

Centenary of Index Medicus

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Billings and Before: Nineteenth Century Medical Bibliography

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This year we are celebrating the one hundredth anniversary of *Index Medicus*, one of the many accomplishments of that towering figure of nineteenth century American medicine, John Shaw Billings. He is not an unsung hero. His official biographer, Fielding H. Garrison; our former Director, Dr. Frank B. Rogers; and other admirers past and present have described his contributions to medical education, hospital design, medical statistics, and public hygiene, but it is the National Library of Medicine, the *Index-Catalogue*, and *Index Medicus* that always receive first recognition. These were the achievements that William H. Welch called "probably the most original and distinctive contribution of America to the medicine of the world."¹

The outlines of Billings's career are well known. He was born in 1838, received his B.A. degree from Miami University in 1857 and his M.D. from the Medical College of Ohio in 1860. In 1861 he joined the Union Army as a surgeon. After serving in the field with the Army of the Potomac, he was assigned to the Surgeon General's Office in Washington in December 1864. Unlike most soldiers, he stayed in the Army after the war was over. At first most of his work seems to have been pretty dull office routine, and one wonders what it was that motivated an experienced and talented surgeon to continue in this career, once patriotism no longer demanded it. Be that as it may, in the fall of 1865 he was placed in nominal charge of the small library in the Surgeon General's Office. Before long he began in his persistent, methodical, and dedicated way to build it up. Backed by Surgeon General Joseph K. Barnes, Billings was determined to create a "National Medical Library," and in fourteen years he turned a collection of less than 2,500 volumes into one of over 100,000.

As the Library grew, so did successive catalogues listing the holdings. In January 1874 Billings also began indexing the journals. By the summer of 1875 he had accumulated tens of thousands of cards. Those from "Aabec" to "Air" were arranged and sent off to the Government Printing Office for publication of a *Specimen Fasciculus of a Catalogue of the National Medical Library*. It set forth designs for a dictionary catalogue combining authors and subjects in one alphabet. Separate monographs were listed under both author and subject;

periodical articles were indexed under subject alone, but with a full citation. The object of the *Specimen Fasciculus*, Billings wrote, was "to show the character and scope of the collection, to obtain criticisms and suggestions as to the form of catalogue which will be most acceptable and useful, and to furnish data for the decision as to whether it is desirable that such a work should be printed and distributed."² The implications of the last phrase become apparent from the letter that accompanied sample copies sent to strategically placed physicians around the country. As Billings hoped and expected, they used their lobbying skills to help persuade Congress to appropriate the necessary funds to publish a full catalogue. In 1880 the *Index-Catalogue of the Library of the Surgeon General's Office, United States Army*, volume one, "A—Berliński," came off the press. When the first series was finally complete in 1895, it took sixteen volumes. It listed some 170,000 books and pamphlets under both author and subject and over 500,000 journal articles under subject alone.³ By any measure it was a stupendous achievement, carried through by Billings, his chief coadjutor Dr. Robert Fletcher, a few volunteer physician indexers and proofreaders, a handful of clerks, and hundreds of thousands of index cards.

Since the *Index-Catalogue*, for all its virtues, could not keep up with new information as it was published, *Index Medicus* was devised as a monthly periodical supplement, listing current books and journal articles in a classified subject arrangement. It was prepared under the editorial supervision of Billings and Fletcher as a by-product of the *Index-Catalogue*. With the permission of the Surgeon General, cards for current material prepared on official time for the *Index-Catalogue* were regularly copied by Library clerks in their off-duty hours and forwarded to the publisher, F. Leypoldt, in New York. The first issue was dated January 31, 1879. At the end of the year, an author index and an alphabetical subject index completed the volume.⁴ The subsequent history of *Index Medicus* is discussed by Dr. Frank B. Rogers elsewhere in this volume.

This bare recital of the creation of the Library, the *Index-Catalogue*, and *Index Medicus* inevitably raises the question, what impelled Billings to do it?

In answer, Garrison and others have regularly quoted Billings's remarks in a commencement-day address to the Society of the Alumni of the Ohio Medical College in 1888. In this speech Billings described how, in order to prepare his thesis for the M.D. degree, he had "ransacked" the libraries of Cincinnati and had had search made in New York, Philadelphia, and elsewhere to find certain data "in their original and authentic form." From this experience he concluded that it required a vast effort to search the individual indexes of thousands of books and

journals (implying that there was no other way to find desired references); that somewhere there existed "over 100,000 volumes of . . . medical books and journals, not counting pamphlets and reprints"; and that in the United States there was not even one "fairly good" medical library. It was this experience which led him, Billings wrote, when the opportunity arose after the war, to establish the Library and the *Index-Catalogue*.⁵

Historians are trained to receive with a certain skepticism the reminiscences of eminent men about their school days, and I believe this statement is worthy of some further examination. Billings's thesis was published in June 1861.⁶ It reported on various surgical operations that had been used for the treatment of epilepsy, the most common of which was trephination in cases when the disease had followed upon an injury to the head. After describing two cases that he had witnessed in the practice of his preceptor, Billings continued: "Dr. Stephen Smith, in a paper published on this subject in the *N. Y. Journal of Medicine* for March, 1852, has given a table of twenty-two cases, in which the operation was performed, all being more or less successful. I have examined the reports of a number of cases in addition to those mentioned by Dr. Smith, and a brief account of the whole is given in the following table."

This table, which is the most impressive part of the paper,⁷ includes citations to forty-seven different reports from the literature. A careful analysis suggests, however, that Billings probably derived eighteen of his citations from Smith's article and thirteen from Victor Bruns's *Handbuch der praktischen Chirurgie*, published in 1854. Four were from the great French *Dictionnaire des sciences médicales*, and six from standard English and American texts in surgery and neurology. In less than a dozen does he seem actually to have examined the original source. Moreover, three of the reports all refer to the same case and at least five cases are not relevant. Thirteen of the citations are seriously in error. Without undue research but with obviously greater resources, I have found an additional twenty-seven cases reported in the literature before 1860. Many were printed in foreign journals or buried in collections of case reports, but relevant articles were also published in the *American Medical Monthly*, New York, 1855; the *Medical Examiner*, Philadelphia, 1856; the *Transylvania Medical Journal*, Louisville, 1851; and, most surprisingly, the *Cincinnati Lancet and Observer*, 1858, in the very city where Billings was studying medicine and in the journal where he published his own review three years later.⁸ As Billings himself observed in a comparable situation, "when one calls attention to his own bibliographical work . . . , it is a sort of challenge which some carper and doubter is sure to take up sooner or later."⁹

My purpose in bringing this out is not to criticize Billings. In his thesis he did not disguise the fact that he had consulted Smith, Bruns, the *Dictionnaire*, and other textbooks, nor did he claim to have made an exhaustive search. His thesis was neither as accurate nor as original as Stephen Smith's paper of 1852, but for an American medical student of that era, it was a highly creditable job. It demonstrates his nascent bibliographic and scholarly interests and a considerable critical sense. It also foreshadows his factual and statistical approach to the solution of problems, his penchant for tabular analysis and display, and his interest in discrete clinical observations and case reports. Billings was to make his mark in fields requiring administrative ability and the organization and presentation of data collected from others rather than in original laboratory or clinical research. With the advantage of hindsight, it is these characteristics, as much as his interest in books and bibliography, that we can perceive in his thesis today.

