Embracing the Future as Stewards of the Past: Charting a Course Forward for Historical Medical Libraries and Archives

IN JUNE 2013, the American Academy of Arts and Sciences (AAAS) released *The Heart of the Matter*, a report on the continuing indispensable role of the humanities and social sciences in meeting major global challenges and urgent national goals. Commissioned by a bipartisan group of senators and representatives and involving more than fifty AAAS members from various sectors—including academia, business, government, the arts, and the media—the report called for renewed commitment to the humanities and social sciences. More specifically, it called for leadership collaborations across a wide array of sectors to meet the urgent goals of: educating Americans in the knowledge, skills, and understanding they will need to thrive in a twenty-first century democracy; fostering a society that is innovative, competitive, and strong; and equipping the nation for leadership in an interconnected world.

Significantly, in identifying these goals, the report acknowledged that they “cannot be achieved by science alone.” Moreover, it encouraged “all disciplines to address ‘Grand Challenges.’”²

The [AAAS] Commission [on the Humanities and Social Sciences] joins the National Academies’ National Research Council, the National Science

1. The Intramural Research Program of the U.S. National Institutes of Health, National Library of Medicine, supported the research for and writing of this essay, which was originally delivered at the 225th Anniversary celebration of the Historical Medical Library of The College of Physicians of Philadelphia, in December 2013. For their critical feedback on earlier versions of the final text, the author is especially grateful to Michelle DiMeo and Simon Chaplin, and to Joyce Backus, Brett Bobley, Kathel Dunn, David Gillikin, Stephen Greenberg, Betsy Humphreys, Ken Koyle, Jennifer Marill, Christie Mofatt, Beth Mullen, Michael North, Bernard Reznick, Mike Sappol, Brandy Schillace, Patricia Tuohy, and Rebecca Warlow.

2. American Academy of Arts & Sciences, Commission on the Humanities and Social Sciences, *The Heart of the Matter: The Humanities and Social Sciences for a Vibrant, Competitive, and Secure Nation*, available online at http://www.humanitiescommission.org/_pdf/hss_report.pdf [accessed August 11, 2014]. Similarly, see History of Science Society, *Report on Data Management and Data-Management Plans for the History of Science Society Committee on Research and the Profession* (September 6, 2013), 27–33, available online at <http://hssonline.org/wp-content/uploads/2014/04/Oct2013-Newsletter.pdf> [accessed August 11, 2014], which addresses how historians of science, as opposed to scientists in various disciplines, need to be represented in efforts to make decisions about the curation and retention of research data, using the context of the recent U.S. Federal government efforts to open up government-produced and government-funded research data.

Foundation, and the National Institutes of Health in recommending that foundations, universities, research centers, and government agencies draw in humanists and social scientists together with physical and biological scientists to address major global challenges. Humanists and social scientists are critical in providing cultural, historical, and ethical expertise and empirical analysis to efforts that address issues such as the provision of clean air and water, food, health, energy, and universal education.³

The recommendations of *The Heart of the Matter* and publications like it⁴ provide definition and scope to the “grand challenge” of historical medical libraries and archives: to be relevant and valuable in the digital age, and in so doing to help cheat their assumed demise. As a source for a range of disciplines and members of the interested public, historical medical libraries and archives are unique stewards of the past whose collections can speak directly to the temporal human condition. These institutions help to build bridges between disciplines and facilitate meaningful public dialogue about health and illness. The digital world holds the promise of broadening the roles of historical medical libraries and archives, but the success of these institutions in achieving this promise depends upon the ability of their leaders at all levels to navigate this world effectively and convey clearly the value of their collections (and related others) for research, education, and learning.

Drawing upon my experiences in the U.S. National Library of Medicine’s History of Medicine Division and in the national nonprofit sector, this essay suggests how historical medical libraries and archives can meet their own “grand challenge,” by demonstrating their fundamental relevance and value, by building and sustaining strategic partnerships, and by embracing the future in which their stewardship of the past will be essential for all the reasons suggested by *The Heart of the Matter*, and more.

