



The Library-Museum Building on the Mall

BILLINGS IS NOMINATED AS SURGEON GENERAL

BETWEEN 1881 and 1884 important persons in the Surgeon General's Office died. George Otis, curator of the museum since 1864, passed away in 1881. Surgeon General Barnes, head of the department for almost 20 years, retired on June 30, 1882. Charles Crane, Assistant Surgeon General from the Civil War until 1882 and then Surgeon General, died on October 10, 1883. Joseph J. Woodward, Otis' colleague in the museum, the department's best-known scientist, and president of the American Medical Association in 1882, was in very poor health and died in 1884. Billings alone remained of the officers who had developed the Library and museum from a few books and specimens into collections of national prominence.

When Barnes retired a number of physicians and scholars tried to have Billings elevated to the post of Surgeon General.¹ Billings felt that his friend Assistant Surgeon General Crane, a competent officer with 35 years service, deserved the promotion. "I did not wish my name to be urged against that of General Crane," he said later, "and wrote decidedly to that effect to my friends, though without much effect."² After Crane died physicians again pushed Billings' candidacy.³ On this occasion he stated his views to Ezra Hunt, president of the American Public Health Association:⁴

I have no objection to having my name presented to the President by those who think proper to do so, but I shall certainly not do it myself nor ask, or hint to, anyone else to do it.

I presume that Dr. Baxter and Dr. Murray are urging their claims from what I see in the papers . . . Dr. Murray is the senior officer of the corps and has two years yet to serve before compulsory retirement. He is in every respect a most estimable gentleman. The difficulty is that if he is appointed the war will break out again two years hence, and the medical corps wants the thing settled once and for all. Moreover the practice of promotion in any medical corps by seniority gives bad results as you know.

Now I do not consider that I have any *claims* to the office any more than any other officer who has done his duty. It is open to all.

If I should be appointed I shall do my best for the interests of the Department and of the profession. I cannot say I am anxious for the place, it is a high honor, but it brings with it much responsibility and worry. I am content as I am. I

want to do what is right, and I take the duties nearest at hand. I have always found plenty of them.

Now I can only advise you to think the matter over + do what you consider best for the service and the profession. There are other comparatively young men in the corps who will fill the office well. I name Moore, Sutherland, + Huntington. Dr. Baxter you know.

Do not be swayed in the least by personal friendship in this matter—it is an important one—and I shall esteem you just as highly if you recommend someone else or if you do nothing. But if you have a decided opinion I think you ought to express it. I have written two or three letters similar to this to friends who have asked me what they should do. I cannot in the least tell them what they should do. I know absolutely nothing as to President Arthur's views nor whether he will make the appointment at once, or wait until Congress meets. To my other correspondents I have simply made one request, which I know is not necessary in your case, viz that they should not attempt to depreciate in any way the other gentlemen whose names are before the President.

On November 23, 1883 the President chose Robert Murray, who had joined the army before the Mexican War, when Billings was a boy. Perhaps it was just as well for the Library that Billings was not selected. As Joseph R. Smith, medical director, Department of Texas, told him, "You would make a good chief to our corps. I cannot but fear, however, that if you were appointed your duties as chief would much interfere with valuable bibliographic and scientific work."⁵

Murray was not a young man and his duties weighed heavily on him. He had to oversee a medical organization whose officers served at more than 150 Army posts and treated more than 40,000 cases a year. There were physical and mental illnesses, epidemics, accidents, suicides, and murders at barracks and forts. Cavalry and infantry fought Indians in the West from Montana to New Mexico—in 1880 there were at least 17 engagements in which soldiers were killed or wounded. All manner of administrative, financial, and professional problems came to rest on the desk of the chief medical officer.

Murray divested himself of some of his responsibilities by combining the museum and Library into a single entity called the Museum and Library Division, with Billings as director. This happened on December 28, 1883; thereafter Billings was curator as well as Librarian.⁶ Billings now had more paper work and responsibility for larger funds. He could make or change policy for the museum, and he did this in at least one important direction, by ordering the collecting of microscopes of all styles. Known today as the Billings Microscope Collection, this is one of the finest historical collections of specialized scientific apparatus in existence.⁷ The new position and title gave Billings more prestige in his attempts to gain a building, and it made easier the settling of decisions that arose later during construction.

CONGRESS PROVIDES A NEW BUILDING

On December 3, 1883, the 48th Congress convened, and Surgeon General Murray started again on the same path that his predecessors had trod in 1880

and 1881 by requesting the Secretary of War to help obtain a new building.⁸ Secretary Lincoln agreed and sent pertinent reports to the White House, where President Arthur approved and transmitted them to Congress.⁹

Two days after the session opened Senator Joseph Hawley introduced Bill S. 403, and five days later Representative William Rosecrans introduced a companion bill, H.R. 48, for construction of a building.¹⁰ Surgeon General Murray urged Senator William Mahone and Representative Stockslager to vote for the building, but again most of the lobbying was directed by Billings. The latter thought that legislation had a good chance of passing during this session; he told Jerome Cochran, "most of the members [of Congress] appreciate the necessity for it and have evidently had some conversation with their medical constituents on the subject."¹¹ Nevertheless he did not slacken his efforts. He furnished Alexander Hutchins, Brooklyn, New York, information on H.R. 48 for Hutchins to incorporate into his inaugural address as president of the Medical Society of the State of New York. Hunter McGuire of Richmond, a prominent teacher and future president of the AMA, received a copy of Bill S. 403 from Billings, and wrote about it to Senator Mahone, whom he knew. Frank L. Sim, editor of *Mississippi Valley Medical Monthly*, convinced Representative Casey Young to favor legislation. Representative Theodore Lyman, who knew Billings, helped persuade Representative William Holman. Henry C. Lea wrote to Representative Samuel Randall. The St. Louis Medical Society prepared another memorial to Congress. Beriah A. Watson, influential surgeon and writer of Jersey City, induced the New Jersey Medical Society to pass resolutions favoring the building.¹²

At the end of April the American Surgical Association, and in May the American Medical Association, met in Washington. These conventions were attended by hundreds of physicians, a large proportion of them influential in their state and local medical organizations. Billings saw the opportunity for more lobbying. He was to be away at the time, so he gave the following instructions to Assistant Surgeon Washington Matthews, who had been assigned to the museum:¹³

For about ten days . . . there will be a stream of medical men from all parts of the country visiting the Museum and Library to see everything that is noteworthy. We shall all have to act as showmen for the time being . . . It is . . . desirable that you should make yourself thoroughly familiar with the condition of the movement to provide a new Library and Museum for this department and with the arguments in favor of it. So far as the printed documents are concerned Dr. Huntington will give you all this and also tell you how the matter stands in the Committees and in Congress. Mr. Myers can show you some of the shocking defects and dangers in the present building which you may have occasion to point out to some visitors.

During the spring of 1884 Hawley's bill was reported back to the Senate, amended to increase the appropriation to \$300,000 for the building and site and accepted without debate.¹⁴ Rosecrans' bill was reported back to the House in July. The proposed building had cleared major hurdles.

But while the committees on public buildings had been looking over Library-Museum bills, other committees had been working on appropriations. Finally the estimated total of civil and military expenses became so large that members of the House Appropriations Committee were unwilling to add the cost of a new building. James F. Hibberd told Billings that Representative Stockslager had stated that the committee was sympathetic but would not recommend an appropriation. Andrew Nebinger, former president of the Medical Society of Pennsylvania, relayed a message to Billings that Representative Samuel Randall had reported that the building might have to be postponed a year or more because appropriations were high. As these legislators predicted, the bills of Hawley and Rosecrans were set aside, not to be reconsidered for many months.¹⁵

In January 1885, shortly after the second session of Congress convened, Representative Lyman informed Billings that he and his friends would try to have the rules of the House suspended so they could bring out the bill, and he asked Billings to send a memorandum of the most important arguments for a new building.¹⁶

As Lyman promised, Representative Stockslager rose in the House on February 16, had the rules suspended, and brought out Rosecrans' bill. Debate was brief, with proponents emphasizing the unsafe, crowded condition of Ford's, the desire of civilian physicians and medical societies for a new museum-library building, and the money that would be saved by transferring pension clerks from rented buildings. "The most magnificent medical museum and library in the world," said Representative John Follett, "is today exposed in a building where no private individual owning such a library would permit it to remain for twenty-four hours."