It is difficult to believe, however, that his student experience provided the primary impetus to Billings's later career rather than an apt story on which to hang a speech to his fellow alumni, who had also been subjected to the "melancholy duty" of writing an inaugural thesis. It is doubtful, for example, that he searched quite as hard as he afterwards intimated. Some of the facts and conclusions presented in the address were probably not reached in 1860 but a good deal later,¹⁰ and others were no doubt exaggerated for effect.

One of these later exaggerations was the remark that there did not exist even one "fairly good" library in the United States. While the condition of American medical libraries was on the whole deplorable in 1860, this seems a rather severe characterization of the library of the Pennsylvania Hospital. It totaled nearly 11,000 volumes and comprised, in the words of Dr. Emil Fischer, who prepared its excellent catalogue of 1857, "a fair representative of medical standard literature, particularly in its English and French part. . . ." Its holdings included some 60 percent of the original sources of the reports listed in Billings's table.¹¹

A more significant exaggeration was the implication that to find the references on a particular subject one's only recourse was to examine the indexes of individual books and journals. Contemporary textbooks and dictionaries often provided an extensive bibliographic apparatus. Moreover, as Billings well knew, there were a number of useful bibliographies that existed in 1860. Their history has been set forth most fully by Dr. Estelle Brodman in *The Development of Medical Bibliography* (1954). It begins in 1506 with Symphorien Champier's *De Medicina Claris Scriptoribus*, a naive listing of only historical interest today. In successive decades and centuries others enlarged and refined the field of bibliography. By the 1700s these scholars had reached an

essential consensus on the primary elements to be used in describing books and had prepared bibliographies exhibiting a variety of approaches both by author and subject. Their work must even today command our admiration.

Two works available to the medical researcher of 1820 or later deserve especial mention. The first is Wilhelm Gottfried Ploucquet's *Literatura Medica Digesta*, four volumes and supplement, 1808-14. It is an admirably organized subject bibliography in which are indexed even individual case reports buried in large tomes containing hundreds of observations. The second is J. D. Reuss's *Repertorium*, sixteen volumes, 1801-21, a subject index of the transactions of learned societies of the seventeenth and eighteenth centuries. Seven volumes are devoted to medicine. Together these two still provide the best general subject approach to the medical literature published before 1800.¹²

As Ploucquet himself saw, however, the already rapidly expanding growth of the literature was making it increasingly difficult for a single individual to compile comprehensive retrospective subject bibliographies. One partial substitute was library catalogues, some of which were useful bibliographical tools quite apart from their function as guides to particular collections. The *Catalogue Raisonné of the Medical Library of the Pennsylvania Hospital*, published in 1857, is a good example.

Such catalogues listed serials by title only, and although Reuss's work demonstrated the value of a periodical index, others were slow to follow. The compilers of the *Catalogue Raisonné* of the library of the Royal Medical Society of Edinburgh in 1837 proposed in a future edition "to extend the present plan of the Catalogue, by incorporating with it many valuable papers on subjects connected with Medicine and the collateral Sciences, which are to be found scattered through the various British and Foreign periodical works in the possession of the Society," but nothing came of the plan.¹³ In his annual report for 1851, Joseph Henry, Secretary of the Smithsonian Institution, called attention to the fact that "about twenty thousand volumes . . . purporting to be additions to the sum of human knowledge, are published annually; and unless this mass be properly arranged, and the means furnished by which its contents may be ascertained, literature and science will be overwhelmed by their own unwieldy bulk. . . . One of the most important means of facilitating the use of libraries," he continued, "particularly with reference to science, is well-digested indexes of subjects, not merely referring to volumes or books, but to memoirs, papers, and parts of scientific transactions and systematic works." Eventually Henry's suggestion bore fruit in the Royal Society of London's *Catalogue of Scientific Papers*, a retrospective author bibliography of articles in scientific jour-

nals and transactions. The first series, covering literature published from 1800 through 1863, came out in six volumes from 1867 to 1872. In time the *Catalogue* was continued in subsequent series to 1900, but the promised subject index did not begin to come out until 1908, and it was never completed.¹⁴

The idea of publishing an index to periodical literature thus was not new in 1870. William F. Poole had in fact issued the first edition of his index to general periodical literature in the English language in 1848 and a second, greatly enlarged edition in 1853. Dr. Joseph M. Toner of Washington had already started indexing American medical journals when Billings also started indexing in 1874, and for that reason Billings at first planned to index only the foreign ones.¹⁵ There was, however, no comprehensive subject index to the medical literature of the nineteenth century. It was this void that the *Index-Catalogue* would attempt to fill.

The planned *Index-Catalogue* foreseen in the *Specimen Fasciculus* could not solve all problems of medical bibliography. Medical science was changing at an ever quickening pace in the nineteenth century, and it seemed increasingly important to have the latest information rapidly at the same time that the expanding amount of information—or at least of publication—made it even more difficult to keep up. One potential solution to this bibliographic impasse was to cut back on the amount of literature covered by selecting critically the best material on a subject and eliminating the rest. Another method was to include only recent literature, allowing the searcher to rely on earlier bibliographies for past works. Both principles are exemplified in review and abstract journals, which began to appear in the eighteenth century. As the editors of *Medical and Philosophical Commentaries* wrote in 1773, review journals were intended to give “a summary view of all the best medical books, and of all the remarkable medical papers contained in the transactions of public societies, as soon after these publications shall appear, as the nature of the work here proposed will allow.”¹⁶

As the nineteenth century advanced, abstract journals were developed notably by the Germans, who became leaders not only in laboratory research but also in bibliography. Curiously, Billings does not seem to have rated them very highly. In his 1876 paper on medical libraries published in a thick centennial volume on *Public Libraries in the United States*, he listed several library catalogues, Haller, Ploucquet, Reuss, Callisen, Pauly, and the Royal Society’s *Catalogue of Scientific Papers* (all of which were comprehensive bibliographies covering many years rather than guides to current literature) as especially useful for reference in medical bibliography, but he did not list a single German abstract journal. Although several contributors to the volume expressed great interest in periodical indexes, only Dr. Theodore Gill, of the

Smithsonian Institution, in his paper on "Scientific Libraries in the United States," gave credit to the abstract journals, which he justly described as "among the most important and really indispensable works of reference for the scientific investigator. . . ." ¹⁷ Even these, however, did not provide a comprehensive index to current publications. It was this gap that *Index Medicus* was intended to fill.

As the centennial volume just quoted makes clear, the world of libraries and bibliography was in ferment in the 1870s. The remarkable thing about the *Index-Catalogue*, I believe, is not that Billings had the idea of producing it, for the need was not hard to perceive, but that, having perceived it, he had the courage to undertake this monumental task along with all his other duties and the determination and ability to carry it through, with the aid of Fletcher, to a magnificently successful conclusion.