Demonstrating Relevance and Value

Recent decades have seen stewardship of the past become a challenging enterprise. Economic pressures, political concerns, social expectations, and a variety of other factors influence not merely *how* individuals and communities remember the past but whether they do so at all.

These traditional factors have combined with technology to create both tremendous resources and profound challenges for stewardship of the past. The expanding digital world and commensurate cultural expectations are driving processes of learning about the past increasingly through virtual surrogates of physical material. In these

3. American Academy of Arts & Sciences, *The Heart of the Matter*, 11.

4. See, for example, *Humanities in the Twenty-First Century: Beyond Utility and Markets*, eds. Elenora Belfiore and Anna Upchurch (New York: Palgrave Macmillan, 2013).

processes, digital surrogates undoubtedly help us to see texts, images, and objects in new ways and in ways that might not otherwise be possible. They bring us to distant physical locations and enable us to see the uniqueness of objects with all of their exactitude. But herein are key challenges for historical medical libraries and archives in the digital age, and no less for other libraries, museums, and related cultural institutions: to produce and deliver digital surrogates from their physical collections, to preserve their digital surrogates and the originals from which they are created, to demonstrate the relevance and value of their physical collections through digital surrogates, *and*—due to the interconnectedness that defines the digital age—to demonstrate such relevance and value of digital surrogates created by others.

At the NLM, one of the most exquisite examples of this multifaceted challenge may be found in the papers of Marshall Nirenberg (1927–2010), the American biochemist and 1968 Nobel Laureate: among his papers are contiguous sheets of 8½" x 11" lab notebook paper on which Nirenberg wrote his notes with pencils and pens, attaching the pages together with cellophane tape (see figure 1). Here in this artifact is one of the first summaries of the genetic code, the very discovery of how sequences of DNA—known as “triplets”—direct the assembly of amino acids into the structural and functional proteins essential to life. This is an achievement that ranks with the work of American biologist James D. Watson and English physicist Francis Crick in our understanding of the genetic basis of life on earth.

GLU	SWNH2	GLY	HIS	PLEU	LEU	LYS	MET	PHE	PRO	SER	TR
.11	-.05	.90	-.03	0		-.11	.17	-.04	-.12	-.22	

Figure 1. Marshall W. Nirenberg, genetic code chart (detail). Laboratory Notes. January 18, 1965, Profiles in Science: The Marshall W. Nirenberg Papers, accessed April 14, 2014, <http://profiles.nlm.nih.gov/ps/access/JJBCCW.jpg>. The actual physical size of the original chart is 19.5" x 19.75." Courtesy of the U.S. National Library of Medicine.

The digital surrogate of Nirenberg's chart can undoubtedly circulate more widely than its original counterpart. And curated thoughtfully—with tools that offer the best possible means to tell its history and join it with related digital surrogates at the NLM and beyond—this surrogate can help to inspire scientists of today and tomorrow, either to *aspire* to be the next Marshall Nirenberg, or—more generally but no less importantly—to study the past in order to contribute to a meaningful future. Moreover, this curated surrogate can enable a diverse and wide audience to see up close and to appreciate the complex history that is embedded in its original counterpart. The folded creases convey the story of scientific discovery. They are the physical remnants of Nirenberg's intellectual labor and that of his research partners, as they carried the chart around the NIH campus in the early 1960s, adding to it and revising it as their research progressed. The fading handwriting in the chart and the discolored tape convey the story of knowledge literally disappearing from view. They are the results of chemicals in ink and adhesive reacting over time with the material of the document and its environment. This underlying story itself reveals the importance of conservation and preservation efforts to help ensure that millions—if not billions—of other twentieth-century documents composed with ballpoint pen ink will not be lost.⁵ And this story reminds us that, despite the wonders of technology to convey knowledge, the original material containing that knowledge can be ephemeral if not simply irreplaceable.