Opponents suggested that the Library be placed in the proposed Library of Congress building, the museum specimens in the Smithsonian Institution, and the records in the new Pension Building. Representative Orlando Potter prophesied that if the legislation passed, "I think it will end in a national library of medicine, a national collection of medical specimens, and finally in a national college of medicine here at the capital." The bill passed without difficulty by a vote of 121 to 23.¹⁷

The Senate had shown by its vote on Hawley's bill that it favored the legislation. Nevertheless Billings' friends continued their pressure. S. Weir Mitchell induced Senator Thomas Bayard to talk to influential colleagues.¹⁸ William P. Clarke, on behalf of Mitchell, visited Washington and talked to Senators Eugene Hale and George Hoar. Samuel W. Gross and Henry C. Lea obtained promises from Representative Randall of the House Appropriations Committee to aid if he could.¹⁹ The Senate passed the bill quickly on Feb. 26, and it was signed by President Arthur on Mar. 2, two days before he left office.²⁰

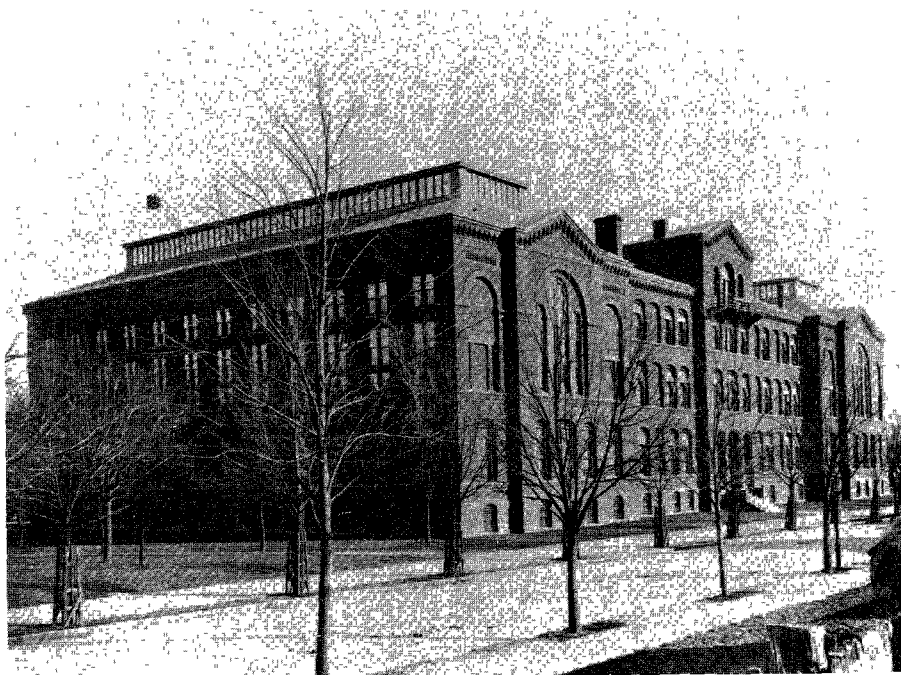
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CONSTRUCTION OF THE BUILDING ON THE MALL

The law appropriated \$200,000 for a building whose design was to be approved and whose site was to be chosen by a commission consisting of the Secretary of War, Architect of the Capitol, and Secretary of the Smithsonian. Three weeks after the law was enacted, the commission selected a quadrangle of ground on the southeast corner of Seventh and B Streets, S.W., measuring 270 feet along B Street (now Independence Avenue) and 170 feet along Seventh Street.²¹ During months that followed the commission approved the plans and the government advertised for bids for construction. The firm of Bright & Humphry received the contract on a low bid of \$179,987.²² Construction proceeded under the eyes of Colonel John Wilson and Lieutenant Colonel Thomas Lincoln Casey, who would become Chief of Engineers. As the work went along Billings was asked to decide such details as the color of the interior walls and concrete floor. He designed the heavy, 25-foot-high iron book stacks, which were fabricated in Trenton, New Jersey, and shipped to Washington.²³

Construction was slower than expected because, in the opinion of the engineer officers, Bright & Humphrey subcontracted much of the work.²⁴ The building was not ready by the expected time, February 1, 1887, and the pension records and clerks had to remain in the F Street building, forcing the government to continue to pay rent. Finally the officers compelled the contractor to complete floors and rooms in a certain order so that the Pension and Record Division could move in, even though carpenters and laborers were still scamping around on scaffolds. Among the economies practiced by the builders was the use of secondhand brass knobs on the front doors. These knobs lettered "Public School City of New York" were still giving visitors a laugh three-quarters of a century later.

By the time the building was finished inside and out, Congress had appropriated \$245,550; \$200,000 in the original act, \$38,050 on August 4, 1886, for iron stacks, museum cases, gas fixtures, and furniture, and \$7,500 on March 3, 1887, for additional items. The completed structure consisted of a building 112 feet long and 55 feet wide, connected to two wings, each 60 feet along the front and 131 feet from front to back. The center was four stories high above the basement and was divided into offices and workrooms. The first floor of the museum wing contained rooms for scientific work. Above was Museum Hall, 47 feet high from floor to peak, with a gallery circling the hall. The first floor of the library wing was occupied by pension files—it was expected that as time went by and the use of Civil War records decreased, the files could be moved to storage and the first floor be taken over by the Library. Above was the large Library Hall with its bookstacks, desks, and chairs. Both wings could be sealed off from the center building in case of fire, although the entire structure with its brick walls, concrete floors, and ironwork was practically fireproof.²⁵



The Library-Museum building shortly after it was completed. Trees had recently been planted along B street, now Independence Avenue.

The Library had no artificial illumination. Light entered through 18 side windows, each 16 feet high and 5 feet wide, through large windows at the front and back, and a clerestory. Lighting proved to be adequate except on overcast, stormy days. There were gas lights in the rooms in the center section and in the large room under Library Hall. Later, in the early 1900's the building would be wired for electricity, but inadequately; in Library Hall only four droplights, consisting of incandescent bulbs with green metal shades over them, would be installed.

The building was heated by hot air flowing through ducts and registers from a coal-fired steam boiler. Rooms in the center section had fireplaces in which clerks could burn wood in the winter.²⁶ Library Hall was so cavernous that it proved impossible to warm adequately on extremely cold days.

The cast iron book stacks were three levels high, 7 feet 9 inches between levels. The cast iron floors were perforated to allow light to pass through so that messengers would be able to read titles on books. But the light was found to be so dim after the books were emplaced that messengers had difficulty deciphering titles; later, after flashlights were invented, they used these handy

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Back of the building The Library wing is on the right, Museum on the left

appliances Shelves were oak The estimated capacity of the hall's 22 stacks was 150,000 volumes

Some of the furniture came from Ford's, the remainder was new It represented the standard office and library equipment of its time, including 11 revolving bookcases, 11 hatracks, 5 water coolers (filled with ice and water each morning), 11 washbowls and pitchers, 78 spittoons, 11 library tables, 42 office revolving chairs, 277 stationary chairs and 4 typewriters (typewriters were still primitive and were not in general use) ²⁷

In the original design a small one-story structure projected from the center rear of the main building to house the boiler, toilets, and lavatories Billings eliminated this structure when Congress reduced his estimate from \$250,000 to \$200,000 After Bright & Humphrey offered to erect the main building for \$179,987, there remained \$21,013 At Billings' request this was applied toward the cost of a small two-story annex, 52 feet long and 24 feet wide, in the rear courtyard, joined to the main building by a covered walkway In the basement of the annex were placed steam boilers, pumps and coal bins, on the first floor toilets and lavatories, and on the second a pathological and a biological laboratory ²⁸

Library buildings of the late 19th century were generally designed for classic beauty or in a style that agreed with the architectural taste of the day rather than as practical work places for readers and librarians Billings did not do this, he based the design of his building on its function How much, if any, he may have influenced later library builders is not known The Library-Museum Building had flaws not anticipated by Billings but revealed by time and use