The origin of *Index Medicus* is not so clear. Garrison and other biographers have regularly credited Billings and Fletcher, apparently assuming that the conception was theirs. *Index Medicus*, however, was published by the firm of F. Leypoldt in New York. Frederick Leypoldt was born in Germany in 1835, emigrated to the United States some twenty years later, worked first for a bookseller, and later went into publishing. In 1868 he started the *Literary Bulletin*, a monthly record of current foreign and American books, and in 1869 *The American Catalogue of Books*, an annual, which soon evolved into, respectively, *The Publishers' Weekly* and *The Publishers' Trade List Annual*. In the latter Leypoldt provided a special index of medical books as early as 1875. In 1876 Leypoldt participated actively in the organization of the American Library Association and began publishing the *American Library Journal*. Thus he had already established the nation's leading periodical guides to current books and a number of other bibliographical publications when he and Billings found common meeting ground at the ALA. His biographer, associate, and friend, Adolf Growoll, has written:

In 1879 Leypoldt, desiring to carry his bibliographical enterprise into fresh fields, projected the *Index Medicus*, a monthly key to medical books and periodicals, which should be a periodical supplement to the great "Index Catalogue of the Library of the Surgeon-General's Office United States Army," by Dr. John S. Billings, now of the New York Public Library, Astor, Lenox, and Tilden Foundations. Fearing that his friends and associates would be inclined to persuade him from new ventures, he kept his plans quiet until they were nearly ready for the launch. Dr. Billings and Dr. Robert Fletcher undertook the editorship, and the work proved professionally very valuable. But its too sanguine projector lost over \$5000 by it, just as the skies were clearing for him, and for some years it was continued only as a labor of love, under certain guarantees from the profession. ¹⁸

In the "Prospectus" to *Index Medicus* which Billings wrote in November 1878, after briefly describing the proposed *Index-Catalogue*, he stated:

It has often been suggested that it is highly desirable that such a Catalogue should be supplemented by some current publication, which should show all recent works, together with articles in periodicals, *arranged by subjects*, but until quite lately no proper means have been available for such an undertaking. Now, however, Mr. F. Leypoldt, of New York, proposes to undertake the publication of such a current medical bibliographical serial, upon the condition that the manuscript for it be furnished of the requisite completeness and accuracy, and this last I have undertaken to supply, so far as the means of information at my command will permit.¹⁹

Whether the initiative came from Billings or Leypoldt cannot now be determined. The idea of a periodical medical index may well have germinated, as Billings implied, in a number of minds.²⁰ Billings and Fletcher, however, were responsible for the editorial design and content of *Index Medicus*. Certain it is that without their efforts and without the opportunity to tie in the preparation of copy for the publisher with the acquisition and indexing program already established at the Library, *Index Medicus* would not then have been possible. The opportunity to use *Index Medicus* to enhance the Library's acquisitions was a further inducement to Billings. But in our admiration for Billings's contributions, we should not overlook the fact that neither would it have been possible without the participation and support of Leypoldt, who continued publishing *Index Medicus* until his death in 1884.

We all know, or think we know, that the *Index-Catalogue* and *Index Medicus* are a monumental work. But how well, really, did they fill existing bibliographic gaps? To test this in a small way, let us return to the principal subject of Billings's thesis, the treatment of epilepsy by trephination. Altogether, using a variety of bibliographic sources in a search that was by no means exhaustive, I have found twelve relevant reports published before 1812, of which six are in Ploucquet and two in the *Index-Catalogue*. For the period from 1812 through 1850, I have citations to thirty-seven reports, of which nine have been found in one or another abstract journal, and seventeen in the *Index-Catalogue*. For 1851 through 1860, I have citations to sixteen reports, of which only two have been found in abstract journals, while fourteen are in the *Index-Catalogue*. Thus for the earlier years, when most of the reports are buried in monographs, Ploucquet outperforms the *Index-Catalogue*, as expected; for later years, the *Index-Catalogue* clearly outperforms the abstract journals, not only in ease of use for retrospective searching but also in extent of coverage.²¹

A comparison of *Index Medicus* for 1879 with the abstract journals reveals similar results. For example, the two major German abstract and review journals, *Schmidt's Jahrbücher der in- und ausländischen gesammten Medicin* and *Jahresbericht über die Leistungen und Fortschritte in der gesammten Medicin*, have about 10,000 citations each. The major French abstract journal, *Revue des sciences médicales en France et à l'étranger*, has about 7,000. Several additional German and French specialty abstract journals average around 1,000 citations each. No comparable English-language publication existed. Braithwaite's *Retrospect of Practical Medicine and Surgery* for 1879, an English abstract journal reprinted in New York, had only 261 abstracts, nearly all from British journals. The Philadelphia *Monthly Abstract of Medical Science* had about 500 a year and the *Half-Yearly Compendium of Medical Science*, also published in Philadelphia, 417. The first volume of *Index Medicus*, in contrast, lists some 24,000 citations to books and journal articles, nearly two and a half times as many as its nearest rival. From a half-dozen German abstract journals it was possible to cull two citations on trephination in the treatment of epilepsy published in 1879; from *Index Medicus*, five. One cannot get from *Index Medicus* anything comparable to the half-page abstract of the most important article which was provided by the *Centralblatt für Chirurgie*, but for extent of coverage combined with bibliographical accuracy and timeliness, *Index Medicus* established itself with the first issue as supreme.²²

Even in this year of its centenary, one cannot discuss the founding of *Index Medicus* without linking it to the *Index-Catalogue*. In Billings's day, the latter overshadowed its companion. As Sir William Osler wrote in 1913,

No undertaking in bibliography of the same magnitude dealing with a special subject had ever been issued, and its extraordinary value was at once appreciated all over the world. . . .

In 1879 a monthly supplement to the "Index Catalogue" was begun as the "Index Medicus," a publication of the greatest value to students, which is now continued by the Carnegie Institution of Washington. There is no better float through posterity than to be the author of a good bibliography. . . . A hundred consult Haller's bibliographies for one that looks at his other works, and years after the iniquity of oblivion has covered Dr. Billings' work in the army, as an organizer in connection with hospitals, and even his relation to the great Library, the great Index will remain an enduring monument to his fame.²³

Since 1913 the *Index-Catalogue* has perforce been discontinued, while *Index Medicus* has grown mightily and produced its own vigorous offspring. Despite Osler's prediction, the National Library of Medicine, as it now is, has outstripped the *Index-Catalogue* at least in current fame. But the creation of this Library as well as its bibliographic tradition was

also part of Billings's conception and achievement. Harking back again to his thesis as our touchstone, I can tell you that out of the forty-five original reports of the cases listed in Billings's table on the treatment of epilepsy by trephination going back to the seventeenth century, in German, French, Italian, English, Irish, and American sources, it is now possible to track down and verify in this Library all but one.

Notes

1. The principal biography is Fielding H. Garrison, *John Shaw Billings, a Memoir* (New York: G. P. Putnam's Sons, 1915). Other accounts of Billings's life and of the history of the National Library of Medicine are listed in Frank B. Rogers, ed., *Selected Papers of John Shaw Billings* (Baltimore: Medical Library Association, 1965), pp. 11-13, and Manfred J. Wasserman, "Historical Chronology and Selected Bibliography Relating to the National Library of Medicine," *Bulletin of the Medical Library Association*, 60 (1972): 551-58. The quotation from Welch is in *Memorial Meeting in Honor of the Late Dr. John Shaw Billings, April 25, 1913* (New York: New York Public Library, 1913; reprinted from its *Bulletin*), p. 10.