Admittedly, Nirenberg's chart is an exceptional case on the spectrum of historical medical collections, which spans from unique archives to relatively more common printed materials. In turn, this spectrum demands varied approaches to stewardship, from conservative efforts that reasonably restrict access for the sake of preservation to more liberal efforts that involve selection and deaccession to enable wide access. Historical medical libraries and archives must fulfill their stewardship on one end of this spectrum, by ensuring the persistence of selected physical creations of our predecessors—as they were originally created—and not merely by creating copies of these materials and releasing them into the world. And they must fulfill their stewardship on the other end of this spectrum, by helping to ensure the integration and interaction of the physical and digital worlds toward contextualizing them

5. Kristi Davenport and Holly Herro, "Preserving Nirenberg's Genetic Code Chart," *Circulating Now: From the Historical Collections of the World's Largest Biomedical Library*, September 16, 2014, available online at <http://circulatingnow.nlm.nih.gov/2014/09/16/preserving-nirenbergs-genetic-code-chart/> [accessed September 29, 2014]. See also Kristi Davenport, Peter Gabriele, Stephen Greenberg, Holly Herro, Christie Moffatt, Jeffrey S. Reznick, and Paul Theerman, "Preserving History at the National Library of Medicine," *George Mason University's History News Network*, May 30, 2011, available online at <http://hnn.us/article/139400> [accessed August 11, 2014].

and making them widely accessible in meaningful ways.⁶ Herein, historical medical libraries and archives can inform the gamut of issues and decisions involving collections located across the entire spectrum of historical medical collections, and especially those far opposite to Nirenberg's chart, such as monographs, medical journals, pamphlets, theses, and ephemera. Covering the sheer breadth and depth of the history of the human condition, originating from around the world, and spanning from the earliest recorded history to born-digital sources of last week—which are already “history” as the Internet expands each day—this multitude of far less famous artifacts of medical-cultural heritage holds both known and yet-to-be-known relevance and value for research, education, and learning about the human condition. Historical medical libraries and archives are therefore in unique—and, due to their heritage, substantially different⁷—positions to circulate these collections to the world, to preserve them for current and future generations, and to demonstrate their relevance and value as part and parcel of their own institutional significance.

One day, if the digital age continues on its present course, the majority of physical collections held by historical medical libraries could conceivably have digital surrogates circulating freely around the world. In this age, historical medical *libraries* must seize initiative by demonstrating their own relevance and value, or else they will find it increasingly challenging to *be* relevant and valuable in and for the future. Historical medical *archives* must seize initiative in a different way, by digitizing their unique collections to prevent them from becoming “invisible” and therefore deemed irrelevant and not valuable in and for the future.

So, as technology liberates the past in the present and for the future, historical medical libraries and archives are in a unique position to give this process meaning through their stewardship of both the physical and the digital, as well as their advocacy for professional training and cutting-edge resources in areas such as cataloging, description, and curation.⁸ Where will this future leave the combined digital-physical

6. The National Library of Medicine's Exhibition Program, and especially its Traveling Exhibition Service, has been especially effective in helping to make accessible and meaningful the historical collections of the NLM and hundreds of libraries and other institutions located in the United States and around the world. See Beth Auten, Hannah F. Norton, Michele R. Tennant, Mary E. Edwards, Nina Stoyan-Rosenzweig, and Matthew Daley, “Using NLM Exhibits and Events to Engage Library Users and Reach the Community,” *Medical Reference Services Quarterly* 32, no. 3 (2013): 266–89, available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3889132/> [accessed August 11, 2014]; and Bridget Faricy-Beredo, “Blowing Up Harry Potter: Leveraging an NLM Exhibition to Your Advantage,” *Public Services Quarterly* 9, no. 1 (2013): 34–45, available online at <http://www.tandfonline.com/doi/abs/10.1080/15228959.2013.758979> [accessed August 11, 2014].

