# Pictorial History of Indexing at the US National Library of Medicine

For journals in the biomedical or life sciences, PubMed is likely their leading source of referral traffic and is an essential tool for researchers in these fields. The backbone of PubMed is MEDLINE, a database of over 25 million journal articles. Although much of the process is automated and online now, MEDLINE continues a tradition of indexing medical journal articles at the National Library of Medicine (NLM) that goes back to the 1870s with the creation of the *Index Medicus*, a monthly collection of journal citations. This collection needed to be manually collected, reviewed, and indexed by the NLM and the following photo essay highlights some of that process using photos from their digital archives.

All photos and some of the photo caption text are from the US National Library of Medicine Digital Collections (https://collections2.nlm.nih.gov/) and are believed to be in the public domain.
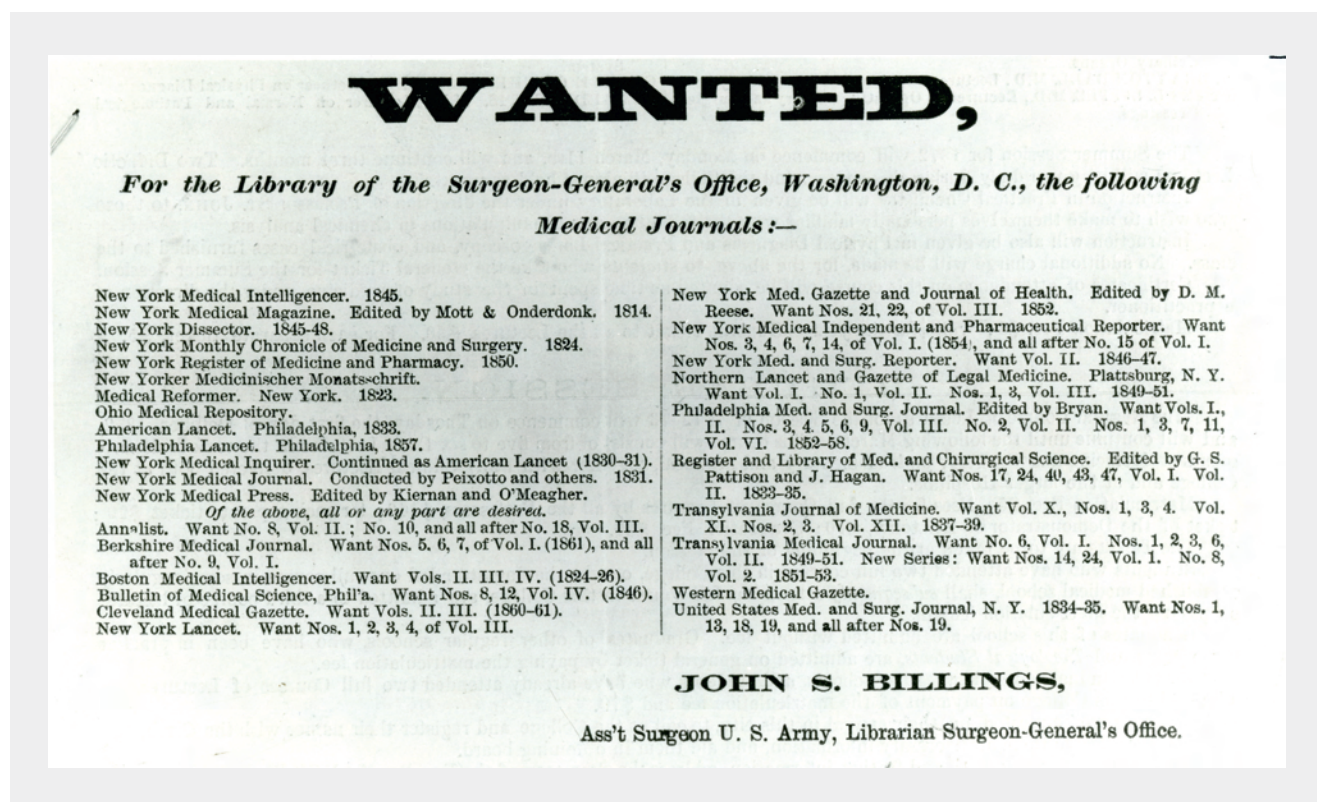
Soon after the Civil War, John Shaw Billings was put in charge of the Library of the Surgeon General's Office, which later became the National Library of Medicine. He quickly moved to substantially expand the Library's holdings, eventually making it the largest medical library in the United States. He did this in part through advertisements such as this in the *New York Medical Record*, September 15, 1873, attempting to fill gaps in the Library's collection of journals. Billings would later start *Index Medicus* with Robert Fletcher. (1873; http://resource.nlm.nih.gov/101656726)

