Title

Review: Paper Machines: About Cards & Catalogs, 1548-1929 by Markus Krajewski

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Paper Machines: About Cards & Catalogs, 1548-1929, by Markus Krajewski. Cambridge, MA: MIT Press, 2011. 224 pp. ISBN 978-0-262-01589-9.

In 1770 Vienna civil servants painted a unique number on every house–not to deliver mail, but to help the queen keep tabs on military conscription-age males. This geographic sorting is the first instance we know of the systematic home address. Ten years later in the same city, the head of the Austrian National Library did something equally novel: he wrote a set of instructions for his employees detailing how to copy the bibliographic details of every book onto uniform slips of paper; these were then stored in 205 wooden boxes, known collectively as the *Josephinian* index. It was a tumultuous time period that required new management techniques for ordering humans, as well as documents in space.

For Markus Krajewski, author of *Paper Machines: About Cards & Catalogs, 1548-1929*, Vienna's overlooked contribution to library history marks the beginning of a powerful new information mechanism, the humble paper index card. Krajewski, a professor of Media History at Bauhaus University in Weimar, describes his book as the first attempt to trace the development of the card catalog, beginning as an aid to the library's flood of books and the scholar's deluge of citations, and later as the corporate office's ubiquitous indexing system, ordering people, money, and inventory. He sees in the paper index card the prototypical universal machine defined by Alan Turing, and for this, he puts its lineage in with the jacquard loom, electronic punch cards, the desktop computer, and today's palm-sized processors.

As Krajewski's story goes, the development of the card catalog into its 20th century forms was an attrition of small gains, painstaking and circuitous, often stumbled upon unexpectedly through dead ends and failures. There were some major difficulties to surmount along the way. For one, directories of collections were not even among the library's self-evident functions until the late 18th century, so each collection required its own "human search engines"–the memories of library directors and staff–as its primary access points; order had to be reestablished with the passing of each succeeding library director. Additionally, the standard way to catalogue a collection's bibliographic information was by transcribing titles, authors, and subjects into a book, and updating these bounded bibliographies required onerous rewriting. In fact, the first known attempt to produce a more mobile, modular bibliography was the 16th century *Bibliotecha Universalis* of Konrad Gessner. To harness the sudden inundation of books at that time, Gessner came up with the idea of cutting slips of paper scraps with titles and subjects, and then affixing them to the bound pages of a book, concocting a temporary, hybrid card catalog still in monograph form.

Lastly, beyond freeing the directory from the fixed page, a card catalog

must also be physically standardized and made public before it can claim a universal, all-encompassing application. Austria's *Josephinian* index, built a century after Gessner's gains, was still only a back-end reference in the form of boxed paper slips pointing to a book's location. It took Harvard University in the late 19th century to finally pave the way for this final amendment to the index, when Ezra Abbott made the Library's catalog accessible to a library-going public for the first time. With this step Krejewski drives home his conception of the universal machine: multiply sourced data inputs operating under standardized instructions, able to be queried by anyone.

Throughout, the book maintains an intimate scope that keeps geo-political events as faint background: the suppression and plundering of Jesuit libraries, the 1798 revolution in France, even the convenient repurposing of gambling implements–these political backdrops are muted, with the focus on more intimate spaces of libraries and their overseers, the scholars' study, and the corporate office. Krajewski also weaves the library's slow arrival at the card catalog with the history of other mobile and arrangeable paper slips. He detours through banknote circulation and the Enlightenment scholar's personal card files, which acted as pre-electronic text generators; excerpts from other scholars' works were written onto pieces of paper, to be arranged into kernels of new arguments ad infinitum. The scholarly card index became the technical basis of literary production during the Enlightenment, foregrounding the social and collective process of knowledge production so often hidden in the myth of the romantic author-genius alone with her thoughts. Krajewski's archival work is impressive here, as he locates, through the journals and correspondence of prolific writers in German, Swiss, Belgian, and American archives, descriptions of the minutiae of private work practices usually kept hidden.

This detailed focus may also be the reason for the book's initial lag, especially when it goes into the detailed logistics of bibliographic drudgery (and despite an eloquent translation by University of California, Irvine Professor Peter Krapp). But the pace picks up in the second half, when the narrative brings us to Melvil Dewey's Library Bureau. With its claims to offer companies efficiency through standards and centralized databases, the Bureau's card indexes, vertical files, and standardized furniture were snatched up by businesses eager to invest in new scientific management theories. Krajewski describes the technology transfer that occurs when corporate and bureaucratic offices adapt libraries' cataloging logic–card catalogs became the organization strategy of forensics units, police databases, and insurance companies interested in managing unabated growth. Libraries' belated acceptance of card catalogs on a wide scale only came after this avid commercial reception of the index card. Krajewski makes much of the fact that 16th-18th century libraries' early indexing innovations have been overlooked

in literature both on histories of management and of turn-of-the-20th century cataloging.

Methodologically the book draws from German media archeology, with resonances of Friedrich Kittler's materialist media histories. The media archeology method self-consciously foregrounds the continuities and ruptures found in technology transfer, and this gives Krajewski license to describe paper systems with familiar, contemporary attributes of our digital technologies. Hence, the card index is an early, pre-electronic data processor, a library's collective search engine (p. 34), and a machine with "(t)he possibility of rearranging its elements" (p. 7). Because there will always be an imperfect equivalence when we compare paper and digital, and between metaphorical language and any object of study, Krajewski is able to play around with these metaphors. The result should be seen as relevant to the Information Studies field, given he historicizes in great detail the problems we identify today–information overload, data floods, and hypertext debates–and shows that their current solutions have a technical legacy squarely derived from the professional and scholarly concerns addressed by libraries centuries ago.

Reviewer

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