THE MOVE FROM FORD'S THEATRE

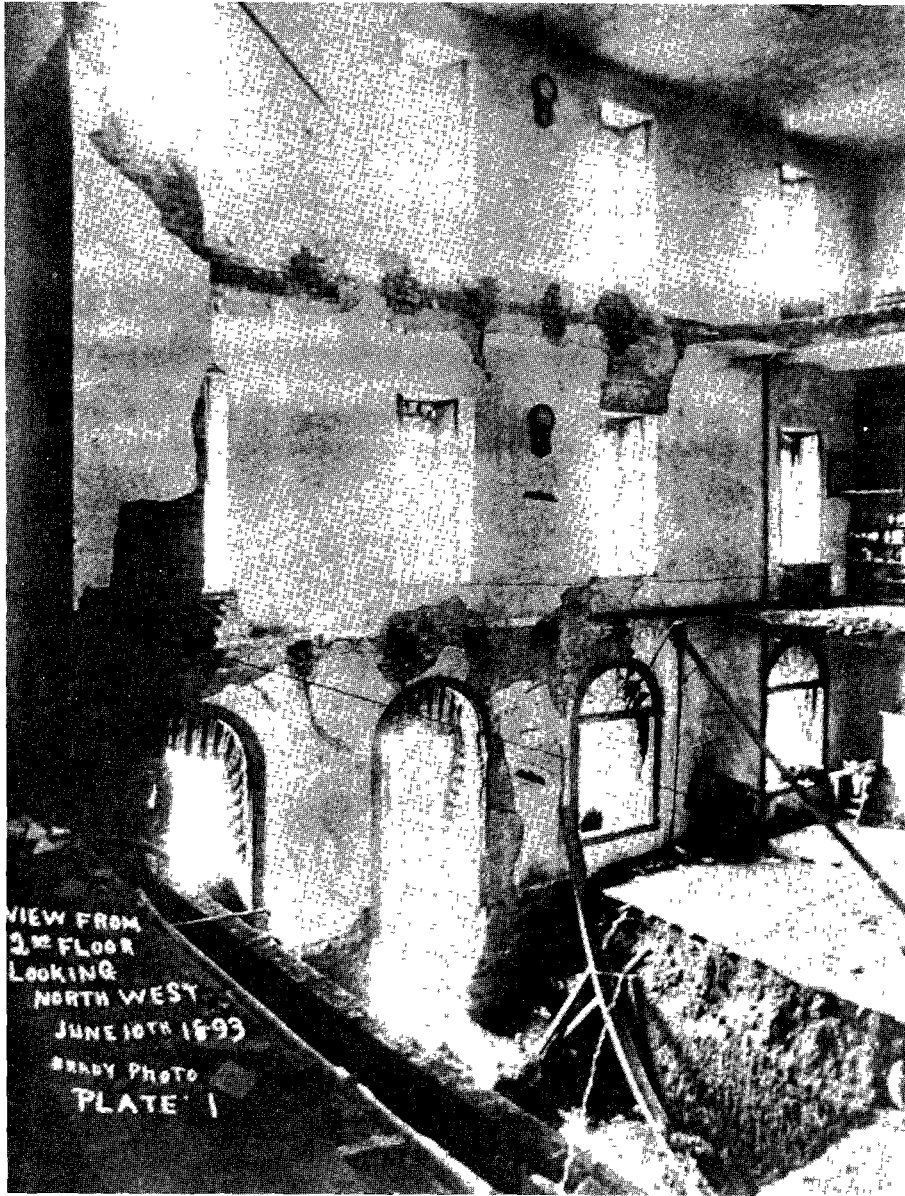
The transportation of books, journals, museum specimens, scientific apparatus, and other items from Ford's Theatre began in August 1887 and lasted for several months. On August 16 Billings packed up his papers in Ford's and moved to the new building.²⁹ The next day Library clerks began packing books into wooden boxes and lifting them onto a wooden chute which extended from a second story window of Ford's out over the sidewalk to the curb. The boxes slid down the chute to a waiting dray, were caught by draymen and stacked in order. For many days Washingtonians could see wagon loads of crated books being hauled by teams of horses down Tenth Street toward the building on the mall.³⁰ On August 31 the last of the books and staff left Ford's Theatre. In the afternoon a clerk opened the Register and wrote in the margin: "First entry in the new building." Then he accessioned Leon Buczwinski's *Poradnik Weterynaryjny* (Veterinary Advisor), assigned it number 119,109, and jotted this reminder: "In the new building, Aug. 31st 1887. (2 p.m.) cool + pleasant."³¹

After the Library and museum departed from Ford's Theatre the government did not close the building but moved in hundreds of clerks and continued to use it for the Record and Pension Division. It is a pity that Congress and the Administration did not heed the warnings of Billings and his associates that the structure was unsafe, for during renovations a few years later on June 9, 1893, the interior collapsed, crushing 22 persons to death and injuring 68 others. Had the Library and museum still been in Ford's they would have been badly damaged, and today there might not be a National Library of Medicine.³²

The development of the Surgeon General's Library from a collection of a few hundred volumes whose existence was scarcely known outside the Army Medical Department into the largest, most diversified medical library in America, housed in its special fireproof building, known throughout the Western world through its *Index-Catalogue*, within a time span of a quarter of a century, was a remarkable achievement by Billings. But it was possible only because his superior officers, Surgeons General Barnes, Crane, and Murray, were good managers who delegated authority to him, allowed him to proceed in his own way, and backed him with their influence when he needed it. And perhaps it was possible only in the tightly knit profession of medicine, with its network of communications based on meetings, journals, and transactions, its members disseminated throughout the United States, and its influential personal relationship between physician and patient.

Billings' feat in obtaining a building from Congress within a period of 7 years is all the more remarkable because he was involved in so many other activities, among them the American Medical Association, the National Board of Health, the American Public Health Association, over which he presided in 1879-80, the international medical congresses of 1881 and 1884, the construction of Johns Hopkins Hospital, the design of an Army-Navy hospital at Hot Springs, Arkansas, in 1882, lecturing at Johns Hopkins and Columbia, and

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Interior of Ford's Theatre after a portion of the interior collapsed. On the second floor, right, may be seen a balcony and shelves, probably left behind when the Library moved. The Library and Museum were fortunate; one may imagine how badly they would have been damaged had they remained in the building.

writing more than a score of articles. He even tried his hand at research, in collaboration with Washington Matthews, making composite photographs of skulls in the museum. And while he left the routine operation of the Library and museum to others, he had to concern himself with the finances, purchases of unusual items, and the adjudication of unusual matters that arose.

THE LIBRARY IN THE NEW BUILDING

In the new building books and bound periodicals were shelved in Library Hall, current and recent journals in an adjacent room in the center section called the reading room. While Billings was preparing to move from Ford's he devised a new classification for monographs. He divided medical literature into 30 groups, as anatomy, anthropology, biography, biology, and so on, and many of the groups into subgroups, as circulatory system into aneurysm, apoplexy, blood, hemorrhage, heart, pulse, and sphygmograph. Within each group books were placed alphabetically by author.³³

When the library was moved, Billings had volumes arranged in the new stacks in a manner most convenient for the clerks and messengers, works used most often being placed on the ground level, those called for least often on the top level. On the ground, first, or A level were placed bound medical periodicals by countries, transactions of societies by localities, folios, bound French dissertations by universities, and miscellaneous literature. On the second or B level were placed monographs, unbound dissertations by universities, and bound chemistry, pharmacy, dentistry, and veterinary periodicals. On the third or C level were placed Japanese and Chinese books, incunabula, manuscript volumes, bound and unbound pamphlets, scientific periodicals, and documents.

Billings considered designating each monograph by a double number, the first part being the accession number, the second a number indicating the book's place in its subgroup.³⁴ Apparently he concluded that a double number was more than was needed, and instead he used a short combination of letters and numbers that told the book's location in the stacks. For example, A, 1, 3, 5 meant level A, range number 1, compartment or section number 3, shelf number 5 (from top).³⁵ Later the designation was modified somewhat, as A²⁷/₅₋₂ meant A level, 27 compartment, 5 shelf, 2 partition. The number was not painted on the spine but written on a label pasted inside the front cover.

