLAIN

WARD 5 & 6  
U.S. MARINE HOSPITAL.  
SAN-FRANCISCO CAL.

Wm. W. W. W.

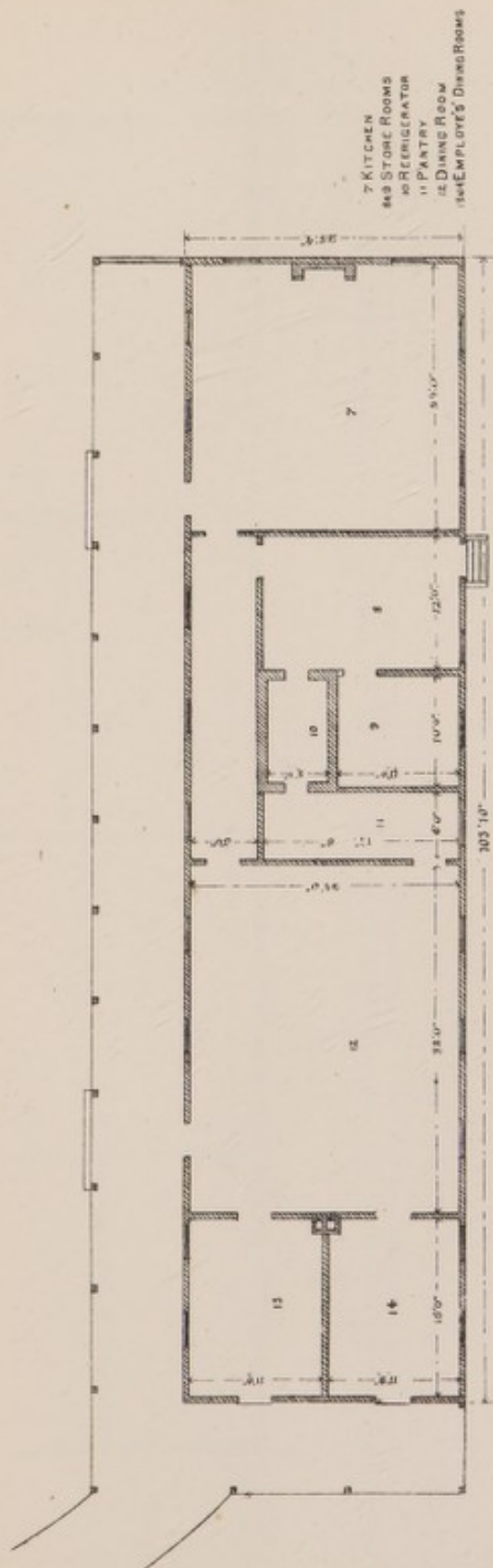
Received  
 of the  
 Secretary of the  
 Board of Education  
 the sum of \$100.00  
 for the year 1888-89  
 J. M. K.

ELEVATION-

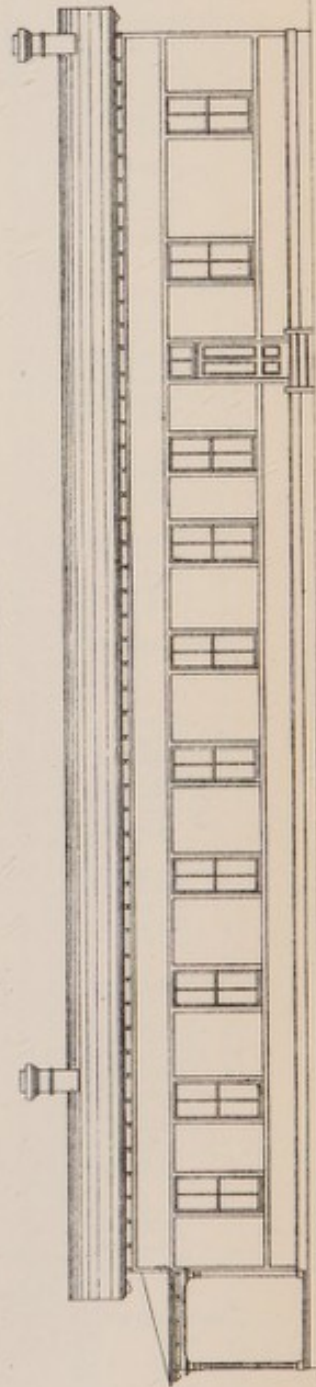


THE UNIVERSITY OF CHICAGO





PLAN.  
KITCHEN. DINING ROOM. &c.  
U.S. MARINE HOSPITAL  
SAN FRANCISCO, CAL.



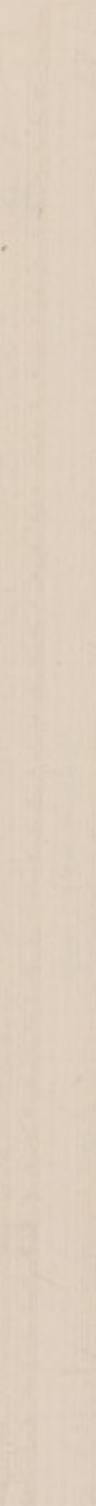
Approved  
*Wm. H. Woodworth*  
Superintendent Surgeon

*Wm. H. Woodworth*  
Superintending Architect



PLATE 1

1890



SECTION OF THE BUILDING

SECTION OF THE BUILDING

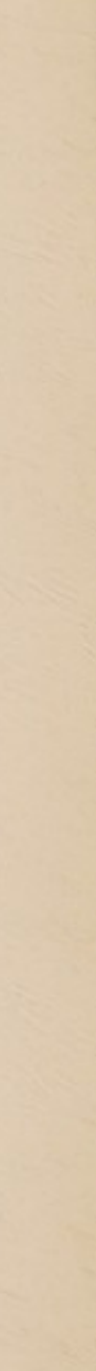
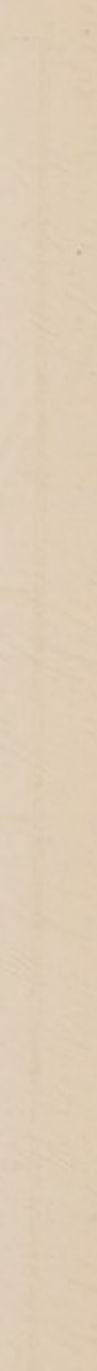
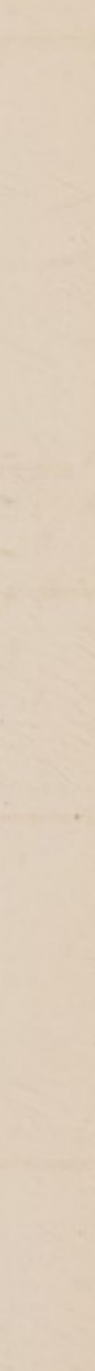
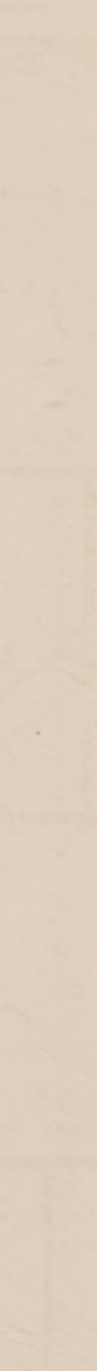
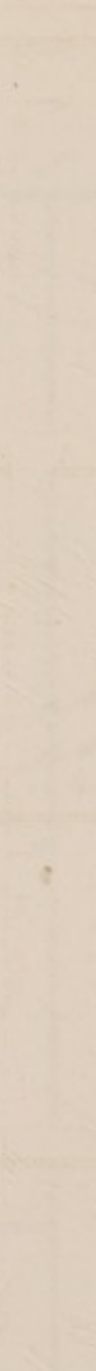
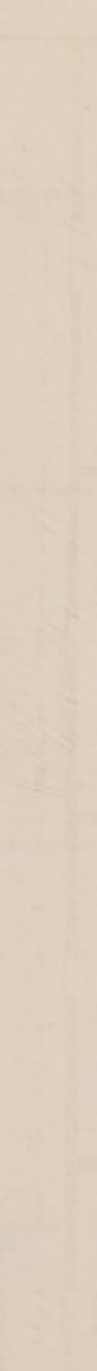
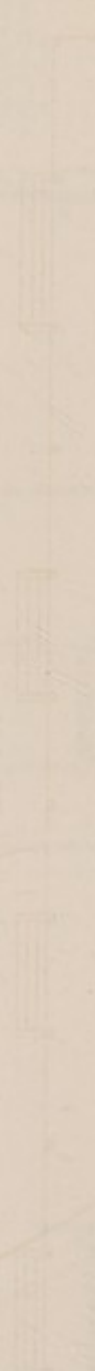
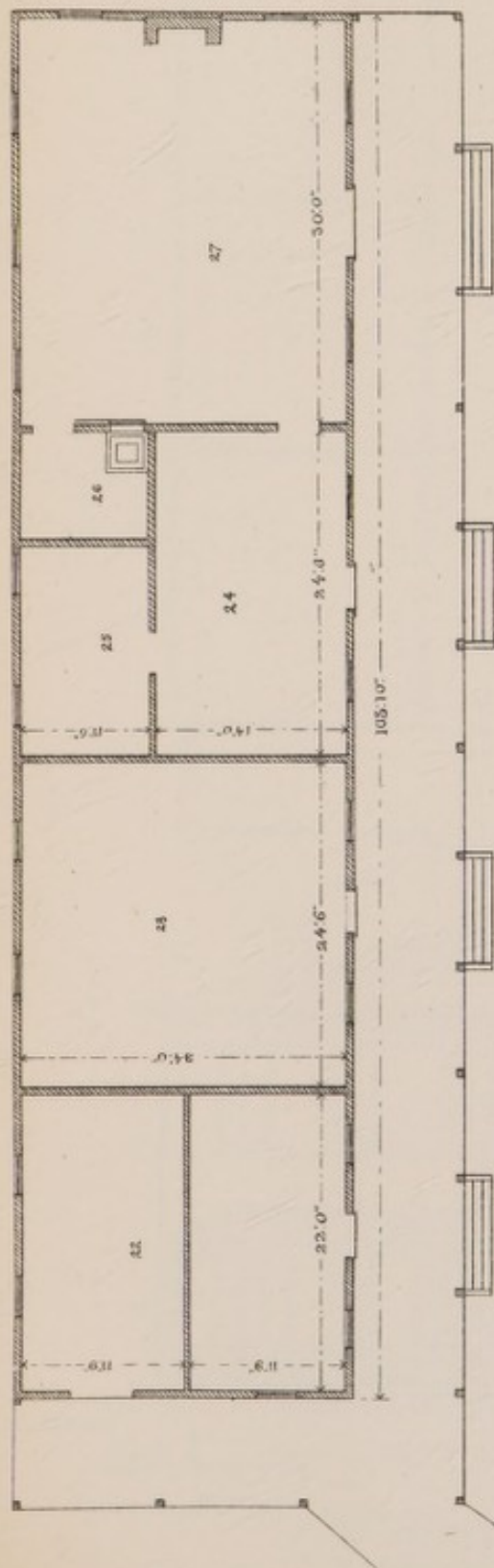
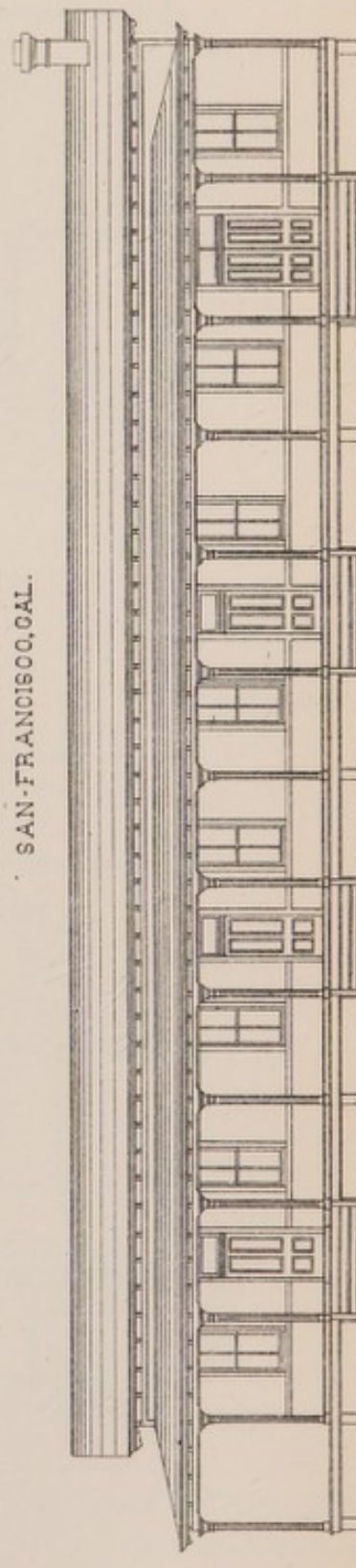


Plate VI



PLAN.

LAUNDRY STORE-ROOM. 30.  
U.S. MARINE HOSPITAL  
SAN-FRANCISCO, CAL.



ELEVATION.

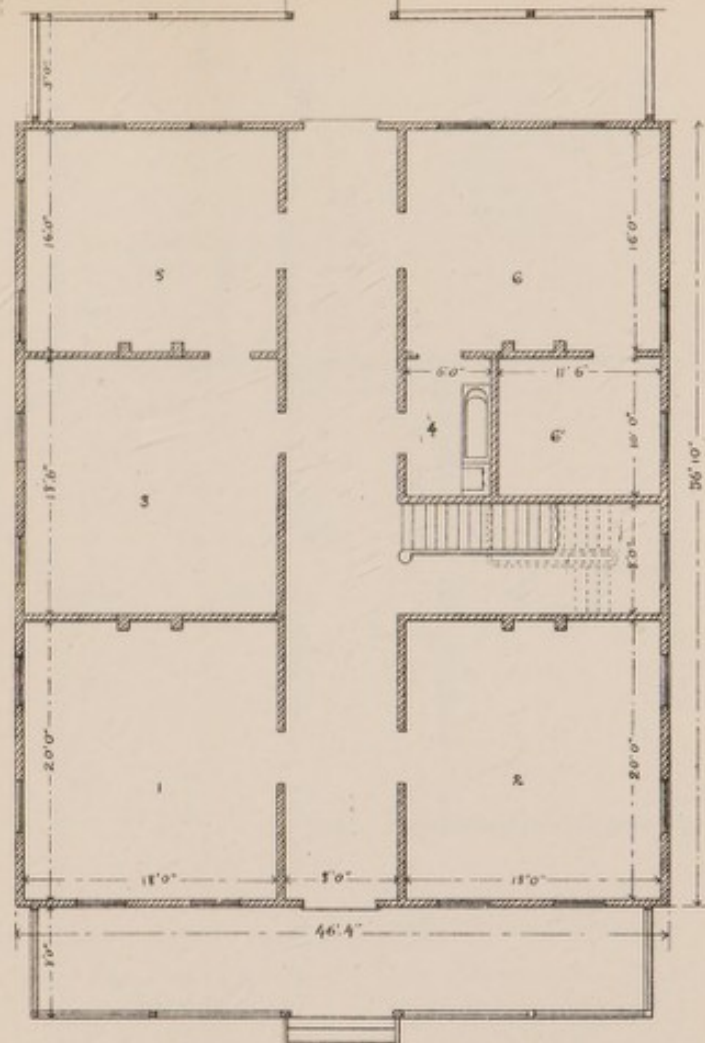
Approved  
Geo. W. Woodward,  
Superintendent

A. W. Miller  
Supervising Architect





Plate VII.



- 1 RECEPTION ROOM
- 2 OFFICE
- 3 LABORATORY
- 4 BATH ROOM
- 5 DISPENSARY
- 6 OPERATING ROOM
- 6' TEMPORARY WARD

FIRST FLOOR PLAN.



Approved

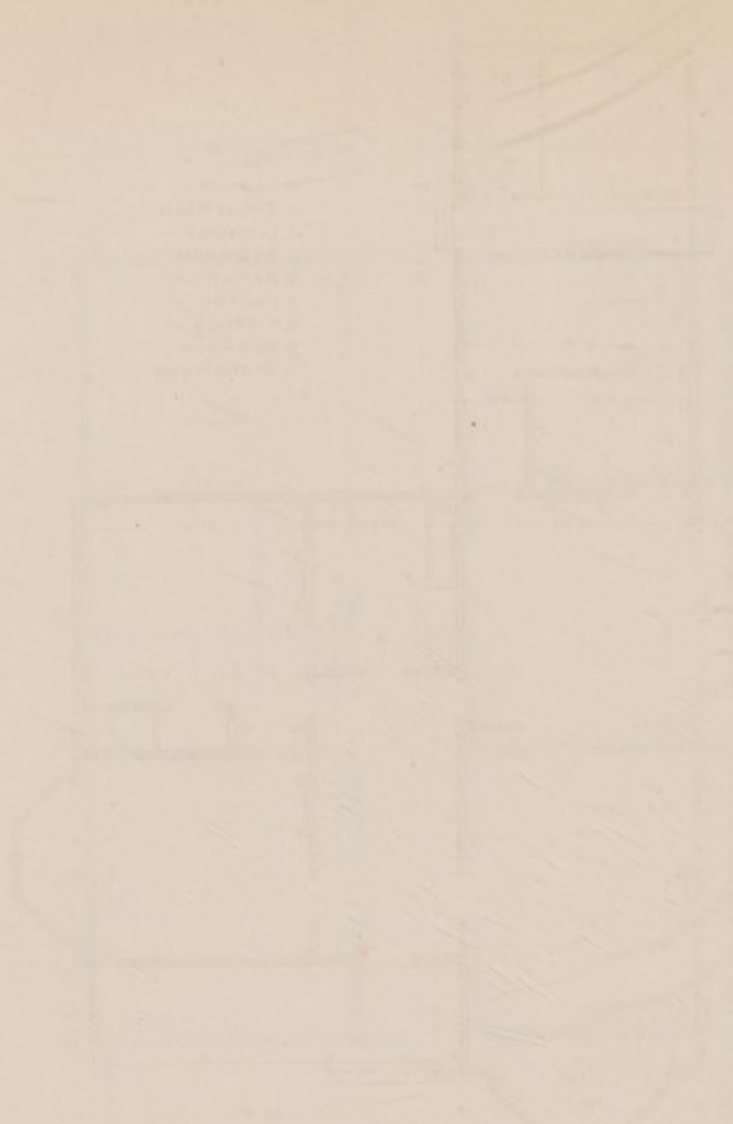
*D. W. Woodworth*  
Superintendent Surgeon

ELEVATION.

EXECUTIVE BUILDING  
U.S. MARINE HOSPITAL  
SAN FRANCISCO, CAL.

*M. H. Muller*  
Supervising Architect





PLAN

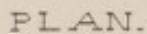
SECTION OF  
THE BUILDING  
AT THE  
STATION



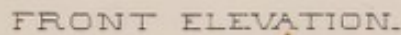
ELEVATION

THE BUILDING  
AT THE  
STATION

## Plate VIII.



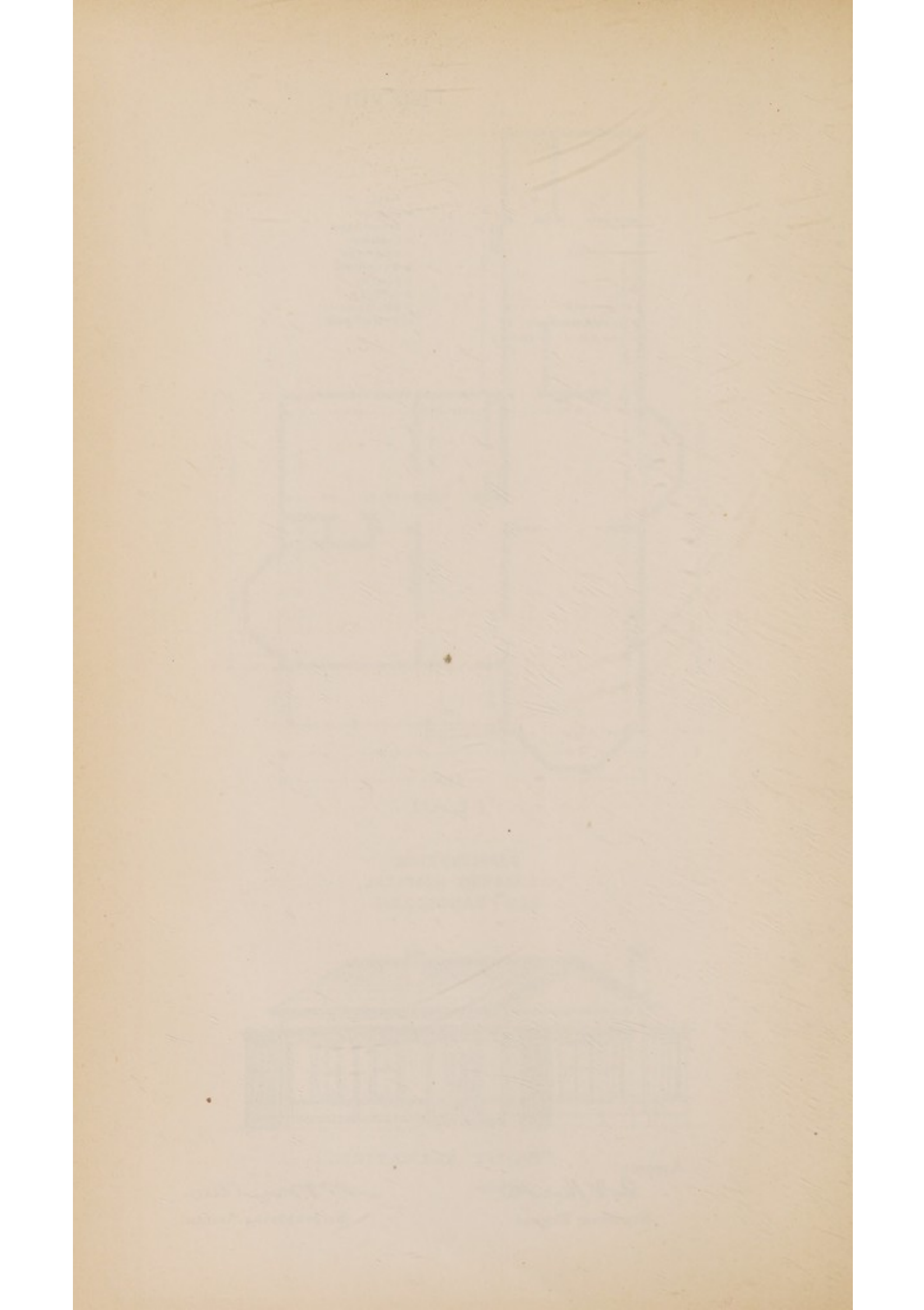
SURGEONS HOUSE



Dr. W. Woodworth,  
Superintending Surgeon

*T. H. Muller*  
Supervising Architect



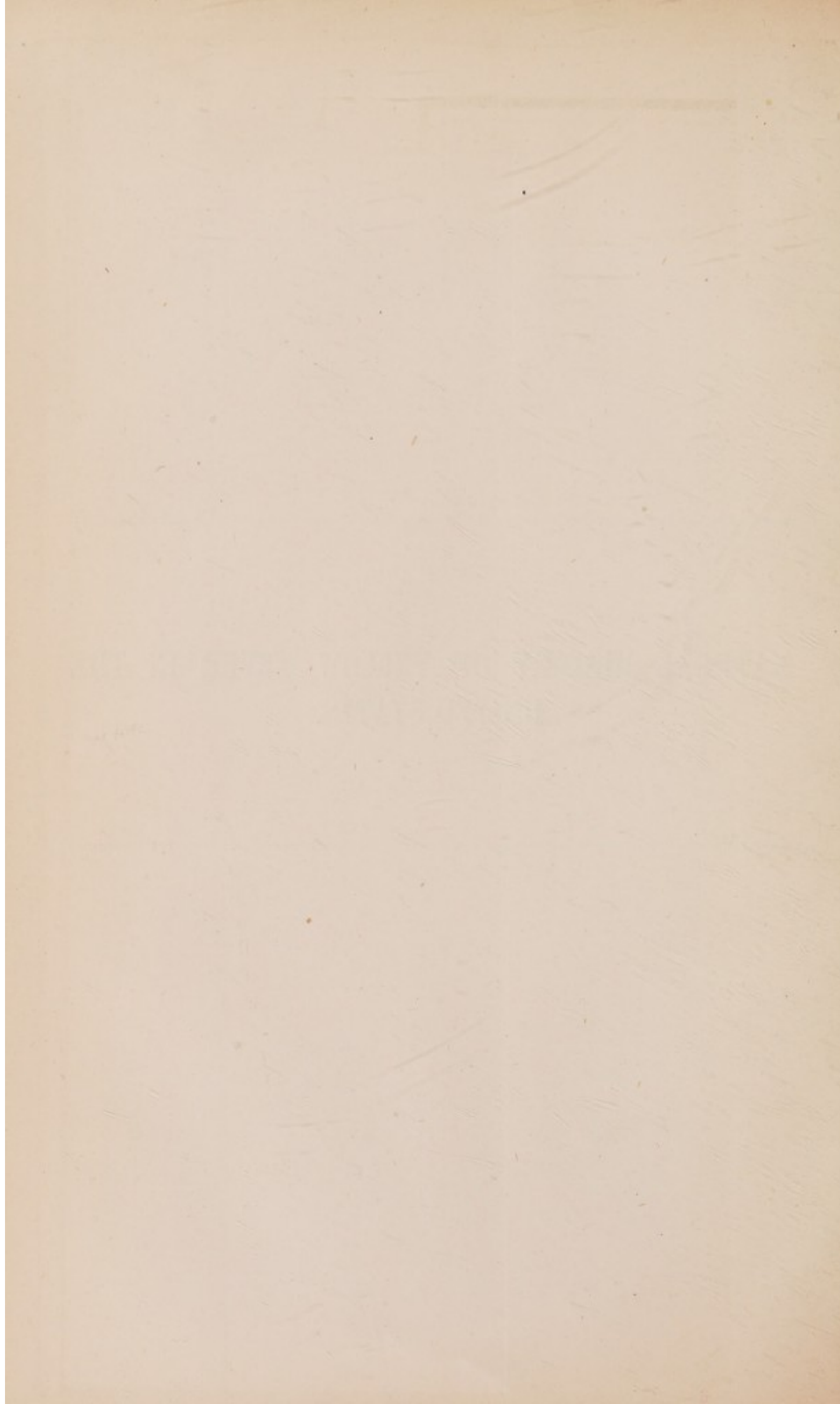


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NATURAL HISTORY OF YELLOW FEVER IN THE  
UNITED STATES.

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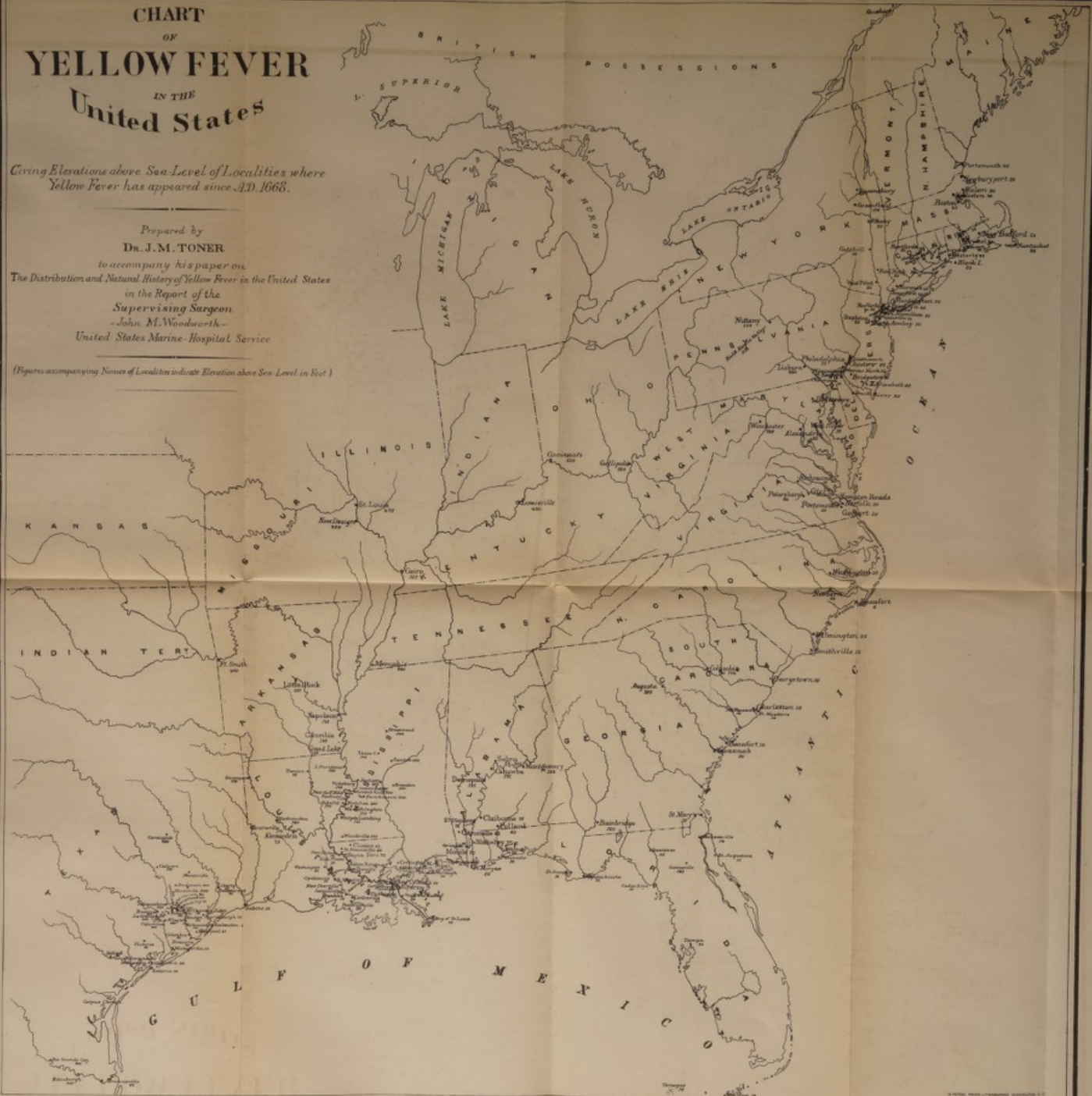
# CHART OF YELLOW FEVER IN THE United States

*Giving Elevations above Sea-Level of Localities where  
Yellow Fever has appeared since A.D. 1668.*

Prepared by  
Dr. J. M. TONER

*to accompany his paper on  
The Distribution and Natural History of Yellow Fever in the United States  
in the Report of the  
Supervising Surgeon  
- John M. Woodworth -  
United States Marine-Hospital Service*

*(Figures accompanying Names of Localities indicate Elevation above Sea-Level in Feet.)*





CHART

YELLOW SEA

United States

Geographical Institute of the United States

Washington

The Hydrographic and Nautical Office of the United States

at the Office of the

Superintendent of the

United States Navy

at the Office of the

Secretary of the Navy

at the Office of the

Secretary of the Navy

at the Office of the

Secretary of the Navy

at the Office of the

Secretary of the Navy

at the Office of the

Secretary of the Navy

at the Office of the

Secretary of the Navy

## B.—THE DISTRIBUTION AND NATURAL HISTORY OF YELLOW FEVER AS IT HAS OCCURRED AT DIFFERENT TIMES IN THE UNITED STATES.

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BY J. M. TONER, M. D.,

*President of the American Medical Association, Washington, D. C.*

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THE map which accompanies this paper, and which indicates the region where yellow fever has prevailed, either in an epidemic or in a sporadic form since the settlement of our country, is made up from notes taken in the study of the geographical distribution of the diseases of the United States.\*

No special opportunities for studying the disease in question are claimed, nor originality in the mode of presenting the facts. Nevertheless, the map is believed to be accurate as far as it goes, if the data derived from past and contemporary medical literature can be relied upon.

Nor is it pretended that this paper is exhaustive, localities not named having, no doubt, been visited by this fever; but we are confident such localities will be found within the region of its general distribution, as here indicated.

The table accompanying this paper, which furnishes mainly the data upon which the map is projected, gives the names of the cities and other localities where yellow fever has occurred in our country from its first settlement, arranged by States in alphabetical order, with the years and dates of its appearance and disappearance.

The elevation of each locality above the sea-level, as far as possible, has been given from reliable sources. In some instances the elevation of a place is assumed from a general knowledge of the altitude of the surrounding country. The errors in these, if any, will be unimportant.

The influence upon localities of elevation above the sea-level, with the exemption from yellow-fever they seem to thence possess, is the view we here wish to call to the attention of sanitarians and of the profession.

We are inclined to give much weight to the theory that diseases have geographical areas and limits, modified somewhat by topographical and climatic conditions, which determine the types of disease as do climate and elevation the fauna and flora of a locality.

The fact has always been patent to the profession, that there are parts of the earth in which particular forms of disease occur, to the almost entire exclusion of others. The study of the causes of this difference is

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\* The map herewith published is projected from a large one, 8 by 10 feet in size, for the execution of which Dr. TONER desires to express his indebtedness to the kindness of the Hon. WILLIS DRUMMOND, Commissioner of the United States Land Office.—W.



as important as any that can engage the attention of the physician. As a simple factor elevation will, we apprehend, be found to possess qualities both preventive and curative.

We shall in this paper studiously avoid discussing the questions whether yellow fever is a specific disease or not; whether it is always imported; or whether under certain conditions it may originate within our own country.

Nor do we aim to speak as an expert, never having seen a case of yellow fever, but rather appear as a collator of facts in its history. At the present time the natural history of disease, if we may so use the term in describing the special characteristic distribution of diseases that exist in limited geographical areas, is attracting much attention. There can be no doubt that an accurate knowledge of the climate and other physical peculiarities, and of the prevailing meteorological conditions of a region, will greatly aid the sanitarian and physician in preventing sickness, and in treating successfully the diseases incident to a locality.

The more exact and extended this information becomes, the more definitely can physicians mark out the boundaries and the distribution of diseases over the globe, and suggest measures of relief.

The chief factors usually and most naturally taken into account in the study of the salubrity of a State, or even a city, are latitude, longitude, the extremes of heat and cold and mean annual temperature, the prevailing direction of the winds, the general humidity of the air, and the annual precipitation, drainage, etc.

These undoubtedly furnish most valuable information, but there is another important element, that of elevation, which has the power to intensify or counteract the influence of most of them.

The most insalubrious regions are, confessedly, the savannas and tide-water lands of the tropic and temperate zones. The impression is quite general that persons of the same nationality, living on mountains or high table-lands are more rugged and healthy, as a general rule, than their friends engaged in similar occupations on the low lands in the same latitude.

The accompanying map enables us, in a comprehensive way, to consider the question whether elevation has presented any barrier to the progress of yellow fever in the United States, by bringing all localities where it has prevailed, with their altitudes, before the eye at one time.

The fact will be patent to any one that the low lands of the Gulf States and the Atlantic coast, with the water-courses emptying into them, are the regions of its most frequent visitations in the United States.

The conceded home of yellow fever is in the West Indies and the Bahamas, with a portion of the adjacent continents of North and South America. A square formed by the forty-fifth and the one hundredth degrees of longitude, and the thirty-fifth north and the fifth south latitude, will include the favorite region of this disease.



Although originating within the square named, history shows that it may prevail on the sea-coast in any locality within the tropics, north and south of the equator, where malarial fevers prevail, and the daily average of the thermometer is over 75° or 80° with a high dew-point for weeks or months together.

If these latter conditions, however, were the only ones necessary to the development of this disease, it should prevail much more widely; for they exist, during parts of the summer at least, in almost all of our Atlantic cities, as may be seen by reference to the record of temperature as shown by the admirable isothermal maps in Lorin Blodgett's *Climatology*.

There are, no doubt, other climatic conditions essential to its origin, if not to its propagation and spread. Once the disease has become epidemic in a place, it can exist at a much lower average daily range of the thermometer than seems to be required for its development.

It is, however, always controlled in its severity and checked in its spread, or entirely arrested by storms, heavy rains, and, most effectually, by frost. This has been exemplified by the polar waves, or "northers," that occasionally blow from the Arctic regions down over Texas, and by long-continued rains.

Yellow fever does not prevail in the East Indies nor in China. It has appeared in most of the maritime cities of the United States on the Atlantic coast, as far north as Boston, and indeed has been chronicled at Quebec and Halifax. But while it is true that it has thus visited many of the cities and towns on the sea-coast, it has, fortunately, never extended far into the interior of our country.

In the United States, it seems to prevail in the large sea-ports and in localities along the navigable water-courses having their outlet in the Gulf of Mexico. Dr. Drake, many years ago, observed that while the disease had appeared at almost every town on the Mississippi, as far up as Vicksburg, that Woodville, twelve miles from the river, was the most remote inland point it had reached. During the late epidemic at Shreveport, a number of deaths occurred, according to the report of the Howard Association, at points outside the city limits—distances from the city not given. The places named are Caddo Parish, Marshall, Greenwood, and Summer Grove.

The same accurate observer (Dr. Drake,) remarks that yellow fever is eminently a disease of cities rather than of rural districts, and of villages rather than of scattered country dwellings. It has been shown that towns of small population are less liable to suffer than larger ones, and the same town within the yellow-fever zone, as its population increases, is more likely to suffer than when its population was less. Hence density of population, or proximity of numerous individuals approaching to crowding, is believed to be a factor of no small influence in the propagation and spread of the disease.



Its appearance in a locality is generally coincident with bilious intermittents, and the first cases are said always to occur near the water in the lowest and most insalubrious places.

It has been observed that its epidemical limits coincide with the range of the growth of the live-oak, the cypress, and the long mosses. Certainly the regions of our country most frequented by this disease are particularly low and flat, with numerous rivers and much marsh and swamp lands, as may be inferred from the localities and their elevations marked on the map. These low lands are to a considerable extent covered with the cypress, long-leaved pine, and other indigenous trees, with thick undergrowth when in an unredeemed or natural state. The northern limit of the growth of the cypress is not much north of Norfolk.

Yellow fever has been considered by nearly all writers a distinct disease from the autumnal remittent fevers of the temperate zone. All agree that it is indigenous at Vera Cruz on the Gulf of Mexico. When we examine into the climatic conditions of this locality, nothing special or satisfactory as an explanation of the peculiarities and origin of the disease has been discovered.

Protracted average high temperature is a constant factor there, but this of itself is deemed insufficient. The time has, perhaps, not come, if it ever does, for the discovery of all the elements entering into its development.

