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BOOK REVIEW FORUM

Objectivity, Collective Sight, and Scientific Personae

JENNIFER TUCKER

Lorraine Daston and Peter Galison's new book, *Objectivity*, is an original and important landmark study that contributes to broader understanding of the emergent history of objectivity, the epistemic values of scientific visualization, and the links connecting both. *Objectivity* is based on a close examination of numerous scientific and medical atlases published in Europe and the US since the eighteenth century. The authors are eminent historians of science who specialize in different historical periods: Daston is a scholar of early modern science, while Galison is a historian and philosopher of twentieth-century microphysics. Both scholars have published extensively and influentially on a number of topics regarding the scientific community, objectivity, vision, and representation. *Objectivity*, beautifully produced and containing over one hundred illustrations (including twenty-one color plates), depicts a variety of scientific phenomena studied since the eighteenth century, from astronomical to botanical to meteorological subjects, and more.

Daston and Galison explore how historically variant approaches to scientific image-making since the eighteenth century have expressed—and reinforced—changing epistemic ideals and values linked to the intellectual authority of scientists. *Objectivity* is a rich, sophisticated, and complex historical analysis to which a brief summary cannot adequately do justice, and readers will find many treasures of their own to mine. A few of their main arguments can be highlighted here:

The authors emphasize that scientific objectivity is a contingent value that has meant different things throughout history and that it is far more complex and novel a concept than it has sometimes seemed. Specifically, Daston and Galison show that making sense of objectivity as a historical value requires deep understanding both of

the essential place of visual representations in scientific practice and of how particular ideals surrounding visual representation in science and medicine emerged and developed within a longer, complicated series of changing epistemic values and concepts of truth.

To grasp the underlying historical patterns of change in epistemic virtues, Daston and Galison emphasize a third point: the need for a long, cross-sectional, multi-disciplinary view of science. They use the analogy of the panorama to describe their project: "Our study is unusually broad in geographic, chronological, and disciplinary sweep: it attempts a panoramic view of developments spread over the eighteenth through the early twentieth centuries and situated in Europe and the United States" (47). Their analysis overflows the usual boundaries (of discipline, geography, time period) that organize the writing of the history of science. As they put it, "Both the scope and narrative shape of this book contrast with much of the best work in the history of science published in the past two decades, although the book is gratefully indebted to that scholarship" (47). They tell their history "not as a microhistory, thickly described and densely embedded in local circumstances, or even as series of such finely textured episodes" (47). Daston and Galison recognize several advantages to the panoramic, or aerial, view: "Some significant historical phenomena are invisible at the local level, even if their manifestations must by definition be located somewhere, sometime" (47). Enlarging the view yields, among other things, further refinement of the received narrative of scientific history, "reconfiguration" (10) replacing "rupture" (47), and "stages" replacing "paradigms" (19). Taking a broad historical view also allows the authors to see new features of science, and it provides the type of perspective needed to map a variety of different epistemic virtues to which scientists have aspired in different times and places, virtues that include—but are not limited to—mechanical objectivity (18).

Of particular interest to scholars in Victorian studies will be Chapters 1, 3, and 4, in which Daston and Galison lay out evidence for their view that objectivity "emerged as a scientific ideal borne out in practices only in the mid-nineteenth century" (35). In contrast to eighteenth-century naturalists and anatomists, who were "aggressively selective" (73) in their ways of describing, depicting, and classifying, nineteenth-century scientists aspired to ideals of "self-denying passivity" (59), "self-restraint" (42), "automatism" (43), and even "blind

sight" (311). Increasingly "wary of human mediation between nature and representation, researchers now turned to mechanically produced images" (120) including photography, which, far from driving this rush to mechanical objectivity, rather "joined the upheaval in the ethics and epistemology of the image" (161). Moral values of metaphysical restraint, hard work, instrumentation, automatic registration, and statements of objectivity became safeguards, Daston and Galison suggest, against statements about the ultimate nature of things during the nineteenth century, an era often associated with rapid scientific change, uncertainty, and crisis. The virtue of "mechanical objectivity" emerged hand-in-hand with the appearance of a "certain kind of willful self" that was prone to impose hypotheses on data (37). "Policing the artists"—containing their predilections for "subjective alterations"—characterized the distinctive brand of late-nineteenth-century pictorial objectivism (174).