2. U.S. Army, Surgeon General's Office, *Specimen Fasciculus of a Catalogue of the National Medical Library* (Washington, 1876), p. iii.

3. Precise statistical details are given volume by volume in a table in *Index-Catalogue of the Library of the Surgeon-General's Office, United States Army*, [1st ser.], 16 vols. (Washington, 1880-95), 16:iii.

4. In addition to works referred to in note 1, I have had the benefit of using the draft manuscript of a history of the Library which Wyndham Miles is preparing for publication.

5. J. S. Billings, "The Medical College of Ohio before the War," *Cincinnati Lancet-Clinic*, n.s. 20 (1888): 297. For use of the passage, see, for example, Garrison, *John Shaw Billings*, pp. 14-16; Harry Miller Lydenberg, *John Shaw Billings* (Chicago: American Library Association, 1924), pp. 14-16; Estelle Brodman, *The Development of Medical Bibliography* (Baltimore: Medical Library Association, 1954), pp. 111-12; Rogers, *Selected Papers*, pp. 4-5.

6. J. S. Billings, "The Surgical Treatment of Epilepsy," *Cincinnati Lancet and Observer*, n.s. 4 (1861): 334-41.

7. The trephination table was reprinted in "Surgical Treatment of Epilepsy," *American Journal of the Medical Sciences*, n.s. 42 (1861): 299; and in *Half-Yearly Abstract of the Medical Sciences* (London), 34 (1861): 58-59. Billings's work was referred to in at least two review articles, James Russell, "Trephining for the Relief of Epileptiform Attacks, Occurring after Injury to the Head," *British Medical Journal*, 1865, 1:610; and M. G. Echeverria, "De la trépanation dans l'épilepsie par traumatismes du crâne," *Archives générales de médecine*, 7th ser. 2 (1878): 652-53. It has recently been examined from the viewpoint of the history of surgery in John D. French and Louise Darling, "The Surgical Treatment of Epilepsy in 1861," *Journal of the International College of Surgeons*, 34 (1960): 685-91.

8. See Appendix.

9. J. S. Billings, "Medical Bibliography" (1883), in Rogers, *Selected Papers*, p. 157.

10. With respect to Billings's conclusion on the size of the medical literature, it may be noted that in his address, "Our Medical Literature" (1881), he estimated that it now formed "a little over 120,000 volumes properly so called," excluding pamphlets. Rogers, *Selected Papers*, p. 116. Brodman, *Development of Medical Bibliography*, p. 111n, suggests that the

actual figure for the size of the literature in 1860 was probably considerably higher. As of June 30, 1888, the Library's collection totaled 86,259 bound volumes, excluding pamphlets and theses. Miles, *History*, chap. 10, citing annual reports of the Surgeon General. The argument that it would not be possible in American libraries to verify references given by European authors appears in another form in the unsigned "Memorandum," no doubt by Billings, that heads the 1872 *Catalogue of the Library*.

11. Emil Fischer, *Catalogue Raisonné of the Medical Library of the Pennsylvania Hospital* (Philadelphia, 1857), p. v. Forty-two of the original sources of reports listed in Billings's table were published before 1857; twenty-five of them are listed in the catalogue. For brief descriptions of this and other medical libraries in the United States, see William J. Rhees, *Manual of Public Libraries, Institutions, and Societies, in the United States, and British Provinces of North America* (Philadelphia, 1859). The library of the Medical College of Ohio, with about 2,000 volumes, was stagnant, and Daniel Drake's efforts to establish a medical library in Cincinnati in 1851 had collapsed soon after his death in 1852. See his *Discourses Delivered by Appointment, before the Cincinnati Medical Library Association, January 9th and 10th, 1852* (Cincinnati, 1852), pp. 62-65, 88-93; Otto Juettner, 1785-1909. *Daniel Drake and His Followers* (Cincinnati: Harvey Publishing Co., 1909), pp. 442-43; Charles A. Isetts, "The History of Medical Libraries in Cincinnati," *Cincinnati Historical Society Bulletin*, in press. However, Reuben D. Mussey of Cincinnati is reported to have had an excellent private medical library to which Billings would probably have had access. Private communication from Dr. Isetts, Head, History of the Health Sciences Library and Museum, University of Cincinnati, who is preparing a catalogue of the Mussey collection.

12. Billings acknowledged their value in "Medical Libraries in the United States" (1876), noting that "It would not probably be desirable to extend an index of these [medical journals] farther back than 1800, as the works of Ploucquet and Reuss fairly cover all medical periodical literature of any importance prior to that date." Rogers, *Selected Papers*, p. 83.

13. *Catalogue Raisonné; or, Classified Arrangement of the Books in the Library of the Medical Society of Edinburgh* (Edinburgh, 1837), p. iv. Billings referred to this plan in "Medical Libraries in the United States" (1876; Rogers, *Selected Papers*, pp. 83-84), citing Professor Maclagan in "Edinburgh Medical Journal, January, 1873 [*sic*; actually 1875], p. 585." Maclagan's article was printed after Billings began indexing journals, not before, as the incorrect date in the citation would suggest.

14. Brodman, *Development of Medical Bibliography*, pp. 93-104.

15. J. S. Billings, "Medical Libraries in the United States" (1876), in Rogers, *Selected Papers*, p. 82. Toner was unable to find a publisher for his index. For his many contributions to medical libraries, bibliography, and history, see Whitfield J. Bell, Jr., "Joseph M. Toner (1825-1896) as a Medical Historian," *Bulletin of the History of Medicine*, 47 (1973): 1-24.

16. *Medical and Philosophical Commentaries*, 1, pt. 1, 2d ed. (London, 1774): 9. For the development of abstract and review journals and indexes to 1790, see David A. Kronick, *A History of Scientific and Technical Periodicals: The Origins and Development of the Scientific and Technical Press, 1665-1790*, 2d ed. (Metuchen, N.J.: Scarecrow Press, 1976), pp. 171-201, 259-77; for subsequent development, see Bruce M. Manzer, *The Abstract Journal, 1790-1920: Origin, Development and Diffusion* (Metuchen, N.J.: Scarecrow Press, 1977).

17. J. S. Billings, "Medical Libraries in the United States," in U.S. Bureau of Education, *Public Libraries in the United States of America; Their History, Condition, and Management*, pt. 1 (Washington, 1876), pp. 181-82; Theodore Gill, "Scientific Libraries in the United States," in *ibid.*, pp. 188-214.

18. Adolf Growoll, *Book Trade Bibliography in the United States in the Nineteenth Century* (1898; reprint ed., New York: Burt Franklin, [1965?]), pp. lxxvii-lxxviii (quotation p. lxxvii); Jay W. Beswick, *The Work of Frederick Leyboldt, Bibliographer and Publisher* (New York: R. R. Bowker, 1942), pp. 5-64. I am indebted to Dr. Genevieve Miller for bringing Growoll's work to my attention.