No doubt there are numerous undiscovered factors and conditions, essential to its existence and present in varying intensity, in different years, and which greatly add to its rapid spread and virulence. The mortality from the disease at the same place is much greater in some seasons when the conditions of heat and moisture are apparently the same. Again, extreme heat and dryness stop the epidemic, as do heavy and protracted rains.

As we have already stated, the conditions of long-continued heat, averaging over 75° throughout the twenty-four hours, and great humidity exist almost constantly during the summer in the Gulf States. Occasionally during the summer season, for months together, this condition of high temperature, but with less moisture, may exist in many of the coast cities of our country, as far north as Boston, and yet rarely ever are these cities visited by this disease in an epidemic form.

Is the exemption of these more northern coast cities due alone to climatic conditions, or are they in part exempted by sanitary and quarantine regulations? Yellow fever is almost annually reported on vessels at the quarantine stations, where it is fortunately arrested and prevented from entering the cities. In the table of the localities where the disease has prevailed, no distinction has been made between the city proper and the quarantine stations which, in a more careful study, should be made.

The average annual distribution of moisture throughout our country is made manifest by a glance at Chas. A. Schott's Tables and Results of



the Precipitation in Rain and Snow, published in 1872 by the Smithsonian Institution, a most valuable contribution to knowledge in this direction. The humidity in the atmosphere is relative to the season, and, as is well known, the absolute humidity is greater in the summer than in the winter, warm air having a greater capacity to contain moisture than cold air, as the following table from Professor Guyot will show. This table expresses, in troy grains, the weight of vapor contained in a cubic foot of saturated air at the stated temperatures of Fahrenheit:

Temperature of air.	Vapor in grains.	Temperature of air.	Vapor in grains.	Temperature of air.	Vapor in grains.
0°	0.545	63°	6.351	80°	10.949
5	0.678	64	6.575	81	11.291
10	0.841	65	6.795	82	11.643
20	1.298	66	7.021	83	12.005
30	1.968	67	7.253	84	12.376
32	2.126	68	7.493	85	12.756
40	2.862	69	7.739	86	13.146
45	3.426	70	7.992	87	13.546
50	4.089	71	8.252	88	13.957
55	4.860	72	8.521	89	14.378
56	5.028	73	8.797	90	14.810
57	5.202	74	9.081	91	15.254
58	5.381	75	9.372	92	15.709
59	5.566	76	9.670	93	16.176
60	5.756	77	9.977	94	16.654
61	5.952	78	10.292	95	17.145
62	6.154	79	10.616	96	17.648

To see how far the conditions of a higher than ordinary average of temperature and a greater degree of humidity may have existed in Memphis and Shreveport during the prevalence of the epidemic of the past summer, we have been enabled, through the courtesy of General Myer, to tabulate the returns, nearly complete, made from Memphis to the United States Signal Bureau for the months of August, September, October, and November, 1872 and 1873. The former year, being healthy at this place, is included for the purpose of contrast. The meteorological tables for Shreveport are compiled from the observations furnished by Dr. J. L. Moore, of Shreveport, the regular observer for the Smithsonian Institution at that point. In addition to the ordinary observations, Dr. Moore gives the daily number of deaths occurring from yellow fever, which, for convenience, is placed in a parallel column on the side of the meteorological table, and on the line of the other daily observations. For Shreveport we are not able to give the observations in 1872 for contrast:



TABLE SHOWING THE METEOROLOGICAL CONDITIONS OBSERVED AT SHREVEPORT, LA., DURING THE YELLOW-FEVER EPIDEMIC OF 1873.

Compiled from the Register of Meteorological Observations under the direction of the Smithsonian Institution, J. L. Moore, M. D., Observer, to which is added the daily Number of Deaths from Yellow Fever.

SHREVEPORT: County of Caddo, State of Louisiana; latitude, 32° 30' north; longitude, 93° 45' west; height above the sea-level, 228.52 feet.]

Day of month.	Thermometer in the open air.				Rain-fall, inches.	Amount of cloudiness.			Winds.*						Barometer reduced to freezing-point.	Relative humidity or fraction of saturation.†			Deaths from yellow fever.
	7 a. m.	2 p. m.	9 p. m.	Mean.		7 a. m.	2 p. m.	9 p. m.	7 a. m.		2 p. m.		9 p. m.						
									Direction.	Force.	Direction.	Force.	Direction.	Force.					
Aug. 1	79	88	81	82½	....	4-4	1-2	3-4	S. W.	5	S.	5	0	0	30.111	.86	.55	.83	..
2	80	89	84	84½	....	1-4	4-4	0	S. W.	6	0	0	0	0	30.068	.82	.53	.79	..
3	80	90	85	85	.01	1-2	3-4	1-4	S. W.	7	N. W.	5	N.	1	30.083	.82	.53	.79	..
4	80	80	79	79½	.40	3-4	4-4	1-4	E.	6	N. E.	12	0	0	30.132	.78	.78	.87	..
5	74	84	78	78½	....	3-4	3-4	0	N. E.	8	N. E.	7	N. E.	5	30.135	.76	.53	.69	..
6	74	87	81	80½	....	1-4	1-2	1-4	N. E.	6	N. E.	7	N.	5	30.065	.72	.45	.70	..
7	80	81	80	80½	....	4-4	4-4	1-2	0	0	E.	5	0	0	29.996	.78	.55	.82	..
8	78	88	77	81	.13	0	4-4	3-4	S. E.	1	0	0	E.	2	29.994	.73	.52	.77	..
9	77	87	81	81½	.11	1-4	3-4	3-4	E.	5	E.	7	E.	1	30.055	.82	.55	.78	..
10	76	87	80	81	....	4-4	3-4	4-4	E.	2	E.	8	E.	1	30.102	.91	.58	.82	..
11	81	90	83	84½	....	1-2	3-4	0	N. E.	4	S. E.	8	N.	4	30.031	.78	.60	.71	..
12	82	91	81	84½	....	3-4	3-4	4-4	N.	2	E.	5	E.	4	30.038	.79	.57	.78	..
13	78	91	85	84½	....	3-4	3-4	1-2	S. W.	6	S. W.	7	S. W.	2	30.014	.86	.54	.72	..
14	80	90	76	82	.60	3-4	3-4	1-2	0	0	S. W.	7	0	0	29.971	.82	.56	.91	..
15	76	91	77	81½	.24	3-4	3-4	4-4	N.	4	N.	2	S. E.	8	29.895	.91	.60	.91	..
16	75	85	79	79½	....	4-4	4-4	3-4	N. E.	4	N. E.	4	0	0	29.939	.90	.68	.87	..
17	76	82	79	79	.05	4-4	4-4	1-2	N.	8	N.	5	N. E.	5	29.997	.91	.83	.78	..
18	78	85	79	80½	....	1-2	1-4	0	N. E.	5	N. E.	6	0	0	30.062	.69	.41	.70	..
19	77	85	79	80½	....	1-4	1-2	1-4	N. E.	1	E.	4	0	0	30.043	.69	.44	.66	..
20	76	85	81	80½	....	3-4	1-2	1-4	E.	1	S. E.	4	S. E.	4	29.961	.73	.47	.67	2
21	76	82	79	79	....	1-4	1-4	0	S. W.	1	N.	7	E.	2	29.969	.77	.83	.78	1
22	79	86	79	81½	....	1-2	3-4	0	0	0	E.	7	N. E.	2	30.029	.74	.48	.74	4
23	76	86	79	80½	....	3-4	3-4	0	E.	2	E.	5	0	0	30.076	.82	.58	.82	..
24	81	88	84	84½	....	0	1-2	1-4	S.	2	N. W.	5	0	0	30.107	.70	.49	.75	2
25	81	90	83	84½	....	0	1-2	1-2	S.	1	N. E.	4	0	0	30.037	.74	.50	.75	2
26	79	90	77	82	....	3-4	3-4	3-4	W.	6	N.	4	S. W.	2	30.020	.78	.53	.82	1
27	78	91	86	85	....	0	1-2	0	S. W.	1	N. E.	1	0	0	30.016	.78	.51	.68	3
28	78	91	81	83½	....	1-4	1-4	1-4	W.	4	N. W.	2	S. E.	2	30.053	.73	.54	.70	4
29	79	84	80	83	.05	0	3-4	0	S. W.	1	0	0	S. E.	4	30.118	.74	.68	.87	4
30	80	91	84	85	....	0	1-2	0	S.	2	S.	5	S. W.	6	30.175	.82	.48	.64	2
31	80	89	82	83½	....	0	1-2	1-4	0	0	0	0	S. E.	1	30.133	.74	.50	.71	4

REMARKS.—Normal summer-heat for this latitude prevailed during the month; mean temperature, 82° 56'; highest at 2 p. m., 91° on the 12th, 13th, 15th, 27th, 28th, and 30th; lowest, 80° on the 4th. Force of wind remarkably uniform and moderate, scarcely rising at any time above the degree of "gentle." *Yellow fever*: The first death from yellow fever in Shreveport this summer was observed on the 20th day of August, which date proved the beginning of the epidemic of 1873. Total deaths from the disease during the month, 29.

\* The force is estimated and registered by figures from 1 to 10, as in the first column of the following table. The figures in the last column, expressing the number of miles per hour, are used in the above.

1. Very light breeze.....	2 miles per hour.	6. Gale.....	45 miles per hour.
2. Gentle breeze.....	4 do.	7. Strong gale.....	60 do.
3. Fresh breeze.....	12 do.	8. Violent gale.....	75 do.
4. Strong wind.....	25 do.	9. Hurricane.....	90 do.
5. High wind.....	35 do.	10. Most violent hurricane.....	100 do.

† The numbers under the head of "Relative humidity" denote the percentage of saturation; full saturation being indicated by 1, and half saturation by 0.5.

Table showing the Meteorological Conditions observed at Shreveport, La., during the Yellow-Fever Epidemic of 1873—Continued.

Day of month.	Thermometer in the open air.				Rain-fall, inches.	Amount of cloudiness.			Winds.						Barometer reduced to freezing-point.	Relative humidity or fraction of saturation.			Deaths from yellow fever.
	7 a. m.	2 p. m.	9 p. m.	Mean.		7 a. m.	2 p. m.	9 p. m.	7 a. m.		2 p. m.		9 p. m.						
									Direction.	Force.	Direction.	Force.	Direction.	Force.					
Sept. 1	79	86	83	82½	....	0	3-4	1-4	S. W.	4	S.	5	0	0	30.071	.78	.58	.71	6
2	78	91	81	83½	....	1-2	1-2	4-4	S.	7	S.	7	S.	7	30.042	.82	.45	.70	5
3	79	98	83	84½	....	3-4	3-4	1-4	S. W.	6	S. W.	10	S.	4	30.022	.82	.45	.60	5
4	78	92	82	84	....	3-4	1-2	0	S. W.	5	S.	7	S.	4	30.052	.82	.43	.63	2
5	79	91	85	85	....	1-4	1-4	1-2	S. W.	2	N. W.	5	0	0	30.127	.82	.36	.64	4
6	77	91	79	82½	....	3-4	1-2	3-4	N.	1	N. E.	6	N.	14	30.167	.77	.45	.74	7
7	74	83	72	76½	.01	1-2	3-4	3-4	N.	7	N.	12	N. E.	8	30.214	.76	.67	.71	10
8	68	79	71	72½	....	1-2	1-2	1-4	N. E.	8	E.	10	N. E.	4	30.178	.70	.58	.62	11
9	67	85	77	76½	....	1-4	3-4	3-4	N. E.	5	N. E.	5	0	0	30.074	.69	.51	.73	8
10	75	87	79	80½	....	1-2	1-2	1-4	N. E.	1	N. E.	4	S. E.	2	30.065	.77	.69	.70	15
11	77	87	81	81½	....	1-4	1-2	1-2	N. E.	1	E.	4	S. E.	4	30.050	.73	.65	.59	18
12	77	76	73	75½	....	4-4	4-4	4-4	0	0	S. E.	6	S. E.	5	29.999	.75	.82	.90	15
13	69	76	70	71½	1.56	4-4	1-4	0	S. W.	1	N. E.	1	N. E.	10	30.076	.90	.64	.80	26
14	61	69	64	64½	.06	0	0	0	N. E.	7	N. E.	7	N. E.	4	30.140	.71	.56	.78	24
15	64	81	69	71½	....	0	0	0	N. E.	2	S. E.	4	E.	1	30.121	.68	.41	.85	31
16	67	83	73	74½	....	0	1-4	0	E.	2	E.	6	0	0	30.107	.74	.30	.67	24
17	69	85	74	76	....	0	1-4	0	0	0	E.	2	0	0	29.978	.70	.41	.76	18
18	70	87	79	78½	....	0	1-4	0	E.	1	N. E.	1	0	0	29.899	.80	.45	.74	19
19	75	87	72	78	....	0	1-2	0	N. E.	2	N. E.	1	N. E.	8	29.939	.72	.49	.76	16
20	63	77	69	69½	....	0	1-4	0	N. E.	6	E.	7	N. E.	4	30.028	.62	.46	.56	14
21	63	80	69	70½	.01	3-4	3-4	0	E.	4	E.	7	N. E.	6	30.021	.67	.51	.75	15
22	65	71	68	68	.05	4-4	1-2	1-4	0	0	N. E.	10	N. E.	2	30.002	.78	.85	.95	18
23	66	78	68	70½	....	0	3-4	0	N. E.	5	N.	7	N.	5	29.970	.89	.54	.84	11
24	62	85	74	73½	....	0	1-2	0	S. E.	2	S. W.	8	S.	8	29.866	1.00	.47	.76	10
25	70	87	75	77½	....	0	1-2	0	S.	4	S. E.	4	S. E.	2	29.935	1.00	.62	.77	14
26	73	83	76	77½	....	1-4	3-4	4-4	S. E.	6	S.	5	S. E.	5	29.988	.85	.83	.82	15
27	75	82	74	77	.48	4-4	4-4	1-2	S. E.	10	S. E.	4	S. E.	5	29.981	.90	.75	1.00	20
28	77	87	80	81½	....	3-4	1-2	1-2	S. E.	2	S.	4	S.	6	29.928	.91	.62	.82	11
29	72	76	69	72½	.12	4-4	4-4	4-4	N. E.	13	N. W.	6	N. E.	13	30.066	.95	.82	.95	7
30	64	74	64	67½	....	4-4	1-4	0	N. E.	7	N. E.	6	N. E.	7	30.146	.73	.76	.73	7

REMARKS.—Extremes of temperature during this month: Highest at 2 p. m., 92°, on the 4th; lowest, 69°, on the 14th; mean for the month, 76°. 14. Humidity appears much greater than last September. Wind variable in force and direction. *Yellow fever*: Heavy mortality from yellow fever during this month, proving most fatal about the middle of the month, averaging seventy-five per cent. Total deaths from the disease, 406.



Table showing the Meteorological Conditions observed at Shreveport, La., during the Yellow-Fever Epidemic of 1873—Continued.

Day of month.		Thermometer in the open air.				Rain-fall, inches.	Amount of cloudiness.			Winds.						Barometer reduced to freezing-point.	Relative humidity or fraction of saturation.			Deaths from yellow fever.
										7 a. m.		2 p. m.		9 p. m.						
		7 a. m.	2 p. m.	9 p. m.	Mean.		7 a. m.	2 p. m.	9 p. m.	Direction.	Force.	Direction.	Force.	Direction.	Force.		Mean.	7 a. m.	2 p. m.	
Oct.	1	61	75	67	67½	.....	0	2-4	1-2	N. E.	5	N.	5	N. E.	7	30.083	.55	.44	.69	8
	2	65	79	71	71½	.....	3-4	0	0	N. E.	2	N. W.	2	N. W.	1	30.090	.73	.43	.80	11
	3	69	84	77	76½	.....	0	1-2	0	N. E.	2	E.	2	S. E.	1	30.028	.75	.54	.69	16
	4	73	88	80	80½	.....	0	1-2	0	S.	1	W.	5	0	0	29.953	.72	.40	.70	7
	5	74	88	80	80½	.....	0	3-4	1-4	0	0	N. W.	2	0	0	29.915	.72	.43	.70	11
	6	61	66	57	61½	.....	1-4	0	0	N.	18	N. E.	14	N.	10	30.137	.61	.32	.47	12
	7	54	64	59	59	.....	0	0	0	N.	4	N.	5	0	0	30.136	.55	.34	.70	6
	8	54	68	63	61½	.....	3-4	3-4	0	0	0	E.	6	S. E.	2	30.116	.74	.56	.67	12
	9	55	77	69	67	.....	0	1-2	1-2	S. E.	1	S. E.	7	S. E.	2	30.129	.81	.61	.75	10
	10	64	79	69	70½	.....	0	3-4	0	0	0	E.	5	0	0	30.178	.78	.47	.75	2
	11	65	87	75	75½	.....	4-4	1-2	0	0	0	N. W.	8	0	0	30.184	.78	.45	.68	3
	12	66	74	65	68½	.....	0	0	0	0	0	N. E.	10	N. E.	1	30.217	.54	.29	.49	8
	13	57	73	61	63½	.....	0	0	0	N. E.	1	E.	2	E.	5	30.163	.63	.24	.71	7
	14	56	74	65	65	.....	0	0	0	0	0	E.	10	S. E.	4	30.186	.69	.36	.68	7
	15	62	79	73	71½	.....	3-4	1-2	1-4	S. E.	1	S. E.	10	S. E.	4	30.277	.72	.51	.63	8
	16	70	77	73	73½	.05	4-4	4-4	1-2	S. E.	2	S.	4	S. E.	1	30.190	.90	.77	.81	5
	17	69	80	75	74½	.01	1-2	3-4	4-4	S. E.	4	S. W.	8	S. E.	8	30.040	.80	.87	.78	7
	18	67	70	59	65½	1.17	4-4	1-2	1-4	N.	12	N.	8	N.	14	30.166	.95	.53	.70	2
	19	50	60	52	54	.....	0	0	0	N.	5	N.	18	N. W.	2	30.253	.65	.29	.60	7
	20	46	70	56	57½	.....	0	0	0	W.	2	N. W.	7	N. E.	2	30.073	.77	.36	.81	5
	21	49	71	65	61½	.....	0	1-2	0	S. E.	2	S.	18	S.	7	29.860	.78	.49	.63	3
	22	63	68	50	60½	1.00	4-4	4-4	4-4	S. E.	2	S. W.	13	N. W.	7	29.969	.89	.95	1.00	4
	23	41	49	47	45½	1.06	4-4	0	0	N.	8	N. E.	8	N. E.	4	30.193	.91	.93	.85	6
	24	39	53	48	46½	.01	1-4	1-4	4-4	N. E.	4	S. E.	4	E.	6	30.246	.91	.80	1.00	3
	25	48	62	63	57½	.85	4-4	4-4	4-4	E.	5	S. E.	4	S. E.	4	30.133	1.00	.83	.94	2
	26	68	78	61	69	.....	4-4	4-4	4-4	S.	5	S. W.	5	N. W.	12	29.936	1.00	.91	.77	5
	27	45	60	54	53	.....	3-4	1-4	0	N. W.	4	N.	5	S. W.	4	30.088	.84	.39	.61	5
	28	37	47	40	41½	.....	0	0	0	N.	7	N. W.	19	N. W.	8	30.454	.62	.28	.56	4
	29	33	55	47	45	.....	0	0	0	.....	.....	S. W.	2	S.	4	30.376	.89	.62	.48	3
	30	42	67	53	54	.....	0	0	0	S. W.	4	W.	10	N.	1	30.170	.74	.60	.86	3
	31	45	57	47	49½	.....	0	0	0	N.	8	N. E.	10	N. E.	4	30.341	.61	.31	.62	4

REMARKS.—Extremes of temperature: Highest at 2 p. m., 88°, on the 4th; lowest, 47°, on the 28th; mean for the month, 62°.68. Variable winds; fluctuating barometer; thunder-storm on the 26th of the month; greatest force of the wind sixty miles an hour. *Yellow fever*: An abatement of the yellow fever, as shown by mortality, was noticed about the middle of September and continued through this month, making a difference of 210 in deaths. Total deaths from yellow fever for November, 196.

Table showing the Meteorological Conditions observed at Shreveport, La., during the Yellow-Fever Epidemic of 1873—Continued.

Day of month.	Thermometer in the open air.				Rain fall, inches.	Amount of cloudiness.			Winds.						Barometer reduced to freezing-point.	Relative humidity or fraction of saturation.			Deaths from yellow fever.
									7 a. m.		2 p. m.		9 p. m.						
	7 a. m.	2 p. m.	9 p. m.	Mean.		7 a. m.	2 p. m.	9 p. m.	Direction.	Force.	Direction.	Force.	Direction.	Force.		Mean.	7 a. m.	2 p. m.	
Nov. 1	44	66	58	56	....	1-2	3-4	4-4	E.	4	S.	5	S. E.	1	30.313	.60	.59	.70	1
2	53	56	58	55½	1.18	3-4	4-4	4-4	N. E.	5	S. E.	2	N.	6	30.162	.80	1.00	1.00	..
3	54	57	54	55	.28	4-4	4-4	4-4	N. E.	7	N. E.	5	N. E.	6	30.182	1.00	.87	.93	2
4	54	60	58	57½	.32	4-4	4-4	4-4	N. E.	6	N. W.	2	N. W.	2	30.074	1.00	.88	.94	1
5	56	60	58	58	.07	4-4	4-4	4-4	N.	4	0	0	N.	4	30.106	1.00	.88	.94	1
6	55	68	61	61½	....	3-4	3-4	0	N. W.	6	N.	2	0	0	30.042	.93	.65	.88	2
7	51	73	62	62	....	0	0	0	W.	2	S. W.	6	W.	2	30.016	1.00	.46	.77	..
8	55	71	56	60½	....	0	0	0	N.	4	N.	1	N.	4	30.230	.80	.37	.81	2
9	47	74	60	60½	....	0	0	0	0	0	W.	2	0	0	30.224	.92	.29	.65	..
10	51	78	66	65	....	0	0	0	0	0	W.	5	S.	8	30.116	.86	.29	.50	1
11	56	79	62	65½	....	1-4	0	0	S. W.	7	S. W.	8	N. W.	4	30.000	.69	.35	.46	..
12	47	54	48	49½	....	1-4	0	0	N.	18	N. W.	16	N. W.	4	30.271	.48	.32	.36	..
13	35	59	50	48	....	0	0	0	0	0	S. W.	4	S. W.	7	30.179	.70	.47	.80	..
14	42	67	58	55½	....	1-4	3-4	3-4	S.	2	S.	1	S.	4	30.171	.74	.33	.58	..
15	55	69	64	62½	....	3-4	4-4	4-4	S.	4	S. W.	6	S.	6	30.135	.87	.65	.83	..
16	65	74	66	68½	....	4-4	1-2	0	S. W.	5	S. W.	8	N. W.	30	29.966	.99	.59	.19	..
17	51	73	68	64	....	1-2	0	1-4	N. W.	6	N. W.	20	S. W.	4	29.623	.52	.17	.22	..
18	53	58	48	53	....	3-4	0	3-4	N. W.	4	N. W.	30	N.	20	30.033	.67	.26	.51	..
19	54	53	58	55	....	0	0	0	N. W.	1	N. W.	13	0	0	30.271	.45	.24	.64	..
20	35	60	53	49½	.05	0	3-4	4-4	S. E.	2	S.	5	S.	4	30.179	.70	.20	.73	..
21	49	64	61	58	8.50	4-4	3-4	4-4	E.	2	S. E.	2	S. E.	6	30.135	.92	.67	.77	..
22	60	66	64	63½	3.85	4-4	4-4	4-4	S. E.	4	S. E.	2	N. E.	2	29.853	.94	.84	1.00	..
23	62	62	59	61	....	4-4	4-4	4-4	N. E.	10	E.	11	N.	4	29.808	.88	.94	.94	..
24	47	50	48	48½	....	4-4	4-4	0	N.	11	N. W.	5	W.	4	30.119	.92	.72	.85	..
25	66	63	55	61½	....	1-4	3-4	1-2	W.	4	N. W.	11	0	0	30.168	.69	.33	.50	..
26	45	63	55	54½	....	3-4	3-4	1-2	S. E.	2	S.	6	S.	12	29.930	.76	.47	.68	..
27	52	63	57	57½	....	4-4	1-2	4-4	S.	5	S.	1	0	0	29.985	1.00	.67	.81	..
28	45	46	45	45½	....	4-4	4-4	4-4	N. E.	11	N. E.	5	E.	4	30.345	.53	.47	.53	..
29	40	59	53	50½	....	4-4	0	1-2	E.	0	S. E.	4	S. E.	2	30.355	1.00	.48	.73	..
30	51	70	63	61½	....	0	4-4	1-4	S.	6	S.	6	S.	8	30.275	1.00	.61	.78	..

REMARKS.—Mean temperature for the month, 57.45°; highest at 2 p. m., 79°, on the 11th; lowest, 46°, on the 28th; first frost, night of the 12th and 13th. *Yellow fever*: Yellow fever continued to abate, until the 10th of the month, when the last death occurred; total deaths from yellow fever for the month, 10.



TABLE OF THE METEOROLOGICAL CONDITIONS OBSERVED AT MEMPHIS, TENN.

Compiled from the Reports of the Signal-Service, U. S. A., for Comparison

[MEMPHIS: County of Shelby, State of Tennessee; latitude 35° 07' north;

		Thermometer.				Amount of cloudiness.*						Wind.						Humidity, per cent.				
1872.						7.35 a.m.		4.35 p.m.		11 p. m.		7.35 a.m.		4.35 p.m.		11 p. m		Barometer.†				
Aug.	7.35 a. m.	4.35 p. m.	11 p. m.	Mean.	Rain-fall, inches.	Lower.	Upper.	Lower.	Upper.	Lower.	Upper.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Mean.	7 a. m.	2 p. m.	9 p. m.	
1	72	89	...	80.50	...	0	2-4	0	2-4	...	...	N. W.	6	N. W.	4	...	...	30.07	.85	.56	...	
2	76	85	77	79.66	...	0	1-4	0	1-4	2-4	0	N. E.	5	N. W.	11	N. W.	2	30.09	.72	.46	.64	
3	73	81	70	74.66	...	0	0	0	1-4	0	0	N. E.	4	N. W.	11	N. E.	4	30.11	.71	.44	.65	
4	...	82	71	76.50	...	...	...	0	2-4	0	0	...	...	N. W.	10	N. E.	6	30.16	...	.45	.70	
5	69	70	90	76.33	...	0	1-4	0	1-4	0	0	N.	4	N.	6	N.	4	30.15	.70	.50	.76	
6	74	88	78	80.00	...	0	0	0	2-4	0	0	N. E.	...	N. E.	4	N. E.	...	30.14	.76	.52	.77	
7	78	90	85	84.33	...	0	1-4	0	2-4	1-4	0	N. E.	...	N. E.	...	N. E.	...	30.11	.73	.47	.77	
8	80	88	78	82.00	...	1-4	0	0	2-4	0	0	S. E.	...	E.	...	S. W.	0	30.10	.74	.55	.77	
9	78	94	75	82.33	...	0	1-4	0	1-4	4-4	...	S. E.	...	S. E.	...	E.	...	30.10	.77	.40	.81	
10	77	90	80	82.33	...	0	2-4	0	...	1-4	0	0	0	S. W.	...	0	0	30.05	.73	.44	.78	
11	80	93	83	85.33	...	0	0	0	2-4	1-4	0	S. E.	...	S. E.	...	S. E.	0	30.05	.78	.48	.71	
12	81	78	76	78.33	...	1-4	0	2-4	1-4	3-4	0	S. W.	...	S. E.	...	0	0	30.06	.78	.77	.81	
13	77	85	79	80.33	...	0	1-4	2-4	1-4	1-4	2-4	S. E.	...	N. W.	...	W.	...	30.06	.81	.68	.38	
14	79	88	79	82.00	...	0	2-4	0	1-4	0	0	W.	10	N. W.	...	N. E.	...	30.02	.82	.46	.74	
15	75	85	76	78.66	...	0	0	0	4-4	0	0	N.	...	N. W.	...	N. W.	...	30.07	.68	.41	.81	
16	74	88	77	79.66	...	0	0	0	2-4	0	0	0	0	N. W.	...	0	0	30.05	.81	.37	.64	
17	75	91	78	81.33	...	0	0	0	1-4	0	0	S. W.	1	S. E.	4	0	0	30.07	.68	.36	.69	
18	78	92	80	83.33	...	0	1-4	0	1-4	0	0	S. E.	1	N. E.	5	0	0	30.12	.65	.37	.70	
19	78	93	82	84.33	...	0	0	0	1-4	0	0	S.	1	S. E.	4	S. E.	4	30.18	.77	.40	.66	
20	80	93	82	85.00	...	0	0	0	2-4	0	0	0	0	E.	2	0	0	30.20	.70	.43	.70	
21	81	93	83	85.66	...	0	0	0	2-4	1-4	0	0	0	0	0	0	0	30.22	.70	.43	.75	
22	80	94	84	86.00	...	S.	2-4	0	1-4	0	1-4	0	0	N. W.	4	0	0	30.17	.78	.40	.67	
23	82	94	82	86.00	...	0	0	0	2-4	1-4	1-4	0	0	0	0	N. E.	1	30.03	.74	.40	.59	
24	78	96	84	86.00	...	0	0	0	1-4	1-4	0	N. E.	1	S. W.	5	S. W.	7	29.96	.69	.39	.64	
25	83	98	87	89.33	...	0	1-4	0	1-4	1-4	0	0	0	N. W.	4	0	0	30.02	.67	.38	.65	
26	82	97	84	89.33	...	0	1-4	1-4	1-4	2-4	0	S. E.	1	N. E.	4	S.	1	30.06	.70	.37	.64	
27	80	93	82	85.00	.54	0	2-4	1-4	2-4	1-4	0	S.	1	W.	4	0	0	30.02	.78	.48	.74	
28	80	95	84	86.33	...	S.	1-4	0	1-4	1-4	0	S.	1	W.	6	S. W.	2	29.97	.78	.44	.71	
29	79	87	64	76.66	...	0	2-4	0	2-4	2-4	0	N. W.	4	N. W.	12	N. E.	8	29.99	.77	.58	.67	
30	68	80	66	71.33	...	0	1-4	0	1-4	1-4	0	N.	6	N. E.	10	N. E.	4	30.08	.74	.30	.58	
31	62	78	66	68.66	...	1-4	2-4	0	1-4	1-4	0	N. E.	4	N. E.	8	N. E.	4	30.09	.66	.29	.58	
Sept.																						
1	60	83	69	70.66	...	0	0	0	0	0	0	N. E.	3	N. E.	6	N.	4	30.17	.59	.21	.65	
2	64	85	73	74.00	...	0	0	0	1-4	1-4	0	E.	1	N. W.	8	N.	1	30.16	.67	.32	.58	
3	65	87	75	75.66	...	0	0	0	1-4	1-4	0	E.	1	N. W.	6	0	0	30.10	.73	.27	.63	
4	69	89	75	77.66	...	0	1-4	0	0	0	0	0	0	S. W.	8	0	0	30.01	.84	.32	.59	
5	69	91	79	79.66	...	S.	H.	S.	H.	0	0	S. W.	1	S. W.	10	S.	4	29.96	.70	.39	.78	
6	74	92	79	81.66	...	0	0	0	2-4	0	0	S.	5	S. W.	9	S.	3	30.01	.67	.37	.58	
7	75	93	82	83.33	...	1-4	0	0	1-4	0	0	S.	1	S.	6	S. W.	1	30.04	.68	.40	.59	
8	76	93	80	83.00	...	0	0	0	1-4	0	0	S.	2	S. W.	10	S.	3	29.99	.68	.40	.62	
9	76	89	76	80.33	...	0	1-4	0	2-4	0	0	S.	4	S. W.	7	S.	2	30.02	.68	.46	.68	
10	71	91	81	81.00	...	S.	0	0	1-4	1-4	1-4	0	0	W.	4	S. E.	6	30.02	.71	.36	.67	
11	76	...	...	76.00	1.10	0	2-4	...	...	...	...	N.	1	...	...	...	...	30.02	.72	...	...	
12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
13	59	74	65	66.00	...	0	0	0	0	0	0	N. W.	5	N. W.	10	N.	4	30.20	.87	.39	.63	
14	60	75	65	66.66	...	0	0	0	0	0	0	N.	4	W.	12	N. W.	4	30.20	.70	.36	.63	
15	60	77	66	67.66	...	0	0	0	0	0	0	0	0	W.	8	N.	1	30.13	.70	.41	.63	
16	60	79	71	70.00	...	S.	0	0	2-4	0	2-4	N. W.	1	N. W.	8	N.	8	30.07	.82	.40	.66	
17	60	77	65	67.33	...	0	1-4	0	0	0	0	N. E.	1	N. E.	6	0	0	30.08	.65	.31	.63	
18	58	84	75	72.33	...	S.	1-4	0	0	0	0	0	0	S. W.	5	S. W.	6	29.98	.77	.40	.63	
19	61	74	61	65.33	...	0	0	0	0	0	0	N.	5	N. E.	4	N. E.	2	30.11	.60	.32	.65	
20	58	86	77	73.66	...	H.	2-4	0	2-4	0	0	S. E.	6	S. W.	6	S.	1	30.07	.64	.41	.77	
21	72	89	79	80.00	...	H.	H.	0	H.	0	0	0	0	S. W.	6	S.	2	30.05	.71	.40	.61	
22	72	89	79	80.00	...	2-4	1-4	0	2-4	1-4	2-0	S.	4	S. W.	8	S. E.	6	30.06	.75	.46	.58	
23	70	87	76	77.66	...	1-0	2-4	0	2-4	1-4	2-0	S.	5	S.	8	S.	2	30.03	.79	.42	.64	
24	75	87	83	81.66	...	2-4	1-4	2-0	2-4	0	4-4	S.	8	S.	12	S.	12	29.95	...	...	...	
25	61	70	60	63.66	1.88	4-4	0	4-4	...	4-4	...	N.	8	S.	7	N. E.	4	30.13	.76	.55	.60	
26	61	75	63	66.33	.33	4-4	...	3-4	...	3-4	...	S. E.	4	N.	6	S. W.	4	29.99	.76	.44	.70	
27	56	77	66	66.33	...	1-4	0	0	1-4	4-4	...	N. E.	4	N. E.	6	E.	8	30.01	.88	.51	.72	
28	70	73	67	66.66	.31	4-4	...	3-4	1-4	0	0	S.	8	S. W.	16	W.	8	29.87	.80	.31	.63	
29	61	73	61	65.00	...	1-4	0	1-4	2-4	1-4	0	W.	2	W.	8	N. W.	2	30.14	.84	.80	.69	
30	55	67	57	59.66	...	0	0	0	2-4	1-4	0	N. W.	6	N. W.	10	0	0	30.17	.76	.31	.71	

\* The letters "F," "H," and "S," indicate foggy, hazy, and smoky, respectively.

† The barometer-readings here given, and in the subsequent tables, are at the temperature given for the corresponding days, and not, as in the preceding tables, reduced to freezing-point.



DURING THE AUGUSTS, SEPTEMBERS, OCTOBERS, AND NOVEMBERS OF 1872 AND 1873.

*of Conditions during the Absence and the Prevalence of Yellow Fever.*

longitude 90° 07' west; height above the sea-level, 260 feet.]