The last few chapters of *Objectivity* describe how the ambition to produce an objective image mechanically was gradually "supplemented by a strategy that explicitly acknowledged the need to employ *trained judgment* in making and using images," a departure that, the authors claim, throws the distinctive features of nineteenth-century objectivity into sharp relief (311). According to them, around 1920 scientists began to criticize the mechanically objective image (46). Twentieth-century empirical scientists came to believe that "well-honed intuitions" and "the use of trained judgment" and interpretation in handling images were "a guiding principle of atlas making in its own right" (46, 311). Along with this "new form of seeing and new status of depiction" came a "different way of cultivating the scientific self" (311). Rejecting "self-denial and actively willed passivity" as primary moral ideals, twentieth-century empirical scientists instead aspired to "judgment, unconscious assessment, and protocol-defying expertise" in the making of images (313). Daston and Galison explain that "patience and industry" were no longer essentially linked with great scientific accomplishments; instead, twentieth-century scientists acquired a new confidence in intuition and perceptual habit, born in professional training. The result was a new scientific persona, that of the "self-confident expert": "Neither genius nor labor would reveal the right image; what was needed was self-confident expertise" (307).

As this brief overview indicates, *Objectivity* is not a study of the social and political uses of objectivity, although its conclusions are rele-

vant to that topic. *Objectivity* therefore differs in focus from the work of Theodore M. Porter, whose work is also widely read and appreciated among Victorian studies scholars. Porter offers new ways of understanding the uses of objectivity for building communities that can communicate across various distances and for buttressing political weaknesses in newly professionalizing disciplines, an approach that differs from the moral notions of self-making that Daston and Galison emphasize.

Objectivity is a significant book in several respects for both the history of science and for Victorian studies. For historians, philosophers, and sociologists of science, the book will be pivotal in larger debates about visual representation in science, the making of the scientific subject, science and print culture, and the history of epistemology. *Objectivity* expands considerably on previous writings by Daston and Galison and contains new critical perspectives, including the book's dedicated focus to the making of a scientific self.

Objectivity will also contribute with equal significance to the interdisciplinary field of Victorian studies. Scholars of Victorian culture and society have long analyzed the social and cultural practices of science and medicine from different disciplinary perspectives. Several of the topics that Daston and Galison treat (scientific imaging, photography, the embodiment of scientific personhood, and mechanical objectivity, for example) are developed by eminent historians of Victorian Britain: Gillian Beer, Roger Cooter, Christopher Lawrence, Bernard Lightman, Iwan Morus, Martin Rudwick, Simon Schaffer, James Secord, Rusty Shteir, and Alison Winter, among others. Three Victorians in particular are highlighted in the book as leading spokesmen for mechanical objectivity: Francis Galton, James Glaisher, and T. H. Huxley. Although the majority of atlases discussed in the book are French or German (and therefore more remains to be learned about British atlases), it is worth pointing out that many of them were read by scientists in nineteenth-century Britain (although English translations and second editions of atlases often were reproduced with different prefaces).

Two distinct but related historiographies are particularly important for contextualizing Daston and Galison's ideas within the broader discipline of historical studies of science. Exploring how the book fits into the wider historiography of objectivity and visualization on the one hand, and of scientific personae on the other, reveals where the book fills gaps, sheds new light, and compels additional questions.

Objectivity and Vision

The battles during the late 1980s and 1990s over how and by whom the history of science ought to be interpreted properly provides an important context for understanding the authors' preoccupations with visualization, epistemic changes, moral values, and objectivity. During the so-called "Science Wars," objectivity was a fighting word that was alternately attacked as fraud or as masking political interests, or praised as representing impartiality and accessibility. At an energetic time in these debates, from 1989 to 1990, Daston and Galison began composing together "The Image of Objectivity," an article that led to subsequent essays on objectivity and that ultimately culminated in this book. "The Image of Objectivity," published in *Representations* in 1992, is an account of the "moralization of objectivity in the late nineteenth and early twentieth centuries as reflected in scientific image making" ("Image" 81). The article introduced Daston and Galison's initial views about nineteenth-century scientific visualization and the history of objectivity. While it was "tempting," Daston and Galison wrote, to "collapse all of objectivity into the view from nowhere," they resisted this temptation "to simplify by conflation" because the highest expressions of objectivity in one mode may seem worthless when judged by the standards of another mode" ("Image" 123).

Daston and Galison's commitment to digging further into objectivity's mutable history drew widespread praise from scholars with divergent opinions and stakes in the wider intellectual and political debates over objectivity. Especially noted was the way the authors offered fresh considerations of the issues involved in the development of objectivity, while at the same time tacitly engaging with the same issues of politics and power that other contemporary writers on objectivity addressed more polemically. Speaking to hypothetical critics on opposite sides of debates over objectivity today in their book, the authors argue that, "before it can be decided whether objectivity exists, and whether it is a good or bad thing, we must first know what objectivity *is*—how it functions in the practices of science" (51).

