

Bruno J. Strasser, *Collecting Experiments. Making Big Data Biology* (University of Chicago Press, 2019), 386 pp., \$37.62 Paper, ISBN: 978-0226635040

Collecting Experiments is an essential text for historians of biology in the 20th and 21st centuries, one which draws in, and on, the history of technology. The analysis is novel even when addressing cases which historians are familiar with, thanks in particular to its archival sources, which Strasser has clearly attended to in depth. For historians of technology, the history of computing is a persistent theme throughout, and - at an analytical level - thanks to the essential importance of maintaining and 'curating' these collections, the book also offers insight for historians of infrastructures. The dynamics surrounding the creation and maintenance of the collections that Strasser discusses will resonate with anyone studying the creation and maintenance of some shared resource or other, be that a network, a standard, or materials.

While building on historical analyses of natural history collections and collecting practices, aligning his approach with John Pickstone's 'ways of knowing', Strasser's collections are deliberately intended to expand our historical imagination. The reader is asked to reconsider what collections can be, so that they can appreciate how ubiquitous and fundamental they are, and have been, in the life sciences. The first case study, for instance, concerns those 'stock collections' of living organisms used in genetic experimentation. That these stocks had to be made is of course well understood, but the author's decision to regard them as a collection provides an opportunity to refresh our thinking. Earlier historians, such as Robert Kohler and Karen Rader, have explored the use of these organisms as experimental tools. Other historians and philosophers, here thinking in particular of Sabina Leonelli and Rachel Ankeny, have already addressed and unpacked 'model organisms' (those more or less standardised fruit flies, bacteria, mice, and plants that have anchored so much of biological research in the C20th and C21st), and the formation of scientific communities around them. However, Strasser's regarding these stocks as *collections* does put them in a new light, to be thought of alongside the herbarium, or - projecting into the future - the electronic database. These connections between otherwise distant cases are secured via epistemic practices of *comparison*.

The book proceeds through a series of case studies, with the only relatively persistent figure being Margaret O. Dayhoff (1925-1983). Chapter three focuses on her pioneering efforts in the 1950s-70s to assemble a protein sequence data collection. Dayhoff's early recognition of the benefits that might follow from collecting protein sequence data into a central resource, and her struggle to ensure the value of this activity was recognised and so placed on a more secure foundation, this is all tracked over the course of the book. For instance, while we initially learn about the publication of an atlas from Dayhoff's collection of published sequences, we later see this knowledge embodied in electronic databases which could be queried remotely. A subsequent chapter explores early attempts to represent and manipulate protein structures on computer screens, using the collections of the Protein Data Bank. Again, Strasser emphasises how the ambition to make structural representations and manipulations easier, by completing them on computers, was not only fundamentally dependent upon collections but was organised to facilitate comparative analyses. Other chapters address serology collections, nucleic acid sequence databases, and the formation of GenBank.

Strasser has done an excellent job of bringing these developments to life. There are nevertheless a couple of imbalances. First, as this is largely a USA based and USA-facing history (though directly informed by, and in some places directly addressing, historical aspects of European bioscience), the international politics of collecting does not get much attention. That discourse surrounding biodiversity was embroiled in various nationalisms is also mentioned by Strasser, but nowhere taken up. The international regulation of collection-making deserves more dedicated attention than it receives here. A second imbalance is caused by the otherwise very effective decision to move from collection to collection. Thanks to this decision, elements of the wider historical background which are less directly contributing to the making of each collection, but which are no less important for understanding what was happening in biology at that time, get diminished. However, this is to make a complaint out of a success. *Collecting Experiments* is sure to inspire a great deal more work to come.

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