		Thermometer.				Amount of cloudiness.						Wind.						Humidity, per cent.					
1873.		7.35 a. m.	4.35 p. m.	11 p. m.	Mean.	Rain-fall, inches.	7.35 a.m.		4.35 p.m.		11 p. m.		7.35 a.m.		4.35 p.m.		11 p. m.		Barometer.	Mean.	7.35 a. m.	4.35 p. m.	11 p. m.
Aug.							Lower.	Upper.	Lower.	Upper.	Lower.	Upper.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.					
1	...	70	85	69	74.66	2.94	4-4	....	3-4	1-4	4-4	....	S. W.	5	S. W.	6	S. W.	2	30.06	1.00	.68	.94	
2	...	70	89	79	79.33	....	1-4	1-4	1-4	1-4	1-4	0	S. W.	2	S. W.	6	0	0	30.03	.94	.59	.86	
3	...	...	82	72	77.00	....	....	....	1-4	1-4	0	0	0	0	N.	12	N.	5	30.08	....	.59	.85	
4	...	68	79	69	72.00	....	0	1-4	0	1-4	0	0	N. E.	4	N. W.	10	N. E.	5	30.15	.81	.44	.74	
5	...	69	82	72	74.33	....	0	0	1-4	1-4	0	0	N.	3	N. E.	12	N. E.	3	30.15	.74	.42	.75	
6	...	71	87	76	74.66	....	0	1-4	2-4	1-4	1-4	....	N. E.	12	S. E.	5	S. E.	2	30.08	.75	.51	.81	
7	...	72	81	74	75.66	....	2-4	1-4	2-4	1-4	0	1-4	E.	12	N.	8	N. E.	1	30.01	.80	.66	.90	
8	...	75	88	78	80.33	....	0	0	1-4	1-4	0	1-4	S. E.	2	S. W.	5	E.	1	30.00	.85	.52	.77	
9	...	77	91	78	82.00	.03	S.	1-4	1-4	1-4	0	1-4	0	0	N. W.	5	S. E.	1	30.05	.81	.50	.90	
10	...	...	92	80	86.00	.23	....	....	1-4	2-4	2-4	0	6	0	N. W.	6	0	0	30.05	....	.56	.91	
11	...	81	91	82	84.66	....	S.	1-4	1-4	1-4	0	0	E.	4	N.	6	N.	2	29.67	.82	.50	.82	
12	...	79	93	82	84.66	....	1-4	2-4	1-4	1-4	2-4	H.	0	0	W.	5	N.	2	29.98	.82	.45	.78	
13	...	78	86	76	80.00	1.09	2-4	2-4	1-4	2-4	1-4	0	S. W.	4	W.	7	N. W.	1	29.96	.86	.68	.90	
14	...	75	85	75	78.33	....	S.	0	1-4	1-4	0	0	N. E.	1	N.	11	0	0	29.96	.76	.41	.76	
15	...	72	87	79	79.33	....	S.	H.	1-4	2-4	1-4	0	N. E.	2	W.	4	S.	2	29.89	.75	.48	.77	
16	...	73	79	74	75.33	....	4-4	....	4-4	....	4-4	....	W.	4	N. W.	11	N.	5	29.92	.90	.77	.85	
17	...	...	82	74	78.00	....	....	....	1-4	1-4	1-4	0	0	0	N. W.	12	N. W.	5	29.98	....	.55	.81	
18	...	71	81	71	74.00	....	S.	0	0	0	0	0	N.	2	N. W.	12	N.	2	30.05	.70	.41	.70	
19	...	69	85	75	76.33	....	H.	1-4	1-4	2-4	1-4	0	N.	3	N.	8	E.	2	30.04	.70	.47	.92	
20	...	71	86	74	77.00	....	S.	2-4	1-4	1-4	1-4	0	N. E.	1	N. W.	6	N.	2	29.93	.70	.31	.72	
21	...	71	88	76	78.33	....	1-4	1-4	1-4	2-4	1-4	0	N. E.	2	E.	7	S.	2	29.98	.75	.76	.72	
22	...	71	86	75	77.33	....	2-4	1-4	2-4	1-4	1-4	0	S. E.	2	N. E.	6	N. W.	1	30.01	.85	.51	.81	
23	...	73	89	79	80.33	....	1-4	1-4	1-4	1-4	1-4	0	E.	1	E.	6	S. E.	1	30.09	.85	.49	.73	
24	...	78	92	81	83.66	....	S.	1-4	H.	2-4	1-4	....	S. E.	1	S. W.	5	0	0	30.09	.86	.48	.67	
25	...	80	92	82	84.66	....	0	0	1-4	1-4	0	0	N. E.	1	W.	4	N.	2	30.09	.78	.45	.83	
26	...	79	94	83	85.33	....	0	1-4	1-4	1-4	0	0	S.	4	S. W.	5	S. W.	9	29.99	.82	.43	.75	
27	...	77	93	75	81.66	....	2-4	1-4	0	2-4	4-4	....	N.	2	W.	4	S. E.	5	29.96	.86	.43	.81	
28	...	75	88	77	80.00	....	S.	1-4	1-4	1-4	0	0	N.	4	N. W.	12	N. E.	4	29.95	.85	.49	.68	
29	...	72	88	78	79.33	....	S.	1-4	1-4	1-4	1-4	0	N. E.	3	N. W.	8	N.	3	30.01	.80	.46	.69	
30	...	77	92	78	82.33	....	0	0	1-4	1-4	S.	0	N.	1	S. W.	5	0	0	30.09	.77	.34	.69	
31	...	77	93	82	84.00	....	0	0	1-4	1-4	0	0	S. W.	1	S. W.	7	S. W.	6	30.11	.77	.48	.70	
Sept.																							
1	...	80	92	81	84.33	....	1-4	1-4	2-4	1-4	1-4	H.	S. W.	6	S. W.	12	W.	3	29.67	.74	.45	.82	
2	...	78	82	73	77.66	.48	0	1-4	H.	1-4	4-4	....	S. W.	1	N. W.	1	N. W.	7	30.01	.81	.66	.90	
3	...	76	77	76	76.33	.40	2-4	1-4	2-4	1-4	0	1-4	S.	8	S. W.	3	S.	5	29.97	.86	.77	.90	
4	...	76	89	79	81.33	....	H.	....	1-4	2-4	0	2-4	S. W.	6	S.	10	S. W.	5	30.12	.86	.52	.65	
5	...	77	86	76	79.66	....	4-4	....	2-4	1-4	H.	1-4	S. W.	1	N.	9	N. E.	4	30.17	.75	.64	.81	
6	...	74	84	72	76.66	....	S.	1-4	0	2-4	H.	H.	N. E.	3	N. E.	9	N. E.	5	30.20	.74	.84	.72	
7	...	66	...	65	65.50	....	2-4	4-4	1-4	1-4	0	0	N.	3	N. E.	14	N. E.	3	30.26	.78	.54	.78	
8	...	60	77	65	67.33	....	0	1-4	S.	0	0	0	N. E.	6	N.	10	N.	4	30.22	.65	.31	.68	
9	...	63	83	73	73.00	....	0	1-4	1-4	2-4	0	1-4	N. E.	3	N.	10	N. E.	3	30.09	.72	.52	.76	
10	...	69	86	76	77.00	....	2-4	1-4	2-4	1-4	0	0	S. E.	1	N.	4	0	0	30.07	.84	.44	.77	
11	...	72	86	76	78.00	....	S.	1-4	1-4	1-4	1-4	0	S.	1	W.	5	0	0	30.05	.72	.48	.77	
12	...	77	83	70	76.66	....	0	1-4	4-4	....	4-4	....	S. W.	2	S. W.	11	N.	13	29.96	.68	.52	.75	
13	...	67	71	58	65.33	.10	4-4	....	1-4	2-4	0	0	N. E.	4	N.	14	N.	7	30.08	.84	.49	.64	
14	...	53	68	58	59.66	....	S.	0	0	0	0	0	N.	5	N.	8	N.	2	30.14	.73	.42	.69	
15	...	55	76	64	65.00	....	S.	0	S.	0	0	0	E.	2	W.	2	0	0	30.11	.68	.41	.78	
16	...	65	82	71	72.66	....	S.	0	S.	1-4	0	0	0	0	N. W.	8	0	0	30.11	.71	.42	.75	
17	...	66	86	75	75.66	....	S.	1-4	S.	1-4	0	0	0	0	W.	4	S. E.	4	29.99	.83	.41	.55	
18	...	70	85	75	76.66	....	S.	1-4	1-4	1-4	S.	0	0	0	N. W.	6	0	0	29.91	.70	.50	.76	
19	...	63	69	56	62.66	....	4-4	....	S.	1-4	S.	0	N.	13	N.	13	N.	5	30.00	.72	.39	.56	
20	...	53	64	58	58.33	....	1-4	1-4	4-4	....	4-4	....	N. E.	4	N. W.	10	N. E.	2	30.09	.60	.52	.25	
21	...	58	73	65	65.33	....	1-4	2-4	3-4	1-4	4-4	....	N. E.	2	N. W.	9	N. E.	2	30.07	.64	.42	.73	
22	...	65	70	63	66.00	.51	1-4	2-4	4-4	....	1-4	0	W.	3	N.	11	N. E.	3	30.06	.78	.65	.94	
23	...	60	70	61	63.66	....	4-4	....	1-4	1-4	0	0	N. E.	8	N. W.	6	N.	2	29.98	.92	.61	.82	
24	...	56	73	68	65.66	....	F.	....	2-4	1-4	4-4	....	S. E.	3	S. E.	6	S.	4	29.86	.87	.67	.79	
25	...	66	79	74	73.00	....	4-4	....	1-4	2-4	0	0	N.	5	N. W.	6	S.	4	29.93	.89	.65	.81	
26	...	70	87	76	77.66	....	0	0	1-4	1-4	0	0	S.	7	S. W.	8	S. E.	4	29.99	.89	.45	.72	
27	...	72	78	76	75.33	.82	4-4	....	4-4	....	4-4	....	E.	4	S. E.	2	S. W.	4	30.03	.85	.86	.81	
28	...	72	84	71	75.66	.24	....	....	1-4	2-4	4-4	....	S. E.	2	S.	9	N.	9	29.95	.90	.64	.89	
29	...	71	63	59	64.33	1.18	4-4	....	....	....	4-4	....	0	0	N. W.	13	N. W.	9	30.05	.89	.83	.81	
30	...	54	66	56	58.66	....	0	1-4	0	0	0	0	N. E.	8	N.	13	N. E.	7	30.17	.80	.45	.77	



Table of Meteorological Conditions observed at Memphis, Tenn., during the Augusts,

1872.	Thermometer.				Rain-fall, inches.	Amount of cloudiness.						Wind.						Barometer.	Humidity per cent.		
	7. 35 a. m.	4. 35 p. m.	11 p. m.	Mean.		7.35 a.m.		4.35 p.m.		11 p. m.		7.35 a.m.		4.35 p.m.		11 p. m.			7. 35 a. m.	4. 35 p. m.	11 p. m.
						Lower.	Upper.	Lower.	Upper.	Lower.	Upper.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.				
Oct.	7. 35 a. m.	4. 35 p. m.	11 p. m.	Mean.	Rain-fall, inches.	Lower.	Upper.	Lower.	Upper.	Lower.	Upper.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Mean.	7. 35 a. m.	4. 35 p. m.	11 p. m.
1...	45	71	61	59.00	.....	1-4	0	0	0	1-4	0	W.	1	N. W.	4	S. W.	8	30.21	.85	.36	.71
2...	56	78	66	66.66	.....	S.	0	0	0	0	0	S.	2	S. W.	5	S.	1	30.14	.74	.42	.73
3...	64	84	73	73.33	.....	0	0	H.	0	0	0	S.	4	S. W.	8	S. W.	8	30.00	.76	.40	.71
4...	67	84	71	74.00	.....	F.	0	0	H.	0	0	S. W.	4	S. W.	6	S.	4	30.12	.84	.40	.70
5...	65	83	70	72.66	.....	S.	0	0	2-4	1-4	H.	S.	3	S.	8	S.	1	30.02	.73	.42	.70
6...	65	65	63	64.33	1.96	2-4	2-4	4-4	.....	0	0	S.	1	N. W.	4	N.	12	30.05	.73	.94	.94
7...	56	70	58	61.33	.....	1-4	1-4	0	1-4	0	0	N. E.	5	N.	8	N.	2	30.13	.87	.65	.80
8...	53	72	58	61.00	.....	0	1-4	0	0	1-4	0	N. E.	4	N. E.	8	0	0	30.13	.79	.34	.81
9...	52	76	63	63.66	.....	S.	0	0	2-4	S.	2-4	N. E.	4	N. W.	4	N. W.	2	30.13	.86	.41	.88
10...	53	58	46	52.33	.....	0	0	S.	0	0	0	W.	16	N.	16	N.	4	30.31	.55	.42	.54
11...	42	59	48	49.66	.....	S.	0	0	0	S.	0	N.	4	N. W.	8	N.	1	30.29	.66	.43	.77
12...	38	65	53	52.00	.....	S.	0	0	0	0	0	N.	1	S. W.	8	S. W.	4	30.11	.90	.38	.66
13...	51	67	56	58.00	.....	S.	0	H.	0	0	0	N. W.	8	N. W.	8	N. W.	8	30.09	.72	.28	.51
14...	42	55	44	47.00	.....	S.	0	H.	0	S.	0	N. W.	8	N. W.	4	N.	2	30.22	.66	.33	.75
15...	43	68	61	57.33	.....	S.	0	4-4	.....	0	2-4	S.	8	S.	12	S. W.	12	30.02	.66	.38	.45
16...	59	70	64	64.33	.....	1-4	2-4	H.	4-4	1-4	2-4	S.	12	S. W.	8	S.	4	30.12	.64	.61	.78
17...	59	75	63	65.66	.....	2-4	2-4	H.	1-4	S.	0	S.	1	S. W.	4	S. W.	1	30.21	.81	.51	.83
18...	53	71	55	59.66	.....	F.	0	H.	0	S.	0	W.	4	N. W.	8	0	0	30.25	.93	.29	.74
19...	47	71	55	57.66	.....	F.	0	0	0	S.	0	N. W.	1	N.	3	0	0	30.24	.92	.25	.74
20...	49	73	56	59.33	.....	F.	0	0	2-4	0	1-4	0	0	N.	2	0	0	30.14	.85	.31	.68
21...	53	74	65	64.00	.02	S.	4-4	1-4	2-4	4-4	.....	E.	3	S.	4	S. E.	12	30.06	.66	.51	.89
22...	63	64	54	60.33	.77	4-4	.....	4-4	.....	4-4	.....	N.	2	N. E.	8	N.	12	30.14	.94	.94	.86
23...	51	58	51	53.33	.05	4-4	.....	4-4	.....	1-4	.....	N.	8	N.	12	N. E.	5	30.29	.85	.69	.72
24...	46	63	55	54.66	.....	S.	2-4	0	2-4	1-4	0	N.	4	N.	7	N.	4	30.24	.76	.51	.68
25...	48	64	53	55.00	.....	S.	0	0	2-4	S.	0	N. W.	4	N. W.	5	N. E.	3	30.14	.85	.57	.86
26...	45	67	53	55.00	.....	0	.....	0	0	0	0	0	0	N. W.	2	0	0	30.07	1.00	.41	.70
27...	47	70	56	57.66	.....	S.	0	0	H.	S.	0	0	0	S. W.	2	0	0	30.07	.84	.48	.80
28...	49	72	60	60.33	.....	S.	0	0	0	1-4	0	N. E.	1	E.	5	E.	8	30.14	.78	.34	.44
29...	56	66	65	62.33	.....	2-4	2-4	4-4	.....	2-4	0	S. E.	5	S. E.	12	S. E.	8	30.09	.51	.45	.53
30...	56	61	49	55.33	.27	4-4	.....	0	1-4	S.	0	S.	4	N. W.	8	N. W.	1	30.18	.93	.40	.78
31...	38	61	51	50.00	.....	F.	.....	0	1-4	S.	0	0	0	N. E.	3	0	0	30.24	1.00	.30	.65
Nov.																					
1...	42	62	52	55.33	.....	S.	1-4	2-4	2-4	2-4	0	E.	2	S.	3	S. W.	2	30.14	.82	.62	.86
2...	47	62	50	53.00	.....	1-4	H.	0	0	S.	0	W.	8	W.	8	S. W.	2	30.09	.84	.22	.64
3...	41	65	55	53.66	.....	S.	H.	0	H.	0	0	N. E.	6	E.	4	S. E.	4	30.13	.65	.35	.56
4...	51	62	64	59.00	.....	S.	2-4	4-4	.....	4-4	.....	S. E.	4	E.	4	S. E.	12	30.00	.65	.51	.43
5...	54	57	47	52.66	.03	4-4	.....	4-4	.....	S.	.....	S.	4	N. W.	8	N.	4	30.12	.86	.75	.84
6...	43	47	47	45.66	.21	4-4	.....	4-4	.....	4-4	.....	N.	1	N.	8	N.	8	30.16	.75	.77	.69
7...	41	57	52	50.00	.....	4-4	.....	1-4	H.	4-4	.....	0	0	S. W.	2	0	0	30.11	.91	.54	.66
8...	47	69	55	54.00	.....	4-4	.....	1-4	3-4	4-4	.....	N. E.	3	N. E.	8	N. E.	3	30.03	.77	.44	.50
9...	50	65	53	56.00	.01	1-4	0	0	1-4	S.	1-4	N. E.	8	N. E.	4	N. E.	5	29.92	.51	.48	.48
10...	51	58	56	55.00	.....	4-4	.....	4-4	.....	4-4	.....	S. E.	4	S. W.	4	S.	4	30.00	.92	.58	.56
11...	55	65	52	57.33	.35	4-4	.....	1-4	3-4	4-4	.....	S. W.	3	S. E.	2	N.	12	30.07	.86	.63	1.00
12...	43	55	51	49.66	.....	1-4	0	0	2-4	4-4	.....	N.	4	S. E.	16	E.	6	30.07	.83	.50	.59
13...	51	58	44	51.00	.....	4-4	.....	0	0	0	0	S.	8	N. W.	10	N. W.	16	29.97	.85	.31	.37
14...	31	39	31	33.66	.....	0	0	H.	0	0	1-4	W.	8	N. W.	12	W.	6	30.30	.38	.34	.58
15...	26	36	31	31.00	.....	2-4	1-4	0	2-4	0	0	W.	5	W.	14	S. W.	8	30.03	.75	.55	.58
16...	27	34	29	30.00	.....	S.	2-4	S.	0	S.	0	W.	8	N. W.	4	N.	2	30.15	.52	.34	.52
17...	21	36	33	30.00	.....	S.	1-4	0	2-4	S.	1-4	0	0	W.	3	0	0	30.29	.71	.46	.80
18...	27	40	33	33.33	.....	F.	H.	S.	H.	S.	0	S. W.	1	S. W.	8	S.	3	30.42	.76	.39	.50
19...	33	52	47	44.00	.....	S.	2-4	S.	3-4	4-4	.....	S.	6	S. W.	7	N.	8	30.17	.51	.29	.41
20...	26	35	29	30.00	.....	S.	0	0	1-4	0	1-4	N.	8	N. E.	3	S. E.	6	30.30	.63	.35	.44
21...	29	46	40	38.33	.01	S.	1-4	4-4	.....	S.	0	S.	4	S. W.	4	S. W.	4	30.06	.55	.69	.55
22...	34	51	41	42.00	.....	S.	0	0	0	0	0	W.	4	S. W.	4	S.	5	30.58	.71	.33	.56
23...	36	57	47	46.66	.....	S.	0	H.	1-4	0	0	S.	5	S. E.	12	S. E.	4	30.23	.70	.30	.34
24...	48	65	61	58.00	.....	4-4	.....	3-4	1-4	4-4	.....	S.	8	S.	13	S.	2	30.07	.63	.53	.65
25...	47	40	39	42.00	.90	4-4	.....	4-4	.....	2-4	.....	N. W.	14	N. E.	2	N. E.	8	30.12	1.00	.82	.90
26...	40	48	41	43.00	.....	4-4	.....	S.	H.	S.	0	N.	3	N. E.	5	0	0	30.17	.64	.56	.73
27...	34	43	31	36.00	.....	F.	0	0	0	0	0	N.	8	N. E.	5	N. E.	4	30.43	.61	.21	.38
28...	26	.....	37	31.50	.....	S.	H.	.....	.....	S.	H.	N. W.	1	.....	.....	N. W.	8	30.47	.63	.....	.39
29...	18	26	23	22.33	.....	0	0	0	2-4	S.	H.	N. W.	12	W.	7	N.	3	30.67	.52	.34	.46
30...	20	34	34	29.33	.....	S.	1-4	S.	1-4	.....	.....	S.	2	S.	6	S.	14	30.25	.70	.34	.43



Septembers, Octobers, and Novembers of the years 1872 and 1873—Continued.

		Thermometer.				Rain-fall, inches.	Amount of cloudiness.						Wind.						Barometer.	Humidity, per cent.		
1873.		7.35 a. m.	4.35 p. m.	11 p. m.	Mean.		7.35 a.m.		4.35 p.m.		11 p. m.		7.35 a.m.		4.35 p.m.		11 p. m.			7.35 a. m.	4.35 p. m.	11 p. m.
Oct.							Lower.	Upper.	Lower.	Upper.	Lower.	Upper.	Lower.	Upper.	Direction.	Velocity.	Direction.	Velocity.				
1	...	53	69	63	61.66	....	0	2-4	3-4	1-4	2-4	2-4	N.	6	N.E.	8	N.	4	30.10	.73	.56	.77
2	...	63	73	65	67.00	....	4-4	....	2-4	2-4	0	0	E.	2	N.E.	2	N.E.	2	30.09	.77	.71	.94
3	...	62	...	70	66.00	....	0	1-4	1-4	1-4	0	2-4	E.	2	S.W.	5	S.	2	30.03	.82	.54	.79
4	...	70	76	66	70.66	....	0	2-4	0	1-4	0	0	S.W.	4	N.W.	10	N.	2	29.94	.79	.64	.81
5	...	63	...	63	63.00	....	S.	2-4	....	....	4-4	....	E.	1	....	....	N.	18	29.96	.77	....	.67
6	...	46	56	47	49.66	.04	2-4	1-4	0	1-4	0	0	N.	12	N.	16	N.	5	30.16	.69	.39	.62
7	*	42	59	50	50.33	....	0	0	S.	0	0	0	N.	7	N.	6	N.	2	30.13	.75	.43	.64
8	...	46	69	56	57.00	....	0	0	S.	1-4	S.	0	E.	4	N.W.	4	N.W.	1	30.12	.69	.42	.23
9	...	52	68	60	60.00	....	S.	0	S.	0	S.	0	0	0	N.W.	5	S.W.	1	30.12	.79	.43	.76
10	...	52	76	64	64.00	....	0	0	S.	2-4	S.	1-4	E.	2	S.W.	6	S.W.	1	30.11	.79	.56	.83
11	...	60	77	65	67.33	....	0	1-4	1-4	2-4	0	0	S.W.	3	N.W.	1	N.	6	30.13	.88	.60	.78
12	...	54	66	55	58.33	....	0	0	S.	1-4	0	0	N.W.	7	N.W.	10	N.	1	30.20	.73	.38	.62
13	...	46	69	54	56.33	....	F.	0	S.	0	S.	0	E.	2	N.W.	3	W.	18	30.17	.61	.35	.67
14	...	46	74	61	60.33	....	S.	0	S.	0	S.	0	E.	1	E.	7	0	0	30.24	.69	.28	.65
15	...	57	...	66	61.50	....	0	1-4	1-4	2-4	1-4	0	S.E.	3	S.E.	8	S.W.	1	30.28	.75	.44	.73
16	...	67	80	70	72.33	....	1-4	2-4	1-4	2-4	0	0	S.	6	S.	5	S.E.	4	30.26	.74	.54	.70
17	...	64	79	72	71.66	....	1-4	2-4	1-4	2-4	4-4	....	S.	3	S.W.	10	S.E.	5	30.05	.78	.54	.66
18	...	55	37	52	54.66	1.76	4-4	....	4-4	....	1-4	0	N.W.	16	N.	12	N.	5	30.09	.93	.75	.86
19	...	46	56	47	49.66	....	0	1-4	0	1-4	1-4	0	N.	6	N.W.	12	N.	3	30.17	.76	.34	.69
20	...	44	55	46	48.33	....	0	0	S.	0	0	0	N.W.	4	N.W.	11	0	0	30.07	.85	.33	.76
21	...	40	63	56	53.00	....	S.	0	S.	0	0	0	W.	1	S.W.	6	S.	6	29.91	.73	.42	.62
22	...	58	68	57	61.00	1.12	1-4	2-4	4-4	....	4-4	....	S.	8	S.	8	N.W.	10	29.92	.81	.84	.87
23	...	40	40	36	38.66	1.09	4-4	....	4-4	....	0	0	N.	8	N.	10	N.	5	30.23	.91	.82	.90
24	...	38	55	47	46.66	....	4-4	....	S.	2-4	2-4	0	N.	5	N.	5	N.E.	2	30.29	.79	.62	.77
25	...	46	52	52	50.00	....	4-4	....	4-4	....	4-4	....	N.E.	1	N.E.	4	E.	3	30.23	.92	.86	.93
26	...	57	65	...	61.00	1.04	4-4	....	4-4	....	....	....	S.	12	S.W.	5	....	....	29.85	1.00	.94	....
27	...	38	56	50	48.00	....	4-4	....	S.	1-4	2-4	0	W.	4	S.W.	11	N.W.	16	29.97	.81	.39	.58
28	...	32	41	34	35.66	....	0	0	0	1-4	0	0	W.	8	W.	8	N.W.	2	30.37	.89	.32	.79
29	...	30	48	42	40.00	....	0	0	S.	1-4	S.	1-4	0	0	S.W.	3	S.	2	30.35	.78	.29	.50
30	...	42	58	46	48.66	....	1-4	2-4	S.	1-4	S.	0	S.W.	8	S.W.	6	S.	2	30.11	.57	.37	.76
31	...	36	47	37	40.00	....	0	0	S.	0	S.	0	N.W.	8	N.W.	6	0	0	30.34	.55	.27	.71
Nov.																						
1	*	29	54	47	43.33	....	0	0	S.	1-4	S.	1-4	E.	3	S.E.	5	S.E.	5	30.39	.88	.26	.41
2	...	45	59	47	53.66	....	1-4	1-4	4-4	....	4-4	....	S.	3	S.E.	2	N.W.	10	30.24	.84	.38	.84
3	...	48	58	49	51.66	.01	4-4	....	S.	1-4	S.	1-4	N.E.	4	N.E.	6	N.E.	2	30.24	.85	.47	.63
4	...	46	53	52	50.33	.27	4-4	....	4-4	....	4-4	....	N.E.	1	N.E.	4	N.E.	3	30.11	.76	.93	.93
5	...	53	61	59	57.66	....	4-4	....	4-4	....	4-4	....	N.	3	N.E.	2	N.E.	1	30.12	.93	.76	.59
6	...	52	64	55	57.00	....	4-4	....	3-4	1-4	S.	0	N.	5	N.E.	0	N.E.	1	30.04	.72	.62	.36
7	...	50	68	62	60.00	....	S.	1-4	S.	0	2-4	0	N.W.	....	S.W.	8	N.W.	6	29.96	.92	.51	.61
8	...	48	65	53	55.33	....	S.	0	S.	0	S.	....	N.W.	2	N.	4	S.W.	4	30.18	.48	.26	.60
9	...	46	69	56	57.00	....	S.	0	0	0	S.	0	S.W.	2	W.	2	0	0	30.18	.77	.27	.62
10	...	48	74	59	60.33	....	S.	0	S.	0	S.	0	S.W.	1	S.W.	2	S.E.	2	30.03	.77	.31	.59
11	...	54	75	60	63.00	....	S.	1-4	S.	0	4-4	....	S.W.	6	W.	11	N.W.	12	29.90	.61	.22	.15
12	...	45	46	40	43.66	....	4-4	....	4-4	....	0	0	N.W.	8	W.	8	N.W.	1	30.15	.60	.33	.47
13	...	33	49	42	41.33	....	S.	1-4	S.	0	S.	0	W.	1	S.	8	S.	6	30.16	.69	.24	.42
14	...	38	57	49	48.00	....	S.	0	S.	0	0	0	S.W.	1	N.W.	1	S.	6	30.13	.62	.30	.50
15	...	50	68	64	60.00	....	1-4	2-4	S.	1-4	3-4	0	S.W.	6	S.W.	14	S.W.	8	30.07	.85	.55	.62
16	...	62	...	...	62.00	....	4-4	....	....	....	....	....	S.W.	8	....	....	....	....	29.87	.77	....	....
17	...	...	60	55	57.50	....	....	....	4-4	....	0	H.	....	....	S.	6	S.W.	3	29.38	....	.34	.50
18	...	47	43	33	41.00	....	4-4	....	4-4	....	0	0	N.W.	27	N.W.	16	N.W.	20	29.82	.34	.43	.51
19	...	26	36	32	31.33	....	S.	0	S.	H.	0	0	N.W.	4	N.W.	12	W.	1	30.18	.63	.29	.59
20	...	29	45	40	38.00	....	H.	H.	H.	....	H.	0	....	4	S.	8	S.	2	30.20	1.00	.38	.47
21	...	45	55	49	49.66	....	F.	....	4-4	....	4-4	....	S.W.	11	S.	6	S.E.	1	30.21	.49	.62	.78
22	...	49	52	49	50.00	1.80	4-4	....	4-4	....	4-4	....	S.	2	E.	10	S.E.	7	30.02	.92	.93	.92
23	...	53	56	54	54.33	.79	4-4	....	4-4	....	4-4	....	S.E.	5	S.W.	1	N.	9	29.80	.93	.93	1.00
24	...	46	46	43	45.00	.07	4-4	....	1-4	....	0	0	N.W.	2	W.	9	S.W.	9	29.97	.92	.69	.75
25	...	45	50	44	46.33	....	S.	0	S.	0	0	0	W.	9	S.W.	19	N.E.	4	29.74	.45	.38	.52
26	...	37	59	51	49.00	....	S.	0	4-4	0	1-4	....	S.E.	7	S.	10	S.	6	29.93	.71	.43	.52
27	...	44	54	43	47.00	....	S.	0	S.	0	4-4	....	S.W.	1	N.	8	N.E.	10	29.99	.75	.32	.35
28	...	...	42	35	38.50	....	....	....	S.	0	0	1-4	....	....	N.E.	6	N.E.	5	30.46	....	.34	.53
29	...	34	45	44	41.00	....	S.	2-4	F.	2-4	0	2-4	N.E.	5	N.E.	...	N.E.	3	30.43	.61	.53	.52
30	...	38	58	57	51.00	....	0	2-4	3-4	2-4	2-4	2-4	E.	3	S.E.	3	S.E.	8	30.37	.81	.64	.81

\* Frost during nights of October 6-7, and October 31 and November 1.



The foregoing record of the meteorological conditions observed during the period of the prevalence of the epidemic yellow fever at Memphis and Shreveport in 1873, undoubtedly furnish important facts which are essential to a correct study of the habits and climatic conditions under which this disease exists. Yet we are unable to deduce from them, or to recognize any positive factor or factors that can satisfactorily account for the outbreak and the prevalence, for months, of a specific fever which is very generally believed by physicians to have been imported from New Orleans, where, however, it was not recognized as being epidemic or even extensively prevalent during any part of the summer.

We may here remark, that in the study of this disease as seen in the United States, it is to man himself, and his neglect of the laws governing health and the sanitary conditions of his abode, that we must look for at least some of the exciting causes.

That the disease has limits varying its boundaries during particular seasons, will be readily conceded. One of the limiting causes assigned by most observers, is low temperature. We believe that elevation and a comparatively dry atmosphere may be added.

We ask the question if, from the facts furnished by the different visitations of yellow fever within the United States, elevation is entitled to be credited in any degree with controlling the spread of the disease to interior towns; and if so, does the elevation control it in any other mode than by the effect of a cooler and drier atmosphere than prevails in the low lands in the same vicinity?

Nothing is truer than that man's health is affected by his surroundings. Where a rapid vegetable growth and decay go on, as in the tropical and semi-tropical regions, these localities must always have conditions peculiar to themselves, which influence powerfully both health and disease, although their modes of action may escape our observation.

Humboldt long ago observed that this fever did not exist at high altitudes. A. Keith Johnson, in his valuable *Physical Atlas*, says: "At Xalapa, in Mexico, on the same parallel with Vera Cruz, but 4,330 feet above the sea, yellow fever is unknown." In Jamaica, Maroontown and the Phoenix Park, at an elevation of 2,000 feet, are noted for their healthfulness, while yellow fever rages along the coast, cutting off many hundreds annually. In this island, however, it has been known to exist in a mild form on Stony Hill, elevated 1,360 feet.

Major Tullock, of the British army, remarks that this disease has never been known in any climate at an elevation of 2,500 feet. Mount Desmoulin, near Roseau, in the island of Dominica, 1,500 feet above the sea, is always free from fever, even while it is epidemic at the water-line. The same exemption is observed in the northern and elevated parts of San Domingo, whatever may be the character of the soil.

Dr. Drake, in his work, fixes a limit to this fever in the United States at 400 feet. These figures would seem to be not far out of the way.



This view of the limitation to the spread of yellow fever by elevation has been observed in Cuba and elsewhere.

Fort Smith, in Arkansas, 460 feet above the sea, is the highest point at which this fever has prevailed as an epidemic in the United States. Although Winchester, Va., at an altitude of 700 feet, is placed upon the map, the cases reported to have occurred there in 1802 are not well authenticated. A correspondence with Dr. G. Miller, an old and intelligent physician of that place, was opened to verify the report, but nothing could be learned that would give credibility to the statement. As a faithful chronicler, however, we do not feel at liberty to omit the mention of the disease at this place, with the authority, and the less so since a person *en route* from the South died there shortly after his arrival, in 1871, of what was supposed to be yellow fever. There is much room for doubt, also, as to the correctness of the diagnosis that recognized yellow fever at Gallipolis, in Ohio, in 1796, and in Bald Eagle Valley and Nittany, in Pennsylvania, in 1799.

The cases at Cincinnati in 1871 and 1873 were strangers, reported to have been brought there on boats from New Orleans and Memphis, which renders it probable that they were yellow fever, but contracted before sailing. No new cases occurred at Cincinnati. Those reported at Winchester, Gallipolis, Bald Eagle Valley, Nittany, and other points, not here questioned, may have been only aggravated cases of bilious fevers.

But lest we be misled, and attribute too much influence to elevation, we should not forget the remark of the late Dr. La Roche, who notices how securely a stranger may live in the near vicinity of the epidemic, provided he does not enter the infected district. This fact suggests that the stratum of air, in which the infection peculiar to yellow fever exists, is heavier than air free from the poison, and which therefore seeks the lowest and dampest localities.

If this view should be verified by careful and repeated observations, it would suggest that houses and hospitals, in districts particularly liable to yellow fever, should be built upon columns or supports 10 or 12 feet high, with the space beneath paved and left open for the free circulation of air. The occupants might thus, to some extent, escape breathing the heavier and more noxious stratum of air.

It is clear, as shown by this map, that the disease has, in the United States, never in an epidemic form reached an elevation of 500 feet. If elevation, then, can exempt the inhabitants of a place from such a terribly destructive disease, the profession should, and will, avail itself of this means of protecting life, namely, the removal of all susceptible persons out of the infected district to an elevation above 500 feet if practicable. So far as we could collect facts bearing upon the point in question as to each locality we have done so, and they are given in the following table :



TABLE OF LOCALITIES IN THE UNITED STATES WHERE YELLOW FEVER HAS APPEARED SINCE A. D. 1663.

With their Elevations above the Sea-level; Dates of Commencement and Suspension of the Disease; Mortality; and Authorities for the Statements.

State.	Locality.	Situation.	Elevation, in feet, above sea-level.	DATE OF COMMENCEMENT.		DATE OF SUSPENSION.		Mortality.	Authority.
				Year.	Month.	Year.	Month.		
Alabama.....	Blakely, Baldwin Co.....	On Tensaw River.....	25	1822	.....	.....	.....	.....	Drake, Principal Diseases of Interior Valley, North America, p. 225.
	Cahawba, Dallas Co.....	On Alabama River.....	175	1853	.....	.....	.....	.....	E. H. Barton, Report Sanitary Commission of New Orleans, 1857, p. 65.
	Citronelle, Mobile Co.....	On Mobile and Ohio Railroad.	65	1853	.....	.....	.....	.....	J. C. Nott, N. O. M. & S. J., 1854, p. 571.
	Dog River Cotton Factory.	Five miles from Mobile.....	30	1853	Aug. 8	.....	.....	.....	C. Whittleworth, Ch. M. J. & Rev., 1859, p. 479.
	Demopolis, Marengo Co....	On Tombigbee River.....	125	1853	.....	.....	.....	.....	E. D. Fenner, History of Epidemic Yellow Fever, 1853, p. 49.
	Fort Claiborne, Monroe Co.	Alabama River.....	75	1819	July 4	1819	Dec. 1	.....	Harvey E. Brown, (asst. surg. U. S. A.) Quarantine, on the southern and Gulf coasts, 1872.
	Fort Morgan Island.....	Mobile Bay.....	20	1867	Aug. 13	.....	.....	.....	Brown, Quarantine, p. 44.
	Fort Saint Stephens, Wash- ington Co.	Tombigbee River.....	75	1819	July 4	1819	Dec. 1	.....	Dowler, Yellow Fever of 1853, p. 16.
	Hollywood.....	Tombigbee River.....	75	1853	.....	.....	.....	.....	E. H. Barton, Report Sanitary Commission of New Orleans, 1857, p. 65.
	Mobile, Mobile Co.....	Mobile Bay.....	20	1705	.....	.....	.....	.....	P. H. Lewis, N. O. M. J., 1845, vol. 1, No. 4, p. 283.
				1765	.....	.....	.....	.....	Drake, Dis. Int. Valley of N. A., p. 216.
				1766	.....	.....	.....	.....	P. H. Lewis, N. O. M. J., vol. 1, No. 4, 1845, p. 283.
				1819	Aug. 15	.....	Nov. —	274	P. H. Lewis, N. O. M. J., vol. 1, No. 4, 1845, p. 284.
				1821	.....	.....	.....	.....	Drake, Dis. Int. Valley of N. A., p. 191.
				1822	.....	.....	.....	.....	Do.
				1824	.....	.....	.....	.....	Do.
				1825	Sept. —	.....	.....	.....	Drake, Dis. Int. Valley of N. A., p. 219.
				1827	Aug. —	.....	.....	.....	Do.
				1828	.....	.....	.....	.....	Do.
				1829	Sept. 14	.....	.....	130	Drake, Dis. Int. Valley of N. A., p. 191.
				1837	Sept. 20	.....	Nov. —	350	Drake, Dis. Int. Valley of N. A., p. 220.
				1838	.....	.....	.....	.....	Do.
				1839	Aug. 11	1839	Oct. 20	650	Drake, Dis. Int. Valley of N. A., p. 191.
				1841	.....	.....	.....	.....	Drake, and Brown, Quarantine, 1872.
				1842	Aug. 20	.....	.....	60	J. H. Lewis, N. O. M. J., 1844, p. 31.
				1843	Aug. 18	.....	Nov. 5	240	Drake, p. 222, and Brown, Quarantine, 1872.
				1844	.....	.....	.....	.....	Do.
				1847	.....	.....	.....	76	Drake, Dis. Int. Valley of N. A., p. 191.
				1848	.....	.....	.....	75	Brown, Quarantine, and Fenner's South Med. Re- ports, vol. 2, p. 304.
					.....	.....	.....	.....	Fenner, South Med. Reports, vol. 2, p. 304.





Table of Localities in the United States where Yellow Fever has appeared since A. D. 1668, &amp;c.—Continued.