19. *Index Medicus*, 1, no. 1 (Jan. 31, 1879): 2.

20. For example, William D. Chapin, compiler of an annual *Index to Original Communications in the Medical Journals of the United States and Canada* (New York) for 1877 and 1878. It lasted only two years, indexing 65 journals the first year and 69 the second.

21. For the period before 1812 (the cutoff for Ploucquet), Bruns has 10 and Billings 9 of the 12 reports; for 1812–50 (which is as late as the coverage of Bruns and Smith extends) they have 27 and Billings 28 of the 37 reports; for 1851–60, Billings has only 4 out of the 16 reports. This further emphasizes Billings's reliance on Bruns and Smith, but also shows that good investigators with reasonable library facilities, aided by earlier bibliographies (Bruns took many of his citations from earlier compilations, abstract journals, etc., which he scrupulously noted) could outperform even the *Index-Catalogue*. Bibliographies can greatly aid but not completely replace the investigator's own imaginative research in the literature.

22. The five citations listed in *Index Medicus* are: (1) J. F. West, "Trephining for Epilepsy," *British Medical Journal*, 1879, 1:291; (2) idem, "Epilepsy Cured by Trephining," *Birmingham Medical Review*, 8 (1879): 200; (3) idem, "Trephining for Traumatic Epilepsy," *British Medical Journal*, 1879, 2:865–66; (4) idem, "Trephining for Traumatic Epilepsy," *Lancet*, 1879, 2:798–800; (5) Charles O'Leary, "Trephining in Epilepsy," *Transactions of the Rhode Island Medical Society*, 2, pt. 2 (1878/79): 95–106. The first two are brief reports of a case presented to the meeting of the Birmingham and Midland Counties Branch of the British Medical Association on January 9, 1879, and are essentially identical. The second two, also essentially the same, report a more extensive account and discussion of the same case presented to the Royal Medical and Chirurgical Society on November 25, 1879. The reader who has seen (3) or (4) will learn nothing new from the other reports by West. O'Leary's paper presents a case in his practice and a discursive discussion of the subject generally, much of it cribbed from Billings's article.

Citation (3) is also found in *Jahresbericht über die Leistungen und Fortschritte in der gesammten Medicin*, Jahrg. 14 (1879), 2:387; in *Centralblatt für Chirurgie*, 7 (1880): 190–91, with a half-page abstract; and in *Revue des sciences médicales*, 15 (1880): 396; Citation (4) is in *Jahrbuch für practische Aerzte*, 3 (1880): 425–26. In comparison with users of the abstract journals, therefore, users of *Index Medicus* would have benefited from having citations to two case reports instead of one, and they would also have had more complete citations.

23. *Memorial Meeting in Honor of . . . Billings*, pp. 9–10.

Appendix

Listed below under numbers 1–47 are the reports given by Billings in his table on the use of trephination in the treatment of epilepsy. They have been rearranged into alphabetical order by "Operator," and reports based on personal communications have been eliminated. For each report are given in order:

- (a) "Operator," number of cases if more than one, and "Where Reported," as given by Billings. Serious errors affecting retrieval are signaled by [1].
- (b) Billings's citation expanded and if necessary corrected.
- (c) The original source of the report, insofar as it could be determined.
- (d) Bibliographies and other references citing the original source. Bibliographies are included only if they index the source under the most specific approach, i.e., for *Index-Catalogue*, "Epilepsy (Treatment of)," and for Ploucquet, "Epilepsia. Therapia. Trepanum."
- (e) Probable source used by Billings.
- (f) Comment.

The citations probably derived from Smith are numbers 9–10, 13–15, 19–24, 31, 33–34, 39, 41, 44, and 46; from Bruns, numbers 4, 11, 16–17, 28, 32, 35–38, 40, 43, and 45.

Numbers 5–6 and 29–30 are from the *Dictionnaire des sciences médicales*, numbers 1, 3, 8, 16, 18, and 26 from English or American texts in surgery or neurology. It is impossible to determine how many of the citations presumably derived from Smith were also examined in the original, as in the case, probably, of numbers 15, 23, and 24. Two of the textbooks cited (1 and 18) were also original sources.

Seriously erroneous citations include numbers 6, 9, 13, 16, 21, 22, 24, 25, 27, 30, 36, 41, and 46. Numbers 3, 8, and 43 all refer to the same case. For irrelevant cases, see numbers 1, 6, 13, 36, and 38; doubtfully relevant are numbers 4, 5, and 31.

Numbers 48–71 below list additional reports published before 1860 which were not included in Billings's table. For each report are given (a) the original citation, and (b) bibliographic sources listing it. The search for cases was not exhaustive, nor are the listings under category (b). The name of the operator in parentheses precedes the citation if it differs from that of the author, as does the number of cases if more than one.

A list of frequently cited references follows.

Allgemeines Repertorium der gesammten deutschen medizinisch-chirurgischen Journalistik.

Bruns, Victor, *Handbuch der praktischen Chirurgie für Ärzte und Wundärzte. Erste Abtheilung: Gehirn und Umhüllungen* (Tübingen, 1854), pp. 1044–48.

Index-Catalogue of the Library of the Surgeon-General's Office, United States Army, [1st ser.], 16 vols. (Washington, 1880–95), 4:293–301.

Ploucquet, Wilhelm G., *Literatura Medica Digesta; sive, Repertorium Medicinae Practicae, Chirurgiae, atque Rei Obstetriciae*, 4 vols. (Tübingen, 1808–09), 2:39; *ibid.*, *Continuatio et Supplementum I* (Tübingen, 1814), p. 58.

Schmidt's Jahrbücher der in- und ausländischen gesammten Medicin. 1834–43 as *Jahrbücher . . .*; 1844–54 as *Carl Christian Schmidt's Jahrbücher . . .*

Smith, Stephen, "The Surgical Treatment of Epilepsy, with Statistical Tables, Comprising All the Recorded Cases of Ligature of the Carotid Artery: and Also of Trephining the Cranium by American Surgeons," *New-York Journal of Medicine, and the Collateral Sciences*, n.s. 8 (1852): 220–42 (table, pp. 236–41).

1. (a) Bell (4 cases): Bell's Surgery, vol. ii.
- (b) Bell, Benjamin, *A System of Surgery*, 1st Amer. ed., 4 vols. (Worcester and Boston, 1791), 2:207–9, or 2d Amer. ed., 4 vols. (Troy, N.Y., 1804), 2:128–29.
- (c) The same, 6 vols. (Edinburgh, 1783–88), 3:185–88.
- (d) Bruns (German translation).
- (e) Work cited.
- (f) It can be presumed that Billings used an American edition, since the British editions and the German translation cited by Bruns report the same cases in volume 3. Bell actually described three cases, not four.
2. (a) Berard: *Gazette des Hôpitaux*, April, 1846.
- (b) "Revue clinique hebdomadaire," *La Lancette française, gazette des hôpitaux civils et militaires*, 2d ser. 8 (11 Apr. 1846): 169–70.
- (c) The same.
- (d) *Half-Yearly Abstract of the Medical Sciences*, Amer. ed., 4 (July–Dec. 1846): 211 (citing "Gaz. des Hôpitaux, April 11, 1846").
- (e) See (d).
- (f) The original source is one paragraph in a miscellany of brief reports on various subjects. The operator was A. Bérard.
3. (a) Birch: Sir A. Cooper's Lectures on Surgery, vol. i.
- (b) Cooper, Astley, *The Lectures of Sir Astley Cooper on the Principles and Practice of Surgery*, ed. Frederick Tyrrell, 3 vols. (London, 1824–27), 1:308–9, or another edition.
- (c) See number 43.
- (d) None found citing Cooper.
- (e) Work cited.
- (f) This is the same case as that reported under Wells (no. 43).

