

Objectivity

Lorraine Daston; Peter Galison

DOI: 10.3395/reciis.v2i2.223en

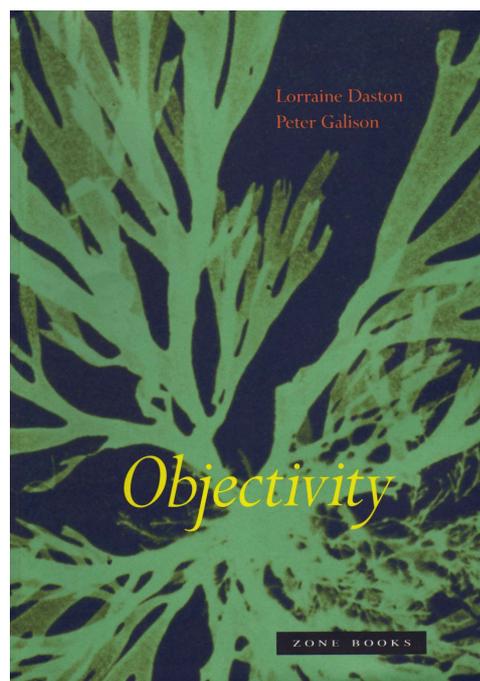
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Objectivity – just a single word composing a short and sober title with no subtitle (a rare event today). However, it would be mistake to presume this is a simple text. Much the opposite. Behind this concept-word the reader will find a dense and erudite work, extremely well organized and written in a clear and sophisticated language. As the authors explain in the Preface, the book is the outcome of more than 15 years of joint research and reflection on the theme, with comings and goings, abandonments, resummptions and rewritings, relying on a wide variety of support, both in collecting source data and in the dialogue with other researchers. Collaborators include some of the most renowned researchers in the area: people such as Naomi Oreskes – a student beginning her doctorate at the start of the research project.

The central question Daston and Galison seek to answer over the book's 501 pages is: how did the term 'objectivity' come to acquire its contemporary meaning within science? How did this historical emergence result in its almost synonymic association with the contemporary notion of science, overriding other categories – or, as the authors call them, other 'epistemic virtues'? A far from easy task, but one brilliantly executed through an analysis of scientific atlases (understood in a broad sense, not just maps) and their images based on the fact that, over the course of their research, the authors ended up conceiving their history of objectivity as an account of different ways of seeing nature and the world.

This leads, then, to the work's central thesis: at the core of the conception of scientific objectivity are different ways of seeing that are at once social, epistemological and ethical. Taken collectively, these do not owe their existence to any individual or laboratory, nor even to a discipline (p. 10). Thus ways of seeing have become



New York: Zone Books; 2007

ISBN: 978-1-890951-78-8

ways of knowing: the visual habits of identifying and collecting data express ‘epistemic truths’ – that is, a set of characteristics intrinsic to a particular discipline – which, by shaping the reading of the natural world, define and construct the data itself (p. 368). The analytic focus is on practices of looking rather than theories of vision – which would have resulted in another book.

The authors develop their central thesis through the incorporation of psychological aspects. For Daston and Galison, “learning to observe and represent in a science is to acquire an ethos and a way of seeing simultaneously. The same well-developed patterns of attention that highlight particular objects in a certain approach (...) also standardize/shape a self” (p. 367). In other words, the multiplicity making up the scientific community is composed not only of individualities but also of distinct collective traditions of education and support for the scientific selves, which are perpetuated through the same mechanisms as the research traditions (*ibid*). Put otherwise: the production of a scientific image is part of the production of a scientific self and both are acquired through the continuous practice of techniques of representing nature simultaneously with the shaping of the self (p. 363).

The introduction of this psychological complement enables the authors to reach some bold conclusions about an objectivity that ‘fears’ subjectivity, the core self. They write: “Objectivity is to epistemology what asceticism is to morality. (...) Objectivity is not just one more intellectual discipline among others. It is a sacrifice – which is how it has been frequently described by its practitioners” (p. 374).

The book is divided into seven chapters, each opening with an image that serves as the starting point for the development of the text, as well as the Preface and a Prologue, which is a persuasive invitation to the reader. The first chapter, ‘Epistemologies of the eye,’ discusses basic questions about seeing-reading images.