By demonstrating the need for deeper historical understanding of epistemic virtues ("truth-to-nature," "objectivity," and "trained judgment") as they are revealed in the norms and practices of atlas production, Daston and Galison contribute to wider debates among philosophers and others over the nature, meanings, and poli-

tics of objectivity. While they pioneer new ways of thinking about the nebulous notion of objectivity and shed new light on the “grand epistemological visions and moral anxieties now associated with scientific objectivity” (52), however, *Objectivity* raises questions that remain to be explored about how objectivity functioned in the practices and marketplaces of science and, particularly, as I discuss below, about the place of atlases in that dynamic process.

Science and the Morals of Self

Another set of historiographical questions which the authors of *Objectivity* address involves scholarship on self-making and scientific intellectual authority. Daston and Galison are particularly interested in how and why objectivity emerged as a new way of *being* (and becoming) a scientist. “Understanding the history of scientific objectivity,” they urge, must be seen as “part and parcel of the history of the scientific self” (39). They especially want to know “what kinds of selves meet the different demands of truth-to-nature, objectivity, and other epistemic virtues?” (204).

As a study of notions of self-making in science, *Objectivity* takes up issues raised by other scholarship in the history and sociology of science. For example, Steven Shapin and Simon Schaffer, in their 1985 book on Robert Boyle, showed how portrayals of individual natural philosophers as Christian gentlemen became examples of how nature should properly be investigated. In 1998, *Science Incarnate: Historical Embodiments of Natural Knowledge*, an anthology of essays edited by Shapin and Christopher Lawrence, explored the ways intellectuals sought to establish the value and authority of their ideas through public displays of their private living habits: patterns of eating, sleeping, exercising, and being ill, as well as the marks of gender and bodily form. And feminist scholarship by Donna Haraway, Londa Schiebinger, Rusty Shteir, and others has revealed the ways in which epistemic virtues like objectivity have been idealized and their meanings defined by particular kinds of persons (male, white, middle-class—“men of science”). By identifying a link between scientific selfhood and image-making, Daston and Galison add a distinct perspective to this literature. “Forms of scientific self and epistemic strategies enter together,” they argue; therefore, struggles “to act, record, draw, trace, and photograph” may be seen as “part and parcel” of the history of scientific objectivity (39).

There is potential here for expanding on the authors' findings and for critique. In particular, one would like to know more about how social factors of difference and exclusion played into the creation of norms and standards associated with the qualities that nineteenth-century scientists sought to eliminate or police. Of the scientific selves explored in Chapters 2 and 3, Daston and Galison state that they were "doubtless inflected by local accents of class and gender," and they especially note the exclusionary Victorian phrase "men of science" (202). "Yet," they continue, "it is equally difficult to overlook the imprint of the larger scientific context" represented by the "broad mission of the atlases themselves: to establish standards for the entire disciplinary community for generations to come" (202).

A fuller engagement with work on gender and race in science might indicate that accents of gender and class (as well as race) were also fundamental in structuring the broad mission of atlases. Recent scholarship on Victorian science suggests, for example, that various conceptions of self-abnegation, as well as of genius and authoritative expert judgment, were closely tied to conceptions of masculinity and social authority. Christopher Lorimer, Londa Shiebinger, Ann Shteir, Nancy Stepan, and others have explored how the effort to find objective, mechanical measures of sexual, class, and racial difference (which Victorians saw as related to issues of training, skill, and judgment) proliferated in this very period of mechanical objectivity—a period that also saw the formulation of modern concepts of sex, class, and race.

A Panoramic View

Objectivity's panoramic approach to the subject of objectivity offers a wide view, but it also limits other kinds of viewing, as Daston and Galison themselves acknowledge (205). Finer points of the topography disappear; the specificity, disorder, and unpredictability of things on street level often seem remote. In the case of *Objectivity*, an explicit analysis of broad notions of objectivity and the making of scientific selfhood takes precedence over topics of longstanding interest to historians such as agents of change, agency, material conditions, dissent, exclusions, and specific discussions of local operations of politics and power.