Billings, Fletcher, and the clerks occupied rooms in the center section of the building. More than half the remaining rooms in the center were assigned to museum employees, officers in charge of pension records, and other officers of the Surgeon General's office.³⁶

The staff now consisted of a Librarian, Billings; a principal assistant librarian, salary \$2,250 a year, Fletcher; a contract surgeon, Wise; 18 clerks, and 1 or 2 messengers. The principal assistant librarian took charge when the Librarian was away, and had more or less general supervision of the preparation of the *Index-Catalogue* (depending upon the amount of responsibility the librarian,

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the official editor, wished to delegate) In the 1890's an assistant librarian would replace the contract surgeon Of the clerks (class I, \$1,200, class II, \$1,400, class III, \$1,600, class IV, \$1,800), one had general charge of library operations, one handled accounts and correspondence, one was in charge of the reading room, one prepared volumes for binding, two (assisted by messengers) ran Library Hall, three accessioned and cataloged, four prepared copy for the *Index-Catalogue*, and five carded and indexed for the *Catalogue*

The number of readers each day or year is not known precisely Beginning in 1888 a register, in which visitors were asked to sign their names, lay open on a desk in Library Hall, but some visitors did not see it or ignored it ³⁷ Army and Navy medical officers, of which there were many, were not required to sign Some researchers and writers came to the Library every day for months but signed once or infrequently It was estimated that 5,000 readers used the collections each year

A visitor to the Library consulted the *Index-Catalogue* (and *Index Medicus* if need be) If absolutely necessary, with permission from the Librarian or principal assistant he could consult the card catalog into which indexers continually filed subject and author cards for the printing of future volumes of the *Index-Catalogue* ³⁸ The editors were reluctant to allow patrons to handle the cards for fear they might withdraw or misfile one After the visitor chose the titles he filled out a form for each volume he desired and handed it to the clerk A messenger located the volumes in the stacks and carried them to the patron Upon leaving the Library the reader returned the volumes and received the form Few books were stolen

Thomas S Cullen of Johns Hopkins, who visited the Library frequently, remembered the institution thus ³⁹

In January 1892 I became an intern in the Department of Gynaecology, under that wonderful surgeon, Howard Atwood Kelly Dr Kelly ran into many interesting and unusual cases and suggested that his assistants publish these

We adopted his suggestion and before long some of us found out that much time could be saved by running over to the Surgeon General's Library in Washington to look up the literature on a given subject The university had made an arrangement with the Baltimore and Ohio Railroad whereby the members of the hospital staff who desired to visit the Washington library could buy round trip tickets for a \$1 25 This was a great help to those of us who had little or no money Before the Washington Union Station was built, the B and O Station was about four squares further downtown and from there we easily reached the library which was then and still is at the corner of 7th and B In later years, many of us went by the Pennsylvania Railroad, got off at 6th street, left the station by the back way, walked across the lawn and in two or three minutes were at the library

Frequently, before going to Washington, we would consult the *Index-Catalogue* and later the *Index Medicus*, to see what had been written on a given subject Upon reaching the library, we would go to the reading room and write out on separate cards the books that we desired

Seated at a desk in the reading room was a frail looking man with curly white hair He had at one time edited a small paper in his home town and later came

to Washington and took charge of the reading room in the Surgeon General's Library Harry O Hall was one of the most accommodating men I have ever met and all of us who used the library had a very warm spot in our hearts for him

He would collect our cards, take them out and give them to the men in the stacks The majority of these men were old and rather feeble but they, too, rendered excellent service

We invariably went back to original sources, for example, if a man reported a case and then analyzed the records of twenty other cases, we just abstracted the case of the author in question and while doing this Mr Hall and his associates looked up the twenty articles referred to in the article we were studying In this way we were able to see the pictures accompanying each article and, at the same time, could draw our own conclusions as to the exact condition in each case

We of the medical profession owe much to those men who were so patient and who cooperated with us in every possible way

* * * * *

For years on one Saturday afternoon each year I would take over a Pennsylvania Railroad carload of fourth year students to the Surgeon General's Library Colonel John S Billings would then give us a clear picture of how the library started and of what it now contained, and would tell us how best to use the library No one else was better able to give us this information as it was Dr Billings himself who was largely responsible for this wonderful library

As in Ford's Theatre Billings would not permit patrons to roam the stacks of the new building His rules were posted for all to see ⁴⁰

No persons, except the employes of the Library, will be permitted to take down books from, or replace them on, the shelves

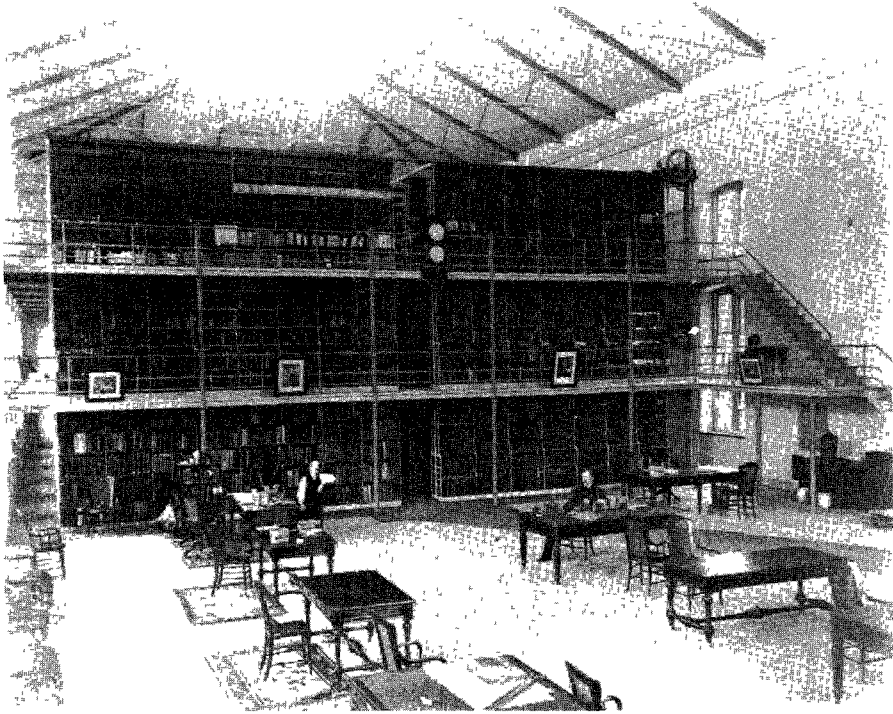
Whenever a book is taken from a shelf and is not to be immediately returned, a card must be put in its place showing where it has gone

All persons other than Library employes wishing to examine books on the shelves must apply to Dr Wise for permission, and will be accompanied either by Dr Wise or by one of the employes of the Library Hall while they are in the alcoves Such permission will be granted only in special cases and for good reasons Experience has shown that the allowing persons other than the Library employes to enter the alcoves gives rise to disarrangement of the books and to possible loss

For local readers who wished to borrow books, Billings posted another set of rules ⁴¹

The Library of the Surgeon General's Office, U S Army, is a reference, and not a lending Library To aid the researches of physicians residing at a distance, certain books are sometimes loaned for short periods, but, as a rule, it is expected that physicians residing in the District will consult the books which they wish to see at the Library itself, where every facility will be given them for that purpose Books will not be loaned to under-graduates in medicine Unbound books and pamphlets and common text books, manuals, and compends will not be loaned No book which cannot be readily replaced if lost or injured is to be loaned, and the Officer in charge of the Library is instructed to require in each case of loan a deposit of money amply sufficient to replace the book if lost or injured

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Library Hall on a quiet afternoon shortly after the building opened. At the desk on the left is Thomas Washington Wise, in charge of library operations. Working at a table on the right is John Shaw Billings. At the right end of the stacks is a dumb waiter, used to move books up or down.

Library Hall and the rest of the building were kept neat and tidy in contrast to later years when it became crowded, dirty, and run down. It was swept and dusted every day, and floors were mopped once a week. Spitting on the floor was forbidden; signs on the wall prohibited it. But spittoons were distributed liberally about the building until at least the World War I era, and janitors had orders to "wash all spittons in very hot water" every morning. Readers were permitted to smoke, although the staff objected to the leaving of smoldering cigars or cigarettes on tables instead of in ashtrays.