7. Simon Chaplin, in his own contribution to this special issue, articulates these differences well.

8. Consider, for example, the initiatives of the National Digital Stewardship Alliance (NDSA), available online at <http://www.digitalpreservation.gov/nds/> [accessed August 11, 2014]; and the International Internet Preservation Consortium (IIPC), available online at <http://netpreserve.org/> [accessed August 11, 2014]; and especially the IIPC's excellent “Why Archive the Web?” video. See also Douglas Coupland, “The Clock Strikes 13 in the Archive World,” *Financial Times* (December 20, 2013), available online at <http://www.ft.com/cms/s/2/f293f01a-66af-11e3-8675-00144feabdc0.html#axzz32SFe4DNh> [accessed August 11, 2014].

world that contains our medical-cultural heritage? Only time will tell; and, as it does, we should embrace every opportunity—in cooperation with patrons, stakeholders, and the media—to demonstrate the relevance and value of historical medical collections, whether to scholarship, to education, or to advancing the greater good.

Building and Sustaining Strategic Partnerships

Hand-in-hand with demonstrating value in the enterprise of historical stewardship is building and sustaining mutually supportive partnerships with like-minded institutions. This effort has become everyday practice in the NLM's History of Medicine Division, especially during periods of constrained budgets that necessitate streamlined but no less impactful programs. Highlighting three of these partnerships—as they have been established formally through memoranda of understanding—reveals a combination of ideas that can be applied to strategic thinking and action in defining and advancing roles for historical medical libraries and archives in the digital age. They support a framework that charts a course for additional partnerships into the future.

Medical Heritage Library

In 2010, the NLM became a partner in a grant from the Alfred P. Sloan Foundation that helped establish the Medical Heritage Library (MHL), “a digital curation collaborative” intended to “promote free and open access to quality historical materials in the history of medicine.”⁹ Their goal is to “provide the means by which readers and scholars across a multitude of disciplines can examine the interrelated nature of medicine and society, both to inform contemporary medicine and strengthen understanding of the world in which we live.”¹⁰ This partnership enabled the NLM to achieve for its historical monographic collections what would have been exceedingly difficult at the time due to budget constraints in the federal government: establish a digital collection and digitization workflow through which the institution could contribute collections to the MHL and circulate them widely to the general public.

Success has followed the MHL, yielding an ever-rich resource for scholarly and popular audiences alike. The partnership has since received grants from the National Endowment for the Humanities (NEH) and the Council on Library and Information Resources (CLIR), the collaborative has grown to include eight partner institutions, and over a dozen additional institutions have contributed digital content, including libraries in Canada and England. And the MHL continues to grow: A U.K. consortium—led by the Wellcome Library—is expanding the number of actively contributing libraries, while strategic connections with other virtual col-

9. U.S. National Library of Medicine, “National Library of Medicine Receives Grant to Digitize ‘Medical Heritage’ Works Dating Back to 17th Century,” available online at http://www.nlm.nih.gov/news/digitize_grant.html [accessed August 11, 2014].

10. Medical Heritage Library, “About the Medical Heritage Library,” available online at <http://www.medicalheritage.org/about/> [accessed August 11, 2014].

laborations, like the Digital Public Library of America, are taking shape. Through these initiatives and others, the MHL will continue to be a key global resource for twenty-first century research, education, and learning.

National Endowment for the Humanities

Complementing both NEH and CLIR support of the MHL has been the NLM's own partnership with the NEH, which seeks to develop initiatives that join scholars, scientists, librarians, and health and cultural heritage professionals to share expertise and develop new research agendas for disciplines of the humanities and sciences, particularly around historical medical collections.¹¹

The first initiative of this NLM-NEH partnership focused on the relationship between the vast datasets maintained by the NLM and the NEH Digging into Data program of its Office of Digital Humanities, which is "designed to challenge the research community to help create the new research infrastructure for the twenty-first century [and] encourage the development and application of new techniques for searching, analyzing, and understanding large bodies of material."¹² In cooperation with the NEH, Maryland Institute for Technology in the Humanities of the University of Maryland, and Research Councils UK, the NLM cosponsored the April 2013 interdisciplinary symposium "Shared Horizons: Data, Biomedicine, and the Digital Humanities," which brought together researchers from the digital humanities and bioinformatics communities to explore collaboration, research methodologies, and the interpretation of evidence arising from the burgeoning area of "big data" and biomedical-driven humanities scholarship.¹³

11. U.S. National Library of Medicine, "NLM & National Endowment for the Humanities to Cooperate on Initiatives of Common Interest," available online at www.nlm.nih.gov/news/partnership_nlm_neh.html [accessed August 11, 2014], and National Endowment for the Humanities, "National Endowment for the Humanities and the National Library of Medicine to Partner on Research, Education, and Career Initiatives," available online at www.neh.gov/news/pressrelease/2012-06-20 [accessed August 11, 2014].