State.	Locality.	Situation.	Elevation, in feet, above sea level.	DATE OF COMMENCEMENT.		DATE OF SUBSE- PENSION.		Mortality.	Authority.
				Year.	Month.	Year.	Month.		
Florida	Milton, Santa Rosa Co . . . . . Pensacola, Escambia Co. . . . . On Blackwater River, near Pensacola Bay. On Pensacola Bay . . . . .		20 15	1829	June —	1829	June —	26	C. C. Dupré, Am. J. of Med. Sci., 1841, p. 380.
				1841	Aug. —	1841	Aug. —	112	Do.
				1853	Aug. —	1854	Aug. —	71	Army Medical Statistics, p. 323.
				1854	June 20	1854	Oct. —		Ed. N. O. M. & S. J., 1854, p. 423.
				1862	June 20	1862	Oct. —		Ed. M. and S. Reporter, 1862, p. 513.
				1864	June 20	1864	Oct. —		E. B. Hunt, Med. Reporter, 1864, p. 349.
				1865	June 20	1865	Oct. —		Brown, Quarantine, p. 40.
				1867	June 20	1867	Oct. —		Surgeon-General's Office, Circular No. 1, 1868, p. 152.
				1869	June 20	1869	Oct. —		Brown, Quarantine, p. 41.
				1853	June 20	1853	Oct. —		Brown, Quarantine, p. 38.
				1855	June 20	1855	Oct. —		Do.
				1764	June 20	1764	Oct. —		P. S. Townsend, N. Y. M., and Ph. J., 1823, p. 315.
				1765	June 20	1765	Oct. —	125	Drake, Dis. Int. Valley of N. A., p. 190.
				1811	June 20	1811	Oct. —	257	Do.
				1822	Aug. 12	1822	Oct. 10		Drake, Dis. Int. Valley of N. A., p. 229.
				1825	Aug. 12	1825	Oct. 10		Brown, Quarantine, p. 36.
				1827	Aug. 23	1827	Oct. 23		Med. Statistics, United States Army, p. 58.
				1834	Aug. 23	1834	Oct. 23		Drake, Dis. Int. Valley of N. A., p. 232.
				1839	Aug. 23	1839	Oct. 23		Drake, Dis. Int. Valley of N. A., p. 233.
				1841	Aug. 23	1841	Oct. 23		Do.
				1842	Aug. 23	1842	Oct. 23		S. C. Laurason, Maryland M. & S. J., 1843, p. 393.
				1843	Aug. 23	1843	Oct. 23		Dr. Wedderburn, Report of San. Com., p. 125.
				1844	Aug. 23	1844	Oct. 23		Do.
				1845	Aug. 23	1845	Oct. 23		Brown, Quarantine, p. 36.
				1846	Aug. 23	1846	Oct. 23		Do.
				1847	Aug. 23	1847	Oct. 23		Do.
				1848	Aug. 23	1848	Oct. 23		Dr. Wedderburn, Report of San. Com., p. 125.
				1853	July 9	1853	July 9		Dr. Wedderburn, Report of San. Com. of N. O., p. 125.
				1854	July 9	1854	July 9		E. D. Fenner, His. of Yellow Fever, N. O., 1853, p. 49.
				1858	Aug. 25	1858	Aug. 25		R. B. S. Hargis, N. O. M. N., 1859, p. 727.
				1863	Aug. 25	1863	Aug. 25		Do.
				1867	July 24	1867	July 24	34	B. F. Gibbs, A. J. M. Sc., 1866, p. 340.
				1873	Aug. 6	1873	Aug. 6	61	M. Reporter, 1868, p. 227.
				1897	Aug. 15	1897	Aug. 15	140	R. F. Michel, Charleston M. J. and R., 1874, vol. 1, No. 4, p. 289.
				1821	Aug. —	1821	Aug. —		Brown, Quarantine, p. 32.
				1838	Aug. —	1838	Aug. —		J. Gotham, M. Reporter, 1856, p. 564.
				1839	Aug. 15	1839	Aug. 15		C. C. Dupré, A. J. Med. Sci., 1841, p. 384.
									Do.
St. Augustine, St. John's Co.	On Matanzas Sound, two miles from the sea.		10	1897	Aug. 15	1897	Aug. 15		
				1821	Aug. —	1821	Aug. —		

Georgia.....	Saint Joseph's, Calhoun Co.....	On Saint Joseph's Bay, near Gulf of Mexico.....	1841	15	1841	26	Do. E. M. and S. J., 1841, p. 17.
	Swansea, Columbia Co.....	On Swansea River.....	1836	50	.....	.....	T. Lawson, Surg. Gen. Report, 1840, p. 308.
	Tampa, Hillsborough Co.....	Head of Tampa Bay, forty miles from the Gulf of Mexico.....	1871	20	.....	.....	Med. and Surg. Reporter, No. 17, p. 371, vol. 25.
	Tortugas.....	Gulf of Mexico.....	1839	12	Sept. —	4	Drake, Dis. Int. Valley of N. A., p. 191.
	Pensacola.....	Pensacola Bay.....	1862	.....	.....	.....	Army Medical Statistics, p. 323.
	Augusta, Richmond Co.....	On Savannah River.....	1867	.....	July 4	38	Circular No. 1, Surgeon General's Office, 1869.
	Bainbridge, Decatur Co.....	On Flint River.....	1873	185	Aug. 14	62	Brown, Quarantine, p. 46.
	Saint Mary's, Camden Co.....	On Saint Mary's River, nine miles from the sea.....	1873	120	.....	.....	John M. Woodworth, Supervising Surgeon, U. S. Marine-Hospital Service, Report 1873.
	Savannah, Chatham Co.....	On Savannah River, eighteen miles from its mouth.....	1808	15	Sept. 5	84	E. M. and S. J., 1839, p. 86.
			1807	30	.....	.....	Ed. Nash, J. M. and S., 1854, p. 345.
Illinois.....	Cairo.....	At junction of Ohio and Mississippi Rivers.....	1808	322	.....	.....	Washington Republican, Oct. 25, 1873, p. 1.
	Louisville.....	On the Ohio River.....	1819	450	Sept. 1	17	J. Seagrave, M. Rep., 1810, p. 133.
	Alexandria, Rapides Parish.....	On Red River.....	1822	75	Sept. 22	5	Dowler, Tableau of Yellow Fever, p. 14.
			1827	.....	.....	.....	Do.
			1831	.....	.....	.....	A. M. Rec., 1820, p. 212.
			1837	.....	.....	.....	N. A. M. and S. J., 1827, p. 1.
			1839	.....	.....	.....	N. A. Med. & S. J., vol. 10, p. 145.
			1847	.....	.....	.....	R. C. Mackall, Ch. M. J. and Rev., 1855, p. 150.
			1853	.....	.....	.....	Do.
			1854	.....	Aug. 5	580	Hume, Charleston M. J., vol. 10, p. 31.
Kentucky.....			1858	.....	.....	.....	S. Chatle, Va., M. J., 1838, p. 491.
			1873	322	Sept. 1	17	H. Wardner, Report Supervising Surgeon U. S. Marine-Hospital Service, 1873.
			1819	450	Sept. 22	5	P. H. Bailhache, <i>ibid.</i>
			1822	75	.....	.....	G. S. D. Anderson, N. O. M. J., 1859, p. 508.
			1827	.....	.....	.....	Do.
			1831	.....	.....	.....	Do.
			1837	.....	.....	.....	Do.
			1839	.....	.....	.....	Do.
			1847	.....	.....	.....	Do.
			1853	.....	.....	.....	Do.
Louisiana.....			1854	.....	Sept. 13	.....	Do.
			1855	10	.....	.....	E. D. Fenner, N. O. M. and S. J., 1848, p. 192.
			1847	.....	.....	.....	P. C. Gaillard, Ch. M. J. and Rev., 1859, p. 481.
			1853	.....	.....	.....	N. O. M. J., 1859, p. 506.
			1858	.....	.....	.....	Do.
			1823	25	.....	.....	Drake, Dis. Int. Valley of N. A., p. 250.
			1817	50	.....	.....	Do.
			1819	.....	.....	.....	Do.
			1822	.....	.....	60	Do.
			1827	.....	.....	.....	Do.
Algeria.....			1829	.....	.....	.....	Do.
			1843	.....	Oct. —	.....	Do.
			1837	.....	.....	.....	Do.
			1847	.....	.....	.....	Do.
			1858	.....	.....	.....	Do.
			1823	25	.....	.....	Do.
			1817	50	.....	.....	Do.
			1819	.....	.....	.....	Do.
			1822	.....	.....	.....	Do.
			1827	.....	.....	.....	Do.
Ascension.....			1829	.....	.....	.....	Do.
			1843	.....	Oct. —	.....	Do.
			1837	.....	.....	.....	Do.
			1847	.....	.....	.....	Do.
			1858	.....	.....	.....	Do.
			1823	25	.....	.....	Do.
			1817	50	.....	.....	Do.
			1819	.....	.....	.....	Do.
			1822	.....	.....	.....	Do.
			1827	.....	.....	.....	Do.



Table of Localities in the United States where Yellow Fever has appeared since A. D. 1663, &amp;c.—Continued.

Name.	Locality.	Situation.	Elevation, in feet, above sea-level.	DATE OF COMMENCEMENT.		DATE OF SUSPENSION.		Mortality.	Authority.
				Year.	Month.	Year.	Month.		
Louisiana.....	Bay of Saint Louis.....	Mouth of the Mississippi River.	10	1820	Aug. —	.....	.....	.....	A. P. Merrill, N. O. M. and S. J., 1851, p. 1.
	Bayou Sara, West Feliciana Parish.	On Mississippi River.....	75	1830	.....	.....	.....	.....	N. O. M. and S. J., 1859, p. 79.
	Buried Settlement, (coast below New Orleans.)	On Mississippi River.....	10	1837	.....	.....	.....	.....	E. D. Fenner, N. O. M. and S. J., 1848, p. 19.
	Carrollton, Jefferson Parish.	On Mississippi River.....	15	1833	.....	.....	.....	.....	P. C. Gaillard, Ch. M. J. and Rev., 1859, p. 481.
	Centerville, Saint Mary's Parish.	On Teche River 60 miles from the Gulf of Mexico.	90	1833	May 18	.....	.....	.....	Brown, Quarantine.
	Clinton, East Feliciana Parish.	32 miles N. of Baton Rouge.	85	1833	Sept. —	.....	.....	.....	E. D. Fenner, N. O. M. and S. J., 1848, p. 192.
	Cloutierville, Natchitoches Parish.	On Old River, branch of Red River.	175	1833	Sept. 1	.....	.....	.....	D. Warren Brickell, N. O. M. N., 1855, p. 167.
	Covington, Saint Tammany Parish.	45 miles north of New Orleans.	25	1833	.....	.....	.....	.....	W. B. Wood, N. O. M. N., 1856, p. 483.
	Donaldsonville, Ascension Parish.	On Mississippi River.....	30	1837	.....	.....	.....	.....	Do.
	Franklin, Saint Mary's Parish.	On Teche River, 65 miles from the Gulf of Mexico.	15	1833	Oct. 19	.....	.....	.....	B. Dowler, Tableau of Yellow Fever, 1853, p. 28.
	Gretna.....	On Mississippi River.....	18	1834	.....	.....	.....	.....	Brown, Quarantine.
	Iberville, Iberville Parish.	.....	15	1834	.....	.....	.....	.....	Do.
	Jeannette's, Parish of Saint Mary.	Settlement on coast below New Orleans.	10	1834	Oct. 7	.....	.....	.....	E. D. Fenner, N. O. M. and S. J., 1848, p. 192.
	Jesuit's Bend.....	Near New Orleans.	12	1834	Sept. 12	.....	.....	.....	Do.
	La Fayette.....	On Mississippi River.....	100	1833	June 22	.....	.....	.....	Drake, Dis. Int. Valley of N. A., p. 247.
	Lake Providence, Carroll Parish.	On Lake Pontchartrain.....	15	1833	.....	.....	.....	.....	J. W. Lyman, N. O. M. and S. J., 1854, p. 670.
	Mandeville, Saint Tammany Parish.	.....	180	1833	.....	.....	.....	.....	W. B. Wood, N. O. M. N., 1856, p. 483.
	McDonoughville.....	On Red River.....	20	1833	.....	.....	.....	.....	N. O. M. J., 1859, p. 506.
	Natchitoches.....	Southern part of Louisiana.	187	1833	.....	.....	.....	.....	Brown, Quarantine.
	New Iberia, Saint Martin's Parish.	.....	187	1833	.....	.....	.....	.....	Brown, Quarantine.
	.....	.....	1870	.....	.....	.....	.....	.....	N. O. M. and S. J., 1848, p. 536.
	.....	.....	.....	.....	.....	.....	.....	.....	J. L. Ridell, N. O. M. and S. J., 1854, p. 813.
	.....	.....	.....	.....	.....	.....	.....	.....	E. D. Fenner, N. O. M. and S. J., p. 192.
	.....	.....	.....	.....	.....	.....	.....	.....	N. O. M. J., 1859, p. 506.
	.....	.....	.....	.....	.....	.....	.....	.....	Drake, Dis. Int. Valley of N. A., p. 191.
	.....	.....	.....	.....	.....	.....	.....	.....	Drake, Dis. Int. Valley of N. A., p. 241.
	.....	.....	.....	.....	.....	.....	.....	.....	Report New Orleans Board of Health, 1872, p. 62.
	.....	.....	.....	.....	.....	.....	.....	.....	Brown, Quarantine, p. 58.





Table of Localities in the United States where Yellow Fever has appeared since A. D. 1663, &amp;c.—Continued.

State.	Locality.	Situation.	Elevation, in feet, above sea-level.	DATE OF COMMENCEMENT.		DATE OF SUSPENSION.		Mortality.	Authority.
				Year.	Month.	Year.	Month.		
Louisiana.....	New Orleans.....	On Mississippi River.....	10	1555	June	.....	Dec.	2, 670	Chaillé, Va. Med. J., 1856, p. 499.
				1556	Aug.	.....	Nov.	74	S. Chaillé, Va. M. J., 1856, p. 492.
				1557	June	.....	Dec.	199	Do.
				1558	June	.....	Oct.	3, 889	Ed. Med. Rep., 1858, vol. 1, No. 4, p. 72.
				1562	.....	.....	.....	.....	Fenner, S. J. of M. S., May, 1866.
				1563	.....	.....	.....	.....	Chaillé, p. 8.
				1564	.....	.....	.....	.....	Harris, Sanitary Commission, p. 264.
				1567	June 10	.....	Dec. 22	3, 093	Ed. N. O. M. J., 1862, p. 194.
				1570	May 16	.....	Dec.	587	J. C. Fuget, N. O. Med. & S. J., vol. 1, No. 2, 1873.
				1571	Aug. 4	.....	Oct.	55	Report N. O. Board of Health, 1871.
	New Orleans, (small settlement on coast below.) Opelousas, Saint Landry Parish.	On Mississippi River.....	10	1572	Aug. 28	.....	Nov. 30	40	Report N. O. Board of Health, 1872, p. 17.
				1573	July 4	.....	Nov. 18	225	Orsanus Smith, Report Supervising Surgeon, U. S. Marine Hospital Service, 1873.
				1554	.....	.....	.....	.....	D. R. Fox, N. O. M. N., 1855, p. 409.
				1555	.....	.....	.....	.....	Do.
				1529	.....	.....	.....	.....	Carpenter, Sketches, p. 26.
				1537	Oct. 20	.....	Nov.	.....	T. A. Cooke, N. O. M. J., 1846, p. 27; Drake, p. 243.
				1539	Aug.	.....	Nov.	.....	Do.
				1542	.....	.....	.....	.....	Do.
				1553	.....	.....	.....	.....	T. A. Cooke, South Med. Rec., vol. 34, 1873, No. 4, p. 139.
				1567	.....	.....	.....	.....	Do.
	Pattersonville, Saint Mary's Parish.	On Teche River.....	20	1553	Aug. 8	.....	Dec.	45	J. S. Grant, M. D., Report San. Com., 1853, p. 43.
				1554	Sept.	.....	.....	.....	W. E. Wood, N. O. M. N., 1856, p. 483.
Plaquemine.....	Point a la Hache, coast below New Orleans. Port Barre.....	On Mississippi River.....	6	1555	Sept.	.....	.....	.....	Do.
				1537	.....	.....	.....	.....	Drake, Dis. Int. Valley, N. A., p. 191.
				1539	.....	.....	.....	.....	Do.
				1547	.....	.....	.....	.....	N. O. M. and S. J., 1848, p. 536.
				1553	Sept.	.....	Oct.	.....	J. B. Hacker, N. O. M. and S. J., 1854, p. 668.
				1558	.....	.....	.....	.....	S. Chaillé, Va. M. J., 1858, p. 491.
				1554	Oct.	.....	.....	.....	Brown, Quarantine.
				1570	.....	.....	.....	.....	T. A. Cooke, South Med. Rec., vol. 3, 1873, No. 4, p. 133.
				1541	Oct. 13	.....	.....	.....	Drake Dis. Int. Valley, N. A., p. 252.
				1543	.....	.....	.....	.....	Do.
				1539	.....	.....	.....	.....	Drake, Dis. Int. Valley, N. A., p. 191.
Saint Francisville..... West Feliciana Parish.....	Saint Francisville..... West Feliciana Parish.....	On Mississippi River.....	80	1511	.....	.....	.....	.....	Drake Dis. Int. Valley N. A., p. 253.
				1517	.....	.....	.....	.....	Do.





Table of Localities in the United States where Yellow Fever has appeared since A. D. 1663, &amp;c.—Continued.

State.	Locality.	Situation.	Elevation, in feet, above sea-level.	DATE OF COMMENCEMENT.		DATE OF SUSPENSION.		Mortality.	Authority.
				Year.	Month.	Year.	Month.		
Massachusetts...	Boston, Suffolk Co. ....	Head of Massachusetts Bay.	45	1798	.....	.....	.....	200	J. H. Griscom, N. Y. J. M., 1856, p. 369.
				1800	.....	.....	.....	.....	S. Emlen, N. A. M. and S. J., 1828, p. 321.
				1802	.....	.....	.....	60	J. Gotham, Med. Rep., 1856, p. 563.
				1805	.....	.....	.....	.....	J. H. Griscom, Visitations of Yellow Fever, p. 13.
				1819	.....	.....	.....	.....	S. Emlen, N. A. M. and S. J., 1828, p. 321.
	Holliston, Middlesex Co. ... Nantucket, Nantucket Co. ... New Bedford, Bristol Co. ...	Inland, 25 miles from Boston. On an island in the ocean ... On Buzzard's Bay. ....	75	1741	.....	.....	.....	15	F. E. Oliver, B. M. and S. J., 1858, p. 140.
			20	1763	.....	.....	.....	259	Med. Rep., 1853, p. 107.
			25	1800	.....	.....	.....	.....	Brown, Quarantine, p. 9.
			20	1796	.....	.....	.....	.....	B. Dowler, Tableau of Yellow Fever, 1853, p. 11.
			20	1798	.....	.....	.....	.....	J. H. Griscom, N. Y. J. M., 1856, p. 369.
Mississippi .....	Newburyport, Essex Co. ... Salem, Essex Co. .... Biloxi, Harrison Co. ....	On Merrimac River. .... On an inlet of the sea. .... On Biloxi Bay. ....	20	1702	.....	.....	.....	.....	J. Gotham, Jr., Med. Rep., 1856, p. 563.
			10	1839	.....	.....	.....	.....	Drake Dis. Int. Valley, N. A., 191.
				1847	.....	.....	.....	.....	Do.
				1853	.....	.....	.....	.....	E. D. Fenner, N. O. M. and S. J., 1848, p. 192.
				1853	.....	.....	.....	.....	J. C. Nott, N. O. M. and S. J., 1854, p. 571.
	Brandon, Rankin Co. ....	Inland, 12 miles from Jackson, on branch of Pearl River.	300	1853	Sept. 15	.....	.....	.....	S. Chaille, Va. M. J., 1858, p. 491.
				1854	Sept. 23	.....	Nov. 18	.....	Report Sanitary Commission, 1853, p. 77.
			320	1855	.....	.....	.....	.....	Trans. A. M. A., 22, p. 201.
			175	1853	Aug. 28	.....	Oct. ....	.....	A. P. Jones, N. O. M. N., 1856, p. 182.
			275	1855	Aug. 23	.....	.....	13	J. S. Beazley, N. O. M. N., 1856, p. 151.
	Clifton, Jefferson Co. .... Cooper's Wells, Hinds Co. ... Grand Gulf, Claiborne Co. ... Greenwood, Carroll Co. .... Jackson, Hinds Co. ....	10 miles from Pearl River ... On Mississippi River. .... On Yazoo River. .... On Pearl River. ....	200	1853	.....	.....	.....	.....	E. McAllister, N. O. M. and S. J., 1854, p. 675.
			140	1853	.....	.....	.....	9	Trans. A. M. A., 1854, p. 525.
			275	1853	.....	.....	.....	.....	S. C. Farras, Stethoscope, 1855, p. 584.
				1854	.....	.....	.....	.....	Do.
			150	1817	Sept. ....	.....	Nov. 9	9	Drake, Dis. Int. Valley, N. A., p. 263.
	Natchez, Adams Co. ....	On Mississippi River. ....		1819	Sept. ....	.....	Dec. ....	180	Brown, Quarantine, p. 39.
				1823	Aug. 10	.....	Oct. 18	312	H. Tooley, History Yellow Fever, 1823, p. 25.
				1825	Aug. 20	.....	Nov. 1	150	Drake, Dis. Int. Valley, N. A., p. 263.
				1827	Sept. 1	.....	Nov. ....	90	A. P. Morrill, Galv. M. J., 1867, p. 861.
				1829	Sept. 8	.....	Nov. 25	280	Drake, Dis. Int. Valley, N. A., p. 191.
				1837	Sept. ....	.....	Nov. ....	235	Do.
				1839	Sept. ....	.....	Nov. ....	.....	Do.
				1844	June ....	.....	Nov. ....	.....	Cartwright, N. O. M. and S. J., 1848, p. 225.
				1848	July 17	.....	Nov. ....	.....	C. H. Stine, N. O. M. and S. J., 1849, p. 549.
				1853	.....	.....	.....	.....	B. Dowler, Tableau of Yellow Fever, 1853, p. 26.

Pascagoula, Jackson Co....	On Pascagoula Bay .....	1875	.....	.....	.....	.....	.....	.....	B. M. and S. J., 1855, p. 275.
Pass Christian, Harrison Co.	Near Saint Louis Bay .....	1847	.....	.....	.....	.....	.....	.....	S. Chaille, Va. M. J., 1858, p. 491.
		1853	.....	.....	.....	.....	.....	.....	E. D. Fenner, N. O. M. and S. J., 1868, p. 192.
		1847	.....	.....	.....	.....	.....	.....	J. C. Nott, N. O. M. and S. J., 1854, p. 571.
		1853	.....	.....	.....	.....	.....	.....	E. D. Fenner, N. O. M. and S. J., 1868, p. 192.
Petit Gulf Hills, Jefferson Co.	On Mississippi River .....	1853	.....	.....	.....	.....	.....	.....	J. C. Nott, N. O. M. and S. J., 1854, p. 571.
Port Gibson, Claiborne Co.	On Bayou Pierre .....	1855	.....	.....	.....	.....	.....	.....	W. H. Calvert, N. O. M. and S. J., 1856, p. 80.
Rodney, Jefferson Co.....	On Mississippi River .....	1858	.....	.....	.....	.....	.....	.....	S. Chaille, Va. M. J., 1858, p. 491.
		200	.....	.....	.....	.....	.....	.....	A. P. Jones, N. O. M. N., 1854, p. 180.
Shieldsborough, Hancock Co.	On Saint Louis Bay .....	1853	.....	.....	.....	.....	.....	.....	E. McAllister, N. O. M. and S. J., 1854, p. 676.
		1829	.....	.....	.....	.....	.....	.....	A. P. Jones, N. O. M. N., 1854, p. 180.
		1843	.....	.....	.....	.....	.....	.....	C. B. New, West Lane, 1844, p. 301.
		1847	.....	.....	.....	.....	.....	.....	A. P. Jones, N. O. M. N., 1854, p. 180.
		1853	.....	.....	.....	.....	.....	.....	Do.
		1829	.....	.....	.....	.....	.....	.....	Drake, Dis. Int. Valley N. A., p. 214.
		1839	.....	.....	.....	.....	.....	.....	Do.
Vicksburg, Warren Co.....	On Mississippi River .....	1841	.....	.....	.....	.....	.....	.....	Do.
		1847	.....	.....	.....	.....	.....	.....	A. L. C. Magruder, N. O. M. J., 1848, p. 659.
		1839	.....	.....	.....	.....	.....	.....	Ed. West Lancet 1853, p. 575.
		1858	.....	.....	.....	.....	.....	.....	Drake, Dis. Int. Valley N. A., p. 191.
Washington, Adams Co ..	Inland, near Natchez .....	1871	.....	.....	.....	.....	.....	.....	S. Chaille, Va. M. J., 1858, p. 491.
Whiteell's Landing .....	Twenty miles below Natchez .....	1825	.....	.....	.....	.....	.....	.....	Med. and Surg. Rep., vol. 25, No. 16, p. 354.
Woodville, Wilkinson Co.	Fifteen miles east of the Mississippi River.	1817	.....	.....	.....	.....	.....	.....	J. W. Monnett, A. J. M. Sec., 1837, p. 243.
		1852	.....	.....	.....	.....	.....	.....	Drake, Dis. Int. Valley of N. A., p. 190.
		1853	.....	.....	.....	.....	.....	.....	J. W. H. West, Lancet, 1844, p. 347.
		1855	.....	.....	.....	.....	.....	.....	P. C. Gaillard, Ch. M. J. and Rev., 1853, p. 480.
		1797	.....	.....	.....	.....	.....	.....	A. C. Holt, N. O. M. N., 1856, p. 194.
		1853	.....	.....	.....	.....	.....	.....	Do.
		1858	.....	.....	.....	.....	.....	.....	S. Chaille, Va. M. J., p. 491.
Yazoo City, Yazoo Co.....	On Yazoo River .....	140	.....	.....	.....	.....	.....	.....	Trans. A. M. A., 1854, p. 525.
Saint Louis, Saint Louis Co.	On Mississippi River .....	475	.....	.....	.....	.....	.....	.....	Ed. Nash, J. M. and S., 1854, p. 345.
New Design, Saint Louis Co.	Twenty miles below Saint Louis.	420	.....	.....	.....	.....	.....	.....	W. Webb, N. O. M. N., 1856, p. 52.
Portsmouth, Rockingham Co.	On Piscataqua River, three miles from the ocean.	40	.....	.....	.....	.....	.....	.....	Dr. Watkins, M. Repos., 1801, p. 74.
Bridgeton, Cumberland Co.	On Cohansey Creek, twenty miles from Delaware Bay.	50	.....	.....	.....	.....	.....	.....	Med. Repos., 1799, p. 211.
Gloucester City, Camden Co.	On Delaware River .....	20	.....	.....	.....	.....	.....	.....	J. H. Griscom, Visitations of Yellow Fever, p. 9.
Perth Amboy, Middlesex Co.	On Raritan Bay .....	20	.....	.....	.....	.....	.....	.....	
Port Elizabeth, Cumberland Co.	On Maurice River .....	20	.....	.....	.....	.....	.....	.....	J. J. Gotham, M. Rep., 1856, p. 564.
Woodbury .....	On Hudson River .....	85	.....	.....	.....	.....	.....	.....	G. Lee, M. Repos., 1800, p. 246.
Albany .....	.....	1798	.....	.....	.....	.....	.....	.....	J. H. Griscom, Visitations of Yellow Fever, p. 9.
Bay Ridge, Long Island ..	.....	1746	.....	.....	.....	.....	.....	.....	J. H. Griscom, Visitations of Yellow Fever, p. 4.
Brooklyn, Kings Co .....	.....	1798	.....	.....	.....	.....	.....	.....	J. Gotham, Jr., M. Rep., 1856, p. 563.
	.....	1856	.....	.....	.....	.....	.....	.....	C. D. Griswold, B. M. and S. J., 1858, p. 214.
	A seaport .....	40	.....	.....	.....	.....	.....	.....	Gillespie, Amer. Med. and Philo. Reg., vol. 3, p. 101.
		1809	.....	.....	.....	.....	.....	.....	Ed. N. Y. J. M., 1856, p. 478.





North Carolina ..	Queensborough, Orange Co.....	1807	.....	.....	.....	*3	J. H. Griscom, M. Rep., 1856, p. 561.
	Red Hook, Dutchess Co....	1808	.....	.....	.....	*1	Ed. N. Y. J. M., 1856, p. 284.
	Stapleton, Staten Island,	1809	.....	.....	.....	*2	Do.
	Richmond Co.	1810	.....	.....	.....	*1	Do.
	Tompkinsville, Staten Isl-	1815	.....	.....	.....	*7	Do.
	and, Richmond Co.	1816	.....	.....	.....	*0	Do.
	West Neck, Suffolk Co....	1817	.....	.....	.....	*4	Ed. N. Y. J. M., 1856, p. 231.
	West Point, Orange Co....	1818	.....	.....	.....	*4	Do.
	Yellow Hook .....	1819	.....	.....	.....	*4	Do.
	Beaufort, Carteret Co .....	1820	.....	.....	.....	37	Do.
		1821	.....	.....	.....	*2	Do.
		1822	.....	.....	.....	*16	Do.
		1823	.....	.....	.....	230	Do.
		1824	.....	.....	.....	*5	Do.
		1825	.....	.....	.....	*8	Do.
		1826	.....	.....	.....	*1	Do.
		1827	.....	.....	.....	*2	Do.
		1828	.....	.....	.....	*4	Do.
		1829	.....	.....	.....	*0	Do.
		1830	.....	.....	.....	*0	Do.
North Carolina ..	Stapleton, Staten Island,	1831	.....	.....	.....	*1	Ed. N. Y. J. M., 1856, p. 234.
	Richmond Co.	1832	.....	.....	.....	*1	Do.
	Tompkinsville, Staten Isl-	1833	.....	.....	.....	*2	Do.
	and, Richmond Co.	1834	.....	.....	.....	*1	Do.
	West Neck, Suffolk Co....	1835	.....	.....	.....	*2	Do.
	West Point, Orange Co....	1838	.....	.....	.....	*8	Do.
	Yellow Hook .....	1839	.....	.....	.....	*4	Do.
	Beaufort, Carteret Co .....	1843	.....	.....	.....	*5	Do.
		1844	.....	.....	.....	*2	Do.
		1846	.....	.....	.....	*0	Do.
		1847	.....	.....	.....	*0	Do.
		1848	.....	.....	.....	*12	Do.
		1852	.....	.....	.....	*1	Ed. N. Y. J. M., 1856, p. 284, and Trans. A. M. A.,
		1853	.....	.....	.....	*14	vol. 7, p. 162
		1854	.....	.....	.....	*20	Ed. N. Y. J. M., 1856, p. 284.
		1855	.....	.....	.....	*5	Do.
		1872	.....	.....	.....	.....	Do.
		1801	.....	.....	.....	.....	B. M. and S. J., vol. 80, No. 23, p. 557.
		1856	.....	.....	.....	.....	J. G. Scott, M. Repos., 1807, p. 202.
		1848	.....	.....	.....	.....	Va. M. J., 1856, p. 328.
North Carolina ..	Beaufort, Carteret Co .....	1848	.....	.....	.....	.....	A. B. Whiting, Ch. M. J. and Rev., 1848, p. 613.
		1848	.....	.....	.....	.....	Do.
		1795	.....	.....	.....	.....	Do.
		1804	.....	.....	.....	.....	Dr. D. Hosack, M. and Philos. Reg., 1813, p. 191.
		1856	.....	.....	.....	.....	J. G. Scott, M. Repos., 1807, p. 242.
		1854	.....	.....	.....	.....	Va. M. J., 1856, p. 328.
		1864	.....	.....	.....	.....	Official Report, U. P. Rice, 1864.
		1871	.....	.....	.....	.....	Do.
		1864	.....	.....	.....	.....	Do.
		1871	.....	.....	.....	.....	Do.
		1864	.....	.....	.....	.....	Do.
		1871	.....	.....	.....	.....	Do.
		1864	.....	.....	.....	.....	Do.
		1871	.....	.....	.....	.....	Do.
		1864	.....	.....	.....	.....	Do.
		1871	.....	.....	.....	.....	Do.
		1864	.....	.....	.....	.....	Do.
		1871	.....	.....	.....	.....	Do.
		1864	.....	.....	.....	.....	Do.
		1871	.....	.....	.....	.....	Do.

\* Star indicates the reports of deaths at the Marine Hospital, N. Y. for the respective years. Ed. N. Y. J. M., 1856, p. 284.





[illegible]

\* Died daily.



Table of Localities in the United States where Yellow Fever has appeared since A. D. 1668, &amp;c.—Continued.

State.	Locality.	Situation.	Elevation, in feet, above sea-level.	DATE OF COMMENCEMENT.		DATE OF SUSPENSION.		Mortality.	Authority.
				Year.	Month.	Year.	Month.		
South Carolina...	Charleston, Charleston district.	A seaport.....	10	1768	.....	.....	.....	.....	M. M. Dowler, N. O. M. J., 1859, p. 305. T. Harris, Phil. M. and Ph. J., 1805, p. 21. W. Hume, Ch. M. J. and Rev., 1852, p. 145, and Simons' Trans. Med. Ass'n S. C., 1851, p. 38.
				1770	.....	.....	.....	.....	
				1792	.....	.....	.....	.....	
				1794	.....	.....	.....	.....	Do.
				1795	.....	.....	.....	.....	Do.
				1796	.....	.....	.....	.....	Do.
				1797	.....	.....	.....	.....	Do.
				1798	.....	.....	.....	.....	T. Y. Simons, Ch. M. J., and Rev., 1851, p. 779.
				1799	.....	.....	.....	239	W. Hume, Ch. M. J., and Rev., 1854, p. 145, and Simons' Trans. Med. Soc. S. C., 1851, p. 38.
				1800	.....	.....	.....	184	Do.
				1802	.....	.....	.....	96	Do.
				1803	.....	.....	.....	.....	Simons' Trans. S. C. Med. Ass'n, 1851, p. 37.
				1804	.....	.....	.....	148	Do.
				1805	.....	.....	.....	.....	Do.
				1807	.....	.....	.....	162	Do.
				1812	.....	.....	.....	.....	Simons' Trans. S. C. Med. Ass'n, p. 38.
				1817	July	.....	Nov.	272	W. Hume, Ch. M. J. and Rev., 1854, p. 145.
				1819	Aug.	.....	Oct.	177	Dowler, N. O. M. J., 1859, p. 597.
				1822	June	.....	Aug.	2	Do.
				1824	Aug.	.....	Nov.	235	Do.
				1825	Aug.	.....	Sept.	2	Do.
				1827	Aug.	.....	Nov.	64	Do.
				1828	Aug.	.....	Sept.	26	Do.
				1830	Sept.	.....	Nov.	30	Do.
				1834	Aug.	.....	Oct.	49	Do.
				1835	Aug.	.....	Sept.	25	Do.
				1838	Aug.	.....	Nov.	351	Do.
				1839	June	.....	Oct.	134	Do.
				1840	Aug.	.....	Oct.	22	Do.
				*1841	.....	.....	.....	.....	Simons' Trans. S. C. Med. Ass'n, p. 59.
				1843	.....	.....	Nov.	1	Dowler, N. O. M. J., p. 597.
				1849	Aug.	.....	Nov.	125	Do.
				1852	Aug.	.....	Nov.	310	Do.
				1854	Aug.	.....	Nov.	627	Do.
				1856	Aug.	.....	Nov.	211	Do.
				1857	Sept.	.....	Nov.	13	Do.





Table of Localities in the United States where Yellow Fever has appeared since A. D. 1668, &amp;c.—Continued.

State.	Locality.	Situation.	Elevation, in feet, above sea-level.	DATE OF COMMENCEMENT.		DATE OF SUSPENSION.		Mortality.	Authority.
				Year.	Month.	Year.	Month.		
Texas.....	Cypress City, Harris Co....	Near Cypress Bayou, a branch of the San Jacinto River.	60	1853	.....	.....	.....	.....	Galv. M. J., 1866, p. 169.
	Danville, Montgomery Co.	On branch of the San Jacinto River.	160	1859	.....	.....	.....	.....	B. Dowler, N. O. M. J., 1860, p. 443.
	Edinburg, Cameron Co....	On Rio Grande River.....	100	1859	July —	.....	.....	13	Trans. A. M. A., vol. 19, p. 406.
	Goliad, Goliad Co.....	On San Antonio River.....	50	1867	July 12	.....	.....	23	B. Dowler, N. O. M. J., 1860, p. 443.
	Galveston, Galveston Co....	On an island in Galveston Bay.	5	1859	Sept. 30	.....	Oct. 11	250	Trans. A. M. A., vol. 19, p. 284.
				1844	July 5	.....	.....	400	Galv. M. J., 1867, p. 838.
				1847	Oct. 1	.....	Nov. 25	200	Do.
				1853	Aug. 16	.....	Nov. 28	536	Ed. Med. and Surg. Rep., vol. 17, 1867, No. 14, p. 297.
				1854	Aug. 9	.....	Nov. 5	404	Do.
				1858	Aug. 27	.....	Nov. 14	344	Do.
				1859	Sept. 17	.....	Nov. 30	182	Do.
				1864	Sept. 1	.....	Nov. 20	259	Do.
				1866	.....	.....	.....	.....	Galv. M. J., 1866, p. 338.
				1867	June 26	.....	Nov. —	1, 150	S. M. Welch, Galv. M. J., vol. 1, No. 2, p. 83.
			55	1867	.....	.....	.....	.....	Trans. A. M. A., vol. 19, p. 289.
			200	1867	Aug. 9	.....	Nov. 26	151	Trans. A. M. A., vol. 19, p. 275.
	Harrisburg, Harris Co....	On Buffalo Bayou.....	50	1853	.....	.....	.....	.....	Galv. M. J., 1866, p. 169.
	Hempstead, Austin Co....	50 miles from Houston, and near Brazos River.	50	1839	.....	.....	.....	.....	W. McCraven, N. O. M. N., 1860, p. 105.
	Hockley, Harris Co.....	Near Buffalo Bayou.....		1844	.....	.....	.....	.....	Do.
	Houston, Harris Co.....	On Buffalo Bayou.....		1847	.....	.....	.....	.....	Do.
				1848	.....	.....	.....	.....	Do.
				1853	.....	.....	.....	.....	Do.
				1854	.....	.....	.....	.....	Do.
				1858	.....	.....	.....	.....	Do.
				1859	.....	.....	.....	.....	Do.
				1864	.....	.....	.....	.....	Galv. M. J., 1866, p. 163.
				1870	.....	.....	Oct. —	1	Galv. M. J., 1870, p. 296.
	Huntsville, Walker Co....	200 miles east by north of Austin.	200	1867	Aug. 9	.....	Oct. 19	130	Trans. A. M. A., vol. 19, p. 275.
	Independence, Washington Co.	80 miles east of Austin, near Brazos River.	250	1867	.....	.....	.....	.....	Trans. A. M. A., vol. 19, p. 289.