Billings, Fletcher. Wise or others had arranged exhibits at least occasionally on the crowded second floor of Ford's. Now with more space available they set up exhibits frequently, sometimes for national medical or scientific meetings, for commemorative or historical purposes, or on special occasions, as the display of the publications by and about Florence Nightingale following her death in 1910.⁴²

In Ford's Theatre the Library had been too crowded to be used as a hall for scientific and medical meetings, but the museum had served the purpose.

A HISTORY OF THE NATIONAL LIBRARY OF MEDICINE

On the evening of a meeting clerks pushed the moveable museum cases to the side, leaving a large open area in which they placed rows of chairs facing a table for the speaker. The Cosmos Club held its charter meeting there, the Chemical Society of Washington was organized in the building, and the Philosophical Society of Washington met there.

The new building was much more spacious than Ford's. Billings and his successors regarded the use of their facilities by societies as another service to the public. They were very liberal in granting permission for local and national groups to assemble there, among them the American Medical Association, Congress of American Physicians and Surgeons, Association of American Physicians, American Pediatric Society, and Medical Library Association.

The inaugural meeting may have been the Congress of Physicians and Surgeons in 1888. Billings presided over this gathering. His personal guest was an influential German physician Friedrich von Esmarch, whose wife was a princess. During a reception the princess asked one of the old retired soldier clerks, assisting with the refreshments, for champagne. The staff had only prepared nonalcoholic punch. The clerk sidled up to Fletcher and asked nervously, "Doctor, what shall I do, the Princess asked for champagne?" Fletcher whispered calmly, "Give the lady what we have, she will understand." And so she did.

THE FIRST INTRUDER IN THE LIBRARY-MUSEUM BUILDING THE ARMY MEDICAL SCHOOL

Billings expected that the new building would remain the uncluttered home of the Library and museum, with free space into which both units could expand in an orderly manner as time passed by. This is the way events proceeded until 1893. Then George M. Sternberg, one of the greatest and most productive American bacteriologists, was appointed Surgeon General. One of Sternberg's first acts was to establish a graduate school for new officers.

Aside from good reasons for instructing young officers in certain branches of medicine, Sternberg was probably permitted to set up this school because it did not cost the Army anything. He placed the school in the Library-Museum Building, obtaining instructional materials from Medical Department supplies, and appointed older, experienced officers as teachers. Two large rooms on the museum side of the building were converted into bacteriological and chemical laboratories, the museum specimens being placed in storerooms. Office space for the faculty was set aside in adjacent rooms. Instruction began in November 1893. The course was 4 months long. Walter Reed, curator of the museum, lectured on clinical and sanitary microscopy, Sternberg on bacteriology, Billings on military hygiene, Fletcher on medical jurisprudence, and several other officers on different subjects. This small, makeshift organization developed into an excellent school, the first school of public health and preventive medicine in the United States.

If the intrusion of the Army Medical School into the building had been

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temporary, the major tenants might not have suffered, but the school was to remain for a generation, eventually squeezing the Library and museum severely⁴³

BILLINGS LAST DAYS AT THE LIBRARY

In 1889 Henry C. Lea, a wealthy publisher and property owner of Philadelphia, listened to the persuasions of William Pepper, provost of the University of Pennsylvania, and promised to donate money for the erection of a laboratory of hygiene under certain conditions, these included the raising of an endowment by the university and the hiring of Billings to direct the laboratory. Pepper almost immediately rode the train to Washington and pressed Billings to accept the job, which Billings did under conditions.⁴⁴ The completion of the *Index-Catalogue* was one of Billings' goals and he would not leave Washington yet, but he agreed to resign from the Army, move to Philadelphia and join the university after it was finished. During the interval he would, if the Surgeon General permitted, plan the laboratory, direct the university hospital, and lecture on hygiene and vital statistics. The Surgeon General, almost always cooperative in the professional advancement of his colleagues, allowed Billings to assume these outside tasks.

The university appointed Billings director of the hospital as of January 1, 1890. Officers of the Army Medical Department and Public Health Service stationed in Washington occasionally taught in medical schools of the city, but Billings may have been unique in directing a hospital 125 miles away.

While Billings was being recruited by the University of Pennsylvania, the time approached when Surgeon General John Moore would reach the compulsory retirement age of 64. Prominent physicians urged President Harrison to appoint Billings to the post. Oliver Wendell Holmes told the President that Billings was "one of the very ablest men I have ever known in the medical profession," and S. Weir Mitchell called him "the most distinguished surgeon the Army medical corps has produced."⁴⁵

But Billings' opponent was Jedediah Baxter, slightly higher on the seniority list and, more importantly, a personal friend of the Secretary of War and physician to the President. Billings never had much of a chance. Baxter was appointed on August 16, 1890, the day Moore retired.

Baxter was only 53 and expected to be Surgeon-General for a long time, but he was felled by a stroke only 4 months later and died on December 2, 1890.⁴⁶ Billings' supporters again pushed his candidacy, but President Harrison looked at the seniority list and selected the ranking officer, Charles Sutherland.⁴⁷ This was the last time that Billings allowed physicians to mount a campaign to persuade a President to appoint him Surgeon General of the Army.

Billings began to lecture at the University of Pennsylvania in the autumn of 1891, and he planned the laboratory, which opened in February 1892.⁴⁸ Busy as he was with the Library and museum, editing the *Index-Catalogue* and *Index Medicus*, and engaging in other matters (as assisting the Census

Bureau with the census of 1890), he found time to direct investigations in the new laboratory⁴⁹ and plan the William Pepper laboratory for research in clinical medicine, opened in 1895.⁵⁰

In the spring of 1895 Billings finally finished his "labor of love," as he called the *Index-Catalogue*. Without the local fanfare or publicity that might be expected to accompany the departure of the department's most widely known officer, he relinquished control of the Library and Museum Division on August 20, 1895.⁵¹ He moved to Philadelphia and into a house he had purchased in the center of town on October 1, 1895, the day he retired from the Army.

Not long afterwards, a survey of 120 medical literature collections in the United States showed that the Surgeon General's Library had leaped ahead of all other medical libraries. It contained approximately 124,000 volumes and 210,000 pamphlets compared with the closest, the library of the College of Physicians in Philadelphia, started in 1788, with 54,000 volumes and 34,000 pamphlets, and the library of the New York Academy of Medicine, 1847, with 50,000 volumes and 15,000 pamphlets. Newberry, a general library in Chicago followed with 30,000 volumes and 25,000 pamphlets. The size of lesser libraries dropped rapidly with more than 90 percent having fewer than 10,000 volumes and more than half fewer than 3,000 volumes.⁵²

Before Billings arrived the Library had received an occasional gift or exchange. After 1871 gifts and exchanges had become commonplace. Statistics kept from 1886 onward show that from 5 percent to 50 percent of the books acquired annually were donated.⁵³ In 1895 it was estimated that one-sixth of the Library's books and pamphlets had been acquired by gift or exchange. By then the Library owned 73,475 books, 135,844 pamphlets, and 2,614 volumes of pamphlets, each volume containing several pamphlets;⁵⁴ Therefore, 11,912 books, 22,640 pamphlets, and 435 volumes of pamphlets had been acquired in these manners, assuming the same proportion of each. "There are few medical writers now living who have not sent to the library at least one pamphlet." Billings wrote in that year.⁵⁵

In a quarter century Billings had developed the largest medical library on the continent, perhaps in the world; had made it the most widely used library, available to tens of thousands of physicians; and had furnished guides, the *Index-Catalogue* and the *Index Medicus*, to the world's good medical writings. The SGL was the largest special research collection in the United States in any branch of learning, with possible exception of two or three libraries devoted to history. Billings had not done this without help; officers of the Medical Department had supported him, his co-workers in the Library had followed where he led, and Congress had provided him with more funds, up to \$10,000 a year for literature alone, than the trustees of any other medical library in the country gave their librarians. But Billings was the brain that directed the body, and without him the Library of the 1860's might have remained a small departmental collection used mainly by Army officers, and there might not have

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been finding aids comparable to the *Index-Catalogue* or *Index Medicus* until a later era.