12. National Endowment for the Humanities, "NEH Announces the Winners of the 2013 Digging Into Data Challenge," available online at <http://www.neh.gov/news/press-release/2014-01-15> [accessed August 11, 2014]. Several studies offer useful background on the emerging relationship between "big data" and the humanities. See especially Matthew Kirschenbaum, "The Remaking of Reading: Data Mining and the Digital Humanities," available online at <http://www.csee.umbc.edu/~hillol/NGDM07/abstracts/talks/MKirschenbaum.pdf> [accessed August 11, 2014]. Significantly, this relationship has become the focus of intense media attention and debate. See, for example, Steve Lohr, "Dickens, Austen and Twain, Through a Digital Lens," *New York Times*, available online at http://www.nytimes.com/2013/01/27/technology/literary-history-seen-through-big-datas-lens.html?pagewanted=all&_r=0 [accessed August 11, 2014].

13. U.S. National Library of Medicine, "NLM to Participate with Partners in 'Shared Horizons: Data, Biomedicine, and the Digital Humanities' Symposium," available online at http://www.nlm.nih.gov/news/hmd_shared_horizons.html [accessed August 11, 2014]. See also Natalie Kornicks, "Shared Ideas at Shared Horizons," available online at <http://www.arhu.umd.edu/news/shared-ideas-shared-horizons> [accessed August 11, 2014]; and the presentations offered at the "Shared Horizons" symposium, which are available publicly at <http://mith.umd.edu/sharedhorizons/resources/> [accessed August 11, 2014]. Significantly, the partnership around "Shared Horizons" led to subsequent strategic cooperation involving the NEH-funded symposium entitled "An Epidemiology of Information: New Methods for Interpreting Disease and Data." See U.S. National Library of Medicine, "NLM to Participate with Partners in 'An Epidemiology of Information: New Methods for Interpreting Disease and Data,'" available online at http://www.nlm.nih.gov/news/epidemiology_of_information.html [accessed August 11, 2014]. The presentations offered at this symposium are publicly available at http://www.flu1918.lib.vt.edu/?page_id=82 [accessed August 11, 2014].

One of the NLM's key contributions to the "Shared Horizons" symposium was its release of the extensible markup language (XML) data from its internationally renowned IndexCat database, a resource consisting of millions of references from the printed, 61-volume *Index-Catalogue of the Library of the Surgeon-General's Office*, originally published from 1880 to 1961.¹⁴ The dataset describes items spanning five centuries—including millions of journal and newspaper articles, obituaries, and letters, hundreds of thousands of monographs and dissertations, and thousands of portraits—and covering a wide range of subjects such as the basic sciences, scientific research, civilian and military medicine, public health, and hospital administration. With this release, the NLM opened this key resource in the history of medicine and science to a new generation of creative and tech-savvy individuals, including those who gathered at the "Shared Horizons" symposium and many more around the world who are exploring historical and contemporary data for the benefit of research, education, and learning.

These collaborations, among many others being undertaken elsewhere, have helped to reveal how historical medical libraries and archives are themselves—both individually and together—rich repositories of quantitative and qualitative data that offer substantial value to "big" (and, in the future, bigger) data initiatives that are engaged in investigating the human condition as it has changed over time. Equally, these collaborations have helped to show that this "virtual" value augments that of the material original, since understanding and investigating the human dimensions of the latter—provenance, context, and curation—will remain integral to the success of any project using digital surrogates and "big data."

Wellcome Trust & Wellcome Library

As the MHL has become a key resource that unites disciplines of the humanities and social sciences around historical medical collections, the NLM's PubMed Central (PMC)—with its millions of full-text articles—has grown to become the world's premiere archive of biomedical and life sciences journal literature, including a substantial corpus of historical content that has been made available through partnerships between the NLM and the Wellcome Trust, the global charitable foundation based in the United Kingdom, and the Wellcome Library, one of the world's major resources for the study of medical history.