Indianola, Calhoun Co. ....	On Matagorda Bay .....	10	1852	Sept. —	.....	.....	Indianola Bulletin, Dec. 16, 1870.
			1853	.....	.....	.....	Brown, Quarantine, p. 68.
			1858	.....	.....	.....	Heard, Rep. Epid. of Texas, p. 15.
			1859	.....	.....	.....	B. Dowler, N. O. M. J., 1860, p. 443.
			1862	.....	.....	.....	Brown, Quarantine, p. 68.
			1867	June 20	.....	80	Trans. A. M. A., vol. 19, p. 268.
La Grange, Fayette Co. ....	On Colorado River .....	450	1867	Aug. —	Nov. —	200	Trans. A. M. A., vol. 19, p. 275.
Liberty, Liberty Co. ....	On Trinity River .....	40	1867	.....	.....	.....	Trans. A. M. A., vol. 19, p. 289.
Liverpool, Brazoria Co. ....	36 miles west of Galveston, near Chocolate River.	25	1853	Aug. —	.....	4	Galv. M. J., 1866, p. 169.
Matagorda, Matagorda Co. ....	On Matagorda Bay .....	15	1862	.....	.....	120	Galv. M. J., 1866, p. 170.
Millican, Brazos Co. ....	Near Brazos River .....	300	1863	.....	.....	.....	Trans. A. M. A., vol. 19, p. 266.
			1864	.....	.....	.....	Galv. M. J., 1866, p. 175.
			1867	Oct. 15	Nov. 12	4	Trans. A. M. A., vol. 19, p. 275.
Navasota, Grimes Co. ....	On the Navasota River .....	200	1867	Aug. 12	Dec. —	154	A. R. Kilpatrick, Galv. M. J., 1862, vol. 1, No. 3, p. 182.
Oldtown, near Indianola .....	.....	20	1867	Oct. 13	.....	.....	Trans. A. M. A., vol. 19, p. 268.
Port Lavaca, Calhoun Co. ....	On Lavaca Bay .....	15	1867	July 3	Oct. 29	.....	Trans. A. M. A., vol. 19, p. 283.
Richmond, Fort Bend Co. ....	On Brazos River .....	125	1853	.....	.....	.....	Galv. M. J., 1866, p. 163.
			1859	.....	.....	.....	B. Dowler, N. O. M. J., 1860, p. 443.
Rio Grande City, Starr Co. ....	On Rio Grande River .....	200	1867	.....	.....	150	Heard, Epidemic diseases of Texas.
Sabine City, Jefferson Co. ....	On Sabine Lake .....	10	1863	July —	Oct. 1	14	Galv. M. J., 1866, p. 170.
Saluria, Calhoun Co. ....	On Matagorda Island .....	10	1853	.....	.....	.....	B. Dowler, N. O. M. J., 1860, p. 443.
Sugarland, Fort Bend Co. ....	On Brazos River .....	100	1859	.....	.....	.....	Trans. A. M. A., vol. 19, p. 284.
Victoria, Victoria Co. ....	On Guadalupe River .....	50	1867	Aug. 1	Dec. 25	200	Dr. Dick, Med. Repos., 1864, p. 190.
Alexandria, Alexandria Co. ....	On Potomac River .....	25	1863	Aug. 1	.....	200	Currie, Memoirs of Yellow Fever, p. 109.
City Point, Prince George Co. ....	On James River .....	15	1738	.....	.....	.....	J. A. Manning, Va. M. J., 1857, p. 283.
Gosport, Norfolk Co. ....	On Elizabeth River .....	20	1855	.....	.....	.....	Brown, Quarantine, p. 18.
Hampton Roads .....	.....	.....	1869	.....	.....	.....	Daily Shreveport Times, vol. 2, No. 311, 1873.
Norfolk, Norfolk Co. ....	On Elizabeth River .....	20	1747	.....	.....	.....	J. H. Griseom, N. Y. J. M., 1856, p. 369.
			1794	.....	.....	.....	Do.
			1795	.....	.....	.....	Va., M. J., 1857, p. 95.
			1796	.....	.....	.....	J. H. Griseom, N. Y. J. M., 1866, p. 369.
			1797	.....	.....	.....	Va. M. J., 1857, p. 95.
			1798	.....	.....	.....	Do.
			1799	.....	.....	.....	Med. Repos., vol. 4, p. 329.
			1800	July 26	Oct. 30	250	Va. M. J., 1857, p. 95.
			1801	.....	.....	.....	Do.
			1802	.....	.....	.....	Do.
			1803	.....	.....	.....	Do.
			1804	.....	.....	.....	Do.
			1805	.....	.....	.....	Do.
			1821	Aug. 1	.....	.....	Va. M. J., 1857, p. 95.
			1826	Sept. 1	.....	.....	Committee's Report, p. 14.
			1832	Aug. 7	.....	.....	Va. M. J., 1857, p. 95.
			1854	Oct. —	Nov. 2	3	Do.
			1855	June 30	Oct. —	1,807	Portsmouth Relief Association Report.
Petersburg, Dinwiddie Co. ....	On Appomattox River .....	20	1798	.....	.....	.....	Currie, Memoirs Yellow Fever, p. 109.
Portsmouth, Norfolk Co. ....	On Elizabeth River .....	20	1802	.....	.....	.....	Portsmouth Relief Association Report, p. 91.
			1854	.....	.....	.....	Do.
			1855	Aug. 1	Oct. —	1,000	Portsmouth Relief Association Report, p. 77.



Table of Localities in the United States where Yellow Fever has appeared since A. D. 1663, &amp;c.—Continued.

State.	Locality.	Situation.	Elevation in feet, above sea-level.	DATE OF COM- MENCEMENT.		DATE OF SUS- PENSION.		Mortality.	Authority.
				Year.	Month.	Year.	Month.		
Virginia .....	Richmond, Henrico Co. .... Scott's Creek, near Ports- mouth. Winchester, Frederick Co.	On James River ..... ..... 20 miles from the Blue Ridge Mountains.	50	1806	.....	.....	.....	.....	M. Repos., 1807, p. 215.
			15	1855	June 29	.....	.....	.....	J. A. Manning, Va. M. J., 1857, p. 99.
			700	1804	July —	.....	.....	.....	R. Dunbar, Med. Repos., 1805, p. 252.

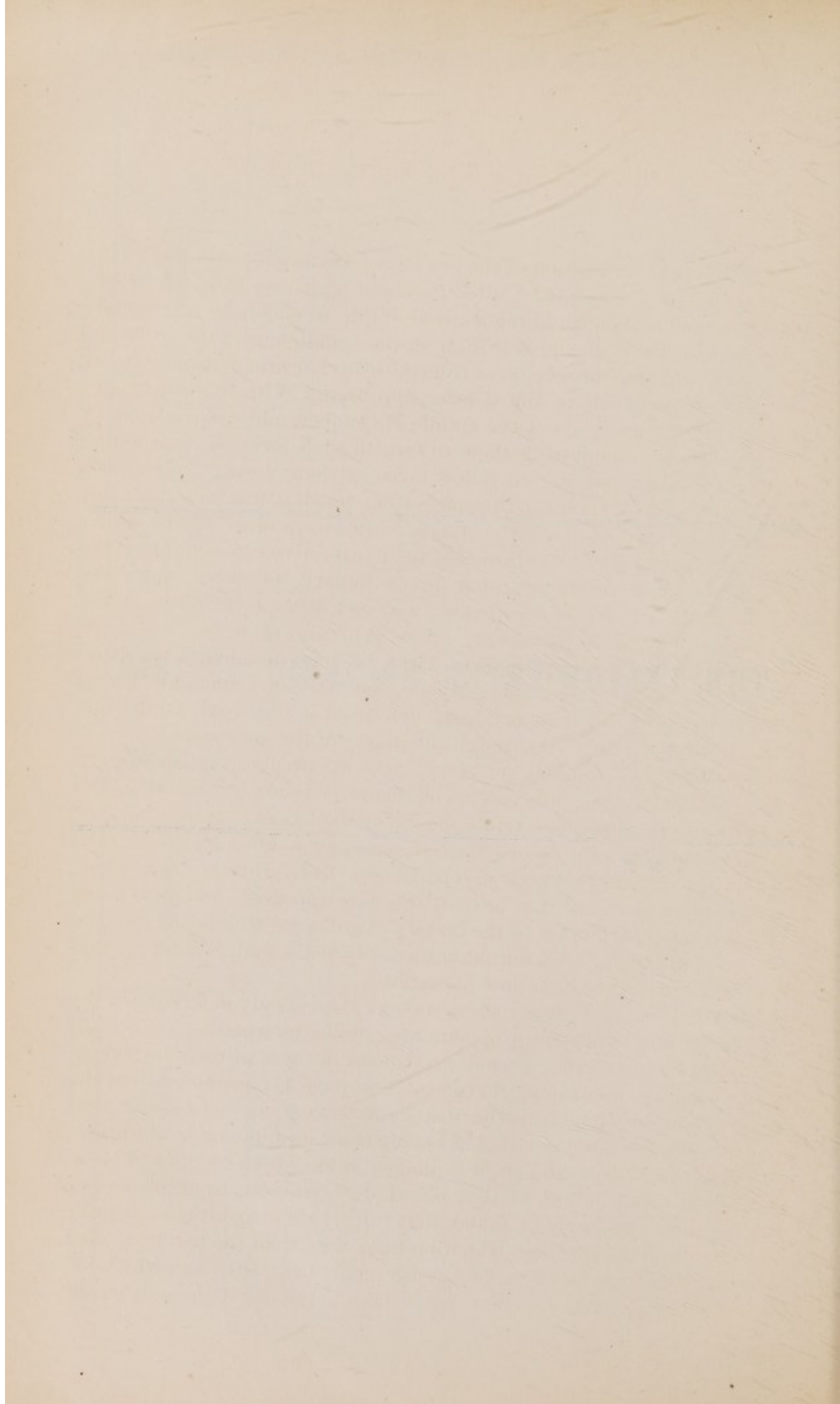
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THE YELLOW-FEVER EPIDEMIC OF 1873.

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## C.—THE YELLOW FEVER EPIDEMIC OF 1873.

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[THE intimate connection of the sea-faring community with every epidemic of yellow fever in the United States of which we have any trustworthy account, seemed to render it desirable to secure as full reports as possible of the epidemic of 1873, from the stand-point of the surgeons of the Marine-Hospital Service, or from those in charge of marine-hospital patients at ports where the disease appeared. With this object the Supervising Surgeon, about the middle of October, addressed a letter to these gentlemen, requesting them to furnish such facts as came under their observation relating to yellow fever at their ports; the dates of its first appearance thereat; the places from which it was imported, and the modes of introduction; the number of cases and of deaths which occurred; the hygienic conditions of their respective communities; the influence of quarantine or other precautionary measures upon the introduction or arrest of the disease; and such other local observations as might be deemed pertinent, or as they were able to k3. In response to this request, reports, more or less detailed, have been received from New York City, Mobile, New Orleans, Memphis, Cairo, and Louisville; and a report from Pensacola is promised, as also one from Shreveport, delayed through the illness of the surgeon.

The epidemic is probably too recent to secure accounts satisfactory in every particular; the interruption of usual methods and routine, the relaxation following the terrible mental and physical strain, the slow convalescence from the disease itself in some cases—all these causes have combined to render the received reports imperfect. But they are, nevertheless, fuller than any that have at this date appeared, and form a not unimportant contribution to the history of a disease which has cost the Southern and Gulf States untold millions of dollars, and, it is safe to say, more lives than they have lost in warfare.

Extended comment upon these reports is advisedly deferred for the present, in the expectation of obtaining fuller information on certain points, and of correcting some discrepancies in those already furnished. It will be noted, for example, in the table on page 111, compiled from the reports mentioned, and from the *Monthly Returns of sick and disabled*, that while the disease is not reported as having made its appearance at Shreveport until the 12th of August, it is alleged to have been brought to Memphis as early as the 10th of that month, by a traveler, from the former place. It will probably be found that this traveler contracted his disease on board the tow-boat which brought him from the mouth of Red River to Memphis, (see Dr. Thornton's report page 104,) and which left New Orleans August 2, yellow fever having prevailed there from the



latter part of June, or early part of July. This inference is further strengthened by the fact that on the arrival of this boat at Memphis her captain and several of the crew were sick, and, though of what disease is not stated, the body of the captain, who died a few hours after leaving Memphis, presented every appearance of having died of yellow fever. If it can be obtained, the history of this tow-boat, which is presumably the same as the one mentioned in the Cairo report, will probably determine this point.

It will be interesting, also, to collate the experience of southern physicians and their views of the relation of dengue to yellow fever, and of the influence of the latter upon the endemic fevers. The reports of the surgeons of the Marine-Hospital Service, immediately preceding and during the yellow-fever epidemic of 1873, show a marked increase in the number of cases, and in the virulence and fatality of this class of the so-called zymotic diseases due to paludal malaria. It was especially noticed that the intermittent fevers were prone to take on the congestive form; and the terms "pernicious," "congestive," and "malignant" occur quite frequently in the reports made during the months of, and immediately preceding, the epidemic. In New Orleans the yellow fever seems to have been overshadowed by an epidemic of dengue or "break-bone fever," from which it is estimated that fully 50,000 of the inhabitants suffered. Dr. Reilly (U. S. M-H. S.) states that the same condition obtained during the yellow-fever epidemic of 1854 in Charleston, S. C., when so many natives were attacked, with such a light mortality; and observes that physicians then differed widely in their diagnoses, many reporting cases as yellow fever which others called "break-bone fever." This may serve to explain the anomaly of natives apparently suffering from yellow fever, as well as of cases reported among those who had suffered in previous epidemics. Dr. Reilly himself, for instance, after having had a severe attack of unmistakable yellow fever, with black vomit, in 1852, was again treated for the same disease during the epidemic of 1854, but from the brief duration of the attack, the severity and character of the accompanying pain, and other symptoms, it seems probable that this second disease was the so-called "break-bone fever."

Of more direct practical utility, however, is the study of measures of prevention—the answer to the question how far the use of carbolic acid is to be credited with the jugulation of the threatened epidemic at New Orleans and Mobile; to what extent efficient or defective sanitary measures affect the progress of yellow fever, in the light of the recent experience in the two former cities as compared with Memphis and Shreveport; what is proper quarantine for this disease at various ports, and what is the true scope, function and value of quarantine; can a quarantine be effective which does not embrace "commerce with foreign nations and among the several States" by land, as well as by water? Inquiries concerning these and kindred matters are still being prosecuted



by the medical officers of the Service; and from the results of their studies it is hoped to be able to frame a plan of prophylactic action to be observed by marine-hospital surgeons throughout the yellow-fever season, the results of which should form an interesting feature of the subsequent annual reports of the Supervising Surgeon.

Meantime, it may be remarked that the substantial immunity of New Orleans and Mobile from yellow-fever this year, under similar conditions of repeated exposures on the one hand, and of well-organized municipal sanitation, coupled with free carbolic disinfection, on the other, would seem to indicate that one or both of these latter are sufficient to arrest yellow fever, or at least to prevent its becoming epidemic. To what extent the use of carbolic acid is an efficient agent is yet to be determined; but of the value of general disinfection, thorough cleanliness, good sewerage, pure air, unpolluted water, wholesome food, individual hygiene—in short, of what goes to make up a good sanitary condition, there can be no question. When such a condition obtains generally throughout the land it will probably only remain to prevent the introduction of fomites, by an intelligent quarantine, in order to be justified in writing *dele* opposite *febris flava* in the American nosology.—W.]

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#### REPORTS ON YELLOW FEVER IN 1873.

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*From the Medical Officers of the United States Marine-Hospital Service.*

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NEW YORK, December 1, 1873.

SIR: In answer to your communication of the 15th ultimo, concerning yellow fever, I have the honor to submit the following report of cases treated in United States Marine Hospital, (Class II,) port of New York, year 1873:

1. Jorgen Andersen; æt. 23; nationality, Swedish; occupation, seaman; admitted from schooner *Jennie Stout*; taken sick on passage from New Orleans; entered hospital July 30; died August 1.

The two following cases from same vessel, admitted at same time, recovered: 2. Gulick Gulbrozen; æt. 23; discharged August 21. 3. Bernard Nicholson; æt. 37; discharged November 3.

4. George Otto; æt. 19; nationality, German; occupation, waiter; admitted from steamer *Morro Castle*; taken sick on passage from Havana; entered hospital August 30; died September 1.

5. Madison Wismore; æt. 27; nationality, American; occupation, engineer; admitted from steamer *Metropolis*; was sick in New Orleans, though the disease was not positively ascertained to have been yellow fever; entered hospital September 22; died September 27. This was undoubted yellow fever when received, and was probably a relapse.

I have also obtained from the records of the Board of Health of this city the particulars of the only cases there reported, as follows:

Fred. W. Bacon; æt. 22; waiter on steamer *Yazoo*; sailed from New Orleans for Philadelphia latter part of May; touched at Havana; and was quarantined, on account of cholera, in New Orleans. Sickness appeared on the ship May 27; arrived at Philadelphia May 29; was not quarantined. Bacon came on to New York; arrived May 31; sick on arrival; taken to No. 7 Eldridge street, and died June 2.



Patrick Hennessy; æt. 30; came from Memphis last of October; also sick on arrival; died in ambulance, on way to hospital, October 30.

The cases reported in Brooklyn were newspaper cases, and were pronounced to be malarial fever by competent authority.

I have the honor, also, to transmit the inclosed communication from Dr. Mosher, deputy health-officer of the port of New York:

HEALTH-OFFICER'S DEPARTMENT,

Quarantine, Tompkinsville, S. I., November 3, 1873.

MY DEAR DOCTOR: I am requested by Dr. Van der Poel to furnish, in answer to your inquiry of 30th ultimo, the following:

Cases of yellow fever occurring at quarantine during 1873:

(1.) First case, May 23. (2.) Last case, October 1. (3.) Total number of cases, 62. (4.) Mortality, 13 deaths. (5.) All cases were taken from vessels arriving at this port.

Very truly, yours,

J. S. MOSHER.

Dr. HEBER SMITH.

From the foregoing it will be seen that there were in all sixty-nine cases of yellow fever, and eighteen deaths therefrom, at this port during the past season; and that so long as quarantine is a matter controlled by State caprice or fear, there is nothing to prevent the introduction of this or any other disease into a community, no matter how rigid or perfect the quarantine of such community may be made—and its present administration at New York is both.

That the yellow fever failed to become epidemic in New York the past season—that it is not epidemic in New York every season—is due, probably, first, to the want of favoring conditions in the season itself, and, second, to the efficiency of the Board of Health; but certainly not to the want of a supply of fomites furnished by land from other ports.

I am, sir, very respectfully, your obedient servant,

HEBER SMITH,

Surgeon U. S. M-H. S.

JOHN M. WOODWORTH, M. D.,

Supervising Surgeon U. S. M-H. S.

NEW ORLEANS, LA., November 5, 1873.

SIR: Referring to your letter of October 24, asking for "a sketch of the present yellow-fever epidemic, on its subsidence, the local influences that have affected the disease," etc., I have the honor to state that the first ascertained cases of yellow fever reported in the city were from the Spanish bark *Valparaiso*, which arrived here from Havana in ballast with five passengers, June 26, 1873, having been detained at quarantine four or five days. The mate of this vessel is the only one on board who did not recover, but several vessels lying in the immediate vicinity lost a number of their crew. The number of cases and deaths from the disease to the 29th ult. is as follows:

*Weekly Statement of Yellow-Fever Cases and Deaths in New Orleans during the Season of 1873.*

During the week ending—	Cases.	Deaths.	During the week ending—	Cases.	Deaths.
<i>Six o'clock p. m.</i>			<i>Six o'clock p. m.</i>		
July 6, 1873.....	1	.....	September 14, 1873.....	60	35
July 13, 1873.....	2	1	September 21, 1873.....	37	26
July 20, 1873.....	1	1	September 28, 1873.....	32	21
July 27, 1873.....	1	1	October 5, 1873.....	42	14
August 3, 1873.....	5	.....	October 12, 1873.....	32	24
August 10, 1873.....	6	3	October 19, 1873.....	34	18
August 17, 1873.....	10	2	October 26, 1873.....	19	11
August 24, 1873.....	8	8			
August 31, 1873.....	16	6	Total.....	343	187
September 7, 1873.....	38	16			



For the foregoing table I am indebted to the courtesy of Dr. S. C. Russell, secretary of New Orleans Board of Health.\*

It is certain that our first cases came from Havana. Quarantine did not prevent it; and it is the opinion of the medical gentlemen who went from here at the first call of distress from Shreveport, that yellow fever was carried to the latter place from New Orleans. Drs. Bruns, Choppin, and Davidson, the physicians referred to, are intelligent, experienced, and well-known members of the faculty, and their opinions are entitled to respect.

New Orleans has been terribly exposed this season from all quarters; for though the disease was brought here originally from Havana, there has been constant communication between this port, Shreveport, and Memphis, and thus repeated new importations. Nurses went from here to Shreveport and returned during the height of the epidemic there and died of the disease here; and fugitives from the pestilence in Shreveport came here to die. To what influence we owe our immunity from the disease, for it has not shown a disposition to spread, I am not prepared to express an opinion, particularly when old physicians of this city, who have devoted a lifetime, one may say, to the study of yellow fever, seeing it in all its phases, have openly confessed their inability to interpret its true nature, and, to use their own words, "the more they saw of it the less they knew about it."

Are we indebted to quarantine regulations for the small number of victims of this scourge? This is hardly probable, for it is proved that the disease was imported from Havana as early as July 6, and it did not appear in Shreveport until the middle of August. Vessels have been arriving weekly from Havana, where the mortality was from four to five hundred daily [weekly?] in July and August, sparing neither native nor foreigner;† and in Memphis, Shreveport, and elsewhere the disease has been fatal almost without parallel. And yet I may safely assert that New Orleans, during the last season, has been one of the few cities of the Union that can boast of a small death-rate in proportion to its population. To what, then, are we to attribute this miraculous escape? In my opinion, thanks are due to good sanitary regulations, to the watchfulness and activity of the board of health, and to the free use of carbolic acid,‡ that yellow fever in this city has been greatly modified, if not completely disarmed of its subtle and terrible power.

I am, sir, very respectfully, your obedient servant,

ORSAMUS SMITH,

*Surgeon U. S. M-H. S.*

JOHN M. WOODWORTH, M. D.,

*Supervising Surgeon U. S. M-H. S.*

\* [The total number of cases, as subsequently reported by Dr. Smith in "Disease and Injury Return" for November, 1873, is given at 394, with a total of 225 deaths; the first case (the mate of the *Val-paraiso*) appeared on July 4, died July 8; the last case reported, taken sick November 18, died November 24.—W.]

† This statement I have from one who was in Havana during this time.

‡ [It is asserted that nowhere in the world before has disinfection on so extensive a scale been resorted to as in New Orleans during the yellow-fever season of 1873; and, as also in Mobile, it met with considerable opposition from some quarters. Concerning the value of this disinfection, which was begun in New Orleans during the first week in August by the free use of impure carbolic acid, Dr. A. W. Perry, Sanitary Inspector New Orleans Board of Health, in a communication to the *New Orleans Medical and Surgical Journal* for November, says: "To ascertain whether or not the small number of subsequent cases (in infected districts) was because of the small number of persons liable to yellow fever who lived in these squares, a census was taken of the total population of each of the squares, and also of the white persons who had come to the city since 1867, the last epidemic year. In thirty squares, in which most of the yellow-fever cases occurred, the total population was 5,223 an average of 174 per square; of these 1,249 were liable to take yellow fever, being nearly 24 per cent. liable. Of the liable persons 7.3 per cent. took the disease before disinfection, and .9 of one per cent. after disinfection." As an isolated fact this is certainly very striking; but isolated facts are not conclusive, and this question is still open for investigation.—W.]



MEMPHIS, TENN., November 18, 1873.

DEAR SIR: Your communication of the 24th ultimo, requesting me to furnish such facts in regard to the late epidemic of yellow fever in Memphis as are at my command, was duly received, and has already been acknowledged. The delay in furnishing the desired information is due partially to the stress of other duties and engagements growing out of the epidemic, and partially to the necessity of sifting facts from rumors and speculations, which are always rife at such a time.

From the best information I can get on the subject, the first case of yellow fever died in Memphis on the 10th of August. This was a man named Davis, who had been in Texas, and on his way home to Alabama passed through Shreveport, La., during the late epidemic there.

At the mouth of Red River he got on the tow-boat *Bee*, which left New Orleans August 2. The man was put off the boat here at the upper landing, near the mouth of Wolf River, in the afternoon of the 10th of August. At the time he was very ill, unable to take care of himself, and was cared for a few hours by a man named Riley and another man, (name not known,) who lived near the landing. That evening he was carried to the Adams-street station-house, where he died during the night. No physician saw him, but, from what I can learn, there was no doubt of his being a case of yellow fever. Riley, the man with him, and several members of his (Riley's) family, contracted the disease and died a few days after. The physician who visited them I have been unable to find, but the presumption is they were attended by Dr. Crone, who died of yellow fever in September. When the tow-boat arrived here, the captain, C. B. Gall, and several of the crew, were sick. The boat remained here but a few hours, and then proceeded on its trip up the river. At Osceola, Ark., the captain died, and his body was shipped back to Memphis for burial. The body was not coffined until after its arrival here, on the 11th of August, and presented all the appearances of having died of yellow fever.

There were a number of deaths during the last two weeks of August in the neighborhood of the place where the *Bee* landed, but they were not reported as yellow fever by the physicians who attended them. The first case that there is any official record of is the case that I reported in the City Hospital. A patient was admitted to this hospital September 2, very ill with yellow fever; had evidently been sick several days, and died on the 3d. The register then shows admissions of yellow fever patients on September 3, 5, 8, &c. I am satisfied there were a number of cases in the city before any were admitted to hospital, but the disease, if recognized by any physician, was not reported as such.

On September 3 I was called to visit a child at the St. Peter's Orphan Asylum, a Catholic institution, located a short distance from the City Hospital. This child was admitted into the Asylum August 28, apparently well; was taken sick on the 2d of September, and died on the 7th. For twenty-four hours previous to death it had unmistakable black-vomit. This child was brought to the Asylum from the foot of Market street, which is in the immediate neighborhood of the point where the boat *Bee* landed, and there had been several deaths in the house whence the child was brought.

The disease prevailed mostly in the northwestern portion of the city, between Washington and Concord streets. But it extended north beyond the bayou to a part of the city known as Chelsea, (the Ninth ward,) mostly occupied by residences, and prevailed here, to a very considerable extent, more than it did in any other suburb. It also extended south and east as far as the city limits, and I knew of several cases beyond the city limits east. It was never as bad in south or central Memphis as in that portion of the city north of where the first case was reported. My opinion is the infection was conveyed by the wind, which in summer and fall, with us, blows from the south to the portion of the city north of the infected district.

The number of deaths from yellow fever will never be definitely known, as proper official record for the city was not kept, and a number of deaths from the disease were reported as from other causes. And, moreover, for at least three weeks after the disease appeared physicians did not recognize it, or at least did not report yellow fever.



The number of deaths from September 14, the date it was first officially published, to November 9, is as follows, taken from the printed reports of the secretary of the Board of Health :

From September 14 to 30, inclusive.....	259
From October 1 to 31, inclusive.....	899
From November 1 to 9, inclusive.....	86
Total .....	1,244

The largest number of deaths on any one day occurred October 10, when 55 died.

There have been deaths from the disease reported since the 9th of November ; and there will, no doubt, be others even after this, November 18.

The report from the City Hospital from September 2 to October 31, inclusive, is as follows:

Number of cases admitted from September 2 to October 31, inclusive.....	169
Deaths from yellow fever.....	103

Number of cases in hospital October 31, 18. Of these, 13 are convalescent and 5 are under treatment.

(The above is taken from report made to the secretary of the Board of Health November 1.)

The deaths in the City Hospital, and also in the Walthall Infirmary, a temporary hospital established during the epidemic, are included in the report of deaths published by the secretary of the Board of Health for the whole city. This is as near as I can give the deaths at this time.

I am unable to give the number of cases that occurred in the city, nor will it ever be known. The misfortune was that there was no well-organized, paid board of health at that time ; our city was defective in its sanitary regulations, and there are no official records of a vital or sanitary character outside of the City Hospital prior to September 2. There is no doubt in my mind that yellow fever was brought here from the South early in August. But I am unable to ascertain when the first case occurred among the residents of the city. I think there is no doubt of its occurring after the 10th of August. Nor do I think there is any doubt of there having been deaths here among the residents of that portion of the city subsequently known as the "infected district" prior to September 1.

There were only four deaths of marine patients from yellow fever in the hospital during the epidemic, three white men and one negro. They have been reported in my official reports to your office, and were included in the general mortality report of the city.

I am, sir, most respectfully, your obedient servant,

G. B. THORNTON, M. D.

JOHN M. WOODWORTH, M. D.,

*Supervising Surgeon U. S. M-H. S.*

MOBILE, ALA., December 6, 1873.

SIR: In compliance with your letter, dated October 24, relative to yellow fever in Mobile this season, I have the honor to submit the following:

The published report of the health-officer to the Advisory Board of Health—an extemporized organization, created to assist the city physician during the prevalence of the epidemic—is so full and complete for the period prior to November 1, that it will not be necessary to do more than summarize my own observations and experience of the epidemic, and to complete the table of cases by adding those which occurred subsequent to October 25.



The following table gives the dates of occurrence, and number of cases on each day, with the result of the cases:

Date of occurrence.	No. of cases.	Result.		Date of occurrence.	No. of cases.	Result.	
		Died.	Recovered.			Died.	Recovered.
August 21.....	1	1	.....	October 13.....	2	.....	2
September 11.....	2	1	1	14.....	1	1	.....
15.....	2	1	1	15.....	1	.....	1
17.....	2	2	.....	16.....	1	1	.....
18.....	1	.....	1	21.....	5	2	3
20.....	1	1	.....	23.....	1	1	.....
22.....	3	1	2	25.....	1	1	.....
23.....	1	.....	1	November 2.....	1	1	.....
25.....	1	1	.....	3.....	1	1	.....
26.....	5	1	4	8.....	2	1	1
30.....	1	1	.....	17.....	1	1	.....
October 1.....	2	1	1	23.....	1	1	.....
4.....	1	.....	1	27.....	1	.....	1
5.....	3	2	1	29.....	1	1	.....
6.....	1	1	.....	Total.....	50	27	23
8.....	2	.....	2				
9.....	1	1	.....				

The first case of yellow fever that appeared in Mobile was that of Owen McKenna. The facts in this case, as reported by Dr. Hicklin, the health-officer, are as follows: "A resident of Mobile the past three years, unacclimated; went to New Orleans on the 16th of August and returned the following day, 17th. He was taken sick on the 21st, and died on the 26th day of the same month. His attending physician pronounced it yellow fever. He resided on Hamilton street, southeastern portion of the city, and was the only case known to me, save Dr. F. M. Stone, who sickened and died of the disease in the month of October, that occurred in that section of the city during the entire prevalence of the disease." Dr. H. states that McKenna's death was before the date of his appointment to office, and he was not apprised whether any disinfection of the premises was made. It may here be stated that the chief duty of the health-officer to the Advisory Board was to superintend the disinfecting of all sections and premises where the disease appeared, the physicians being requested to report every case which occurred under their charge at the earliest moment possible.

The next case came directly from Shreveport via New Orleans. He resided above Shreveport, and in passing that city remained all night. On the morning of September 11 he was found on the wharf, under an old shed, by a policeman, who conveyed him to the hospital, by order of the city physician, who had seen and examined the case, and pronounced it to be yellow fever; died on the 13th. On the way to the hospital he was supported in the conveyance by the said policeman, who together with his son were both taken sick the 15th and 18th, respectively, on Spring Hill road, in the north-western portion of the city, immediately in the district which afterward became the "infected quarter," and from which the disease spread in that portion of the city.

In the hospital where this second case was carried and died there have been eight cases treated, including his, all of which originated therein, none being admitted from outside save that. Of this number five died and three recovered.

The disease was introduced into the marine hospital in the following manner: On the 11th of September Robert Smith, an Englishman, long a resident of Mobile, was admitted with what was recorded as intermittent fever, a diagnosis based upon the periodicity in the occurrence of two successive chills followed by fever. The first chill took place on the 10th of September, the day prior to his admission. These chills recurred on the 12th, 13th, and 14th, after which his fever became continuous and the



complication of another disease, yellow fever, was recognized. This patient had been under treatment a few months before for malarial fever. Investigation of his case furnished the following facts: He was employed as a watchman on the steamer *Emma No. 2*, that had been lying for a considerable time at the end of the wharf from which Dixon, the Shreveport case, was taken. From idle curiosity Smith visited Dixon under the shed, a short distance from the steamer, and assisted in placing him in the conveyance for the city hospital. This was on the morning of the evening Smith took sick, and doubtless was the source and time of his infection. This was a typical case of the existence of two distinct morbid poisons operating at the same time in the system. After a severe illness of seventeen days, and the occurrence of black-vomit on the third day of the fever, reckoning from the date of its recognition, this patient made a fair recovery.

At this time thorough disinfection was instituted and maintained in and around the hospital-buildings for a period of six weeks, under the supervision of the health-officer, acting under the directions of the Board of Health, and to whose opinion as to its efficacy in its employment generally throughout infected localities I shall have occasion to refer further on.

*Case 29.*—On the 8th of October O. L. Crampton\* was taken ill of yellow fever at this hospital, where he was quartered, and after an illness of nine days recovered. The infection, doubtless, was in this instance from the Englishman, Smith, as the prevailing winds were, up to this time, from the north and east, carrying the germs of the disease from the already infected buildings, the city hospital and infirmary, to the south and west. It is not known that exposure from any other source could have happened, as every precaution had been observed in protecting against it by confinement to the building after certain hours in the evening and before certain hours in the morning, thereby escaping the moist, and consequently dangerous, night air that existed almost constantly through the months of October and November. It may be well to state, in explanation of the situation of the hospital buildings mentioned, that the marine hospital is situated on Saint Anthony street, north side, between Bayou street on the east, and Jefferson street on the west, occupying, with its grounds, an entire block. The city hospital covers the greater portion of the adjoining block to the west, facing on Saint Anthony street; and the infirmary, the block directly opposite the city hospital, facing likewise on Saint Anthony street. These squares, together with the one opposite the marine hospital, comprise about eight square acres and cover what was designated the first and essential "infected section," upon which the Board of Health directed all its energies in a rigid quarantine and thorough disinfection.

*Case 35.*—Mr. C. C. Colton, employed in the custom-house of this city as hospital and enrolling clerk, was attacked with yellow fever October 16, and died in this hospital October 20, a victim of the most malignant type of the disease. Mr. Colton was from the northern part of this State, where he had engaged in "planting" for the past six years; had been a resident of this city five months, and consequently unacclimated; knowing the danger he would incur in remaining in the city constantly, he had determined upon the risk, and to remain until such a time as it should be pronounced an epidemic. By invitation he made this hospital his residence, as a guest of the surgeon in charge; and though the true character of the disease was made known to him by the attending physician to case 29, he chose to remain and nurse said case, from which he took the disease, with the result as above mentioned.

From case 29, three seamen, 31, 32, and 34; a colored servant, gardener to the hospital, (case 37,) and the steward of the hospital, (case 36,) took yellow fever and recovered. Two of the seamen had just arrived from New York City; discharged from their ship sick; applied to the hospital for treatment, and accidentally entered the room in which case 29 was sick. The third seaman had been an inmate of the hospital for some time with a chronic disease, and was exposed in like manner; and the steward and servant assisted in case 29.

\* The surgeon in charge.—W.



It is a noticeable fact that only those persons directly exposed to case 29 were attacked, and that others throughout the building escaped, having no access to the rooms of those sick of the fever. Every precaution was taken to isolate all those immediately exposed, and to prevent a spread by saturating the atmosphere of the wards, and throughout the building, with carbolic acid and chloride of lime.

The cases occurring in November were mostly those who, as refugees, had remained absent from the city during the existence of quarantine, and returned too early, though advised so to do by their physicians, basing their opinions on the action of the Board of Health in recommending the raising of quarantine, and the return of citizens to the city. Doubtless the greater rate of mortality among this class over those that remained in the city was due to facts well known to the profession. Two of these returned refugees died in houses that had remained unoccupied and unopened during the season.

The means employed to arrest the course of the yellow fever were the energetic, thorough, and liberal use of carbolic acid throughout the vicinity of the infected district and premises having fever cases. The winds, with an average mean temperature of  $78^{\circ}.5$ , continuing to prevail from the north and east during most of the season, carried the disease to the south and west, leaving the "primary infected section," a small corner in the northeastern portion of the greater area, that finally became known as the "infected district." The efforts to prevent the yellow fever from extending beyond this district met with deserved success; and the course pursued by the Board of Health of New Orleans, in the epidemic of yellow fever of 1871, in "stamping out" the disease, was strictly pursued here. The health-officer of Mobile states in his report that, during a period commencing September 18 and ending October 20, he "had used over a thousand gallons of crude carbolic acid and nearly three thousand pounds of sulphate of iron. Chlorine gas, used for the purpose of fumigation in the houses, was generated by the action of sulphuric acid upon the black oxide of manganese and chloride of sodium." In concluding his report Dr. Hicklin remarks, "that the result of their labors," speaking of the Board of Health of Mobile, "is too apparent to the world, when the mortuary record of the past two months is consulted, to permit a doubt to remain in the mind of any honest individual as to the good they have done." And further, "New Orleans and Mobile were at the beginning of the season in close, almost daily, communication with Shreveport, Memphis, Pensacola, and Montgomery. The two first, New Orleans and Mobile, began an early and systematic use of disinfectants and fumigations. They escaped, or hedged in the disease, and no epidemic resulted, notwithstanding cases were brought into the midst of each of them from the hot-bed of the disease, Shreveport."

In summing up the facts in the history of the disease in Mobile this year, it would appear that the theories advanced as to the nature, cause, and prophylaxis of yellow fever, by Dr. C. B. White, of New Orleans, in his annual report for 1871, based, I presume, chiefly upon his experience in that epidemic, have received another valuable support in like results effected in Mobile this season.

I am, sir, very respectfully, your obedient servant,

O. L. CRAMPTON,

*Surgeon-in-charge U. S. Marine Hospital, Mobile.*

JOHN M. WOODWORTH, M. D.,

*Supervising Surgeon U. S. M-H. S.*

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CAIRO, ILL., November 8, 1873.

SIR: In response to your request of the 25th October for the facts concerning the cases of yellow fever at this place, I have the honor to state that, during the summer and even after the disease was raging as an epidemic at Shreveport, the Illinois Central Railroad Company continued to receive cotton direct from that place and from Memphis. This cotton and other freight was received on board the transfer wharf-



boat, conveyed up the bank to the depot and shipped east. Considerable freight from below, including cotton, was also received at Captain Phillips's wharf-boat. At the same time the work of filling in and constructing a new wharf was being carried on in the immediate vicinity of the transfer wharf-boat, which gave employment to thirty or forty teams hauling in the earth from near the Mississippi River.

On the 1st of September I received two cases of yellow fever at the hospital from the steamer *Mary Alice*; on the 10th, two cases from the tow-boat *B*; and on the 24th, one case from the *Keystone*. Four of these cases were fatal, being in the stage of collapse when brought in. The fatal cases all had black vomit, with more or less general hemorrhage from the mucous membranes, and the *post mortem* appearances answered the descriptions given in the books—orange-colored or golden-yellow liver; mucous membrane of stomach highly inflamed; shrunken and almost empty gall and urinary bladders, etc.

The first fatal case among the citizens did not occur until September 13, when the cashier of the Illinois Central wharf-boat died. Then followed in rapid succession several other cases among persons employed in the same locality. Next, the clerk of Captain Phillips's wharf-boat sickened, and died on the fourth day. His nurse, a colored woman, who did the washing of his clothing, took the disease and died one week after; and a child in the house where the nurse died also took the disease, but recovered.