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The Seven Arts of Indexing a Journal Article. This undated cartoon provides an overview of the manual indexing process. (http://resource.nlm.nih.gov/101449128) (*Editor's note*: Although this cartoon provides a helpful guide, I was wary about including it because of its sexist portrayal of the main character. In the end, I think the gender dynamics highlighted in each step of the process are important to show, especially in the context of other articles in this issue of *Science Editor* on the importance of workplace diversity and inclusion. As illustrated by this simple cartoon, true inclusion is not simply addressed by headcount and who is in each role matters too.)
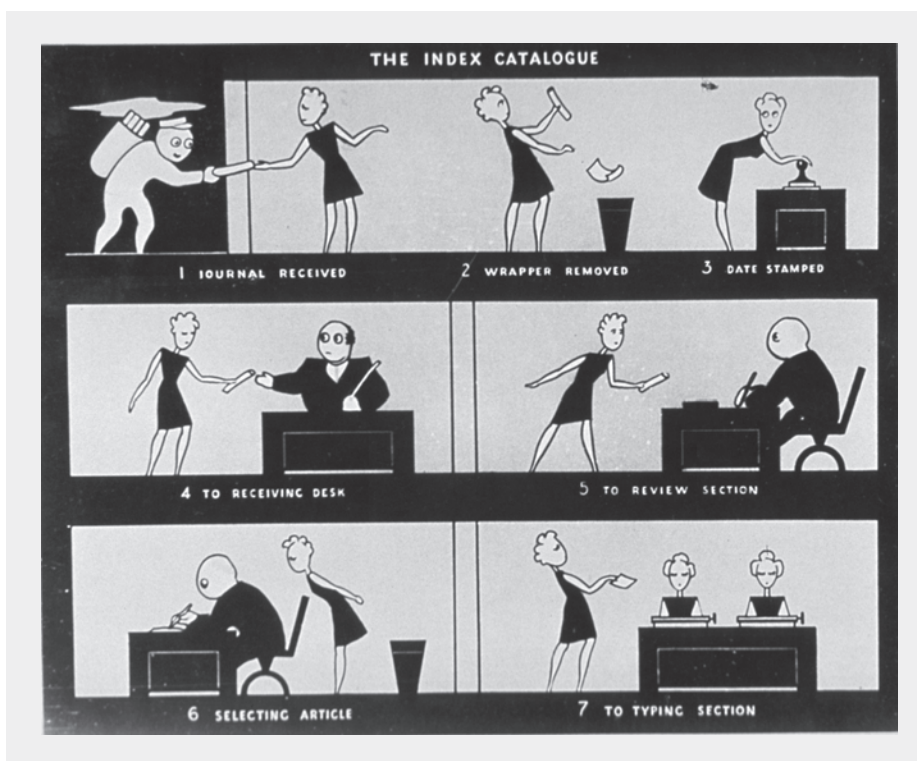
From the book *US National Library of Medicine*: "By the late 1960s, staff members faced the daunting task of reviewing an ever-growing list of medical journals as the publishing industry exploded during the late 20th century." (From the US National Library of Medicine Digital Collections: http://resource.nlm.nih.gov/101445991)
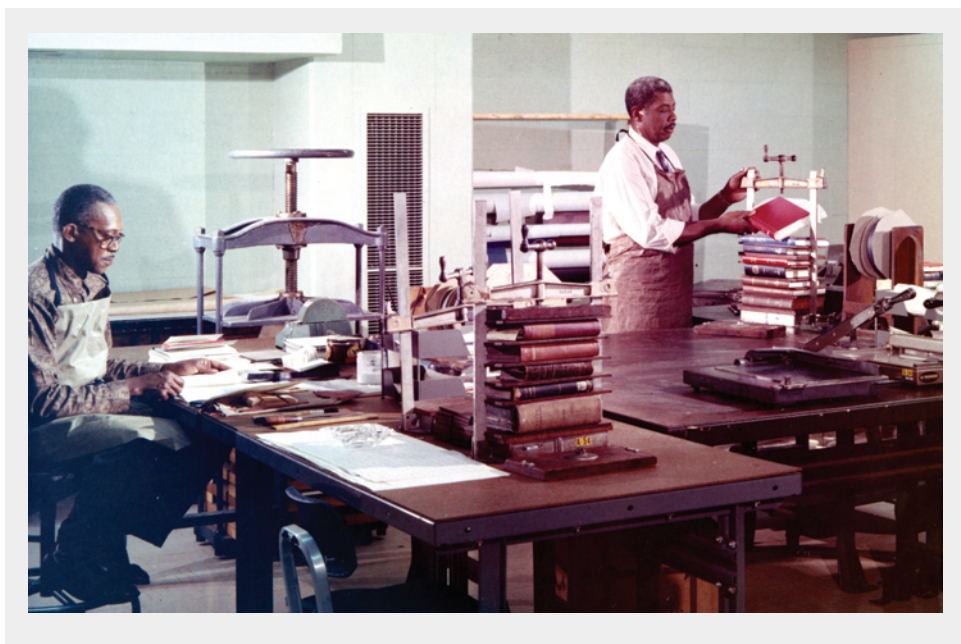
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A Bibliographic Services Division proofreader checks hard copy against data sheet and journal at the National Library of Medicine. (circa 1960s; http://resource.nlm.nih.gov/101641611)