Objectivity therefore raises a matrix of questions for historians of the Victorian period, among them questions about ways of under-

standing how the epistemologies, visual practices, and scientific self-personae were operationalized in social and cultural practice. Given the weight of atlases as primary material in this study, it is especially worthwhile to reflect on how the focus on atlases, as opposed to other media for scientific visualization (scientific journals, scientific meetings, popular lectures, magazines, and newspapers), might also circumscribe the range of possible conclusions about scientific ideals that can be drawn from them. Daston and Galison identify atlases as the most salient source of evidence for this study because these texts register new epistemic fears and virtues “more explicitly and forcefully” than other visual sources (48). They represent the “visual foundations” of many observational disciplines and are used to train future generations of scientific practitioners. Therefore, atlases have special implications “for who the scientist aspired to be, for how knowledge was most securely acquired, and for what kinds of things there were in the world” (10). Atlases, indeed, serve as descriptive guides to idealized scientific identities or personae; a bit like conduct books for scientists, they offer moral lessons about how proper knowledge is to be secured. However, a crucial historical question about both atlases *and* conduct books concerns their reception and use, not their production alone. We do not really accept that nineteenth-century women lived according to prescriptive literature. In fact, part of the point of such literature was to respond to the very substantial ways in which women did not do so. A similar point may be made about the various senses of objective imagery, as the following example from *Objectivity* illustrates.

In *Objectivity*, the authors describe American amateur astronomer Percival Lowell as having internalized the values of mechanical objectivity. Lowell was a dedicated believer in the possibility of extraterrestrial life and is perhaps best remembered today as the photographer who took the first successful photographs of the planet Mars. When offered the chance by a magazine editor to retouch his original 1907 photographs of the canals of Mars for publication in a popular magazine, Lowell refused, fearing it would violate the stricture against intervening in objective representation (180). But in exactly the same year, official institutions of astronomy, including the Royal Astronomical Society, refused to credit Lowell’s photographs as scientific evidence of the Martian canals. Rather, astronomers enlisted synoptic charts and maps based on hand-drawn watercolors and pencil sketches by experienced amateurs that were judged for accuracy by a specialist

interpreter. Few would disagree that Victorian scientists revered the apparent mechanical objectivity of photography; however, given that scientists and laboratory technicians used skill and judgment in the making of nineteenth-century scientific images—including photographs—it seems necessary to articulate a distinction between trained judgment itself and the ideological and/or methodological conception of expertise as trained judgment that the authors have found in prescriptive literature like scientific atlases. What Daston and Galison really seem to be suggesting is that the latter emerged in the early twentieth century (with no specific view about the former). This distinction, therefore, would not only clarify what might otherwise create misunderstanding but would also strengthen one of the core arguments of *Objectivity*, since there is a very clear sense in which the practice of producing mechanically objective images required training, skill, and judgment.

Objectivity calls for greater understanding of “the ways [images] are made, used, and defended against rivals” (42), yet the book does not describe in detail information about the contemporary reception of atlases or individual images, a subject that might reveal important information about “what hinges” (42) on the different epistemic strategies as it explores how these choices were consequential for contemporaries. Observation is not the purview of an individual scientist, laboratory, or discipline alone; it is, Daston and Galison agree, always an outcome of collectively learned ways of seeing (26). Daston and Galison describe atlases as an “exemplary form of collective empiricism” (22) and suggest that they depend on and enable all kinds of collaborations (26). This argument, while compelling and undoubtedly accurate, would have even more force with the provision of additional knowledge about the social, intellectual, commercial, and material aspects of the atlas-making collaborations (especially who the atlas makers, image producers, and atlas audiences were). Some research is starting to indicate, for example, that in the nineteenth century, many people who made photographs for atlases (frequently professional photographers or paid technicians) were on the margins of scientific disciplinary research and cannot be presumed to have been the main audience for these atlases. While this does not weaken the force of Daston and Galison’s claims about the authority of the epistemic virtues praised in the atlases, it does suggest a possible need for a clearer understanding about the heterogeneous (and unequal)

conditions and points of access that underpinned collective enterprises such as atlas production.

The ways that trained judgment mattered even during the heyday of mid-nineteenth-century scientific atlas production may possibly be more clearly seen by looking at other contexts besides atlases. In focusing on how illustrations are constructed and their meanings determined, philosophers, sociologists, and historians of science usually tend to rely on the notion that the meaning of images is determined largely by the accompanying text. Literary scholars and visual anthropologists such as Jonathan Smith and Deborah Poole, on the other hand, have developed ways of considering how scientific images travel in a culture, doing different kinds of work in different contexts of viewing and use. One would like to know more, for example, about how the work performed by images in atlases compares with that done by images seen and published elsewhere, including scientific society meetings, illustrated lectures, scientific journals, and magazines.

Objectivity is a landmark study that, in addition to its value to the history of science and to Victorian studies, will prove to be of profound interest and value far beyond these areas, with particular relevance for scholarship on contemporary historiography and historical methodology and interpretation. Daston and Galison are trailblazers in the study of visual images and image-making as central to the rhetoric, values, and practice of science. *Objectivity* provides a rare synthetic analysis of scientific objectivity and visualization and will be invaluable for years to come, not only for historians of science but also for scholars of art, media, communication, literature, law, and historiography.

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