There were in all thirteen deaths out of about three times that number of cases of yellow-fever among the citizens, making, with the four deaths among those landed here with the disease, seventeen deaths from yellow fever between September 1 and September 25.

It was especially noted that the disease was confined to persons employed about the river and the localities above described; the four or five exceptions which occurred being in the families of men who were thus employed.

The disease did not make its appearance among the citizens until after the first two cases were received at the hospital from the steamer; and no new fatal cases occurred among citizens after the establishment of quarantine.

Very truly,

H. WARDNER.

JOHN M. WOODWORTH, M. D.,

*Supervising Surgeon U. S. M-H. S.*

LOUISVILLE, Ky., December 2, 1873.

SIR: I send you herewith, as requested, report of cases of yellow fever occurring in this city during September and October, 1873.

As there were no cases of this disease among the patients admitted to the Marine Hospital, this report is compiled from the reports of the attending physicians, who have been good enough to place the same at my disposal. I desire, in this connection, to acknowledge the receipt of such information from Drs. Fenner, Hewitt, Given, Leber, and Blackburn of this city.

1. The dates of the first and last cases of yellow fever in Louisville, during the year 1873, were September 22 and October 15, respectively.

2. The total number of cases in the city, 10.

3. The mortality, 5.

4. The mode of introduction was by rail in all cases, except one by boat, and all were from Memphis, Tenn.

5. The local influences here were all favorable to recovery, being among the better class of people, and no spread of the disease was manifested.

I am, sir, very respectfully,

P. H. BAILHACHE,

*Surgeon U. S. M-H. S.*

JOHN M. WOODWORTH, M. D.,

*Supervising Surgeon U. S. M-H. S.*



[Dr. D. P. FENNER, in charge of marine-hospital patients at Shreveport, La., has undertaken the preparation of a detailed report of the epidemic at that place, which it was hoped to have received in time for publication with the foregoing; but sickness and other causes have delayed its completion. The following statement, in the absence of that report, is compiled partly from Dr. Fenner's letters and partly from medical journals and other sources deemed trustworthy.]

The insanitary condition of Shreveport had attracted attention for some time previous to the outbreak of the epidemic, and was made a subject of much complaint by physicians and others. There was the usual absence of hygienic precaution and police; the accumulated filth of the city lay untouched for months; the streets were neglected and uncleaned; the sewerage was so defective that the refuse of hotels and boarding-houses was poured out upon the surface of the ground, and the whole city was enveloped in a disgusting odor day and night.

Prof. Joseph Jones, M. D., of New Orleans, in commenting on this subject, says: "Such is said to have been the sanitary condition of Shreveport, at the time of the breaking out of the epidemic; and if it be possible to generate in this latitude yellow fever by the combination of filth, heat, and moisture, the conditions were certainly present for the origin of the pestilence *de novo*." The spring and early summer seemed to have been as healthy as usual. The malarial fevers of the region did not attract special attention, either by their numbers or severity; but as the summer advanced, the continued heat of June and July, and the insanitary condition above noticed, aggravated their severity and they began to assume a more and more malignant character.

During the latter part of July, what has been characterized as a "stampede" took place among the sailors and river-boatmen at New Orleans, and numbers of them shipped on Red River packets, which were plying continually from that port to Shreveport, the navigation at that time being very good. On the 12th of August, according to Dr. Fenner, occurred the first case of yellow fever, of which he gives, substantially, the following details: Newton Walker worked and slept on the levee in a store which was closed, the firm having gone into liquidation; took his meals at a place next door in an eating and lodging-house, a common resort of the lower class of boatmen and of that class alone; was attacked with the fever on the night of August 12, and was first seen by the doctor on the 18th, at his (Walker's) brother's house, two and one-half miles from the city. Two children, who had not been away from the house, subsequently sickened and died, at the end of three and four days respectively, with all the phenomena of yellow fever well marked; the whole family were rapidly attacked and five or six died.

About the 15th of August several suspicious cases of illness among the boatmen were received in hospital; but as none of them died and there were no rumors of yellow fever at the time, they were diagnosed as cases of remittent fever. On the 19th of August it was reported that three men had fallen dead in front of the Mechanics' Exchange, on Texas street. Upon subsequent inquiry it proved that these men had been wandering about, sick; two of them lay down and died, and the other expired before he could be got to the hospital.

Yellow fever began to be now openly talked of. On the 22d a death occurred which was pronounced to be "without doubt" from the dreaded disease, and on the 25th two cases developed in a private family immediately across the street from the hospital referred to, and one case in Dr. Fenner's house, which adjoins the hospital. Cases also developed about the same time in Texas street, in and around boarding-houses used by steamboat-men; and in all places frequented by river-men the fever appeared early and spread thence as from centers of infection. In about ten days after the disease was recognized and correctly diagnosed, say, about the 1st of September, it had become epidemic and was followed by a general exodus, so that, it was estimated, the population was reduced in a brief space at least 50 per cent. On the 15th of September the epidemic reached its climax, the deaths on that day numbering 39; but for many days after the number fluctuated between 15 and 20; whole families were swept away,



and commercial firms, partners and clerks, were literally blotted out of existence. About the 17th of September the fever began to attack the suburban population and appeared in the outskirts of the city, at Marshall, Longview, Greenwood, Summer Grove, Bossier, Minden, and throughout Caddo Parish generally.

There was a decided diminution in the average of deaths per day after the 24th of September, and on the 30th the decrease in the number of cases in the city marked the abatement of the epidemic. During the month of October the fever slowly declined, and intermittent fever and dengue made their appearance.

The following statistics of the epidemic are mere approximations, which may be corrected upon the publication of subsequent reports: Population, in July previous to epidemic, 9,000; during epidemic, between 4,000 and 4,500; of these 1,500 were negroes. Number of cases of yellow fever, 3,000; number of deaths, 759; of these about 120 were negroes. Mortality about 25 per cent.—W.]

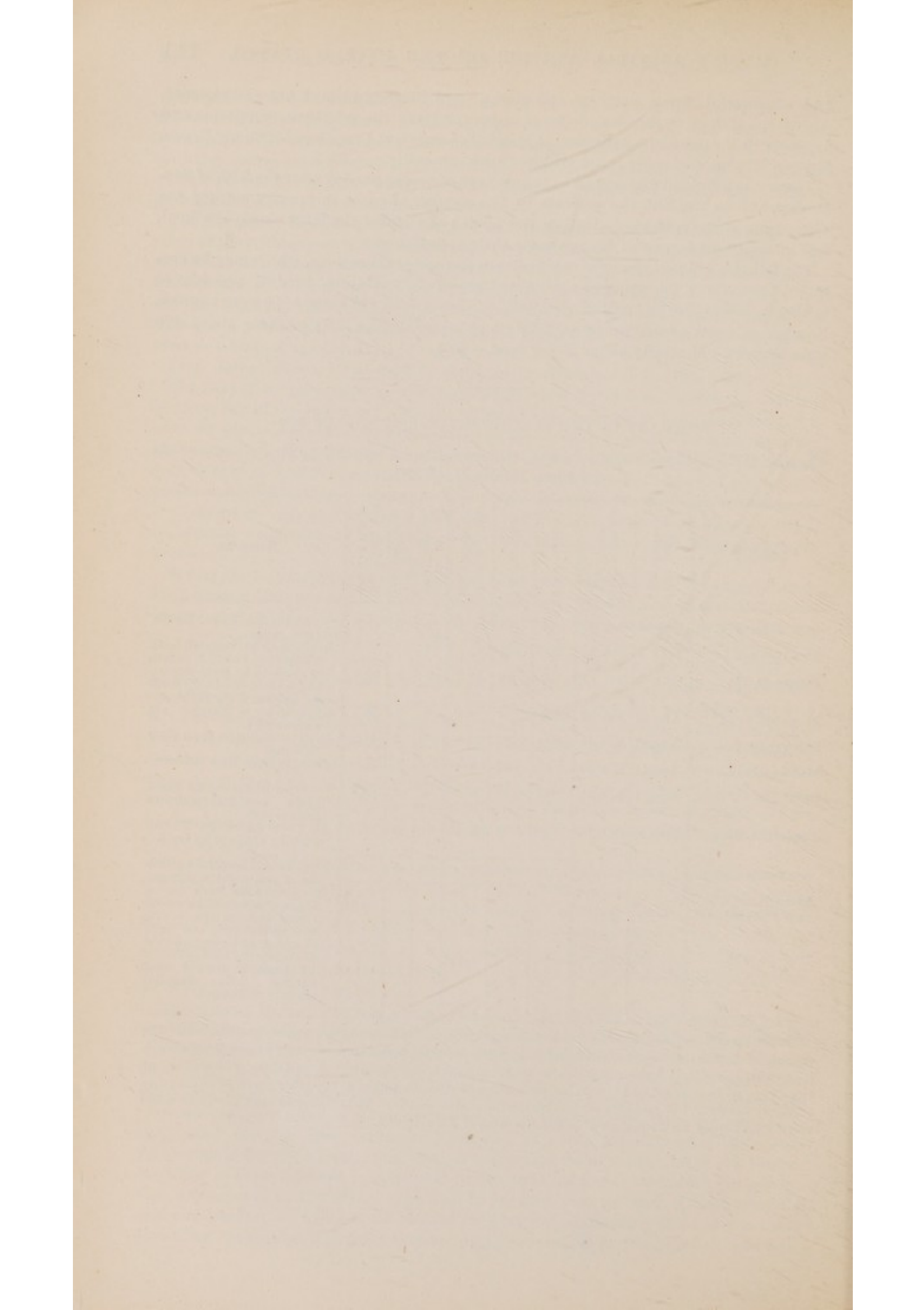
#### SUMMARY OF THE YELLOW-FEVER EPIDEMIC OF 1873:

*Showing the localities, number of cases, and mortality, as reported by the Surgeons of the United States Marine-Hospital Service.*

Locality.	First case appeared—	Last case appeared—	Total cases.	Total deaths.	Mortality, per cent. of cases.	Cases in marine hospital.	Deaths in marine hospital.	Mortality, per cent. of cases.	Remarks.
New York, N. Y. . . .	May 23	Oct. 30	69	18	26.1	5	3	60.0	See report Dr. Heber Smith, ante, p. 101.
New Orleans, La. . .	July 4	Nov. 18	394	225	57.1	24	13	54.2	Introduced by Spanish bark <i>Valparaso</i> , from Havana.
Pensacola, Fla. . . . .	Aug. 3	Oct. 15	600	62	10.3	40	8	20.0	Supposed to be from deserting seamen from ship <i>Golden Dream</i> , from Havana.
Memphis, Tenn * . . .	Aug. 10	Nov. 9	4,204	1,244	29.5	9	5	55.5	Brought by a traveler via Shreveport.
Shreveport, La. . . . .	Aug. 12	Nov. 10	3,000	759	25.3	7	3	42.8	By river-boatmen from New Orleans.
Mobile, Ala. . . . .	Aug. 21	Nov. 29	50	27	54.0	8	1	12.5	Brought from New Orleans.
Cairo, Ill. . . . .	Sept. 1	Sept. 25	43	17	39.5	5	4	80.0	By river-boatmen; no cases after establishment of quarantine.
Louisville, Ky. . . . .	Sept. 22	Oct. 15	10	5	50.0	.....	.....	.....	All from Memphis, Tenn.; nine by rail, one by boat.
Totals. . . . .	.....	.....	8,370	2,357	.....	98	37	.....	The general hospital mortality of yellow fever is greater than that here shown for marine hospitals, which latter is unusually favorable, considering the class of cases, and the fact that the mortality list is swollen by patients landed and carried into hospital already moribund.
Average mortality, per cent. of cases	.....	.....	.....	.....	28.16	.....	.....	37.75	

\* Record for Memphis imperfect; the number of cases is not known, even approximately, while the number of deaths above given includes only those reported between September 14 and November 9, notwithstanding it is known that deaths occurred both before and after these dates. The number of cases here given is based on the average proportion of cases to deaths at the other seven places, and is certainly not over, but probably largely under, the actual number. It is believed that the same strictures would apply with equal force to the statistics of Shreveport.





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REPORT

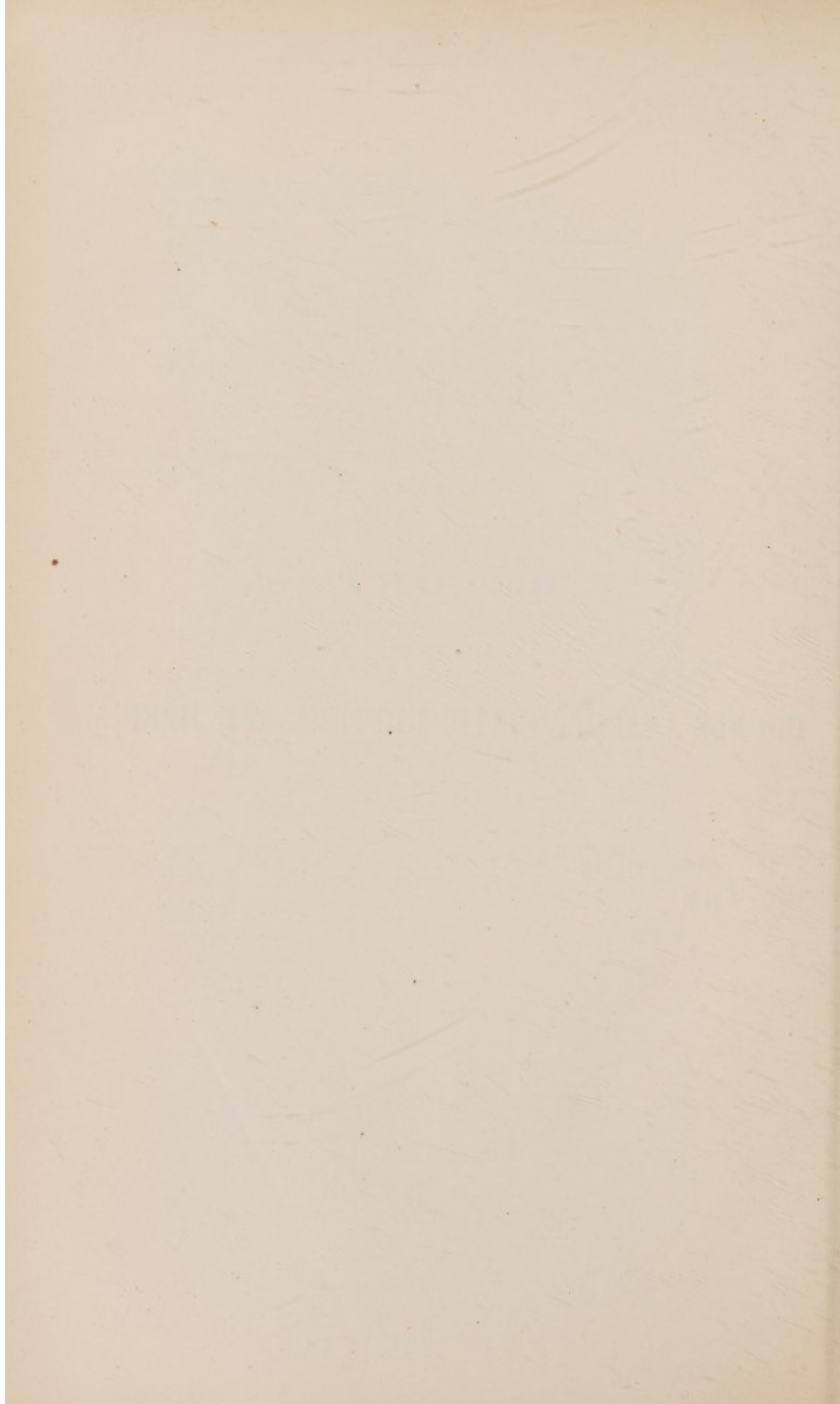
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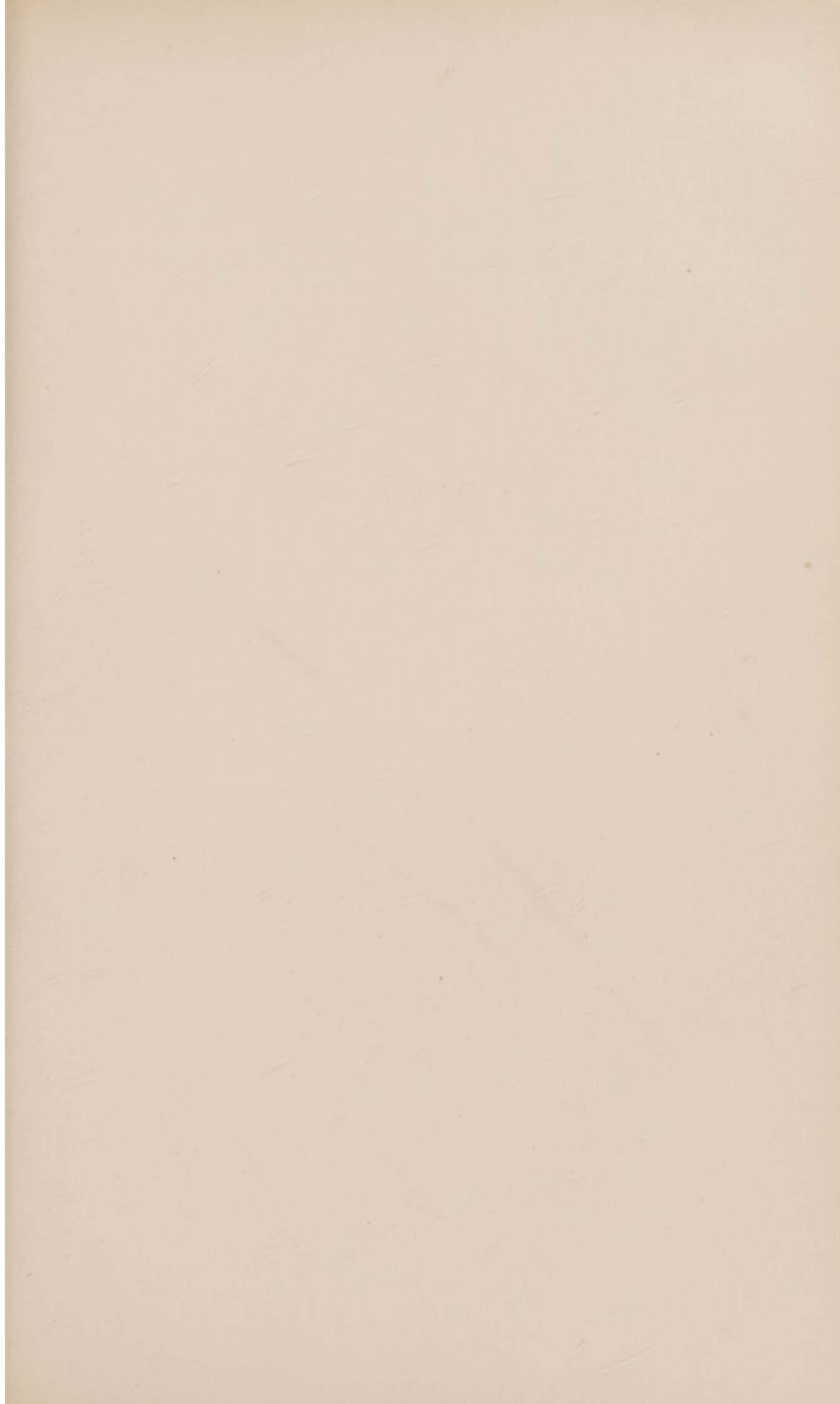
DOUBLE DIAPHRAGMATIC RUPTURE AND HERNIA.

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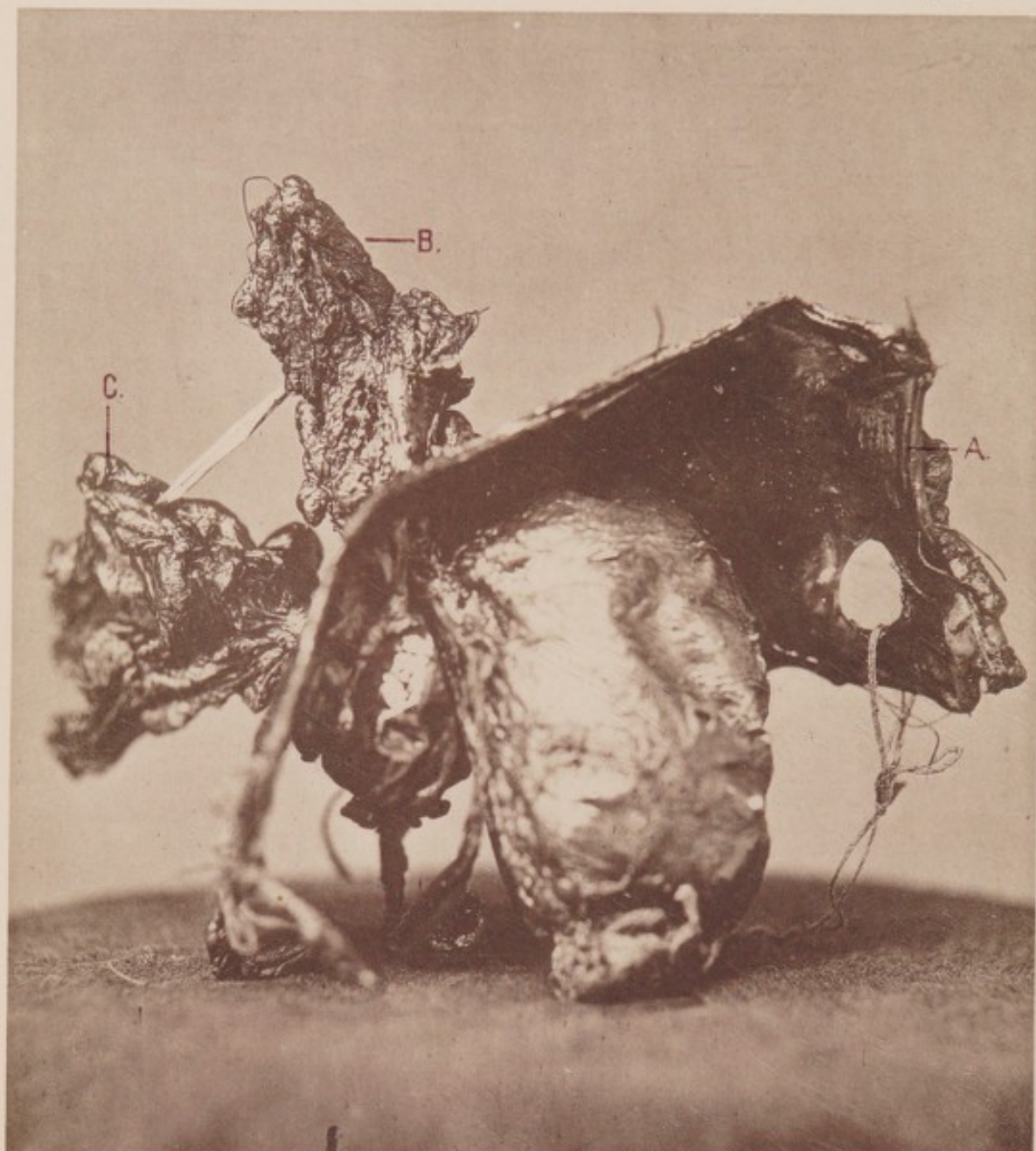
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DOUBLE DIAPHRAGMATIC HERNIA.

- A. Diaphragm, showing inferior surface.  
B. Hernia of large intestine and omentum.  
C. Hernia of small intestine and omentum.

## D.—CASE OF DOUBLE DIAPHRAGMATIC RUPTURE AND HERNIA.

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Reported by THOMAS T. MINOR, M. D.,  
*Surgeon United States Marine-Hospital Service, Port Townsend, W. T.*

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ON the morning of June 28, was called to see James Testor, seaman, on board United States revenue-cutter *Reliance*. Found him suffering severe pain, of a colicky nature, in the region of the umbilicus, exacerbating at intervals. The pain had come on suddenly. His pulse was slightly accelerated. There was no vomiting.

Administered from my pocket-case two grains sulphate of quinia, with one-fourth grain sulphate of morphia, and in a few minutes he was apparently much better.

On the evening of the same day he was brought to the hospital. His symptoms of colic had entirely disappeared, and were replaced by those of an acute attack of pleurisy. Sharp pain located in the left side, about the eighth rib, impaired respiration, accompanied with that "catching" of breath peculiar to every well-marked case of acute pleurisy. There was but little cough, the pulse was rapid and full, and his skin covered with perspiration. He was put to bed, and one-fourth grain sulphate of morphia injected hypodermically. After getting quiet he received:

R Hyd. sub. mur.  
Jalapa pulv. aa.....gr. x.  
Pulv. ipecac co.....gr. v.  
M.

During the night he received at intervals of three to four hours, a powder consisting of camphor, opium, and ipecac, each one grain.

The next day, June 29, he felt better. In the morning he received one-half ounce of Rochelle salts, and at noon one-half ounce castor-oil. In the afternoon he had a copious discharge from the bowels, after which he breathed more easily, but the severe pain continued.

On the 30th, Monday, he seemed to be better. Upon auscultating and percussing the left side of the chest, resonance on percussion was readily obtained over the seat of pain, while almost all other portions of the corresponding cavity gave extreme dullness, and throughout the entire (left) lung the respiratory murmur was absent. During the day the respirations became more regular, but the pain still remained. The powders of camphor, opium, and ipecac were still continued. Upon visiting him in the evening he was found lying upon his well side, and seemed to be more comfortable in that position than any other.

About one o'clock on Tuesday morning, July 1, he was suddenly seized with nausea and vomited slightly for the first time. He got on his feet



for a few minutes, then laid down, and was soon after discovered to be dead.

*Post mortem examination* sixteen hours after death. The right lung and right pleural cavity were found in a healthy condition, as was also the heart, except that it was displaced considerably to the right. The left lung was completely collapsed; pieces cut from different portions of it would not float in water. The corresponding pleural cavity contained about five pints of sero-sanguineous fluid. There was *a double rupture of the diaphragm to the left of the esophageal opening and double hernia of intestine and omentum*. Anteriorly the large intestine and a portion of the greater omentum were projected through the wall of the diaphragm into the left pleural cavity. Strangulation of this hernia had occurred and perforation of the intestine. Posteriorly, through another entirely distinct rupture of the diaphragm, was a hernia of small intestine and omentum.

The abdominal viscera were examined. The liver was enlarged; the greater omentum was drawn far above its usual position, and there were signs of inflammation, particularly along the large intestine.

The previous history of this case, so far as can be ascertained, is as follows: Before shipping on the *Reliance*, Testor was employed on a merchant vessel at Seabeck, W. T. Ten days previous to his death, while loading ship, he was engaged in shoving heavy plank up a steep incline, bearing their weight full against the abdomen. The plank were so heavy that sometimes he required assistance, and the gang-way being narrow another sailor would help by pushing him from behind, he still receiving the full weight against his bowels. While thus engaged he felt a sudden snap inside, and, feeling sick (faint,) had to give up work. In a few days, having, as he supposed, entirely recovered, he reshipped in the revenue-cutter one week before his death.

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[THE practical interest of this case for the medical officer of the Service lies rather in the direction of prophylaxis when phrenic hernia is diagnosed, since it is doubtful if any surgical interference could ever be of avail, although operations have been suggested by some writers, (Guthrie and others.) Exclusive of those among military men—from gun-shot, sword, and bayonet wounds—of the ninety-odd cases recorded, the proportion of sailors who have been the subjects of this injury is as four to five of all other occupations, falls from masts and other accidents incident to a sea-faring life readily accounting for this preponderance.

Though detected before death, according to Dr. Bowditch, of Boston,\* in only two instances—one by Mr. William Lawrence, of London, at St. Bartholomew's, and the other by Dr. Bowditch himself, at the Massachusetts General Hospital—there appears to

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\* "Mr. Lawrence, so far as I can discover, is the only person who ever (before our case at the hospital) recognized the hernia by these signs, † or, as I may add, by any other, save by the morbid appearances after death. It may have been suspected but never definitely diagnosed."—*A Treatise on Diaphragmatic Hernia*. By HENRY I. BOWDITCH, M. D., &c., p. 50.

The reference † is to a foot-note: † "London Lancet, September 5, 1835." But the case detailed in the Lancet of that date (p. 751) cannot be the one Dr. B. refers to; for after detailing the history of the case, its termination in death, and the *post mortem* appearances—which revealed "a large portion of the intestines, the whole of the omentum, a great portion of the spleen, and the entire pancreas, so completely occupying the left side of the chest that the lung was compressed to the size of a man's fist," &c.—the report closes as fol-



be, aside from want of familiarity owing to the infrequent occurrence of this form of hernia, no reason why the diagnosis may not be made with tolerable accuracy in any case where the attention has been awakened, as by the history of a previous severe injury of the trunk; and the frequent occurrence of such injuries to sailors makes it peculiarly the duty of the marine-hospital surgeon to carefully scrutinize the condition of the thorax and abdomen of every patient coming under his care who has been thus injured at any time, no matter how remote. For, although it is true, as above stated, that only some ninety-three or four cases of diaphragmatic hernia are to be found recorded since 1610, there can be little doubt that its occurrence is much more frequent than this would seem to imply.

It is probable, also, that so far from rupture of the diaphragm, and consequent hernia of the abdominal viscera into the thoracic cavity, being speedily, or even "generally fatal,"\* that the chief risk arises from its difficulty of detection; and that what is true of all herniæ is substantially true of this form, viz, that a hernia, if properly managed, is not immediately dangerous to the patient; does not materially affect his health, nor diminish his enjoyments; but it is, nevertheless, a source of constant danger, since violent exercise, sudden exertion, imprudence in diet, or exposure to atmospheric vicissitudes may bring it from a perfectly innocent state into a condition which frequently proves fatal.† That these propositions are at least plausible is believed to be shown by such cases as the following:

A carpenter, thirty-nine years old, fell from a considerable height; at the end of six months was able to resume his ordinary occupation, though suffering from difficulty of breathing, dry cough, pain on the left side of the chest, and frequent nausea. Fifteen years after, fell from a height of twenty feet, broke the seven lower ribs on the left side, and died three days after. The stomach and transverse arch of the colon were found in the left pleural cavity, having passed through a round opening, two and one-half inches wide, in the tendon of the diaphragm. The omentum adhered to the edge of this opening on the thoracic, and the spleen on the abdominal side of the diaphragm, the great curvature of the stomach was turned upward towards the mediastinum, and the arch of the colon was adherent on one side to the small curvature of the stomach, and on the other to the diaphragm.‡

The steward of a ship between thirty and forty years of age, came under treatment for agonizing colic and vomiting; bowels became costive, stercoraceous vomiting ensued, no stools could be procured, and death followed in fifteen days. On *post mortem*, in the lower part of left pleura was found the whole omentum, perfectly condensed, which had passed through the tendinous portion of the diaphragm, pulling up the large curvature of the stomach, which, with the transverse arch of the colon distended to three times its natural size, was adherent to the left side of the diaphragm. The whole was attached by firm and old adhesions to the margin of the orifice in the diaphragm, in which a portion of the colon was also engaged, and firmly constricted. Some years previous to death this man had been seriously wounded by a broad-pointed knife, which penetrated the body on the left side between the fifth and sixth ribs to a considerable depth, a portion of lung protruding from the wound. After recovering from

lows: "Mr. L. again alluded to the difficulty of diagnosis in this case, though, he remarked, the fixed pain of the side, the change of situation of the heart, and the arrested respiration in the left side, might perhaps have led to a conjecture of the nature of the disease."

That Mr. Lawrence certainly did not so conjecture in this case is further shown by the remark in the fifth edition of his classical work on *Ruptures*, (p. 628,) published in 1838, three years after the above: "Among the numerous recorded instances I believe that there is not one in which the nature of the malady was even conjectured before the patient's death." So that, unless Dr. Bowditch refers to some other case of Mr. Lawrence's which I have been unable to find, the credit of being "the only person who ever recognized" a phrenic hernia before death must be added to the other laurels of the eminent surgeon-physician of Boston.

\* DEVERGIE, *Médecine Légale*, vol. ii, p. 147.

† LAWRENCE on *Ruptures*, p. 2.

‡ DESAULT, *Journal de Chirurgie*, tom. iii., art. 2, quoted by LAWRENCE, *op. cit.*, p. 626.



this injury he had been subject to spasms in the region of the stomach, but had, nevertheless, made several voyages to India as steward of a ship.\*

A patient, fifty-four years of age, was received into the Bristol Infirmary with a fracture of the leg which proceeded favorably, until on the seventh day delirium came on with prostration of the vital powers, when death speedily ensued, the symptoms at last resembling enteritis. He had received a violent blow on the back, thirty-eight years before, from the fall of a tree, since when he had suffered from asthmatic dyspnoea, dyspepsia, and constipation. He had, however, always been able to follow his usual employment. After death the whole stomach, nine feet of the small intestines, four feet of the colon, and the omentum, were found in the left pleural cavity, the omentum being connected to the pleura near the clavicle by old and firm adhesions. These viscera had passed through a circular aperture in the diaphragm three and one-half inches in diameter, situated in front and to the left of the œsophageal opening.†

A sailor aged forty was admitted into Guy's Hospital for treatment for necrosis of ankle; six months previous had fallen on the deck of a vessel from a great height, breaking some ribs and severely injuring his ankle. Three months after admission he died, and on examination two-thirds of the left pleural cavity, or nearly one-half of the entire capacity of the chest was found to be occupied by the distended stomach and a long curve of the arch of the colon, which had protruded through an aperture in the diaphragm. The omentum was strongly adherent in one or two places to the margin of the aperture, which was of old standing, its edges being opaque, yellowish, firm, and even. The deceased had stated that many years previous to his admission to hospital he had met with an accident by which he had fractured some of his ribs on the left side; and Mr. Alfred S. Taylor, in commenting upon the case, remarks that, "from the man's statement, he must have survived the only accident which could have produced the rupture at least nine months. The perfect degree of cicatrization about the aperture showed that it must have been of very long standing."‡

A porter in a warehouse died of typhoid pneumonia in Saint Thomas's Hospital, and on post-mortem, the left pleural cavity was found to contain the stomach, spleen, a large loop of the transverse colon, and nearly the whole of the small intestines; in fact, "the only portions of the alimentary canal which were not in the pleural cavity were the lower part of the ileum, the cæcum and ascending colon, and sigmoid flexure." The stomach and transverse colon were firmly adherent to the parietes of the thorax and to the thoracic surface of the diaphragm, while the ileum and ascending colon were similarly attached to its abdominal surface. The man had been crushed between the buffers of two railway carriages or engines more than two and a half years previously, and attributed his subsequent suffering, from pain in the left side of the abdomen, shortness of breath, cough, and expectoration, to this injury.§

From the foregoing it seems clear that hernia of the most astounding proportions may exist for many years without seriously affecting the patient's health, or even his usefulness within certain limits, so long as strangulation, primarily, and such diseases as involve the respiratory and digestive organs, be averted. Hence the importance of determining when such a hernia exists, and of then prescribing the necessary precautionary measures.

Among the more prominent physical signs of a protrusion of the abdominal viscera into the thoracic cavity are, (1) cardiac palpitation to the right of its normal location; (2) thoracic dullness or resonance in unusual regions on percussion; (3) the absence of respiratory murmur and the presence of borborygmi in the chest;|| (4) prominence and immobility of the affected side of the thorax.¶ To these may be added such symp-

\* *London Medical Gazette*, vol. x., p. 43.

† *Ibid.*, vol. xii, p. 673.

‡ *Guy's Hospital Reports*, vol. iii, p. 368.

§ Dr. PEACOCK'S case, in *Transactions of the Pathological Society of London*, vol. xvii, p. 141.

|| LAENNEC, *Traité d'Auscultation Médiate*.

¶ BOWDITCH, *op. cit.*, p. 51.



toms as liability to dyspnœa on exertion, pains in the hypochondria or chest, colics, costiveness, and frequent nausea and vomiting. When these physical signs and symptoms are permanent the viscera, it may be assumed, have become adherent in their abnormal position; but it occasionally happens that such phenomena are intermittent, their access marking the protrusions of the viscera, and their cessation being due to spontaneous reduction of the hernia.

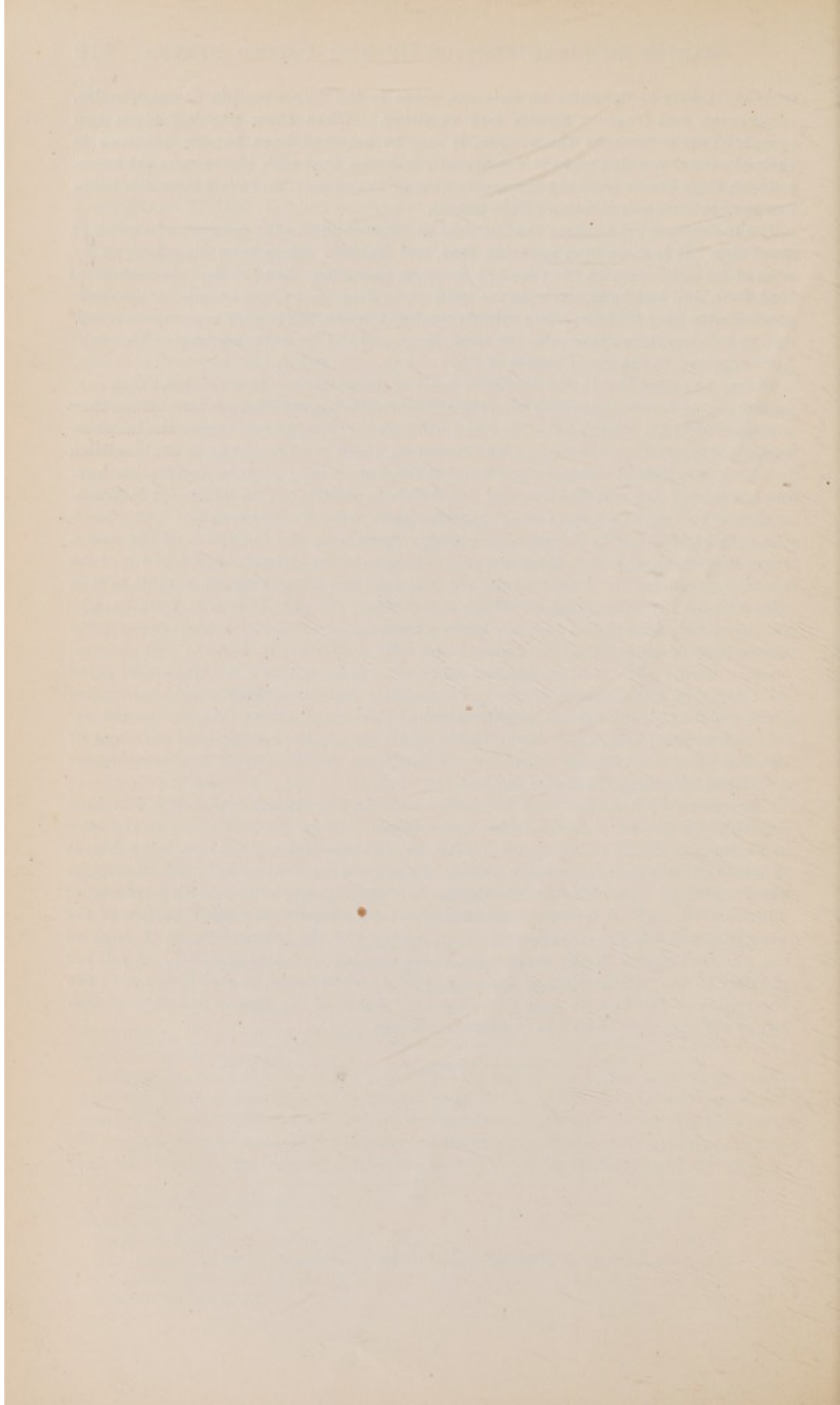
The indications are obvious that persons so afflicted pursue the vocation of a sailor at great risk. It is more than probable that, had Testor's injury been diagnosed at the time of its occurrence on the vessel at Seabeck, assuming that the rupture occurred at that time, and had he in consequence been warned against violent muscular exertion, counselled to keep his bowels in a soluble condition, and to avoid such exposure as would lead to inflammatory diseases of the respiratory, and the digestive apparatus, he might have survived to the usual period of life.