Formed in 2003–2004, the first partnership—which also involved the Joint Information Systems Committee (JISC)—yielded the availability of complete back issues covering nearly two hundred years—and over three million pages—of historically significant

14. U.S. National Library of Medicine, "NLM Releases Extensible Markup Language (XML) for IndexCat™ Data: Data Includes More than 3.7 Million Bibliographic Items Spanning Five Centuries," available online at http://www.nlm.nih.gov/news/indexcat_data_xml.html [accessed August 11, 2014].

biomedical journals. Significantly, publishers who agreed to participate in this initiative also agreed to continue to deposit current content of their journals (after a maximum embargo period of one year) into the PMC archive, thus helping to ensure that the scientific record of the present will be available for the future. A decade later—based on mutual success of the first engagement and mutual dedication to grow the historical content of PMC—the NLM and the Wellcome Trust and Wellcome Library came together again to support a second multiyear project to include historical back issues in PMC, concentrating on mental health journals and relevant others.¹⁵ This collaboration will grow the historical journal content of PMC by millions of articles, serving generations of researchers, educators, and students for decades to come.

In terms of their value for the future of historical medical libraries and archives, and no less the future of research, education, and learning around historical medical collections, these partnerships between the NLM and the Wellcome represent a growing climate of collaboration, along with the partnerships involving the MHL and the NEH. Together, they combine fundamentally to help insert historical medical material in mainstream research, teaching, and learning resources, making this material more discoverable, usable, valuable, and relevant.

Opportunities abound for historical medical libraries and archives to build and sustain their own partnerships—rooted in their own collections, resources, and programs—as means to advance their respective missions. Whether these partnerships are with units of their home institutions, with other local or regional institutions, or with national or global initiatives, such linkages enable all who are involved to speak to the value of their contributions and the benefits provided to their respective constituencies. The broader such linkages can be—the louder the chorus of mutually supportive institutional voices can be—the greater the value and relevance that can be conveyed through them.

Embracing the Future

During these early years of the twenty-first century, the many ways of discussing, studying, and learning about the past and the present are inextricably bound up with a persistent real world that coexists with an expanding digital realm that is rapidly changing the shape of human inquiry and the structures of human knowledge. The work of collecting, cataloging, preserving, curating, and making accessible for the future selected parts of the vast Internet brings this issue into sharp relief.

15. U.S. National Library of Medicine, “NLM and Wellcome Library Establish Agreement to Make 150 Years of Biomedical Journals Freely Available Online,” available online at http://www.nlm.nih.gov/news/welcome_library_agreement.html [accessed August 11, 2014], and Wellcome Library, “Wellcome Library and NLM establish agreement to make 150 years of biomedical journals freely available online,” available at <http://www.wellcome.ac.uk/News/Media-office/Press-releases/2014/WTP056252.htm> [accessed August 11, 2014].

As the Library of Congress has embarked upon collecting and preserving born-digital materials, including U.S. election websites and content on Twitter, the online social networking and microblogging service,¹⁶ the NLM has initiated collecting, preserving, and curating selected health and medicine-related blogs, based on the fact that in the current publishing environment there are important and insightful views on twenty-first century health care that are not reflected in traditional technical and scholarly literature. Blogs like *33 Charts: Medicine, Health and (Social) Media*, by a physician at Texas Children's Hospital, *e-patient Dave: A Voice of Patient Engagement*,¹⁷ by a cancer survivor and leader in the participatory medicine movement, and thousands of similar others fit in the long tradition of professional narratives, personal papers, and other technical health and medical information. These blogs may sometimes be less formal, but they are equally if not sometimes more insightful as they illustrate a diversity of philosophical and cultural perspectives related to human health and disease. Thus, their collection, preservation, and curation today—alongside “traditional” born-physical materials—will help to yield tomorrow's historical collections for research, education, and learning.¹⁸ As the NLM embarks upon this chapter in its twenty-first century history, it recognizes the complementary importance of historical medical libraries and archives: their own, interrelated physical and virtual collections—as well as their own blogs and other social media initiatives that relate to their interrelated collections—are and will remain a fundamental part of the continuum of the historical-medical record as it extends from the distant past to the present, and into the future. Without historical medical libraries and archives, the availability of that continuum—and the human experiences and knowledge therein—will be lost and so too will be substantial opportunities to advance research, teaching, and learning.¹⁹