4. (a) Blake: *London Medical and Physiological Journal*.
 (b) Blake, A., "A Case of Epileptic Convulsions and Hemiplegia, the Consequence of a Contusion on the Head, Cured by the Application of the Trepphine: with Observations," *London Medical and Physical Journal*, 55 (1826): 103-6.
 (c) The same.
 (d) Bruns. *Medico-Chirurgical Review*, New York reprint, n.s. 4 (Jan.-Apr. 1826): 592-93. *Index-Cat*.
 (e) Bruns or *Medico-Chirurgical Review*.
 (f) Bruns noted this case but considered it not relevant, perhaps because the operation occurred shortly after the injury.
5. (a) Boucher: *Dictionnaire des Science Medicale*, art. Trepan.
 (b) *Dictionnaire des sciences médicales*, 60 vols. (Paris, 1812-22), 55:548 (art. Trépanation).
 (c) "Observations anatomiques," *Histoire de l'Académie royale des sciences*, 1757, pp. 28-33 (observation I, pp. 28-29, includes this and another case communicated by Boucher).
 (d) Work cited. Ploucquet, J. D. Reuss, *Repertorium Commentationum a Societatibus Litterariis Editarum*, 16 vols. (Göttingen, 1801-21), 13:94.
 (e) Work cited.
 (f) The patient actually was trephined for a skull fracture and was thereupon "cured" of a pre-existing case of epilepsy.
6. (a) Boyer: *Dictionnaire des Science Medicale*, art. Epilepsie [!].
 (b) As above (no. 5).
 (c) Boyer, Alexis, *Traité des maladies chirurgicales et des opérations qui leur conviennent*, 11 vols. (Paris, 1814-26), 5:141-47.
 (d) None found.
 (e) Work cited.
 (f) Billings's citation is to the wrong article in the *Dictionnaire*. The case is irrelevant, since the patient was not trephined.
7. (a) Brainard (6 cases): *Chicago Medical Journal*, 1859.
 (b) [Brainard, D.], "Editorial: Notes of Surgical Operations," *Chicago Medical Journal*, 2 (1859): 637-42 ("Trephining for epilepsy and insanity," pp. 639-41).
 (c) The same.
 (d) *Canstatt's Jahresbericht über die Fortschritte der gesammten Medicin in allen Ländern*, 1860, 3:75. *Index-Cat*. (citing different report of same cases).
 (e) Work cited.
8. (a) Buch: Travers on Constitutional Irritation.
 (b) Travers, Benjamin, *A Further Inquiry Concerning Constitutional Irritation, and the Pathology of the Nervous System* (London, 1835), p. 285.
 (c) See number 43.
 (d) None found citing Travers.
 (e) Work cited.
 (f) This is the same case as that reported under Wells (no. 43). The operator's name is Birch, as Travers states, not Buch.
9. (a) Cadwall: *Boston Medical and Surgical Journal*, vol. xxvii [!].
 (b) Cadwell, F. A., "Trephining for Epilepsy," *Boston Medical and Surgical Journal*, 24 (1841): 369-70.
 (c) The same.
 (d) Smith. Bruns. *Index-Cat*.
 (e) Smith.
 (f) Smith has the same error in the author's name as Billings, but the correct volume number.
10. (a) Campbell: *American Journal of Medical Sciences*, vol. xii.
 (b) Campbell, H., "Cases of Epilepsy," *American Journal of the Medical Sciences*, n.s. 12 (1846): 370-72.
 (c) The same.

- (d) Smith.
 (e) Smith.
11. (a) Coates: *Edinburgh Medical and Surgical Journal*, 1806.
 (b) Coates, H., "Case of Epilepsy Cured by Trepanning," *Edinburgh Medical and Surgical Journal*, 2 (1806): 428-29.
 (c) The same.
 (d) Bruns. *Index-Cat.*
 (e) Bruns.
12. (a) Crampton: *Dublin Hospital Reports*, vol. i.
 (b) Crampton, P., "On Periostitis, or Inflammation of the Periostium," *Dublin Hospital Reports and Communications in Medicine and Surgery*, 1 (1818): 330-57 (pp. 342-46).
 (c) The same.
 (d) None found.
 (e) Work cited?
 (f) The 1831 manuscript catalogue of the library of the Medical College of Ohio lists three volumes of the *Dublin Hospital Reports* without specifying which volumes. Photocopy from University of Cincinnati History of Health Sciences Library. The operator's name was Hewson.
13. (a) Dixon: *Boston Medical and Surgical Journal*, vol. xxxi [!].
 (b) Dixon, E. H., "Application of the Trephine for a Neuralgic Affection of the Cranium," *Boston Medical and Surgical Journal*, 35 (1847): 53-55.
 (c) The same.
 (d) Smith.
 (e) Smith.
 (f) Irrelevant case: the author specifically stated that the patient had no symptoms of epilepsy.
14. (a) Dudley (5 cases): *Transylvania Journal of Medicine*, vol. i.
 (b) Dudley, B. W., "Observations on Injuries of the Head," *Transylvania Journal of Medicine*, 1 (1828): 9-40.
 (c) The same.
 (d) Smith. *Allgemeines Repertorium*, Jahrg. 3, Heft 5 (May 1829): 114. *Annali universali di medicina*, 50 (1829): 402-5. *Summarium des Neuesten aus der gesammten Medicin*, 1 (1829): 369. *Index-Cat.*
 (e) Smith
15. (a) Elliott: *Transylvania Journal of Medicine*, vol. ii.
 (b) Cartwright, S. A., "Epilepsy Cured by an Operation with the Trephine," *Transylvania Journal of Medicine*, 2 (1829): 288-89.
 (c) The same.
 (d) Smith.
 (e) Smith.
 (f) The operator's name was Elliott (according to the article), which Smith misspelled "Elliot"; this suggests that Billings probably examined the original source.
16. (a) Farre: *Sir A. Cooper's Lectures*, vol. i., p. 170 [!].
 (b) As above (no. 3), 1:279.
 (c) The same.
 (d) Bruns.
 (e) Bruns.
 (f) The only edition found in which the case in question occurs on p. 170 of vol. 1 is the German translation cited by Bruns.
17. (a) Fricke: *Bruns' Chirurgie*.
 (b) Bruns, Victor, *Handbuch der praktischen Chirurgie für Ärzte und Wundärzte. Erste Abtheilung: Gehirn und Umhüllungen* (Tübingen, 1854), p. 1045.
 (c) Fricke, J. C. G., "Practische Bemerkungen für die Lehre von den Kopfverletzungen," *Annalen der chirurgischen Abtheilung des allgemeinen Krankenhauses in Hamburg*, 1 (1828): 19-87 (pp. 82-86).