After indexing, the thousands of journal issues arriving at the NLM needed to be collected and bound for archival purposes by a team of bookbinders. (circa 1963; http://resource.nlm.nih.gov/101594531)

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Considering the number of journals and articles the NLM was processing each day, it's not surprising they were quick to adopt computer automation in the 1960s. This photo shows "computer operators working with the tape-driven Honeywell 800 mainframe computer, originally acquired by the library in 1963 which ran the Medical Literature Analysis and Retrieval System (MEDLARS). (circa 1960s; http://resource.nlm.nih.gov/101648240)

The mainframe computer system running MEDLARS required punch cards for input. This card punch operator is likely preparing citations for ingestion. (circa 1960s; http://resource.nlm.nih.gov/101445995)

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By the 1970s, the punch card system had been replaced by early computer terminals. Here an operator is likely entering citation information using a hardcopy of the 1974 Medical Subject Headings (MeSH) for reference. (circa 1974; http://resource. nlm.nih.gov/101446015)

In the early 1970s, MEDLARS moved online, and MEDLINE was created. As the World Wide Web would not be developed for another 20 years, MEDLINE connected with medical library computer terminals directly, allowing "interactive search of the medical literature" as shown in this map of MEDLINE network, circa 1970s. Although the number of libraries grew, the MEDLINE network stayed relatively the same until PubMed debuted in 1997, allowing access to anyone with a computer and the internet. (http:// resource.nlm.nih.gov/101446024)

References

https://www.nlm.nih.gov/bsd/medline.html
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https://www.uzh.ch/blog/hbz/2018/10/02/wie-entstand-pubmed/
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