16. Library of Congress, *Update on the Twitter Archive at the Library of Congress*, available online at http://www.loc.gov/today/pr/2013/files/twitter_report_2013jan.pdf [accessed March 24, 2014]; and “The Library of Congress Web Archives (LCWA),” available online at <http://lcweb2.loc.gov/diglib/lcwa/html/lcwa-home.html> [accessed June 9, 2014].

17. “33 Charts: Medicine. Health. (Social Media),” available online at <http://33charts.com/> [accessed August 11, 2014]; and “e-Patient Dave: A Voice of Patient Engagement,” available online at <http://www.epatientdave.com/> [accessed August 11, 2014].

18. Christie Moffatt and Jennifer Marill, “Case Study: Developing a ‘Health and Medicine Blogs’ Collection at the U.S. National Library of Medicine,” in *Science at Risk: Toward a National Strategy for Preserving Online Science*, a final report of the November 2012 National Digital Information Infrastructure and Preservation Program (NDIIPP) meeting of the same title, which focused on identifying valuable and at-risk science content on the open web, available online at <http://www.digitalpreservation.gov/meetings/documents/othermeetings/science-at-risk-NDIIPP-report-nov-2012.pdf> [accessed June 9, 2014]. See also Christopher Klose, “Health and Medicine Blogs Collection: A 21st Century Twist,” *NLM in Focus* (January 3, 2013), available online at <http://infocus.nlm.nih.gov/2013/01/what-wondrous-things-my-four.html> [accessed August 8, 2014].

19. “Only the Digital Dies: The Newest Technologies Look Most Likely to Vanish; the Oldest May Always Be with Us,” *The Economist* (January 26, 2013), 14, available online at <http://www.economist.com/news/leaders/21570728-newest-technologies-look-most-likely-vanish-oldest-may-always-be-us-only> [accessed August 11, 2014].

Fulfilling a mission of collecting and preserving the past demands that historical medical libraries and archives embrace the future. Waiting until the past is distant history is too late and puts these institutions at risk to be left behind as orphaned artifacts of a bygone era. Recalling a major chapter in the history of librarianship—involving John Shaw Billings, one of the most learned men of Gilded Age America—should offer inspiration to historical medical libraries and archives both to look and act ahead of the future that is unfolding.

Few nineteenth-century Americans loved libraries more than Billings, who was a bibliophile, self-taught librarian, and brilliant administrator, as well as a surgeon who served during the U.S. Civil War. After the war, the 27-year-old Billings became head of the Library of the Surgeon General's Office, the institutional predecessor of the NLM. The Surgeon General charged him with modernizing the library, handling its growing collections of medical books and journals from the Army's temporary hospitals (which closed at the end of Civil War hostilities), and acquiring new materials. Billings took on this charge with gusto, setting out to create a comprehensive library of medical materials through extensive and relentless correspondence with physicians, editors, health and government officials, librarians, and society officers to request donations, exchanges, and outright purchases. Billings also wrote to State Department officials traveling overseas, asking them to bring back foreign medical books and journals. As he wrote to Dr. A.W. Woodhull:

"...I write to ask your assistance in a matter which I have very much at heart and in which I hope you will take some interest. I am trying to form a great National Medical Library here—a work of great labor, which I am satisfied can only be done under Government Auspices. We have now about 18,000. vols [sic]—in iron shelves in the fireproof building of the Army Med Museum. Catalogued and open to the Profession—and it is now on a proper basis as the Medical Section of the National or Congressional Library. I want to make it as complete as it can be made..."