- (d) Bruns.
 (e) Work cited.
18. (a) Gross (4 cases): *Gross' Surgery*, vol. ii.
 (b) Gross, Samuel David, *A System of Surgery; Pathological, Diagnostic, Therapeutic, and Operative*, 2 vols. (Philadelphia, 1859), 2:295-96.
 (c) The same.
 (d) None.
 (e) Work cited.
19. (a) Guild: *American Journal of Medical Sciences*, vol. iv.
 (b) Guild, J., "Case of Epilepsy, Successfully Treated by the Operation of Trepanning," *American Journal of the Medical Sciences*, 4 (1829): 96-97.
 (c) The same.
 (d) Smith. Bruns. *Allgemeines Repertorium*, Jahrg. 4, Heft 3 (Mar. 1830): 126-27. *Medico-Chirurgical Review, and Journal of Practical Medicine*, n.s. 12 (1830): 504. *Summarium des Neuesten aus der gesammten Medicin*, 3 (1829): 221-22. *Index-Cat.*
 (e) Smith.
20. (a) Hayward [1]: *Boston Medical and Surgical Journal*, 1838.
 (b) Hayward, G., "Trephining for Epilepsy," *Boston Medical and Surgical Journal*, 18 (27 June 1838): 325-29.
 (c) The same.
 (d) Smith (*Bost. Med. & Surg. Jour.* June, 1838). Bruns. *Index-Cat.*
 (e) Smith.
21. (a) Hayward [2]: *Boston Medical and Surgical Journal*, vol. xxviii [!].
 (b) [Ed.], "Trephining for Epilepsy," *Boston Medical and Surgical Journal*, 18 (20 June 1838): 320.
 (c) The same.
 (d) Smith (*Bost. Med. & Surg. Jour.* Vol. xxviii [!], p. 320).
 (e) Smith.
 (f) The operator was Hayward. This is not the same case as the one reported by Hayward in the issue of 27 June. Note that Billings repeated Smith's error in the volume number.
22. (a) Hayward [3]: *Boston Medical and Surgical Journal*, vol. xxiv [!].
 (b) "Surgical Operations Performed at the Massachusetts General Hospital," *Boston Medical and Surgical Journal*, 27 (1842): 265-69.
 (c) The same.
 (d) Smith.
 (e) Smith.
23. (a) Hobson [1]: *Western Lancet*, vol. ix.
 (b) Holston, J. G. F., "Trephining for Epilepsy, While under the Influence of Chloroform," *Western Lancet and Hospital Reporter*, 9 (1849): 85-88.
 (c) The same.
 (d) Smith. *Index-Cat.*
 (e) Smith.
 (f) Two cases are described in this article, one fully, one briefly. Both are again described, the second more fully, in no. 24 with two additional cases. Smith cited this article for two cases and no. 24 for two. Billings apparently intended to cite this article for one case and the next for three. Elsewhere in his article, Billings refers to other cases (not treated by trephination) described in citation 24, giving the author's name correctly. It is clear that Billings examined both articles.
24. (a) Hobson [2 and 3] (3 cases): *Western Lancet*, vol. ix [!].
 (b) Holston, J. G. F., "Surgical Treatment of Epilepsy," *Western Lancet and Hospital Reporter*, 11 (1850): 700-707.
 (c) The same.
 (d) Smith. *Index-Cat.*
 (e) Smith.

25. (a) Howard: Transactions of State Medical Society of Ohio, 1843 [!].
(b) Howard, R. L., "Cases in Operative Surgery," *Proceedings of the Ohio Medical Convention, 1847*, pp. 31-37 ("Epilepsy—partial hemiplegia of right side, occasioned by fracture of the skull," pp. 35-37).
(c) The same.
(d) None found.
(e) Work cited?
(f) The *Transactions of the State Medical Society of Ohio* (properly Ohio State Medical Society), which was not the same organization as the Ohio Medical Convention (also known as Medical Convention of Ohio), begin in 1846. The citation is listed in the *Index-Catalogue* under "Epilepsy (Cause of)."
26. (a) Howship: Abercrombie on Diseases of the Brain, p. 196.
(b) Abercrombie, John, *Pathological and Practical Researches on Diseases of the Brain and the Spinal Cord*, 2d ed. (Edinburgh, 1829), pp. 196-97.
(c) Howship, John, *Practical Observations in Surgery, and Morbid Anatomy* (London, 1816), pp.121-22.
(d) Bruns (citing German translation of Howship's book).
(e) Work cited.
(f) Abercrombie reports on pp. 192-93 another relevant case, first described by Clossy (no. 51), which Billings did not include in his table.
27. (a) Johnson: Virginia Medical Journal, 1837 [!].
(b) Peachy, St. G., "Epilepsy the Result of an Injury to the Skull, Cured by the Operation of Trephining. Performed by the Late Carter P. Johnson, M.D. Professor of Anatomy in the Medical College of Virginia," *Virginia Medical Journal*, 9 (1857): 307-9.
(c) The same.
(d) *Index-Cat*
(e) Work cited.
28. (a) Kite: Bruns' Chirurgie.
(b) As above (no. 17), p. 1046.
(c) Kite, Charles, *An Essay on the Recovery of the Apparently Dead* (London, 1788), p. 244.
(d) Bruns (German translation). Ploucquet (German translation).
(e) Work cited.
29. (a) La Motte: Dictionnaire des Science Medicale, art. Trepan.
(b) As above (no. 5).
(c) Mauquest de La Motte, Guillaume, *Traité complet de chirurgie*, 2d ed., 4 vols. (Paris, 1732), 2:409-12. First edition, 1722, not available for verification.
(d) Bruns. Ploucquet.
(e) Work cited.
30. (a) Marchetti: Dictionnaire des Science Medicale, art. Epilepsie [!].
(b) As above (no. 5), 55:547.
(c) Marchetti, Pietro de. *Observationum Medico-Chirurgicarum Rariorum Sylloge* (Padua, 1664), pp. 11-12.
(d) Bruns. Ploucquet.
(e) Work cited.
31. (a) Mitchell: *Materia Medica and Therapeutics*.
(b) Mitchell, Thomas D., *Materia Medica and Therapeutics* (Philadelphia, 1850), p. 722.
(c) The same.
(d) Smith.
(e) Smith.
(f) The relevance of this case is questionable, since the patient is described only as having had "nervous spells not unlike convulsions."