*Expansion of the Library During the Billings Era
(Billings Became Librarian in the Fall of 1865)*

Date	Volumes	Pamphlets
October 23, 1865	2,282	
June 12, 1868	6,984	
June 30, 1871	"about" 14,000	
June 30, 1872	"about" 19,000	7,000
June 30, 1873	"about" 25,000	15,000
June 30, 1878	"about" 46,000	50,000
June 30, 1879	"about" 49,000	53,500
June 30, 1880	"about" 51,500	57,000
June 30, 1881	"about" 54,000	60,200
June 30, 1882	"about" 57,000	63,700
June 30, 1883	"about" 60,900	68,700

Date June 30	Bound Volumes				
	Journals	Transactions	Theses	Pamphlets	Books
1884	22,050	3,229	1,385	1,149	37,925
1885	23,039	3,440	1,385	1,213	43,412
1886	24,116	3,532	1,385	1,331	46,368
1887	25,337	3,649	1,385	1,562	53,192
1888	26,891	3,766	1,385	1,768	55,602
1889	28,009	3,981	1,531	1,818	58,612
1890	29,017	4,156	1,574	1,925	61,214
1891	30,048	4,305	1,574	2,039	64,003
1892	31,212	4,504	1,663	2,073	67,748
1893	32,215	4,699	1,663	2,258	69,818
1894	33,297	4,913	1,663	2,604	72,090
1895	34,345	5,067	1,762	2,614	73,475

Date June 30	Unbound Volumes		Total Volumes	Total Pamphlets
	Theses	Other Pamphlets		
1884	38,583	47,920	65,738	72,219
1885	40,524	55,399	72,719	95,923
1886	42,212	64,419	76,732	106,631
1887	45,279	74,374	85,165	119,653
1888	47,894	82,756	89,412	130,614
1889	49,785	91,199	93,951	140,984
1890	49,407	99,670	97,886	149,077
1891	50,801	104,520	101,969	155,321
1892	53,442	112,564	107,200	166,006
1893	53,693	119,137	110,653	173,100
1894	56,218	127,560	114,567	183,778
1895	57,187	135,844	117,263	193,031

Sources: Catalog of October 23, 1865, catalog of June 12, 1868; annual reports of the Surgeon General, 1872 to 1895.

BILLINGS DEVELOPS THE NEW YORK PUBLIC LIBRARY

As Billings' career in the Army was drawing to a close, the trustees of the recently founded John Crerar Library in Chicago were searching for a person to organize and develop an institution to be erected according to the provisions of Crerar's will. Francis A. Walker, president of Massachusetts Institute of Technology, recommended Billings as the⁵⁶

one man in the country who above all others has qualifications for the position easily the best medical bibliographer in the world one of our best men of science one of the most useful men living—practical, sensible, popular. To have such a man as Billings at the head of any great public library would command at once success in the very highest degree.

But Walker also stated that he assumed Billings was not available, and I doubt that Billings was made aware of the search being conducted for a librarian. If the trustees had approached him instead of accepting Walker's conclusion and passing him by, it is conceivable that Billings might have accepted and spent the last years of his life in Chicago.

As matters turned out, later that year, 1895, Billings was offered and he accepted the directorship of the New York Public Library system. The system had been created in the spring of 1895 through the merger of the Lenox and Astor libraries, and with funds from the Tilden Trust. A trustee, John Cadwalader, was the brother-in-law of S. Weir Mitchell, Billings' best friend. Mitchell told Cadwalader about Billings' abilities and achievements. In December 1895 the trustees listened to Cadwalader's recommendation of Billings and voted to hire him as director.

Billings had now been associated with the University of Pennsylvania for 5 years, and even though he liked his duties, he found, when he was offered the opportunity to resume library work, that he liked the latter more. He was embarrassed at leaving Philadelphia so soon after arriving, but he arranged with the university to remain until the end of the school year, June 1, 1896.

Billings was 58, at an age when many persons consider retiring, when he undertook the management of the complex, fragmented, sprawling New York City library system. As he had planned the building for the Medical Department's Library and Museum, so in 1897 he drew up a memorandum giving his conception of a central library building for New York, showing its dimensions, lighting, heating, ventilation, service facilities, rooms, book capacity, and estimate of cost. He made a rough drawing of the floor plan. Based on his ideas the present main building of the New York Public Library was erected between 1902 and 1911. And as he had done in the SGL, he devised a classification scheme to encompass the volumes in the reference department, formed by the union of the Astor and Lenox libraries, and had the volumes recataloged and rearranged on the shelves. He began a card catalog to encompass the holdings of all the separate libraries. As he had done in the SGL, he began the practice of indexing selected articles, taking home periodicals each night and checking articles for an indexer to catalog the next day. These subject cards

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were interspersed in the catalog and were very helpful to researchers in the humanities and social sciences, for at that time there were few published indexes to periodicals⁵⁷

On visits to Washington Billings stopped at the Library to see his old associates. He kept an eye out for publications the Library did not have,⁵⁸ he gave advice when asked for it, he initiated exchanges between the SGL and NYPL, and he used his influence on behalf of the Library when it was needed, as when there was talk of decreasing the congressional appropriation in 1901.

As in Washington, he became active in matters outside the NYPL. He was one of the incorporators of the Carnegie Institution in 1902 and was thereafter chairman of the board of trustees. He was associated with the medical statistics of the census in 1900 and 1910. He planned the Peter Bent Brigham Hospital in Boston, and advised the city of Memphis, Tennessee, on a new hospital. He wrote literary and professional articles. He presided over the American Library Association in 1902. He gave advice to libraries, among them a library in Tokyo and one at Harvard. He was one of the founders of the Charaka Club for history of medicine. He was one of the Committee of Fifty, for the investigation of the physiological effects of liquor.

One of the remarkable qualities of Billings is that he accomplished much of his work while in poor health. His health began to deteriorate when he was in his forties. He had neuritis in his right arm. He was operated upon five times for cancer of the lip. He had trouble with his teeth. He suffered from gallstones and underwent operations.⁵⁹ He never complained, not even his wife knew of some of his operations until he returned from the hospital. Fielding Garrison never heard him mention any of his operations, only a casual remark about a rib that he broke when he fell in a jolting railroad car.

On March 11, 1913, Billings died of pneumonia following an abdominal operation at New York Hospital. Three days later he was buried in Arlington Cemetery, where lay several of his associates from the Library and museum, among them his old friend and collaborator Robert Fletcher. Of all the good things said about Billings perhaps none was more accurate than the assessment by Garrison years later:⁶⁰ "Billings was unique in the Surgeon General's Library, but then, he was virtually an all-around superman, who has certainly had no equal."

Notes

¹ Oliver Wendell Holmes, Harvard President Charles Eliot, MIT President William B. Rogers, William Pepper, George E. Waring, Jr., S. Weir Mitchell, Justin Winsor, Henry Bowditch and other prominent persons urged President Arthur to appoint Billings to the post. Their letters and printed petitions signed by the faculties of Johns Hopkins, University of Virginia, and other persons are in NA, copies in MS/C/273.

² Draft letter Billings to Ezra M. Hunt, Oct. 13, 1883, MS/C/81.

³ Some of Billings' friends had printed an eight-page pamphlet "Brief upon the Surgeon Generalship of the Army," extolling Billings, and sent a copy to the White House. A copy of this pamphlet and letters to the President and the Secretary of War from influential physicians are in NA, copies in MS/C/273.