It may be added that in the details of cases of traumatic hernia which have been consulted, the rupture has generally been the result of a much greater amount of violence than is described in Dr. Minor's case; and at first blush this would seem to give the latter an important medico-legal bearing. Unfortunately, there is no record as to the condition in which the ruptured tissues were found at the *post mortem*; and the preparation having been dried and varnished, it was impossible to determine, on its receipt in Washington, whether the edges of the ruptured muscle were cicatrized or not. The "sudden snap inside," felt by Testor, may possibly have been the indication of the occurrence of the rupture; but, if so, the case is unique in the character and amount of the violence producing it. Velpeau cites the only case met with at all comparable to it in this respect. A young man of robust constitution, the patient of a M. Battalia, who furnished the history, died in a few hours with many of the symptoms of strangulated hernia caused, apparently, by a debauch and violent efforts in coition the night before; on *post mortem* the stomach, greater omentum, and part of the transverse colon were found in the thoracic cavity.\* M. Battalia felt assured that the rupture was the immediate cause of death, notwithstanding that the cicatrix of a sabre-wound, received four years before, was found on the right side of the thorax; that the edges of the orifice in the diaphragm were hard and irregular; and that there were considerable peritoneal adhesions, especially to the liver.

The preparation from which the accompanying photograph was taken, has been deposited in the Army Medical Museum, medical section, No. 1199; and in the same collection are also to be seen preparations, No. 522, medical section, showing a hernia in which the stomach and a large portion of the greater omentum have passed through the œsophageal opening of the diaphragm into the thoracic cavity, with fatal result; and No. 1789, surgical section, consisting of several ribs, the stomach, a portion of the omentum, and the diaphragm, exhibiting a hernia of the entire stomach, through an old gun-shot wound of the diaphragm, death ensuing from strangulation. A full list of titles of the bibliography of the subject will also be found, in connection with the description of this last, on page 205 of the second part of the *Medical and Surgical History of the War*, now in course of preparation.—W.]

\* VELPEAU'S *Operative Surgery*, Mott; vol. iii, ed. 1847, p. 701.



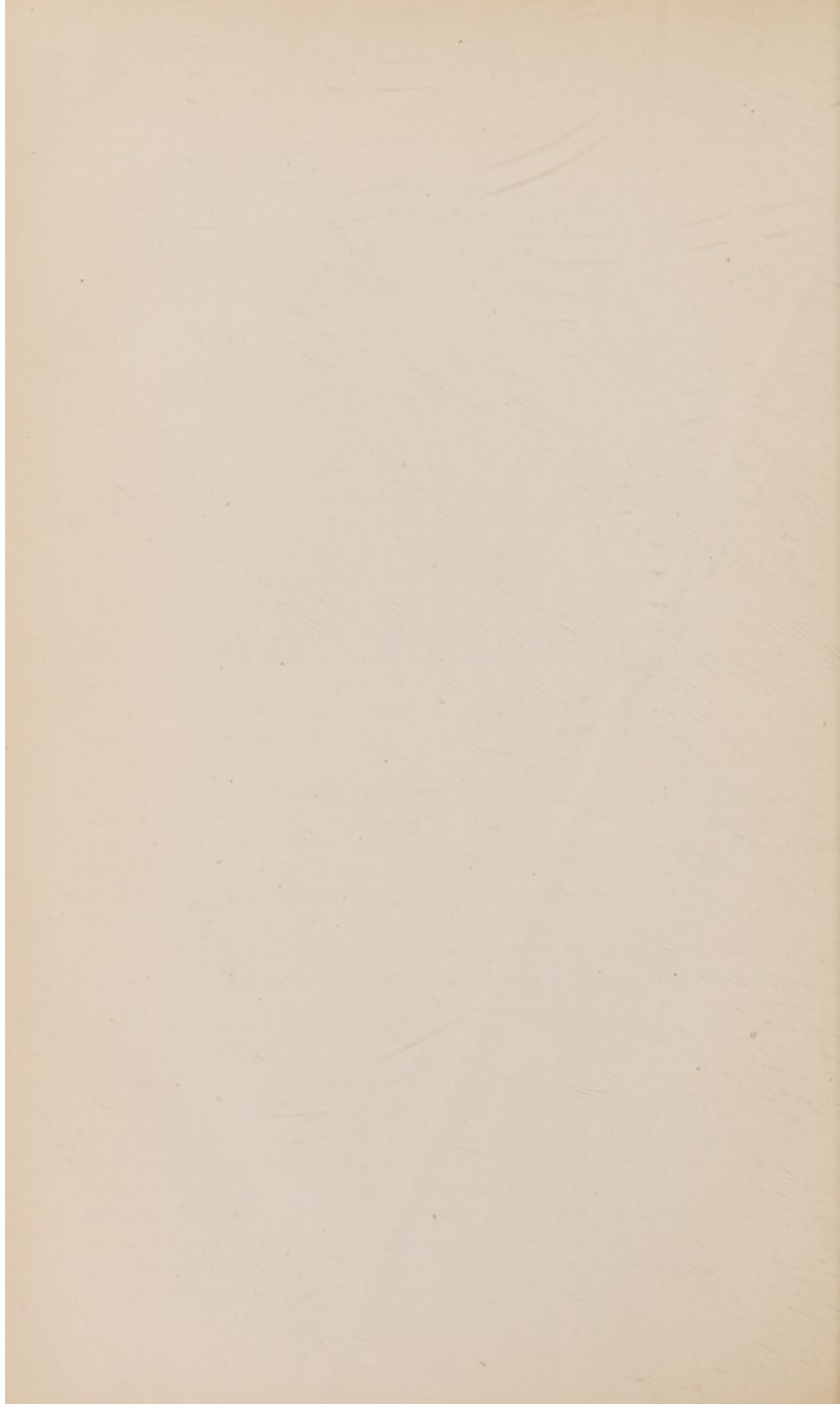


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URETHRAL STRICTURES.

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## E.—STRICTURES OF THE URETHRA.

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By C. N. ELLINWOOD, M. D.,

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With Notes of Cases by Drs. ELLINWOOD and O. L. CRAMPTON, Surgeon in charge United States Marine Hospital, Mobile, Ala.

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STRICTURE of the urethra is a very common malady among seamen, a fact in itself sufficient to make its consideration an important one in the Marine-Hospital Service, and the more so since strictures are now submitted to a great many modes of treatment, probably because no method has yet proved entirely satisfactory. As is generally the rule with diseases for which many remedies are recommended, none is found to cure in all cases of stricture. It is treated in one hospital by internal urethrotomy; in another by external urethrotomy; in a third by injections of some sort; in still another by dilatation, continuous or occasional; while in some it is not treated at all beyond giving mere temporary relief by preventing retention of urine. So, too, in different countries the treatment is as various as in different hospitals; while the theories on which the treatment is based are as diverse among authors as is the practice among surgeons.

It is proposed to the corps of United States Marine-Hospital surgeons that a systematic effort be made, with the ample field we enjoy, to settle and determine, in the interest of our profession, as well as in the interest of humanity, these undetermined questions. If every officer in the Service would practice upon the best and most rational teachings in the surgical literature of this malady, and make the Marine-Hospital Bureau the receptacle of a concise statement of his experience, the one best way of treating every stricture of a given character would soon be determined.

My observations of this disease during the past year have been made upon two different classes of seamen, those making long voyages of three to twelve months, and known as "deep-water sailors," and those making short voyages on coasters and steamers. Seventy-five per cent. of all the cases of stricture admitted to the United States marine hospital at this port are from the former class, and about one-half of these, or 37.5 per cent. of the whole number admitted, had urinary fistulæ.

Only permanent strictures are here considered, and all the cases admitted were traced either to chronic urethritis on the one hand—and that generally from gonorrhœa or masturbation—or to direct violence, for cause. The urinary fistulæ were ordinarily traceable to the rude and



improper introduction of instruments, mostly in the hands of the seaman himself.

As a rule seamen do not seek hospital relief for a stricture until serious difficulty is experienced in urinating, so that we seldom see them at the commencement of the disease. But so far as I have yet been able to arrive at true histories of cases, urethral injections have had but little to do with their production, except in the case of strictures at or near the external meatus urinarius, which are frequently caused by wounding the mucous membrane with the syringe. Sometimes the long-continued use of such injections as keep up an inflammation of the urethra do, doubtless, cause strictures, but ordinarily the cause of the stricture is to be found in the continuation of the granular urethritis rather than in the remedy.

The mode of treatment adopted at this hospital during the past year has been, for all idiopathic strictures situated anywhere in the urethra beyond two and a half inches from the external meatus, by the "divulsion" method described by Gouley in his recent admirable book. We have sometimes found great difficulty in passing the conducting bougie through the stricture, but have never yet failed to get one or another kind of capillary bougie into the bladder; and we find that habitude in manipulating these delicate little instruments is overcoming many of the difficulties encountered in the beginning. The soft bougie of Leroy d'Étiolles answers the purpose best in the majority of cases; while the French elastic catheter, with a leaden stylet, proposed by Sir Henry Thompson, has been found in some cases to be of great utility in traversing a very tortuous urethra. We have had no accidents nor bad sequelæ to follow the use of the divulsor; a hemorrhage (quite profuse in two instances) and a urethral-fever followed in some cases; but these consequences speedily disappeared by rest and a few doses of quinine. In all the idiopathic strictures so treated we have succeeded in re-establishing the urethral canal, sometimes perfectly, so far as we could judge, but sometimes only partially through the patient growing impatient or deserting and preventing the necessary continuance of the treatment. It is, as yet, too early to speak confidently of the permanence of the cure by this method of treatment, but it is the most satisfactory of any yet adopted, so far as I have been able to follow the cases subjected to it.

Strictures at and near the external meatus have not been so successfully treated by this method, and when they exist with a stricture in the bulbous portion of the urethra, as they frequently do, I now commence the treatment by cutting from within through the constricting tissue, and then proceed to divulse the posterior stricture.

I append hereto brief notes of three cases of idiopathic stricture, and one case of traumatic stricture; reserving for the future the tabulation of them, when I shall have accumulated a greater number than I now have notes of.



## NOTES OF CASES.

[Service of Dr. ELLINWOOD, San Francisco, Cal.]

No. 96.—*Stricture—Urinary fistula—Divulsion—Recovery.*—Chris. Nicholson; "deep-water" sailor; admitted February, 18, 1873, having dense fibrous constricting band around the urethra at three inches from external meatus, and another in bulbous portion, dating two and a half years back; also a urinary fistula at perineo-scrotal junction. February 18.—Passed a soft filiform bougie and followed it by the small-sized divulsor; operation was followed by slight hemorrhage and inflammation. February 23.—Repeated operation and injected the fistula with sol. iodine, (3i to fʒi,) with urethra dilated. March 5.—Repeated operation, using larger instrument. March 12.—Urine flowing entirely through urethra; repeated operation with the third-size Holt's dilator. March 17.—Used largest size with but little pain and no hemorrhage. March 21.—Discharged, with no symptoms of stricture.

No. 113.—*Multiple stricture of spongy portion.*—Jno. Lynch, admitted to hospital July 26, 1872, with four strictures of urethra, situated between a point three inches from external meatus and the membranous portion; the urethra hard and unelastic between the constrictions; malady of five years' duration; patient a "deep-water" sailor, and relieves frequent retentions of urine by using a catheter himself; unable to urinate in a continuous stream; introduced a small gum catheter, size No. 1, with difficulty, and fastened it in, maintaining "continuous dilatation," with slight intermissions during a month, with a notable increase in size of canal. August 29.—Used divulsion; required a strong force to pass the smallest-sized Holt's instrument. The constricting fibrous tissue was rent asunder and a profuse hemorrhage followed, with subsequent pain and inflammation. September 4.—The inflammation having subsided, I repeated the divulsion, using a larger-sized instrument, causing less pain and inflammation than before; the operation was repeated every fifth or sixth day, and after the subsidence of the inflammation, which followed the operation, the urine was observed to flow in a continually increasing stream, and the resistance to the instrument constantly diminished. October 27.—The urethra admitted a No. 7 sound, and patient was discharged at his own request. Six months later he called at my office, and reported that he had experienced no further trouble from his stricture. Habits, intemperate.

No. 121.—*Stricture, with urinary fistula.*—George Williams, admitted March 7, 1873, with a stricture near external meatus urinarius, in the fossa navicularis, admitting a No. 1 sound only, and another firm constriction from fibrous deposit three and one-half inches back, and also a urinary fistula in perineum. Used the bulbous bougie in exploring, and finding the stricture near external orifice very painful on dilatation, divided it freely by incision from within, and put a pledget of lint in the cut. Two days after tore asunder the constricting fibers of the other stricture and injected the fistula with a strong solution of iodine while the urethra was filled. We observed a remarkable dilatation of the membranous portion of the urethra into a pouch-like diverticulum in this case. June 14.—The divulsion has been repeated at intervals of five days without untoward symptoms arising, the fistula being perfectly healed, the free flow of urine through urethra re-established, and no urethral discharge nor symptoms of stricture remaining. The patient is discharged.

No. 177.—*Traumatic stricture from contusion of the perineum, with urinary fistula—Exterior abscesses from infiltration of urine—External urethrotomy performed later—Cysts in liver; perforation of stomach—Death.*—"Wash," an Indian boy of about twenty years of age, fell from a height astride a capstan-bar, and sustained a severe contusion of the perineum, followed by extensive infiltration of urine and cystitis. Two months after the accident he came under my care with the urine escaping entirely through three or four fistulae in the perineum and scrotum, and a muco-purulent discharge from the urethra. The boy was much emaciated, and suffered such gastric disturbance that it was with great difficulty he could be nourished. After long perseverance I suc-



ceeded in passing an elastic catheter through the urethra and the tortuous false passage into the bladder, emptied it, and fastened the instrument there, intending to treat it by "continuous dilatation," but the patient not understanding our language, and obstinate at best, withdrew the instrument twenty-four hours after. This was followed by the flow of urine in considerable quantity from the natural canal, so that a few days later a second attempt was made to maintain a catheter in the bladder, with the same result as before. Some weeks later the natural channel was found obliterated, the number of fistulæ increased, and abscesses in the gluteal region formed. I now determined to make a direct outlet for the urine, and with that object made a free incision from without into the membranous urethra, introduced a short catheter into the bladder and fastened it, and also incised the several fistulæ. The operation was followed by great relief to the patient, and although he would not allow the instrument to remain in the bladder, yet the urine flowed mostly through the new channel. The boy continued to emaciate. It became impossible to nourish him, the stomach refusing every kind of food, and he died March 2, 1873.

On *post mortem* examination we found that all that portion of the urethra between the bulb and bladder had entirely sloughed away, the mucous membrane of bladder suppurated, and a large recto-vesical fistula established, from which the urine latterly had escaped. Cysts were found in the liver, and one large one pushing against the stomach had caused an ulceration there three inches long, which opened the stomach on removing the liver. Abscesses were also found in the lungs.

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[Service of Dr. CRAMPTON, Mobile, Ala.]

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*Two cases of organic urethral stricture requiring external cutting.* No. 1.—Michael Robinson, aged thirty-two years, was admitted into hospital July 25, 1872, with bilious intermittent fever. Previous history: The patient states that he contracted syphilis eight years ago. Three years after he noticed his stream of urine was becoming small; it gradually diminished in size until his water had frequently to be passed in dribblets—being unable, from the effects of turpentine stupes used in the treatment of the fever, to pass his water except in drops and with pain. Attention was first called to the existing stricture. Two sinuses were discovered communicating internally with the urethra; one through the scrotum, the other at the scroto-perineal junction on the raphæ. So soon as an instrumental examination was admissible a tight, almost impassable, stricture was found at the bulbous portion of the urethra, extending forward about an inch. The scrotum was enlarged, and its subcutaneous connective tissue indurated and thickened. Attempts were first made to overcome the difficulty by gradual dilatation, but after reasonable effort, with little success, it was evident the firm deposits would not yield sufficiently by this method, and "external perineal urethrotomy" was decided upon. September 2 the operation was performed while the patient was profoundly under the influence of chloroform, and in the position for lithotomy. The plan of Dr. C. H. Mastin, of Mobile, as described by him in his pamphlet, entitled "A New Method of treating Stricture of the Urethra after external Section," was adopted in the operation, which is "nothing more than the old L'Boutonnière, in which the incision is made *anterior to the stricture*, a probe passed through the obstruction, and the *stricture cut subcutaneously*, and the wound healed by *first intention*," an operation resorted to only in this class of strictures. It may here be interesting and proper to explain the treatment advised by Dr. Mastin upon coming to the closing and dressing the incision, and best described in his own language: "After all appearance of any oozing of blood has ceased, we then place in the bladder, through the urethra, a full-sized gum catheter, and proceed to close the wound accurately. For this purpose we employ the ordinary suture-pins, of which we pass two, three, or four, as the length of the external wound may call for, entering them about half an inch from the free margin of the wound in the integuments, and passing them



deeply, almost to the urethra, and bringing them out on the opposite side, at the same distance from the edge of the incision to which they had been entered on the other side. The edges of the wound are now evenly and smoothly coaptated, whilst the intervals between the deep-seated pins are more securely closed by the introduction of smaller pins, which are passed less deeply—simply through the skin proper. The pins are now encircled by a firm, flat silk ligature running from one to the other, in the form of united figures of 8; we thus insure both superficial and deep pressure upon the sides of divided tissue. The catheter is left open in the urethra to drain off the urine as it is collected in the bladder. The patient is kept on his side in bed, with a pillow between the knees, and a urinal under the lip of the catheter to catch the urine as it escapes. The wound is kept constantly saturated with a mixture of cold water and the tincture of arnica, applied by means of soft cloths. \* \* \* \* \*

At the expiration of twenty-four to thirty-six hours the catheter is removed and a new one substituted. In about two or three days the catheter is dispensed with, and only used when calls are made to micturate. \* \* \* On the fourth, fifth, or sixth day, as their appearance may indicate, the deep pins are removed, and as the perineum regains its shape and appearance the superficial pins are removed one by one." The urine is, each time there is a call, drained off during this period, and until the wound has entirely healed, "or so long as any tenderness exists about the seat of stricture."

After the operation this case progressed favorably, and without a single untoward symptom. The urine is voided in a large stream, and a No. 25 bougie (French scale) can be passed easily. The sinuses healed in eleven days, and the incision by the first intention. The patient presented himself for examination August 5 last, and the scrotum had become very much reduced in size, and the results certainly were all that could be desired.

No. 2.—James Monroe, aged fifty-three years, colored; a stout man of full habit; admitted December 5, 1872, with a firm and well organized stricture of four years duration. Little or nothing clear could be ascertained of the previous history of this patient. But this much was learned, that he had had, since a severe case of clap, arrested by strong injections of nitrate of silver, more or less difficulty in passing water; that, applying for treatment outside, he had been operated on twice, by "internal cutting." On admission, the subcutaneous cellular tissue of the scrotum was found thickened and indurated. The integument was also red and eczematous; and there were several sinuses (seven in all) in the scrotum, perineum, buttocks, and in the left groin, through which the urine passed as through a sieve. After repeated attempts no instrument could be forced beyond the coarctation situated at the bulb, and which extended forward an inch or more into the spongy portion, and backward into the membranous portion a short distance, as discovered during the operation performed for his relief. December 19.—The patient, having undergone a preparatory course of treatment, was this day placed on the operating table, brought under the influence of chloroform, and the operation performed in every particular the same as reported in the first case. The progress of the case until January 10, 1873, is worthy of no special notice, save that the wound healed two-thirds the distance by the first intention, the remainder by granulation, and the sinuses had closed in seventeen days. Unmistakable signs of kidney-disease made their appearance at this date, ending the patient's life on April 12, 1873. A *post mortem* examination revealed one of the forms of fatty kidney described by Tanner as "the enlarged, pale, and mottled kidney, the result of sub-acute inflammatory action and fatty degeneration." This condition of the kidneys was found associated with a fatty liver.

*Three cases of organic urethral stricture, cut internally.* No. 1.—Thomas Beaman, aged fifty years; admitted August 3, 1872, with chronic vesical catarrh, the sequence of a long-standing, organic stricture, situated low down. This patient's general health was sadly broken down through intemperance and the natural effects of the disease from which he suffered. The stricture was divided internally by Professor



Bumstead's instrument, (a modification of Maisonneuve's,) August 13, 1872, without the use of chloroform. A No. 20 sound, French scale, (the only scale employed in this hospital,) was passed, gradually increasing the size to a No. 23. A No. 12 English gum catheter was then introduced, the urine drawn off, and the catheter left as a retained sound for twenty-four hours. The stricture was soon sufficiently overcome to admit treating the catarrh. He was discharged March 3, 1873, cured of the stricture, but with little improvement of his vesical difficulty.

No. 2.—Frank Rector, a Swede, aged thirty-four years; admitted August 12, 1872, with anal fistulæ, and an organic urethral stricture. He states that the stricture was treated in a London hospital, for some length of time, by gradual dilatation, and with considerable relief; but, becoming dissatisfied, he shipped and came to this country. While employed in the lower bay of Mobile an abscess formed near the anus, compelling him to seek hospital relief. The abscess was opened on the day of his admission and found to communicate with the rectum, making a second fistulous opening. These fistulæ in due time were healed, after division with the bistoury and grooved director. The stricture was divided internally, while under chloroform, on the 19th day of August; and the patient discharged, by request, August 27, his vessel being loaded and going to sea. On the day of leaving the hospital he was able to pass himself a No. 23 bougie, and was instructed to carry it up to a No. 25.

No. 3.—Johannes Bosman, aged forty-five years, a strong, healthy Hollander, was admitted to hospital June 21, 1873, with rupture of the urethra, from a fall, striking the perineum across a yard-arm of his ship. On admission the scrotum, penis, and perineum were of a bright-red color, and very œdematous. A clear, serous fluid exuded on puncture. The urine was frequently voided in dribblets, and with great pain. Considerable constitutional irritation existed; nausea and vomiting, with severe pain in the back over the region of the kidneys. It was found impossible to pass any instrument owing to a dense and firm stricture situated low down in the urethra. Free incisions were made into the affected parts, and poultices applied. On the second day the patient seemed better, and the œdema very much reduced, affording great relief. On the twelfth day was so far improved as to admit of an operation to relieve the stricture. While under the influence of chloroform the stricture was divided internally, a No. 23 bougie, French scale, introduced, and afterward a No. 12 catheter, which was left in the usual length of time—twenty-four hours. On the 23d of July, 1873, he was discharged, cured.

There have been treated in this hospital during the fiscal year ended June 30, 1873, thirteen cases of stricture, two by "external perineal section," with the results of one cure, and one death from kidney-disease; eight by internal section, cured; and three treated by gradual dilatation, much improved when last seen.

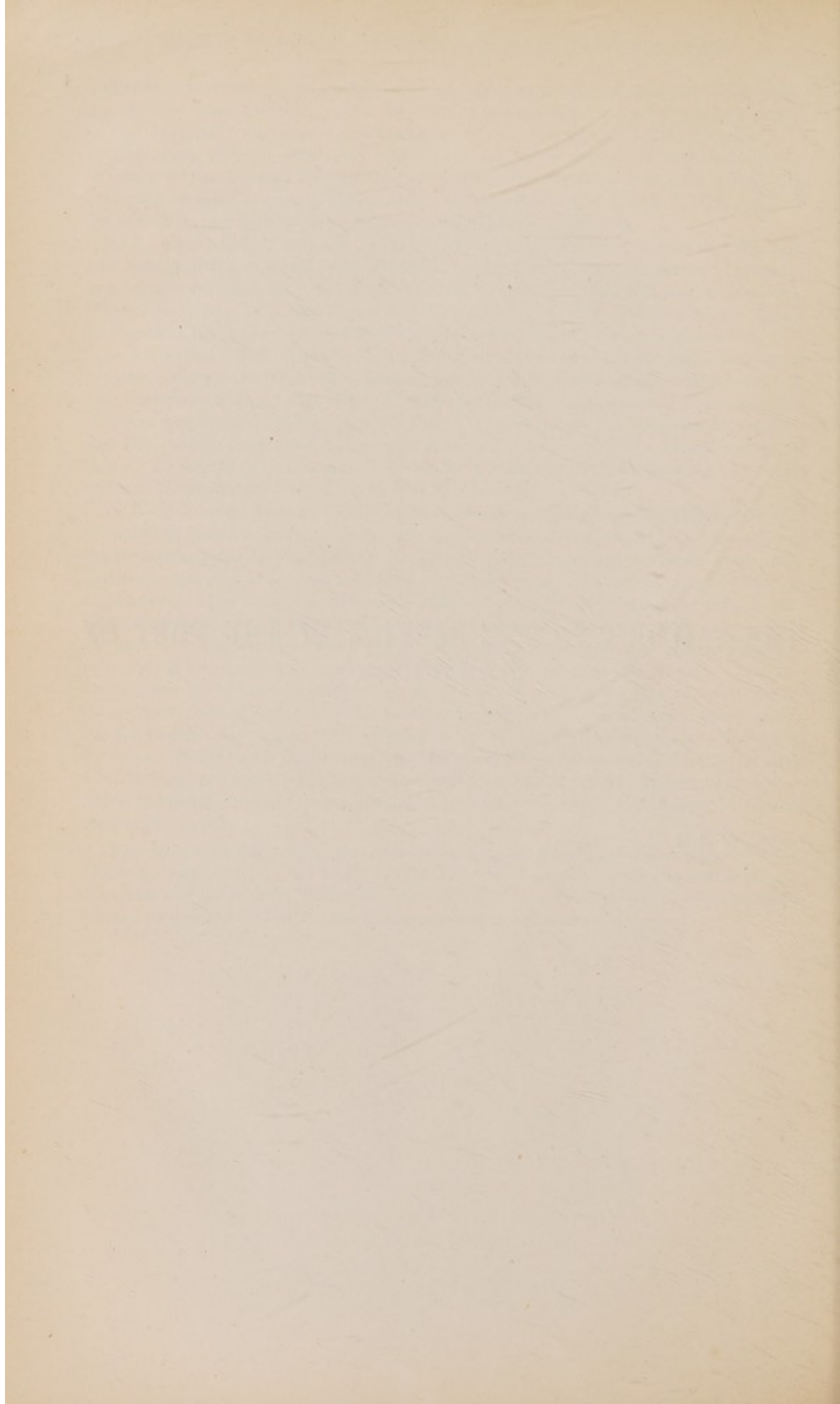
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THE SAILOR AND THE SERVICE AT THE PORT OF  
NEW YORK.

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## F.—THE SAILOR AND THE SERVICE AT THE PORT OF NEW YORK.

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By HEBER SMITH, M. D.,

*Surgeon United States Marine-Hospital Service, New York City.*

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AMONG the duties of the doctor in medicine, in modern times, the study of the causes of disease and the search for measures of prevention have come to be recognized as equal at least, if not paramount, in value to the highest technical skill and the most successful application of remedies when disease actually exists. In this broader field the physician becomes the student and investigator not only of man's physical, but also of his social and moral environment, and the bearing and effect of the most diverse and apparently remote influences are traced to their results in the production of disease and death, or the conservation of health and life.

What is thus true of the doctor in medicine in general, is especially so of the medical officer of the Marine-Hospital Service. To him is confided not merely the medical and surgical care of the sick and disabled who may be entitled to relief from the marine-hospital fund, but the authority to determine the validity of the claim for such relief. This authority carries with it the implied responsibility of guarding the fund from claims growing out of avoidable or preventable causes. Hence it is peculiarly within the province of the marine-hospital surgeon to inquire into the surroundings and conditions of the sailor, both afloat and ashore; to study the effects of his avocation afloat in the production of disease; to investigate his habits when ashore, and the laws and other influences which affect him; and to suggest such measures of correction or relief as may prevent his becoming a charge upon the fund and best preserve him in the vigor of health and usefulness.

It is with these objects in view that the following paper is offered; and though the subjects are treated in a crude and desultory manner, the hope is entertained that their intrinsic importance may awaken sufficient interest to secure some amelioration of the more glaring evils which beset the mariner ashore.

The sailor has in all ages been recognized as the nation's ward. Ancient Rome had stringent laws for his protection, and England has for many years made the welfare of those hardy mariners, to whom she attributes her former naval and her present commercial supremacy, the object of her wisest and most elaborate legislation.

The United States, relying on the inherent manhood of her citizens, has left them the widest liberty in this as in other respects; and so far



as naval interests are concerned this confidence has never proved misplaced. But in the American merchant-marine this liberty has grown into license; and in the absence of legal supervision, abuses have grown up so flagrant and demoralizing that at last Congress has been forced to enact a law for the protection of seamen in American ports and vessels. An act, which is substantially the English shipping-act, was approved and became a law on the 7th of June, 1872. This law, if executed by commissioners having the welfare of seamen at heart, is, with some few exceptions, admirable for its purpose. But if it is to be put into the hands of selfish and unscrupulous men to execute—men who are intent only upon swelling the fees which the law permits them to take from both the ship-owner and the sailor, and active principally in providing places for a retinue of relatives—then it becomes only an additional engine of oppression, and renders the sailor's condition worse than before.

Unfortunately, instances of such incumbents are not wanting; and this fact is the more to be deplored since it lends a color of justice to the attacks which have been made upon the act, and gives apparent importance to the demands for its repeal. The principal opposition comes, of course, from the sailor boarding-house keepers and runners, who find themselves deprived of a lucrative monopoly in the business of providing ships with crews. And so strong is the hold of these men upon seamen that they have succeeded in making it appear that the sailors themselves are the ones chiefly interested in the repeal of the law, parading them through the streets organized into processions, with flying banners, to demand the return of their privilege of being robbed and sold as before—sold into a bondage as absolute, as degrading, and as hopeless as was ever African slavery.

It is not claimed that the law is perfect by any means; but it is a step in the right direction, and with a few very obvious amendments it would be out of the power of even self-seeking and incompetent commissioners, who have already done so much to cast odium upon it, to prevent its greatly ameliorating the condition of the sailor. The specific necessity for some of these amendments may be here briefly considered.

And, first, it would seem desirable to remove the temptation to multiply fees which the wording of the act now presents to the commissioner. The law provides that the shipping-commissioner shall receive his compensation from fees not to exceed \$5,000 a year; but the practical construction of the act is such that the \$5,000 can be swelled to an indefinite amount through deputy-commissioners and office-expenses. The direct result of this is, it is claimed, an unjust and oppressive interpretation of the act by which the commissioner enforces the collection of fees from the wages of the sailor for discharging and shipping for every trip, no matter how short, and notwithstanding that he may re-ship on the same vessel immediately for another term; and this contin-



uously for months, going through the formalities of discharging and shipping each trip, and each time mulcting him the amount of the fees.

A typical illustration of this evil is given in the following statement, being substantially that of an intelligent sailor applying at the surgeon's office for hospital-relief while this sheet was being penned: "The—— Mail Steamship Company's vessels will average a trip a month. There is very little change in their crews from month to month. In fact, they are not discharged at all, but the formalities have to be gone through with. The sailor is not only thereby taxed 50 cents to swell the fees of the commissioner, but is deprived of his pay while in port. The owners of the vessel keep quiet, because the two dollars shipping-fee, which they have to pay Captain ——, is less than the men's wages would amount to while in port."

It does not seem at all probable that this was contemplated by those who framed the bill, and if the authority to overrule this interpretation exists it should be exercised forthwith, since the common sailor, who is here the sufferer, cannot afford the usual routine of contesting the construction and mode of enforcement of statutory provisions.

It is next to be regretted that the act does not prohibit, specifically and conclusively, the system of "advance wages." To this system, more than anything else, is due the largest proportion of the seamen's troubles. It is through the payment of advance-wages that boarding-house keepers are enabled to fleece sailors by compelling the payment of extortionate, and in many cases purely fictitious, board and rum bills, thus sending him again penniless to sea. He is usually cast ashore before the "dead-horse," as the advance is called, is worked out, and he must then put himself in the power of the keeper again, who obtains his pay from the next advance, and so on. As a writer, who speaks by authority, has recently said, "the sailor should make his own bargain with the captain of the ship, as the sail-maker, steward, and carpenter make their own contracts. Then he will become a man like one of them, and will go to sea cheerfully, to earn his own money, instead of working reluctantly for his 'dead-horse' for the benefit of his landlord. He should receive his wages on board the ship at the end of every month, either in cash, in clothing, or in a draft upon the owners, as he may elect. Then, on his arrival in port, all the landlord can steal will be the cash on his person. After that is gone he will not harbor him a day if he has no prospect of an advance of which to rob him. The sailor will then ship again and he will be kept upon the sea, which is the best place for him until he learns the value of money wherewith to live respectably when he is on shore."

That the reader may, in some degree, appreciate the justice of these strictures, let us follow a sailor from his arrival in port to his departure upon another voyage.

While to the weary passenger the sight of land and the approach to the familiar scenes of the home-port is one of the most joyous occasions



of his life, his happiness is seldom shared by the sailor before the mast, who knows too well the home and the friends that await him. The boarding-house runner, no longer allowed to meet him on board, now awaits him on the wharf. He comes ashore with his bag, and is met on the pier by a runner from the house where he boarded the last time he was in port. His advance-wages, probably, were not sufficient to pay the fictitious bill presented by the landlord when he last shipped; consequently he is still in debt at that house, and is expected, as a matter of course, to return there when he again enters port, and to surrender as security any money he may have, as also his clothes and other effects. Should he ship again the next day he could not escape the landlord, who would be on hand for the advance with a board-bill contracted perhaps months previously, perhaps entirely fraudulent. Such is the superstitious fear sailors have of boarding-masters that they never remonstrate. They have been taught better. They believe that boarding-masters can prevent their ever obtaining another ship, if so disposed.

Under the former system of boarding vessels in the bay—now happily abolished by the shipping-act, but only after a stubborn resistance—if the sailor refused to accompany the runner, he would have been terribly beaten then and there, but in the streets of the city this cannot be done. So he is followed and watched, and fortunate indeed will he be if he escapes.\*

But let us suppose the sailor returns with the runner to his old boarding-house. What kind of a place is prepared for his reception? Few that have not had actual experience would credit a faithful description of the vile dens. Situated in the very worst parts of the city, on such streets as Baxter, Water, and Cherry, in old dilapidated houses reeking with filth and overrun with vermin, the sailor is shown to a bunk in a room that has as many double, and in some cases treble, tiers as it will hold, and without a sign of a convenience for the ordinary necessities of life; and that is his lodging-place. In the saloon, or living-room of the house, he is surrounded by a crowd of creatures, male and female, in

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\* A sailor applied for admission to hospital in August last, having just returned from a voyage. He left his clothes at a ship-chandler's store while he came to the Marine-Hospital office to obtain his permit. Returning to the ship-chandler's for his clothes, he found they had been delivered to a runner and taken to a boarding-house, whither he went to demand his property. The boarding-master not only refused to give up the clothing, but the sickness and helplessness of the sailor did not save him from being shamefully maltreated and kicked into the street, and he was sent to the hospital with blackened eyes and barely clothing enough to cover his nakedness.

The landlord's object in getting possession of the clothes was to compel the seaman to come to his house when he left the hospital. If he came sufficiently submissive, all would be well; the landlord would ship him and take his pay from the advance wages, not forgetting to charge a good round sum for storage. If the seaman did not come to his boarding-house when he left the hospital, the landlord would still have the clothes, which he could sell to other seamen. After being so badly treated the man gave up the pursuit of his property, being afraid of his life.



various stages of intoxication ; and can it be thought strange, if, under such circumstances, he immediately proceeds to get as drunk as his associates ? How can he escape ? Each new-comer is expected to contribute to the hilarity of the crowd, and he would be forthwith thrashed and then pitched into the street if he failed to meet such expectations. And this is his home.\*

But the curse of the advance-wages system does not end with the demoralization, the drunkenness and debauchery, and consequent evils to moral and physical health wrought in the boarding-house. As it seizes upon him the moment the sailor sets foot on shore, so it follows him until he is again afloat, and the world is sick of the details of the methods of shipping crews and of the cruelties practiced upon them at sea. That the worst horrors of "shanghaing" are still realities, we have evidence in the case of the ship *Sunrise*, at San Francisco, which sailed from New York with a crew of tailors, carpenters, and barbers, "shanghaied" in the port of New York since the new shipping-act went into effect. But the saddest and most recent testimony is to be found in that noble, last appeal of Captain Fry, of the *Virginus*, who, speaking of his crew, in his effort to save the lives of the poor fellows, says : "The greater portion of the crew were entrapped by their lodging-house keepers, who gained possession of them and watched the opportunity to put them on board on receiving advances on their wages."

What is the remedy for this state of affairs ? Can these evils, which are ruining our mercantile marine ; which, by destroying the efficiency of the sailor, are not the least important factors in the production of avoidable shipwreck and disaster ; and which are more potent than all else in filling our hospitals—can they be removed ? And, if so, how ?