32. (a) Palmer: *London Medical Gazette*, vol. xvii.
 (b) Palmer, T. F., "Miscellaneous Cases in Practical Surgery," *London Medical Gazette*, 17 (1835): 220-22 ("Case III. Epilepsy from venereal enlargement of the cranium, cured by the operation of trepan," pp. 221-22).
 (c) The same.
 (d) Bruns. *Schmidt's Jahrbücher*, 12 (1836): 70. *Index-Cat.*
 (e) Bruns.
33. (a) Pancoast: *Philadelphia Medical Examiner*, 1849.
 (b) Meigs, J. A., "Epilepsy from Pressure upon the Brain (Clinic of Jefferson Medical College)," *Medical Examiner and Record of Medical Science (Philadelphia)*, n.s. 5 (1849): 648-50.
 (c) The same.
 (d) Smith. *Index-Cat.*
 (e) Smith.
 (f) Pancoast was the operator. Both Smith and Billings indicate that *Philadelphia* is part of the journal title, but it is not.
34. (a) Pope: *St. Louis Medical and Surgical Journal*, vol. vii.
 (b) Pope, C. A., "Surgical Cases," *St. Louis Medical and Surgical Journal*, 7 [i.e. 8] (1850): 289-301 ("Case 4. Fracture of the cranium with depression—epilepsy—operation—recovery," pp. 293-96).
 (c) The same.
 (d) Smith. *Index-Cat.*
 (e) Smith.
35. (a) Rhodius: *Centur 1*, obs. 66.
 (b) Rode, Johan. *Observationum Medicinalium Centuriae Tres* (Frankfurt, 1676), cent. I, obs. 66, pp. 37-38, in Pierre Borel, *Historiarum et Observationum Medicophysicarum Centuriae IV. . . . Nunc Autem Aliunde . . . Accedunt Joh. Rhodii Observationes . . .*, 6 pts. (Frankfurt, 1676).
 (c) The same.
 (d) Bruns (Rhodius, *Centur. I, Obs. 66*). Ploucquet.
 (e) Bruns.
36. (a) Riboli: *London Medical and Surgical Journal*, 1826 [!].
 (b) Riboli, Timoteo, "Storia d'una terebrazione per un dolore fisso al vertice pel corso di tre anni consecutivi in conseguenza di otite acuta, con strane forme monomaniache, e (per l'autore) incoerenti manifestazioni fisico-morali di incompleta potenza di facoltà volitiva," *Il Filiatre-sebezio; giornale delle scienze mediche*, 31 (1846): 193-201.
 (c) The same.
 (d) Bruns. *Schmidt's Jahrbücher*, 63 (1849): 70-71.
 (e) Bruns.
 (f) It seems probable that Billings derived his completely erroneous citation by miscopying from Bruns the next citation after Riboli, which is "London medical and physical Journal 1826." The case is not relevant since the patient did not have epilepsy.
37. (a) Riencke: *Bruns' Chirurgie*.
 (b) As above (no. 17).
 (c) Breyer, Franc., *Dissertatio Inauguralis Medico-Chirurgica de Trepanatione Cranii in Morbis Capitis*, praeside Leopold Socrates Riecke (Tübingen, 1831), p. 17 (case 25).
 (d) Bruns.
 (e) Work cited.
 (f) Riecke's name is misspelled in Billings's table.
38. (a) Robertson: *Gazette Medicale*, 1848.
 (b) Robertson, L., "Sur l'application du trépan au traitement de l'aliénation mentale résultant d'un enfoncement du crane," *Gazette médicale de Paris*, 19 (1848): 377-78 (an abstract of the original).

- (c) Robertson, C. L., "On the Application of the Trephine to the Treatment of Mental Derangement, Consequent on Depression of the Skull," *Lancet*, 1847, 2:175-76.
- (d) Bruns (The Lancet.—Gazette médicale de Paris. 1848. pg. 377).
- (e) Bruns.
- (f) The case is not relevant, since the patient did not have symptoms of epilepsy.
39. (a) Rogers: New York Medical and Physiological Journal, vol. v.
- (b) Rogers, D. L., "A Case of Epilepsy, from Depression of Bone, Cured by Trephining, with Observations," *New York Medical and Physical Journal*, 5 (1826): 79-86.
- (c) The same.
- (d) Smith. Bruns. *Index-Cat.*
- (e) Smith.
- (f) Smith cited "N.Y. Med. & Phys. Jour.," which, expanded incorrectly, might be the source of Billings's error in the title.
40. (a) Steidele: Chirurgische Beobachtungen.
- (b) Steidele, Raphael Johann, *Sammlung verschiedener in der chirurgisch-praktischen Lehrschule gemachten Beobachtungen*, 4 vols. (Vienna, 1776-88). Not available for verification.
- (c) The same.
- (d) Bruns.
- (e) Bruns.
- (f) The existence of the work has been verified, but it has not been available for examination to verify the case and precise citation.
41. (a) Trowbridge: Boston Medical and Surgical Journal, vol. xxviii [!].
- (b) Trowbridge, A., "Gun-shot Wounds," *Boston Medical and Surgical Journal*, 18 (1838): 341-47 (p. 345).
- (c) The same.
- (d) Smith (also erroneously citing v. 28).
- (e) Smith.
42. (a) Warren (2 cases): Boston Medical Magazine, vol. i.
- (b) [Warren, J. C.], "Massachusetts General Hospital," *Medical Magazine* (Boston), 1 (1832): 93-98.
- (c) The same.
- (d) *Index-Cat.*
- (e) Work cited?
- (f) Smith (p. 234) noted that "Dr. J. C. Warren has operated twice successfully," but had no further particulars and did not give a citation.
43. (a) Wells: Trans. of Society for Imp. of Medicine and Surgery, 1812.
- (b) Wells, W. C., "A Case of Epilepsy and Hemiplegia, Apparently Induced by a Sharp Projection from the Inner Table of the Skull," *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge*, 3 (1812): 91-93.
- (c) The same.
- (d) Bruns.
- (e) Bruns.
- (f) The operator was Birch. This is the same case as nos. 3 and 8.
44. (a) Wells: Essays on Pathology and Therapeutics, by Dickson.
- (b) Dickson, Samuel Henry, *Essays on Pathology and Therapeutics*, 2 vols. (Charleston and New York, 1845), 2:464.
- (c) The same.
- (d) Smith.
- (e) Smith.
45. (a) Wurm: Surgical Writings of Schmucker, 1776.
- (b) Schmucker, Johann Leberecht, ed., *Vermischte chirurgische Schriften*, 3 vols. (Berlin, 1776-82), 1:252-54.
- (c) The same.

- (d) Bruns.
 (e) Bruns.
46. (a) Yandell: *Western Journal of Medicine and Surgery*, vol. vii [!].
 (b) Yandell, W. M., "A Case of Stricture of the Urethra, with Effusion of Urine into the Scrotum, Sloughing and Loss of a Testis; and a Case of Epilepsy in Which Trephining Was Resorted To," *Western Journal of Medicine and Surgery*, n.s. 1 (1844): 384-85.
 (c) The same.
 (d) Smith.
 (e) Smith.
47. (a) Yeates: *American Journal of Medical Sciences*, January, 1860.
 (b) Yeates, H. P., "Case of Epilepsy Cured by the Removal of a Portion of Depressed Bone from the Skull, Resulting from an Injury Received Ten Years Prior to the Operation," *American Journal of the Medical Sciences*, n.s. 39 (1860): 87-88.
 (c) The same.
 (d) *Half-Yearly Abstract of the Medical Sciences*, Amer. ed., 31 (1860): 54-55. *Index-Cat.*
 (e) Work cited?
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