A HISTORY OF THE NATIONAL LIBRARY OF MEDICINE

⁴ Draft letter, Billings to Hunt, Oct 13, 1883 MS/C/81

⁵ Letter, Smith to Billings, May 25, 1882 NYPL, copy in MS/C/276

⁶ After Billings left the Medical Department in 1895 there were periods when the directorship of the Museum and Library Division was vested in one person and times when there were a curator and a librarian separately

The museum already had microscopes purchased for use by Woodward and other scientists. Billings began to purchase them for purposes of history

⁸ Letter, Murray to Secretary of War Dec 3, 1883, sending estimate of funds needed for building and a copy of pamphlet containing resolutions of the AMA. NA. The letter and pamphlet were printed in Senate Exec Doc 12, 48th Cong 1st sess

⁹ 48th Cong, 1st sess, Senate Exec Doc 12. This document contains letters of Murray, Lincoln, and the President, a reprint of Sen Exec Doc 65, 47th Cong, Bill H R 7681 and accompanying report 1895, 47th Cong, letter, from Gross, Flint, and Holmes to the AMA, along with the AMA resolution and memorial, and three architects' plans of the building

¹⁰ 48th Cong 1st sess, Bill S 403 Dec 5 1883 Bill H R 48 Dec 10, 1883, introduced by Rosecrans. A month later Rep Robert Davis introduced a similar bill, H R 2272, Jan 7 1884

¹¹ Letter, Billings to Cochran, Dec 22, 1883 MS/C/81

¹² Letters, Murray to Mahone, Dec 14, and to Stockslager Dec 28, 1883. NA. Inaugural address of Hutchins Feb 5, 1883 *Trans Med Soc State of New York*, 1884, p 11. Letters McGuire to Billings, Jan 14, 1884, Young to Sim, Jan 18, and Sim to Billings, May 27, 1884. Lyman to Billings, Feb 7, 1884, J V Ingham to Billings, n d, re Randall W W Watkins, St Louis, to Billings, Jan 18, 1884. Watson to Billings, sending preamble and resolutions, Apr 24, 1884. Hutchings to Billings, Jan 8, 1884 MS/C/1

¹³ Letter, Billings to Matthews, Mar 18, 1884 MS/C/81

¹⁴ Hawley's Bill S 403 was reported to the Senate May 28, 1884, and was amended and passed June 3 (*Congressional Record*, p 4603, 4766)

¹⁵ Letters, Hibberd to Billings, May 11, 1884, Henry C Lea to Billings, quoting Randall, June 7, 1884, Randall to Nebinger to H C Wood to Billings, June 14, 1884 MS/C/1

¹⁶ Letter, Lyman to Billings, Jan 14 1885 MS/C/1

¹⁷ Debate, *Congressional Record*, Feb 16, 1885, pp 1767-1770

¹⁸ Letter, Bayard to Mitchell, Feb 25, 1885 Billings papers, NYPL, copy in MS/C/276

¹⁹ Letters, Clarke to Mitchell, Feb 10, 1885, Randall to Gross, Feb 24, Randall to Lea, Feb 20 MS/C/1

²⁰ *Congressional Record*, Feb 26, 1885, p 2117, Mar 3, p 2569 48th Cong, 2d sess, Public Law 62, U S Statutes at Large, Ch 315

²¹ Letter, Secretary of the Smithsonian to Surg Gen Murray, records SGO, letters received, file 4938/1880, NA. *Washington Star*, Mar 26, 1885. This site had been recommended by Sen Morrill and other senators on the Committee on Public Buildings. *Congressional Record*, Feb 25, 1885, p 2117

²² *Washington Republican*, Aug 19, 1885

²³ Letter, Wilson to Surgeon General, June 18, 1887 with draft reply in Billings handwriting for the Surgeon General's signature. NA. The stacks were made by Phoenix Iron Works, with Billings supplying the blueprints. It has been said that these were the third metal stacks in the United States, preceded only by those in Boston Athenaeum and Harvard libraries

²⁴ There were at least 34 subcontracts according to a list in NA

²⁵ Details about the interior and exterior of the building, its dimensions and fixtures and uses of rooms may be found in "News Item," *Med News* 49 330-334 (Sept 18, 1886), with drawing of the building *Library J* 12 394 (1887) (information provided by Billings). "A Medical Palace," *New York Herald* June 30, 1889, copy in MS/C/47, Charles Smart, "The Army Medical Museum and the Library of the Surgeon General's Office" *Military Service Institution United States* 19 277-279 (1896), and *JAMA* 24 577-580 (1895). Joanna R N Kyle, "The Army Medical Library and Museum," *Godey's Mag* 136 408-418 (1898). *Amer Architect* Jan 16, 1886. Robert S Henry, *The Armed Forces Institute of Pathology*. Drawings and photographs are in MS/C/47. Three plates showing elevations and floor plans of the building are in 47th Cong, 1st sess, Sen Exec Doc 65, and in 48th Cong, 1st sess, Sen Exec Doc 12, copies in MS/C/47

In the museum letterbook for this period in Otis Archives, AMM, are many letters from Billings to merchants and manufacturers, asking for bids to supply furnishings for the new building. From the letters can be ascertained everything that was bought, from gas light fixtures to window shades

This was the first building in Washington designed specifically for library purposes

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²⁶ These fireplaces were used at least into the 1920's

²⁷ All of the furnishings of the building from awnings (26) to linoleum (744½ yards) to wheelbarrows (2) to ladders (31) were inventoried each year, 1887 to 1915 Inventories are in MS/C/307

²⁸ Draft letter, Surgeon General to Secretary of War, Sept 29, 1885 NA The letter was written by a clerk and changes are in Billings' handwriting

²⁹ A clerk with a sense of history noted in the margin of the accession book, "Register Catalogue of Books," No 10, p 296, "Aug 16/87 Dr B Com[enced] to move to new B[uilding]" Details of the move of the Library, Museum, and Pension and Record Division may be found in correspondence in letterbooks in Otis Archives, AMM

³⁰ "Register Catalogue of Books," No 10, p 297 "Aug 17th, 1887 The Force down to museum helping pack books, etc Aug 17th, 18th, & 19th "

A reporter's view of the move is in *Washington Evening Star*, Aug 20

³¹ "Register Catalogue of Books," No 10, p 306

³² A photo by Brady of the interior of the building in July 1893, after the collapse, is on p 76 of Olszewski, *Restoration of Ford's Theatre* From this photo a person may visualize the damage that would have been done to the Library had it remained in the building

³³ Fielding Garrison listed all groups and subgroups in "Classification and Arrangement of Books in the Library of the Surgeon General's Office," *Bull Assoc Med Librarians* 1 70-84 (1902)

³⁴ Letter, Billings to P C Fisher, Coll Phys, Phila, Nov 13, 1886 MS/C/81

³⁵ The system of indicating the location of a volume by case, shelf, tier, and sequence was apparently used in a number of libraries during this period See section "Shelf Marks" in *Public Libraries in the United States* (1876), pp 493-4

This system was described by F Garrison, "Classification and Arrangement of Books in the Library of the Surgeon General's Office," *Bull Assoc Med Librarians* 1 84 (1902) By the 1920's three numbers were used, for example, Sterility 3-1-8 indicated that the subject began in range 3, section 1, shelf 8 (see letter, Robert Austin to W Miles, Dec 30, 1978, and notebooks in NLM)

³⁶ Lists of all the furniture in the offices and other rooms may be found in annual inventories of the Museum and Library Division, 1887-1915

MS/C/307 Charles Smart, "The Army Medical Museum and Library of the Surgeon General's Office," *JAMA*, 24 577-80 (1895), has a somewhat detailed description of the building as of 1895

³⁷ The Library has few statistics on the number of readers before 1946 when the count began to be printed in annual reports The early registers are now in HMD Estimates may be found in questionnaires answered by the Librarian, such as questionnaire from Library University of Paris, Nov 1907 (MS/C/116) and answer, Nov 18 (MS/fB/101)

³⁸ The Library also had a file of author cards that had been printed in the *Index-Catalogue* Subject cards were thrown away when they were returned from the GPO as a precaution against their being inadvertently filed and printed again, but author cards were kept in one alphabetical file This file became quite large by 1916 it comprised 30 double drawers This file was a convenience for the editors, the public was expected to use the *Index-Catalogue*

³⁹ Thomas S Cullen, "Proposed New and Centrally located Surgeon General's Library Building," manuscript volume in NLM

⁴⁰ Rules dated May 2 1890, signed by Billings MS/C/81

⁴¹ Order, Apr 15, 1892 signed by Billings MS/C/81

⁴² A list of items in the Nightingale exhibit, Apr 16, 1910, is in MS/C/116

⁴³ An account of the development of the Army Medical School may be found in Henry *Armed Forces Institute of Pathology*