There has been an attempt to do so, by the framers of the shipping-act, by placing certain restrictions on the payment of advance-wages, (sections 17-19.) But the restrictions are easily evaded and have done little or no good. The disease is too serious and too deep-rooted to be

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\* This description does not, it is true, apply to all sailor boarding-houses. There are a few, out of the one hundred and twenty or thirty houses in New York, where sailors are taken to board, in which no liquor is sold, and where some show of home comfort is made. The largest of these is the "Sailors' Home," under the auspices of the American Seamen's Friend Society. It would be pleasant to find one place for the reception of seamen that could be commended ; but this "Sailors' Home," with the exception of the exclusion of liquor and lewd women, is found to be little better than the others. In the sleeping-rooms recently visited, the actual space allotted to the occupants was in no case over 320 cubic feet ; and the sole provision for ventilation was a crescentic aperture cut through the upper part of the door, and of less than six cubic inches capacity. The same overcrowding and filth, the same tiers of bunks, the same total disregard of hygienic laws, are apparent here as elsewhere. In fact, this "Home" and the Society that directs it are mere burlesques upon philanthropic effort ; and the evidence of the truth of this assertion, as regards the Seamen's Friend Society, is to be found in the published financial statement of its secretary and treasurer.



overcome by half-way measures; only the most heroic treatment will avail. The testimony of all who have studied the subject practically is to the effect that there can be no improvement in the condition of the sailor until the payment of wages in advance is absolutely and effectually prohibited. The only argument in favor of the system which is seriously urged is that, from the improvident habits of the sailor, it is necessary to furnish him with the means to buy his "kit" before he can go aboard for any ordinary voyage. This is hardly worth a moment's consideration. The steward, sail-maker, carpenter, and other petty officers, the firemen, coal-heavers, and all others employed in the engine-rooms of steamers rarely, if ever, receive an advance, while their "kits" generally cost much more than those of the ordinary seaman.

The General Government only can cope with the difficulty. It is worse than useless, in face of the history of the past, to look for any relief from State legislation or from private effort. Such a *résumé* as the following should be a sufficient warning against relying on the former, at least:

The earliest record of a tax imposed upon seamen entering the port of New York occurs in the history of the year 1754. The amount of this tax and the method of its collection is not stated. It was imposed upon seamen and passengers alike, for quarantine purposes, and was known as the mariners' fund. Land was taken on Staten Island, in the name of the people, by right of eminent domain. Buildings were erected, the expense of which was deducted from the joint fund before mentioned. From time to time, as surplus funds accumulated, various laws were passed by the legislature directing in what manner these funds should be disposed of. The House of Refuge for Juvenile Delinquents received in this way, at different times, not less than \$80,000. The various city dispensaries were similarly endowed.

The manifest injustice of taxing the hard earnings of seamen for quarantine purposes, and afterward diverting a large share of the fund so raised to other objects, which were wholly foreign to their interests, began to attract the attention of commercial men in the city of New York about the year 1830. The result was the passage of a law in 1831 separating this fund, and creating the board of trustees of the Seamen's Fund and Retreat, which board was to have control of the tax collected from masters, mates, and seamen, and use the same for their exclusive benefit when sick and disabled. It was definitely ascertained by a thorough investigation that after deducting all that had been expended in board, nursing, and medical attendance for seamen, there remained in their favor, apart from what had been paid by, and expended for, passengers, the sum of \$341,000. This money had been expended as before mentioned in the purchase of the quarantine site, the erection of buildings, wharves, &c., and the endowment of institutions in the city of New York.

The board of trustees of the Seamen's Fund and Retreat held their



first meeting on the 9th of May, 1831. The tax authorized by law to be collected from seamen entering the port of New York, at that time, was \$1.50 from captains and \$1 from mates and seamen of all deep-water vessels, and 25 cents from masters, mates, and seamen of all coastwise vessels every time they entered port.

The tax thus collected the trustees were directed to expend in the purchase of land, and the erection of suitable buildings, for the exclusive use of sick and disabled seamen. Forty acres of ground were soon after purchased, hospital buildings were erected, and, in course of time, the trustees found they had property valued at \$120,000, and a handsome surplus in the treasury. This prosperity was destined, however, to be of short duration, for in 1847 an act was passed by the legislature instructing the trustees of the Seamen's Fund and Retreat to "cause to be erected, upon the farm occupied by them, a suitable building or buildings, to be exclusively appropriated to, and for the use of, the following-named persons, to wit, the destitute, sick, and infirm mothers, wives, sisters, daughters, or widows of seamen, who, upon satisfactory proof, had paid the hospital-tax for the term of two years." To enable the trustees to carry out the above directions the sum of \$10,000 was appropriated for this purpose out of the moneys which had been paid by the trustees of the Retreat to the credit of the Mariners' Fund. The trustees were further directed to provide annually for the support and care of the aforementioned, out of the tax collected by them of masters, mates, and seamen, after defraying the current expenses of the Retreat.

In 1849 an act was passed by the legislature, directing the trustees of the Seamen's Fund and Retreat to invest \$6,166.13 of the seamen's money in stock of the State of New York, the interest to be applied to the relief of the distressed families of seamen and their orphan children.

In 1851 an act was passed by the legislature, creating the board of trustees of the Mariner's Family Industrial Society, whose duty it should be to receive from the trustees of the Seamen's Fund and Retreat the sum of \$16,166, and apply so much of said sum as might be necessary to the immediate erection of a suitable building on the grounds of the Retreat for an asylum for the mothers, wives, widows, sisters, and daughters of seamen, as provided for in the act of 1847; the surplus, if any there should be, to be applied for the relief of the persons mentioned in the aforesaid act. Five acres of the farm belonging to seamen were taken for this asylum.

In 1853 the United States court decided the tax upon passengers entering the port of New York unconstitutional, and this decision, it was supposed, included also the State tax upon seamen. From that time the payment of the State hospital-tax by the commercial community became a voluntary matter, and the receipts of the institution rapidly declined. But the legislature was not yet through with the sailor's money, collected exclusively for his care when sick and disabled. The last blow came on



the 7th of April 1854, when an act was passed directing the trustees of the Seamen's Fund and Retreat to pay monthly to the treasurer of the Mariner's Family Society, for the maintenance of their asylum, 10 per cent. of the monthly collections of the trustees from masters, mates, and seamen arriving at the port of New York.

Does any one need to be told that the Seamen's Fund and Retreat is bankrupt, with a mortgage of \$50,000 hanging over it, and that its doors are only kept open by the money it receives from chance patients?

And how much worse is it for a sailor boarding-house keeper to rob and maltreat the poor sailor, than for the great State of New York to collect money from him for over a century, ostensibly to provide him relief when sick and disabled, and then, as fast as a little surplus accumulated, vote it away by legislative enactments for the reformation of juvenile delinquents, the support of dispensaries, and the founding of old ladies' homes?

In the history of the sailor at the port of New York the facts meagerly outlined in the foregoing will form an indispensable chapter.

Meanwhile, the connection between these surroundings and influences, the unjust and oppressive interpretation and enforcement of the shipping-act, the train of ills which follow the system of advance-wages, the mockery of philanthropy in so many of the organizations ostensibly devoted to the welfare of "poor Jack," and the legalized swindling carried on under the cover of State enactments—the connection between these and the Marine-Hospital Service is intimate and important.

Coming ashore, more than half the time, not only with no wages due him, but actually in debt to the vessel and his landlord, for his "dead-horse" and the various taxes and charges levied on him, it is hardly to be wondered at that the sailor has received the title "reckless." But his recklessness is very far from the ideal of the jolly, light-hearted outpouring of animal spirits which song-writers and novelists have portrayed. It is rather the recklessness of despair; of impulses which drive him to any manner of excess so that he but forget himself and his condition. And soon, from exposure, from the vilest of liquors and the worst debauchery, he is driven to the hospital, broken-down and diseased. Fully 30 per cent. of all cases treated by the marine-hospital surgeon are of preventable diseases—"preventable," not in the ordinary sense of that term, but in the much narrower one of being so by compliance with a few of the simplest and most obvious requirements of decent living.

But even to the sailor while still well, the temptation is strong to make the hospital a refuge; and when the change from his boarding-house bunk to the clean, airy ward, the comfortable bed, and the wholesome food of the hospital—above all, when the change from the landlord's extortionate charges to the freedom from expense while in hospital, is considered, it is not strange that the sailor makes such strenuous effort to convert what is intended for his temporary relief when sick and disabled, into a boarding-house for his convenience while well. The

extent to which this has been done, in the past, is shown conclusively by the reduced expense attending the administration of the Service now, as compared with the cost before it came under its present supervision. For the fiscal year ended June 30, 1873, the total expense at this port, including surgeon's salary, was \$34,070. The expenditures, under the old contract-system, during the fiscal year ended June 30, 1870, were \$81,486.71. This saving, it may be remarked, is due almost entirely to excluding from hospital those applicants who were not strictly subjects for hospital-relief, although no one entitled to the benefit of the fund was refused, and an aggregate of 38,504 days' maintenance and medical and surgical care was furnished for the former sum.





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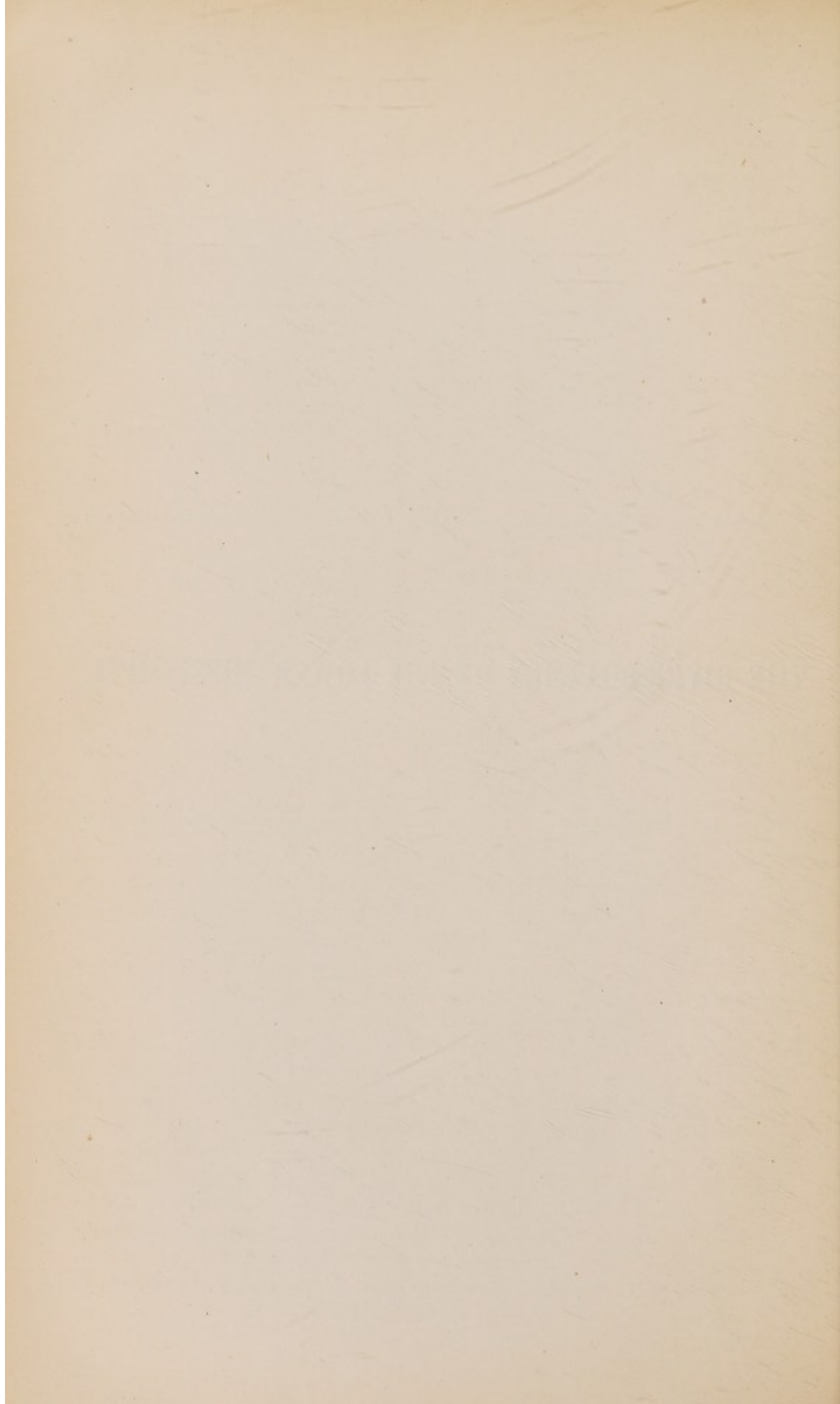
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THE RIVER-BOATMEN OF THE LOWER MISSISSIPPI.

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## G.—REPORT ON THE RIVER-BOATMEN OF THE LOWER MISSISSIPPI.

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By ORSAMUS SMITH, M. D.,  
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THE following report is based upon an investigation, made in accordance with the request of the Supervising Surgeon, into the mode of life, food, shelter, and other conditions affecting the health of seamen on river-boats.

Of such conditions, the most important in its direct bearing upon the nature and amount of sickness among these men is, probably, the construction of the average steamboat used for navigating the Red, Ouachita, Yazoo, Arkansas, and White Rivers, as also the many lakes and bayous emptying into these and into the Mississippi River. These boats are used expressly for the purpose of carrying supplies of all kinds into the interior, and for bringing, as return-freight, cotton and sugar to New Orleans. They are usually of the variety known as "stern-wheel," with a hull from 140 to 175 feet long, from 32 to 35 feet beam, and from  $3\frac{1}{2}$  to  $5\frac{1}{2}$  feet depth of hold. The propelling engines, two in number, together with the heater and auxiliary or "doctor" engine, are placed quite near the stern, say within 20 feet of it, and extend forward about 40 feet. Forward of the engines, on the main or lower deck, is an entirely vacant space of about 80 feet, and next forward of this the boilers (from 2 to 4) are placed, fore and aft. The boilers are usually 24 feet long; immediately in front of them is a space of about 10 feet for the storage of wood or coal. Forward of this coal-room are the main stairs leading up to the "boiler-deck." On this deck is the cabin, which usually is quite comfortable, having a row of state-rooms on each side, with a dining-room or saloon between. On the largest of these boats there is, over this cabin, a shorter and narrower cabin, known as "the texas," which contains rooms for the captain and officers, and also berths for the cabin servants. This "texas," cabin, and the upper decks, are all supported from the main or lower deck by rows of oak and pine stanchions; and the boat presents the appearance of a frame house with the first story not inclosed or weather-boarded. The usual space between the main and cabin decks is from 12 to 15 feet, and the object in leaving it entirely open is the better facility of stowing a large number of bales of cotton on the lower deck. There is also some width of guard all around the lower deck, say about 2 feet, which, added to the beam of the hull and the narrowness of the upper cabin, permits of cotton-bales being piled from seven to ten tiers high on the sides of the boat, thus



carrying them up alongside the cabin on both sides. A boat loaded in this manner appears a huge pile of bales, very little of her being visible except her chimneys, pilot-house, and wheel. These boats are always classed as to their capacity for carrying cotton, and they rate at from 1,200 to 2,800 bales each. As an ordinary bale of cotton is estimated to measure 27 cubic feet, it can easily be seen that the stowage of the craft is admirably economized, to the detriment of the larger portion of her crew. During the last few years stern-wheel boats have almost entirely superseded the use of side-wheelers in the tributaries, being found more economical and better suited to those crooked, narrow streams. In regard to the provision made for the warmth and comfort of the lower-deck crew of one of this class of boats, it amounts to nothing; as, from the nature of the boat's build and business, she has no room or space which could be set apart for rooms or bunks for the men. Her lower deck is entirely taken up by her machinery, boilers, and the space used for cotton, and this space is simply every spot into which a bale can be squeezed or wedged. There is no deck-stove used, as it would be unsafe to have a fire under the control of such careless beings as compose the deck-crew. The greatest watchfulness is required on the part of all hands to keep such vessels from burning.

In regard to the class of men who do the heavy work on the cotton-boats the following may be said:

The average "roustabout," or, as he is termed in slang, "rooster," is a strong black fellow who has probably been a slave, and leaves the plantation for that supposed freedom, and rollicking life which this class take enjoyment in while their trip's wages last. He soon becomes corrupted by his associates, and after making a trip scarcely ever makes another effort at labor until necessity compels him to procure food. The low dens to which he resorts, and where he squanders his hard-earned money, need no description here, as they are to be found too often in all large cities. The property of the average "roustabout" consists generally in what he stands and sleeps in, comprising an old flannel shirt, a pair of coarse pantaloons, a pair of tattered brogans run down at heel, and an old ragged hat. He may also have a cotton-hook stuck in the waistband of his breeches, but more probably he has traded it off for drink before seeking a berth for a new voyage. He wears neither socks, drawers, nor undershirt, and has no bedding or blanket to protect him from the cold when asleep. The usual way their tasks are performed is to have "all hands" at work at once, consequently their rest is very broken and irregular; frequently they are obliged to work thirty-six hours or longer without rest except for meals. These men are comparatively well paid, their wages being from \$45 to \$60 per month in the winter or busy season; but owing to their thriftless habits the money earned does them but little good.

They are very well fed, both as to quality and quantity of food furnished them. It is well cooked, and consists of good soup, boiled beans



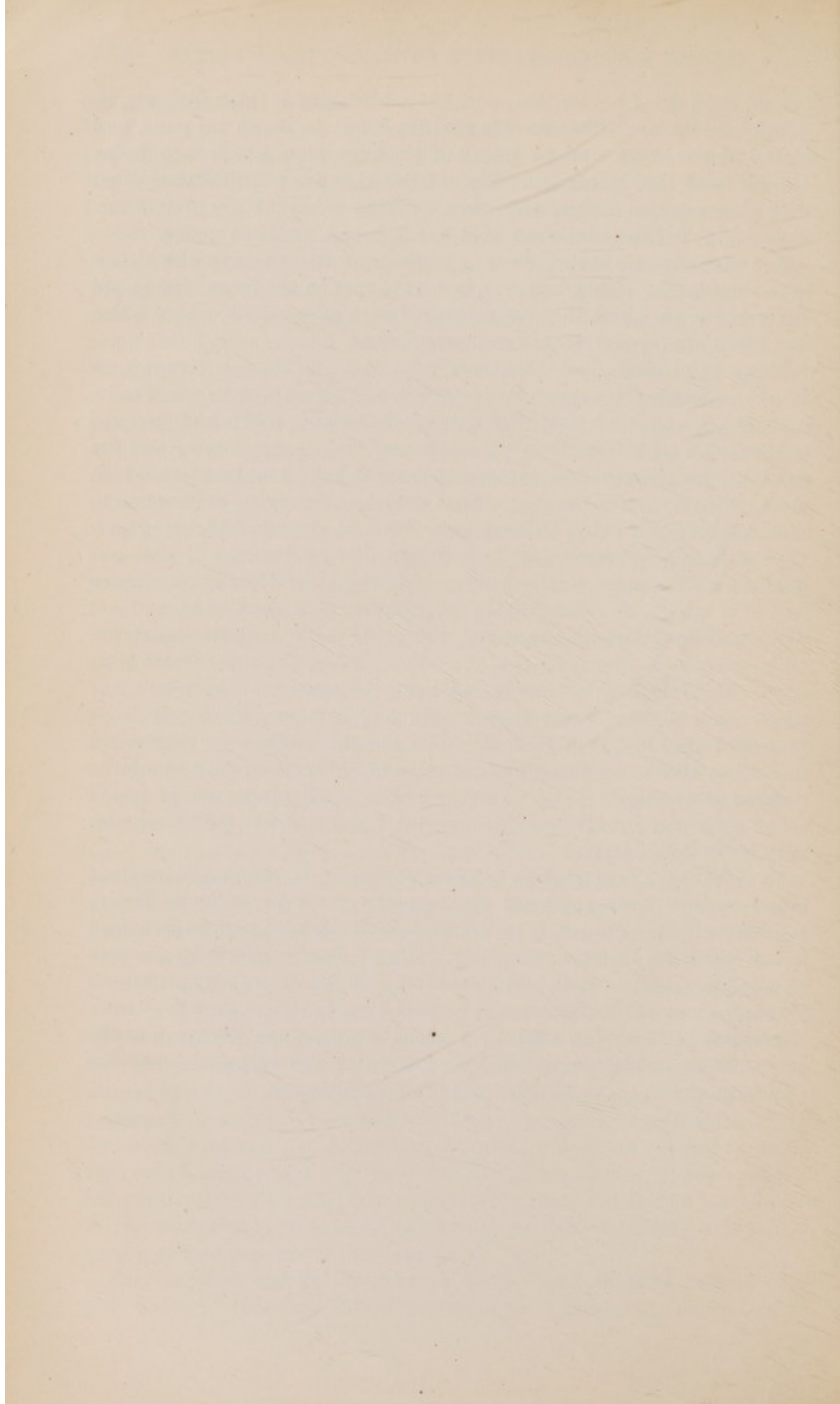
corned beef, dried apples, &c., with the addition of a thick fruit-pie, or "duff," for dinner. This food is portioned out in large tin pans, and placed on the lower deck or guard of the boat, from which each helps himself to all that he can eat. Twice a day they are plentifully supplied with strong boiled coffee, and when working at night are always furnished with a heavy lunch of cold meat, bread, and hot coffee.

The worst feature of their feeding is the comfortless way in which they take their meals. This, however, is not the case on the large Mississippi River boats, on which they are furnished with mess-rooms, where white and black are separately and well attended to.

Many unfortunate and disastrous trips occur in these tributaries, as I have experienced to my own discomfort. Where a boat happens to be overloaded, and overtaken with extreme low water, and a bad stress of cold weather with frost, these "roustabouts" suffer exceedingly; and the result is a great and sudden increase in the sick-list. One instance, which came under my notice during the past winter, is deserving of mention in illustration of this point. The steamer *Flavilla*, Captain Till, being on a voyage from Shreveport, La., to Jefferson, Tex., a distance of only one hundred and ten miles, was, by reason of high winds and low water, thrown foul of a stump, or some hidden obstruction, in Lake Caddo, and not withstanding every effort that her crew could make, with the assistance of hawsers and steam-capstan, she remained fast there for about nine days. Her fuel became exhausted, her provisions ran short, and her whole crew suffered severely from cold and hunger. Fuel had to be brought to her in a skiff from one mile distant. When she succeeded in getting afloat once more, and returned to Shreveport, she had a large number of small-pox cases on board, only a small proportion of which found their way into the marine hospital. Many of her crew were also very badly frost-bitten.

In view of the construction of these cotton-boats, the hardships their crews endure from exposure through the want of accommodation, together with the unusually severe winters which have been experienced in the South for the past two seasons, it is no wonder that such diseases as small-pox, rheumatism, and pulmonary complaints are very prevalent. To these causes of disease should be added the immense growth of rank vegetation in these low swampy regions, which, when decaying in the late summer and fall seasons during low water, is a very fruitful source of a large percentage of every form of malarial fevers.





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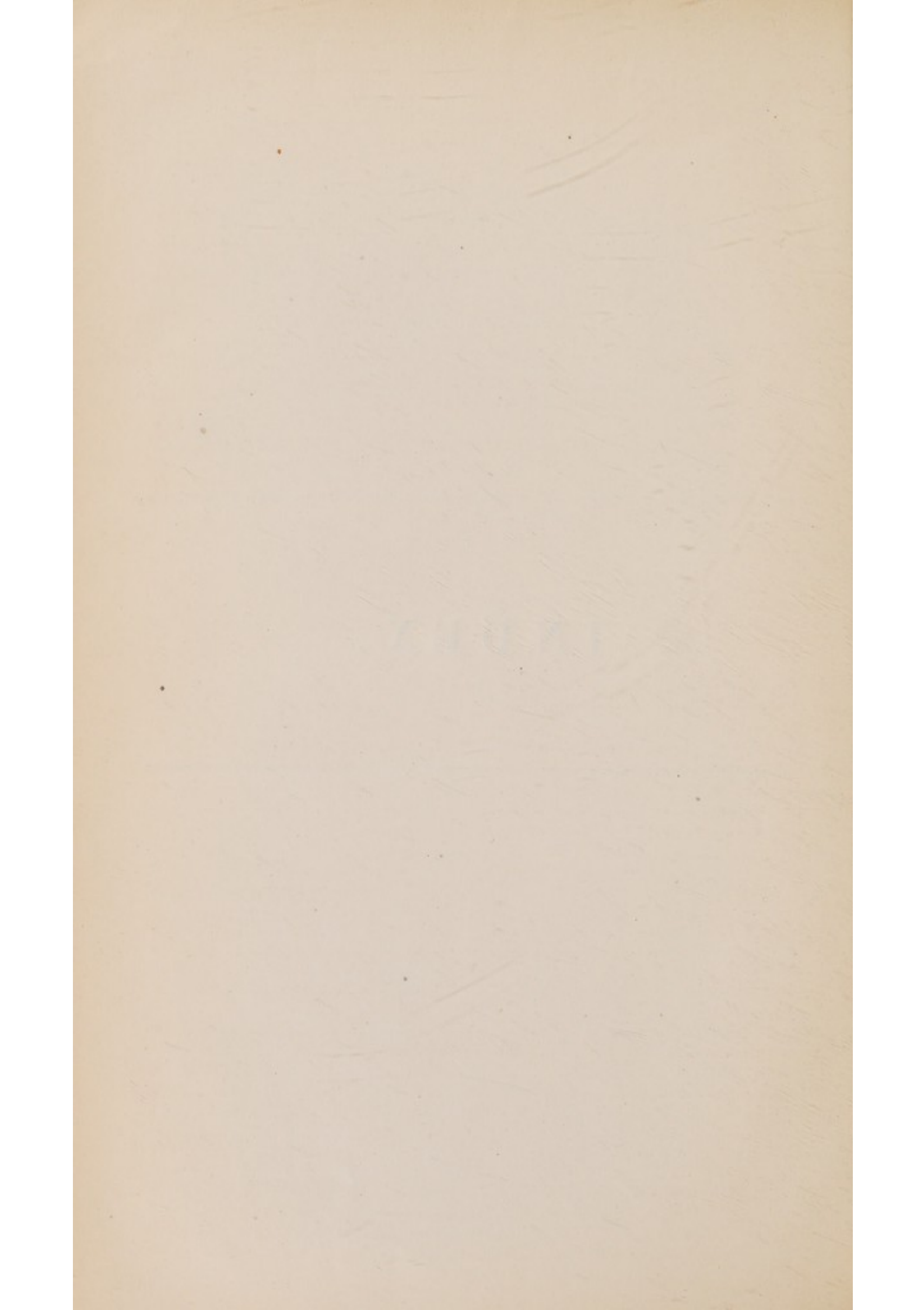
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# INDEX.

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# INDEX.

	Page.
Abuse of sailors.....	134-136
Advance-wages, curse of, to sailors.....	133
American shipping-act.....	132
Ancient and modern hospitals.....	49
Arrangement of hospital-wards.....	54
Average cost of relief during 1873.....	8
in organized hospitals.....	20
BAILHACHE, Dr. P. H., (U. S. M-H. S.,) report of yellow fever at Louisville.....	109
Bellevue Hospital, marine patients in.....	52
pyæmia and erysipelas in.....	50
Basis of hospital arrangement.....	53
Bath-rooms in hospitals.....	55
Cairo, yellow fever in.....	108
Carbolic acid and yellow fever.....	101-103-108
Ceilings and walls of hospitals.....	56
Chicago Marine Hospital.....	17, 50
an innovation.....	17
cost of.....	59
Civil-service system and marine-hospital surgeons.....	11
Collections of hospital-dues during 1873.....	7
Construction of hospitals.....	49
stern-wheel steamboats.....	143
Consular officers and hospital-money collections.....	11
Contract system of hospital-relief abolished.....	19
Correspondence, official.....	13
Cost of hospital-relief by contract system.....	19
during 1873.....	7
in organized hospitals.....	20
Marine Pavilion-Hospital.....	59
the Service during 1873.....	7
CRAMPTON, Dr. O. L., notes of cases of urethral stricture.....	126
report of yellow fever in Mobile.....	105
Dengue and yellow fever.....	100
Diaphragmatic hernia.....	115
Diseases of river-boatmen.....	145
Distribution and Natural History of Yellow Fever in the United States. By J. M. TONER, M. D.....	63
Drainage and sewerage of hospitals.....	58
Dues, (hospital,) total collection of, during 1873.....	7
Duration of permit reduced.....	13
Duties of marine-hospital surgeons.....	12
Economical construction of hospitals.....	49
Economy of Service at port of New York.....	139
ELLINWOOD, Dr. C. N., (U. S. M-H. S.,) on strictures of the urethra.....	123
notes of cases of urethral stricture.....	125



	Page.
Erysipelas and pyæmia in marine hospital, Chelsea, Mass .....	52
Erysipelas in badly-constructed hospitals.....	50
Bellevue Hospital.....	50
marine hospital, Saint Louis, Mo.....	52
Estimates for hospital-funds abolished.....	13
Evils of badly-constructed hospitals .....	50
contract system .....	19
Examination of marine-hospital surgeons .....	11
Executive building of hospital .....	59
FENNER, Dr. D. P., yellow fever at Shreveport .....	110
Floors, material for hospital.....	56
number of, in hospital .....	54
FLORENCE NIGHTINGALE on hospital diseases .....	52
Foreign seamen in marine hospitals .....	8-14
Great general hospital, evils of .....	49
Guyot's table of weight of vapor in saturated air.....	67
Heating of hospitals .....	57
Hernia, diaphragmatic.....	115
Hospital buildings.....	17
construction.....	53
executive building of .....	59
kitchen .....	58
miasm .....	50-53
new Chicago marine .....	50
Hospital-relief at the port of New York .....	20
by contract abolished .....	19
how provided .....	12
increased facilities for, during 1873 .....	8
Hospital-tax receipts to be preserved by masters of vessels .....	11
Hospitals, ancient and modern .....	49
Hospitals and Hospital Construction. By JOHN M. WOODWORTH, M. D., Super- vising Surgeon United States Marine-Hospital Service.....	47
Hospitals, economical construction of.....	49
Hospitals, evils of badly-constructed.....	50
location of.....	53
primary object of .....	49
pyæmia and erysipelas in .....	52
Insanitary condition of Memphis .....	105
Shreveport .....	110
Inspection of seamen before shipping.....	16
Judaic hygiene.....	52
Key West Marine Hospital injured by a hurricane.....	18
Kitchen and provision store-room of hospitals.....	58
of new hospital at Chicago.....	58
Laundry, hospital .....	58
Laws governing Marine-Hospital Service.....	14
Legislation, prospective.....	14
Location of hospital.....	53
Louisville, yellow fever in .....	109



	Page.
Marine-hospital buildings, condition of.....	18
proposed new.....	19
Marine-hospital proposed at Pittsburgh.....	21
at New York.....	20
Marine-Hospital Service, re-organization of.....	8
Material for hospital-floors.....	56
Medical inspection of seamen before shipping.....	16
Medical officers, Marine-Hospital Service.....	11, 12
on duty at custom-house.....	12
Memphis, absence of sanitation in.....	105
defective records of yellow fever in.....	105
yellow fever in.....	104
Meteorological observations at Memphis.....	72
at Shreveport.....	68
MINOR, Dr. THOMAS T., (U. S. M-H. S.,) report of a case of diaphragmatic hernia.....	115
Mobile, disinfection during yellow fever in.....	108
table of cases of yellow fever in.....	106
yellow fever in.....	105
Moisture in warm and cold air.....	67
MOSHER, Dr. J. S., report of yellow fever at New York quarantine.....	102
MULLETT, A. B., supervising architect.....	50
Natural history of yellow fever in the United States.....	63
New Orleans, disinfection during yellow fever in.....	103
yellow fever in.....	102
New York, economy of Service at port of.....	139
hospital relief at port of.....	20
quarantine at port of.....	16
necessity for hospital at port of.....	20
yellow fever at port of.....	101
Nomenclature of diseases.....	12
Note on diaphragmatic hernia, by the Supervising Surgeon.....	116
on yellow fever at Shreveport, by the Supervising Surgeon.....	110
on yellow fever epidemic of 1873, by the Supervising Surgeon.....	97
Nurses' rooms in hospitals.....	55
Office relief.....	12
Official correspondence.....	13
Operations of the United States Marine-Hospital Service, 1873.....	7, 22
Organic matter in hospital walls.....	57
Pavilion hospital, cost of.....	59
Permits for hospital-relief, present duration of.....	13
PERRY, Dr. A. W., disinfection in New Orleans.....	103
Pittsburg Marine Hospital, sale of.....	21
Preventable diseases of seamen.....	16, 138
Primary object of hospitals.....	49
Progress of re-organization of the Marine-Hospital Service.....	8
Proposed new hospitals.....	19
Provisional Nomenclature of Royal College of Physicians.....	12
Pyæmia and erysipelas in badly constructed hospitals.....	50
Quarantine and yellow fever at Cairo.....	109
at port of New York.....	16
hospitals, tax-paying seamen in.....	15
its relations to the Marine-Hospital Service.....	15



	Page.
Reading-rooms in hospitals .....	55
Recommendations of the Supervising-Surgeon .....	14, 16, 17, 18, 20, 21
Regulations United States Marine-Hospital Service .....	9
first code of .....	10
new code .....	9
simple machinery of .....	10
reduction of forms by .....	11
division of, into sections .....	11
minor changes in .....	13
prospect of further revision of .....	14
REILLY, Dr., (U. S. M-H. S.,) on yellow fever and dengue .....	100
Relief at surgeon's office .....	12
in marine hospitals .....	12
Report of yellow fever, in 1873, at Cairo, Ill. ....	108
Louisville, Ky .....	109
Memphis, Tenn .....	104
Mobile, Ala .....	105
New Orleans, La .....	102
New York City .....	101
Pensacola, Fla .....	111
Shreveport, La .....	110
Report of a Case of double Diaphragmatic Rupture and Hernia, by THOMAS T. MINOR, M. D., U. S. M-H. S .....	113
Revision of Regulations of the United States Marine-Hospital Service .....	9
Rights of tax-paying seamen ignored .....	16
River-boatmen of the Lower Mississippi .....	141
character of .....	144
diseases of .....	145
"Roustabouts" .....	144
Safest hospital for the sick .....	49
Sailor boarding-houses, keepers of .....	132
Sailor, the Nation's ward .....	131
Sailors, unseaworthiness of .....	17
San Francisco Marine Hospital, site for .....	18
Marine Pavilion-Hospital, description of .....	53
estimated cost of .....	59
Sanitary measures among the Jews .....	52-56
Seamen in quarantine hospitals .....	15
medical inspection of, before shipping .....	16
number treated in 1873 .....	7
of the Light-House Service, Coast Survey Service, and Engineer Corps	
of the Army .....	14
physical condition of .....	17
Seamen, the term not defined by law .....	14
Secretary of State and Marine-Hospital Service .....	11
Sewerage, hospital .....	58
Shreveport, insanitary condition of .....	110
yellow fever at .....	110
Small-pox, cost of treating cases of .....	8
epidemic of .....	8
SMITH, Dr. HEBER, (U. S. M-H. S.,) the sailor and the Service .....	129
Yellow fever at the port of New York .....	101
SMITH, Dr. ORSAMUS, (U. S. M-H. S.,) on the river-boatmen of the Lower Mississippi .....	143

	Page.
SMITH, DR. ORSAMUS, (U. S. M-H. S.,) report on yellow fever in New Orleans....	102
Smoking-rooms in hospitals.....	55
Statistics .....	21
disease and injury tables, 1873.....	32
mortality-table with causes .....	40
receipts and expenditures from 1798 to 1873, inclusive .....	28
statement of hospital-relief furnished in 1873.....	23
statement of location, cost and disposition of marine hospitals.....	30
summary statement of operations during 1873.....	22
Strictures of the Urethra. By Dr. C. N. ELLINWOOD, Surgeon U. S. M-H. S.....	123
Subsistence for surgeons and families.....	13
Summary of the yellow-fever epidemic of 1873.....	111
Supervising Surgeon, act providing for appointment of .....	9
duties of .....	9
note on phrenic hernia, by.....	116
yellow fever at Shreveport, by.....	110
yellow fever epidemic, by .....	97
on hospitals and hospital construction.....	47
Surgeon's house .....	59
Surgeons United States Marine-Hospital Service, duties of.....	12
examination of.....	11
Table of Places where Yellow Fever has appeared in the United States since 1668 .....	78
The River-Boatmen of the Lower Mississippi. By ORSAMUS SMITH, M. D., Surgeon U. S. M-H. S.....	143
The Sailor and the Service at the Port of New York. By HEBER SMITH, M. D., Surgeon U. S. M-H. S.....	129
THORNTON, Dr. G. B. Report on yellow fever in Memphis.....	104
TONER, Dr. J. M. Distribution and natural history of yellow fever in the United States .....	63
Unseaworthiness of sailors .....	17
Urethral strictures .....	121
Ventilation .....	57
Ventilator, fire-place as a .....	57
WARDNER, Dr. H. Report on yellow fever in Cairo.....	108
Ward dining-rooms.....	55
Wards, cubic space in.....	54
distances between .....	54
ground arrangement of .....	54
number of patients to.....	55
number to a floor.....	54
light, heat, and ventilation of.....	57
size of .....	54
small .....	55
superficial space of .....	54
ventilation of .....	54
windows in .....	57
wood-work of .....	57
Wash-rooms in hospitals .....	55
Water-closets in hospitals.....	55
WOODWORTH, JOHN M., Supervising Surgeon U. S. M-H. S. Hospitals and hospital construction .....	47
note by, on phrenic hernia.....	116



	Page.
WOODWORTH, JOHN M., note on yellow fever at Shreveport.....	110
yellow-fever epidemic of 1873 .....	97
Yellow fever, a disease of cities.....	65
and carbolic acid .....	101-108
dengue .....	100
intermittent fever, co-existence of.....	106
quarantine at Cairo .....	109
the malarial fevers.....	100
Marine-Hospital Service .....	100
atmosphere heavier than pure air .....	77
at port of New York .....	101
Shreveport .....	110
Pensacola.....	111
conceded home of .....	64
epidemical limits of.....	66
epidemic of 1873.....	97
summary of .....	111
influence of elevation upon .....	63-76
heat and humidity upon .....	66
table of places where it has appeared in the United States since 1668 .....	78
in Louisville .....	109
Mobile .....	105
Memphis .....	104
New Orleans .....	102

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