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Review: *Science in the Archives: Pasts, Presents, Futures*, ed. by Lorraine Daston, Chicago and London: The University of Chicago Press, 2017

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Sciences have always employed archives that collected the past, and not only those sciences that we conveniently call historical. With the number/quantity and sophistication of data resources, this usage changed. Thanks to computer science, scanning, querying and translation technologies, archive searches are progressively able to provide an unprecedented density of targeted information. And we accept that our archives constantly manipulate and loose their data, so that the reconstruction of past events is constantly in flux, never true, never definitive. Archives-the central brains of science?

The collected volume *Science in the Archives*, edited by Lorraine Daston and published in 2017 by The University of Chicago Press, focuses on the organizational framework, materiality, and usage of archives in the past and present. The book presents case studies from a range of disciplines and geographically includes European and English-speaking American regions in multiple time periods: Antiquity, the 19th and 20th centuries, and the present time. The cases open up questions of methodology: why did we not see the centrality of archives for scientific progress before?

This book is not about the “archive” as an institution. Archives as here presented are materialized organizations of textual objects or thoughts continuously collected from the past to the present. The book thus merges archival science (as in Marchand’s chapter) with other disciplines and their storage ideas. In David Sepkoski’s chapter “The Earth as Archive: Contingency, Narrative, and the History of Life,” the layers of the earth become an organizational mode for fossils, thus the earth can be called an archive. Other archives include studies of memory (Taub), heritage (Hsia), the organization of a

research library (Mendelsohn), and digital databases (Jancovi'c, Jones, Lemov, Rosenberg, Strasser).

The advantage of this inclusive treatment is that collecting methods suddenly seem comparable, while usually the different disciplines would not look at each other. But an associated disadvantage is the necessarily inconsistent discussion of access that follows. If the term “archive” as in Florence Hsia’s excellent chapter “Astronomy after the Deluge” is equivalent to heritage, and consequently does not provide a specific defined location for a historical collection, the question of who had access to the information becomes irrelevant for the question of archival usage. We do not learn how social activity around archives impacted their shape or transmission. This is where the discussion of archives as scientific research apparatus branches away from other approaches towards making sense of archives, such as Markus Friedrich’s recent book *Die Geburt Des Archivs : Eine Wissensgeschichte*. (München: Oldenbourg Verlag, 2013). Friedrich looks at accessibility of political archives and argues not only for the thesis that citizens deployed social activity that included frequent visits to town archives, but also that the town archive as a place of storage developed into a stronghold to confirm the originality of a document. But in *Science in the Archives*, the problem of access is marginalized and only discussed where it is connected with the claim that the internet provides greater access for everybody on all topics.

In *Science in the Archives*, many chapters treat man-made archival frameworks, customized for storage (Taub, Jancovi'c), and full of political or religious prejudgments (Hsia; Gere). In fact, man-made archives require decisions of what to keep and what to discard—these decisions are often politically or ethically motivated, and are specific to their historical time and place. In her chapter “Archiving Scientific Ideas in Greco-Roman Antiquity,” Liba Taub writes about personal notes (*doxai*), made from the writings of others in classical times, that readers transmitted quasi-publicly as scientific note collections over many centuries. And Cathy Gere reveals a clearly prejudiced political framework in her chapter “Evolutionary Genetics and the Politics of the Human Archives.” Politics identified “human populations supposedly untouched by ...cosmopolitan

modernity” as the “past of the metropolis” (p. 203), with wide-reaching impact on collecting practices and interpretive results in the science of evolutionary genetics. To collect the genome of the purest tribes, she concludes, means making decisions about race that are not motivated by research, but by unstated notions of hierarchy.

Many sciences have harbored the hope that they would reach more objective results from collecting and analyzing more data. Mega-archives emerged as long term projects as early as the 19thth century, collections that wanted to provide and preserve data for future scientists. In her chapter “The Immortal Archive: Nineteenth-Century Science Imagines the Future,” Lorraine Daston writes about the “pathos of positivism,” the emotion of fear at the end of the 19thth century about the interpretation of facts. In the wake of 19thth century positivism, so many interpretations were falsified by new fact discoveries, that in the end only the archive of facts accumulated over time seemed to promise grounds for future scientific truth. And this fear was the underlying emotion responsible for two monumental productions, the Prussian (and later German) *Corpus Inscriptionum Latinarum* (from 1853), and the French international collaborative project of *Carte du Ciel* (from 1887).

Collecting and storing big data in the internet age creates topical archives, where the boundaries of the archive are inseparable from the dynamics of the data that it stores. In his chapter on climatological data archiving, “Montage and Metamorphosis Climatological Data Archiving and the U.S. National Climate Program,” Vladimir Jancovi’c reviews the archiving methods concerning weather and climate from the 1970s. He argues that the archive is an inseparable part and product of a multidimensional process of archiving. In “The ‘Data Deluge’: Turning Private Data into Public Archives,” Bruno J. Strasser explains that the “deluge of data” that accompanied the growth of the internet is a result not only of more data, but also of the transformation of old (sometimes private) information into data of scientific relevance.

The evolution of different and regional “heritages,” distinguished by their traditions, and proud of their variety, as in various national political archives, is

not what scientific archives are about. By removing the idea of place, this book makes archives into spaces defined not by nation-state politics, but by relations of bodies to each other rather than by its borders. The tool of this new archive is the search engine. In “An Archive of Words” Daniel Rosenberg addresses an internal glitch of search engines that we usually don’t think about, the so-called “stop list,” a term coined in 1930 for any list of unwanted entities (even people) and used since the 1960s in computer science to describe those words which computer indexing omitted (pp. 276-277). When hard drive and motor capacity was limited, it helped the indexing search engine to function correctly. By providing a list of words to ignore, such as “the” or “a”, the search engine would not run out of time or capacity when indexing an archive—and indexing was necessary in order to prepare any word search. Every archive created its own stop list, and therefore, many different stop lists have been used. Indeed Rosenberg argues that the phenomenon is visible already in the Bible concordances of the middle ages. The glitch happens when scientific text analysis relies on quantitative measures. By analyzing word clouds, created with search engines using different stop-lists, Rosenberg shows that the results vary, and lead to different text interpretations. In his chapter “Querying the Archive: Data Mining from Priori to page Rank,” Matthew Jones builds on these insights in his study of larger archives and methods of data mining that do not search for words, but for recurring patterns. The stop list gave way to algorithmic search engines that were developed to sift through an ever-growing volume of data, with the (positivist) idea that the bigger the volume the more objective the outcome.

At the end of this rich and innovative volume we recognize the origins of the current dream of an endless and universally accessible archive of the future and also realize that it probably will not provide any greater certainty for knowledge. Current data collection robs us from the certainty of the material, location and time stamp that we were used to in the past, but leaves the field wide open to numerical and text-based analytic technologies that provide new results to old queries, none of them definitive.