⁴⁴ Garrison, *Billings*, 278-9 Francis N Thorpe, *William Pepper* (1904) 132-140, 187, 295

⁴⁵ Letters, Holmes to President Harrison, July 24, 1890, Mitchell to C E Smith Mar 13, 1890 These and letters from other physicians, including one from retired Surg Gen Moore, are in the National Archives copies in MS/C/273

⁴⁶ A sketch of Baxter is in James E Pilcher, *The Surgeon Generals of the Army* (1905), p 74-78, and in James M Phalen, *Chiefs of the Medical Department* (1940) p 62-65

⁴⁷ A sketch of Sutherland is in Pilcher, p 79-82, and in Phalen, p 66-69 Letters sent by physicians recommending Billings for the post of Surgeon General are in the National Archives, copies in MS/C/273

⁴⁸ Billings, *The Objects, Plans, and Needs of the Laboratory of Hygiene*, an address, published as a pamphlet, delivered at the opening of the laboratory, Feb 22, 1892

⁴⁹ J H Wright, 'The Bacteria of River

Waters," *Mem Nat Acad Sci* 7 417-21 (1894)
 Billings and A W Peckham, "The Influence of Certain Agents in Destroying the Vitality of the Typhoid and Colon Bacillus," *Science*, n s 1 169-74 (1895)
 Billings, "The Influence of Light upon the Bacillus of Typhoid and the Colon Bacillus," *Mem Nat Acad Sci* 7 477-82 (1895)
 Billings, "On the Influence of Insolation upon Culture Media and of Desiccation upon the Vitality of the Bacillus of Typhoid, of the Colon Bacillus, and of the Staphylococcus Pyogenes Aureus," *Mem Nat Acad Sci* 7 483-4 (1894)
 Billings, S Weir Mitchell, D H Bergey, "The Composition of Expired Air and its Effects upon Animal Life," *Smithsonian Contributions to Knowledge*, 29 no 989, 1895

⁵⁰ Billings, *The William Pepper Laboratory of Clinical Medicine*, an address, published in a 15-page pamphlet, at the opening of the laboratory, Dec 4, 1895

⁵¹ In Army language Billings was relieved from duty as officer in charge of the Division by David Lowe Huntington on Aug 20, 1895, letter, Billings to Surgeon General Aug 20, 1895 NA, copy in MS/C/273

⁵² C D Spivak, "Medical Libraries of the United States," *Philadelphia Med J* 2 851-8 (1898)

⁵³ Annual reports of the Surgeon General The statistics also show that 75 percent of the pamphlets were donated, as well as many photographs and journals

⁵⁴ Statistics as of June 30, 1895, from *Annual Report of the Surgeon General*

⁵⁵ *Index-Catalogue*, vol 16, 1895, p [111]-114
 Billings said many times that donors would not be forgotten, and he had bookplates printed upon which the name of the benefactor could be written (a copy of the bookplate is in William Stokes "Lectures on the Theory and Practice of Physic," 1840, NLM call No WB/S874L/1840), but over the years many of the original bindings upon which the bookplates were pasted, and end papers upon which owners had written their names, were discarded during rebinding, and it is no longer possible to identify the names of many of the contributors

⁵⁶ Letter, Walker to trustees Crerar Lib, Feb 25, 1895, quoted in *The John Crerar Library 1895-1944*, by The Librarian [J Christian Bay], 1945, p 40

⁵⁷ Billings' contributions to the New York Public Library are just touched on here For details see the massive *History of the New York Public Library* by Harry M Lydenberg (1923), and *The New York Public Library*, Phyllis Dam (1972)

⁵⁸ "I transmit by this mail a package of medical dissertations which have just come to me

from the University of Berne and which are intended for the Library of the Surgeon General's Office It is my impression that I made an arrangement, when in Berne with Prof Kroecker, to have the dissertations furnished to the Library"; letter, Billings to W D McCaw, Dec 7, 1912 MS/C/116

⁵⁹ 'It appeared that on one of his trips from Washington to Baltimore to attend a meeting at the Johns Hopkins Hospital he felt an attack of what is called gallstone colic coming on At once, to the great amusement of the people in the car, he walked into the aisle and stood on his head, hoping by this way that the gravity of the calculus would force it back from the mouth of the duct', Henry C Yarrow, *Military Surgeon* 60 173 (1927)

⁶⁰ Letter, Garrison to Klebs, June 26, 1926 MS/C/166

Fielding Garrison wrote the following concise outline of Billings' career in a letter to William S Thayer of Johns Hopkins in 1927

During the decades 1880-1900, he was undoubtedly the leading American physician of his time, in respect of character, achievement and versatility, recognized as such in Europe, and Dr Welch pointed out at the New York memorial meeting in April, 1913, "The one most frequently sought for and chosen to represent this country in international medical congresses and occasions of importance His leadership was based upon intellectual power and above all upon strength and integrity of character He was a singularly wise man, combining with far-sighted vision critical judgment, the gift of persuasion and practical good sense' To this one might add a quite unexampled combination of physical, mental and moral courage

During his main period of activity (1865-95), he did more to elevate the status of American medicine than any other man of his time, by attacking the evil at the source, viz, the somewhat *mesquin* character of certain persons calling themselves physicians, who were permitted and authorized by law to pronounce upon causes of death and diagnoses of disease in reports of vital and medical statistics His constructive work in this direction was along the following lines

Building up of the Surgeon General's Library, Index Catalogue and (with Fletcher) Index Medicus

Management of the vital statistics of the 10th, 11th and 12th censuses of the United States, latter having been defined in Europe as 'worse than worthless' until Billings took hold of them

Reorganization of then Marine Hospital Service, at instance of Secretary of Treasury and with consent of Surgeon General and Adjutant General, during 1869-74 took it out of politics

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and gave it military organization (accountability and responsibility) The present U S Public Health Service is of course far beyond anything Billings ever dreamed of in scope and achievement, but the old Marine Hospital Service up to 1874 was mainly politics

Activities in public health via National Board of Health, American Public Health Association, U S Census, work as a heating and ventilating engineer and constructor of hospitals, planning and execution of Laboratory of Hygiene of University of Pennsylvania (1892), reports on barracks, hospitals and military hygiene (1870-75), plan for triangulating the entire United States as to sanitary defects by areas with a view to 'corrective action' in the military sense (1875)—an actual questionnaire of over 400 items, innumerable public addresses and papers, etc

Leadership in hospital construction via planning and construction of Barnes Hospital, Soldiers' Home, D C (1873), Johns Hopkins Hospital (1875-89), Peter Bent Brigham Hospital (1913) Also Army Medical Museum (1887), Laboratory of Hygiene (1892), William Pepper Laboratory of Clinical Medicine (1895) and New York Public Library (1911) Was entirely self-taught in the business and profited by some blunders made in war period 1861-5

Work for advancement of medical education via organization of medical faculty of Johns Hopkins Hospital, caustic criticism of status of Amer-

ican medical literature in 1876 (a Century of American Medicine), professorship of hygiene in Univ of Penna 1895 (a tactical blunder on his part, however), lectures on history of medicine (J H U), military hygiene (Army Medical School), public hygiene (supra), vital statistics (Cartwright lectures 1889), etc

Recognition as leader in later period via librarianship of New York Public Library (1896-1913), as trustee of Carnegie Institution of Washington, as secretary National Academy of Sciences, D C L from Oxford and similar degrees No American physician had been so signally honored prior to this time, although Benj Rush directed the mint, etc Selection of Billings to represent United States at International Medical Congress at London in 1881, Brit Med Assoc 1886, and Internat Med Congress, Berlin, 1891, suggests how far American medicine had risen in European esteem since the Centennial Year (1876) and that Billings was recognized in Europe as the prime mover Prior to 1866, Billings had been recognized in the Army and in Europe as one of the best military surgeons in the country (first surgeon in war to excise ankle joint, 1862 [Lister's excision of wrist 1865]) Billings wrote best history of surgery in English in 1895 (Dennis's System of Surgery) He was also recognized as an able military administrator and was a medical Inspector of the Army of the Potomac at end of Civil War