Billings was so dedicated to his quest to build a world-class library that Oliver Wendell Holmes Sr. noted he was "...a bibliophile of such eminence that I regard him as a positive danger to the owner of a library, if he is ever let loose in it alone."²⁰

Under Billings' stewardship, the library's roughly 2,300 medical volumes grew into a collection of some 124,000 bound volumes. By 1895, the Surgeon General's Library was the largest medical library in the Americas and possibly the world.

20. Richard R. Bowker, "Address," in "Memorial Meeting in Honor of Dr. John Shaw Billings," *Bulletin of the New York Public Library* 17 (1913): 524–25.

Billings' passion for librarianship went beyond the collection of books.²¹ He also introduced his own system of cataloging the library's collection. His two landmark indices began to appear in the late 1870s: the *Index-Catalogue of the Library of the Surgeon General's Office* and *Index Medicus*, the forerunner of MEDLINE—the benchmark bibliographic database of scientific journal articles focusing on medical science fields—which is the core of today's PubMed database of more than 24 million citations for biomedical literature from MEDLINE, life science journals, and online books. These resources created by Billings made the library internationally famous. Over one hundred years later, the NLM built on that legacy, first (in 2003–2004) developing and releasing the IndexCat database that encompasses the content of the *Index-Catalogue*, and then (in 2013) releasing the IndexCat XML data to help ensure that this information will continue to be available to new generations of users in the age of “big data” and ages of bigger data to come.

How can we apply the work and legacy of John Shaw Billings to chart emerging roles for historical medical libraries and archives and their value in the digital age? Just as Billings embraced the challenges of his physical world, historical medical libraries and archives should embrace the challenges of their digital world as it coexists with the physical. They should acknowledge and celebrate the fact that today these worlds together convey the full continuum of the medical experience, a continuum that deserves to be collected and preserved as a whole and made available as such for the future. At the risk of being accused of engaging in speculative history, but nonetheless as a means to offering a thoughtful way forward for historical medical libraries and archives, it could be argued that Billings would have likely appreciated the challenges and embrace of the digital future. His keen ability to collect information and his dedication to making that information accessible and useful would likely have prompted him to support many of the initiatives described in this essay and the overall need for historical medical libraries and archives to move strategically into the digital age. So, as Billings has been a seminal figure in the history of these institutions, he can and should be a seminal influence in seizing initiative to make their collections and programs relevant and valuable as they deserve to be for research, education, and the greater good.

Conclusion

For historical medical libraries and archives to survive and thrive in the future, their unique stewardship of medical-cultural heritage—collecting it, cataloging it, preserving it, curating it, making it accessible, as well as refining collection development and retention policies related to it—must become future-oriented in terms of

21. Stephen J. Greenberg and Patricia E. Gallagher, “The Great Contribution: Index Medicus, Index-Catalogue, and IndexCat,” *Journal of the Medical Library Association* 97, no. 2 (2009): 108–13, available online at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2670211/> [accessed August 8, 2014].

thinking, planning, and action. To be sure, each of these institutions lives in its own ecosystem that defines its current existence and possible future. At the same time, these institutions stand together—and alongside related heritage organizations—in the face of an overarching present and future that could well overtake them and their stewardship of history, as trends prompt blind embracing of the virtual world and foolish disregard of the physical one. How precisely historical medical libraries and archives will survive and thrive depends not upon technology, but upon informed and proactive leadership at all levels that can effectively navigate the digital world and corresponding factors of culture, economy, society, and politics. It is *because* historical medical libraries and archives are in one sense unique *and* face challenges similar to other nonmedical libraries or cultural memory institutions that their future deserves to be charted—and led thoughtfully—with an eye to the big picture that will ultimately determine their fate. This “grand challenge” for historical medical libraries and archives, and the outcome of their investment in facing it, will be a richer fabric of medical-cultural heritage for tomorrow, to be relevant to, valuable for, and valued by a wide audience, including scholars, educators, students, and the public. Indeed, if historical medical libraries and archives can successfully meet their “grand challenge,” they will be integral to the heart of the matter that involves every body—in every community and environment—that is revealed through historical medical collections of all kinds, stewarded by the NLM and by historical medical libraries and archives located around the world.

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