[7] Especially enlightening is Erwin Panofsky's *Life and Art of Albrecht Dürer* (Princeton, NJ: Princeton University Press, 2006), originally published in 1948, but still unsurpassed.

[8] Noteworthy examples include Owen Gingrich, *The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus* (New York: Walker and Co., 2004) on Copernicus's *De revolutionibus*; Kevin Birmingham, *The Most Dangerous Book: The Battle for James Joyce's* Ulysses (New York: Penguin, 2015); and Emma Smith's *The Making of Shakespeare's First Folio* (Oxford: Bodleian Library, 2015) and its companion volume, *Shakespeare's First Folio: Four Centuries of an Iconic Book* (Oxford: Oxford University Press, 2016).

[9] Hans Rupprich, *Dürer. Schriftlicher. Nachlass* (Berlin: Deutscher Verein für Kunstwissenschaft, 1956–69).

[10] De Hamel, *Meetings with Remarkable Manuscripts*, 3.

Science in the Archives: Pasts, Presents, Futures

Edited by Lorraine Daston. Chicago: University of Chicago Press, 2017. 392 pp. Softcover and EPUB. $37.50. Softcover ISBN 978-0-22643-236-6; EPUB ISBN 978-0-22643-253-3.

Science depends on archives. From astronomers, to climate scientists, to epidemiologists, records of observations acquired, arranged and described, and made available for use are essential sources of evidence for interpreting and understanding the natural world. *Science in the Archives: Pasts, Presents, Futures*, edited by Lorraine Daston, provides a wide-ranging, nuanced, and challenging set of explorations of relationships between scientists' data and records of science, and the practices that make these into a usable past.

Lorraine Daston, director of the Max Planck Institute for the History of Science, is well known for extensive scholarship on topics such as the history of objectivity and observation in science. This particular volume grew out of a working group at the Max Planck Institute that convened in summers of 2013 and 2014. This work connects to a broader initiative of the institute focused on exploring "The Sciences of the Archive" which has also resulted in publications on data histories, biodiversity, and the history of photography and film in the production of the scientific record.[1]

Daston anchors the book in the concept of "third nature." In this context, first nature is of the physical world as experienced. Second nature is the processed result of scientists' interactions with the world through observation and experiment. The results of that work—records of observation and experiment—are then curated, organized, processed, edited, and transmitted to become an essential source of scientific knowledge for scientists now and in the future as third nature.

In the context of this book, "the archive" is understood as "the physical expression of how present science creates a usable past for future science" (p. 329).

In this regard, the book engages with and extends the memory regimes central to Geoffrey Bowker's 2006 book *Memory Practices in the Sciences.*[2] Undoubtedly, this expansive framing of "archive" may irk some archivists. To be sure, none of the twelve contributors are identified as archivists or as individuals working in or at an archives. The first sentence on the back of the book notes, "Archives bring to mind rooms filled with old papers and dusty artifacts." In short, this is not a book about work archivists do in archives. Instead, *Science in the Archives* is about a broader set of issues facing how the past is made usable for science going forward.

With that noted, it would be a mistake to dismiss this as another example of humanities scholars thinking grandiose thoughts about "the archive," as a vague, tired conceptual shibboleth. Each chapter in the book is directly, concretely, and contextually concerned with issues in the selection, management, maintenance, and manipulation of objects and records in particular science collections, archives, and data centers. Across the essays, *Science in the Archives* raises substantive and thoughtful points around how data and objects are collected, stored, organized, and used. In this vein, the volume has much for practicing archivists, even those not interested in science, to explore and consider. Significantly, by zooming out of the particular contexts of archives as institutions or sets of records, chapters across the book demonstrate connections between managing archives and efforts to publish records of scientific data and observations. This results in surfacing complex interactions over time between archiving and publishing. The framing around memory practices throughout the book is useful as a way of thinking about how archives and other collections are woven into a wide range of scholarly communications practices and activities.

The book is organized into four very different sections. "Nature's Own Canon: Archives of the Historical Sciences" focuses on how sciences like astronomy and geology have developed practices for managing and collecting observations and specimens over time and documenting and interpreting the natural world. In this section, Florence Hsia's essay on the history of managing, publishing, and interpreting data in astronomy from ancient Greece to current efforts at NASA is particularly insightful in providing a longer view to thinking about archiving and publishing scientific data.

In "Spanning the Centuries: Archives from Ancient to Modern," essays focus on specific historical communities' attempts to produce canonical sources of records and data for future use. This section includes Daston's chapter on the first wave of "big science" initiatives to document two million stars and 180,000 Latin inscriptions on photographic plates and paper squeezes in the latter half of the nineteenth century. In both cases, these efforts take on tasks of organizing, documenting, and producing records of the world with an eye toward making those records usable for future scholarship.

The third section of the book, "Problems and Politics: Controversies in the Global Archive," explores a series of ethical and privacy issues that emerge around efforts to collect and curate genomic and climate science data. Bruno Strasser's chapter on the history and development of data sharing and publishing in genetics provides a detailed history of the development of the GenBank data archive and its role in helping to shift scientific data sharing to a more open model. Cathy Gere follows the fraught history of international genetic diversity documentation projects that have collected biological samples from peoples across the world to map the history of human origins.

Last, "The Future of Data: Archives of the New Millennium" includes a series of essays exploring the quantified-self movement, personal digital archiving, and indexing technologies like PageRank and Stop Word lists. In this section, Rebecca Lemov's essay "Archives-of-Self: The Vicissitudes of Time and Self in a Technologically Determinist Future" is particularly relevant to ongoing discussions of collecting and preserving social media content, as she explores the development of notions of life logging in the late 1990s through to a state of "constant observation" and "a kind of self-surveillance and self-tracking" that is increasingly a part of the lives of people around the world.

I highly recommend *Science in the Archives* because archivists will do well to reflect on issues it raises. Despite the title, it is not really a book about archives in the way that archivists know and think of them. Specifically, this is not a book about archival institutions or archival records. It is instead a book exploring the ways that scientists produce a usable past that they interact with to build knowledge now and in the future. The authors' explorations of collecting, interpreting, and organizing scientific information contain considerable valuable examples and situations relevant for reflecting on in relationship to archival practice. Of particular note, the considerations on ethics, privacy issues, consent, and political issues that emerge around collecting and managing genetic information and climate change data have substantive and direct connections to ethical issues that are increasingly essential for archivists to engage and on which to reflect. If you do pick this book up, plan to spend some time with it. *Science in the Archives* eludes simple explanation, and the essays examine a range of interrelated issues in different domains, sometimes thousands of years apart, each at substantive depth. I see it as the kind of book best read in fits and starts with a lot of time to digest.

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Notes

[1] For more on this broader initiative, see Max Planck Institute for the History of Science, https://www.mpiwg-berlin.mpg.de/research/projects/DeptII_Daston-SciencesOfTheArchives.

[2] Geoffrey C. Bowker, *Memory Practices in the Sciences* (Cambridge, MA: MIT Press, 2006).