Chapters 2, 3 and 6 examine in detail the three main patterns of ways of seeing and representing nature – which, in turn, correspond to different scientific traditions: *truth-to-nature*, *mechanical objectivity* and *trained judgment*. These concepts provide the title for each of these chapters. In chapters 2 and 3, the authors contrast the images present in scientific atlases designed to attain ‘epistemic virtues’ from those seeking ‘truth-to-nature’ and ‘mechanical objectivity.’ In the first case, roughly spanning from the 18th century to the start of the 19th century, images were intended to represent not the real individual specimen but the exemplary characteristic representative of the entire species. That is, the particular that represents the universal, the individual that represents the whole. In the second case, whose initial landmark is located in the mid 19th century with the invention of photography, the conscious search for ‘objective’ ways of producing scientific images leads to the adoption of automatized methods that are presumed to be completely independent of human manipulation, whether by artists or scientists. In these cases photography was almost always the preferred option.

In a brief diversion to the book’s main line of argument, chapters 4 and 5 look at the essential prerequisites for the historically situated emergence of ‘trained judgment’ (chapter 6) as a way of seeing typical to 20th century sciences – though this does not mean that the other modalities are replaced and cease to exist. On the contrary, the book refutes any such reductionist teleology and insists on the coexistence and even overlapping of diverse ways of seeing and various scientific traditions over time.

The fourth chapter investigates the essence and emergence of the ‘scientific self,’ partially abandoning the history of scientific atlases. Daston and Galison examine the post-Kantian reception of the language of objectivity and subjectivity in three different contexts – German (centring the analysis on Hermann von Helmholtz), French (focusing on Claude Bernard) and English (exploring Thomas Huxley) – and note the incorporation of a strong distinction between the objective and subjective in the practices of these scientists. A distinction that grows and becomes widespread over the course of the 19th century, eventually resulting in a crisis within science from which emerges today’s ascetic and impersonal conception of science.

This crisis provoked two responses. One of them is discussed in chapter 5 (which necessarily is not opened by an image): ‘structural objectivity,’ or in other words, objectivity without images, rejected as elements ‘contaminated’ by the mind of the scientist or draughtsman, or by the mechanism of the photographic equipment. Many scientists following this approach take refuge in structures considered as the permanent nucleus of science invariable through history and cultures. The price of ‘structural objectivity’ was the suppression of individuality, including images of any kind. This austere side of scientific objectivity, as the authors recall (p. 46), is still alive and well among philosophers.

The second response, arising from the dissatisfaction of the atlas producers (i.e. the scientists from some of the closest branches of the natural sciences) with ‘mechanical objectivity,’ whose images were considered overly compromised by incidental details and by the technical equipment used to capture them, is examined in chapter six. This ‘trained judgment,’ an epistemic virtue that emerges to replace ‘mechanical objectivity,’ will separate the signal from the noise as a way of interpreting the images: identifying patterns, sets of shared characteristics indicating a phenomenon or process.

The last chapter, ‘Representation to presentation,’ summarizes the book’s discussions and speculates on what the way of seeing will be like in the 21st century with its nanoparticles and the need to construct equipment with theory already introjected in order to represent/present the data and findings themselves. Daston and Galison contrast the synthesis they themselves have developed through historical analysis with what they perceive as a future trend focused on the field of fluid dynamics, pointing to the new approximation between science and art via technology. Summarizing these ideas, the authors present two extremely interesting and elucidating tables, useful even for those who will read only the review, which I reproduce below:

Epistemic Virtue	Truth-to-Nature	Mechanical Objectivity	Trained Judgment
Persona	Wise	Worker	Specialist
Image	Reasoned	Mechanic	Interpreted
Practice	Selection, Synthesis	Automatic Transfer	Pattern Recognition
Ontology	Universals	Particulars	Sets/families

Epistemic Virtue	Image-as-Tool
Persona	Combines the ethos of the end of the 20 th century scientist with the pro-equipment orientation of the industrial engineer and the authorial ambition of the artist
Image	A hybrid between simulation, mimesis and manipulation
Practice	Simultaneity between doing and seeing
Ontology	'Nanoproduced' objects breaking the barrier between the natural and the artefact

Each of the book's chapters dialogues with a wealth of sources, provided in an abundant bibliography at the end. As well as the historical sources in themselves, highly varied and exhaustively researched, the supporting bibliography and references leave few gaps to be filled. Evidently the text is closely affiliated to the Social Studies of Science and Technology school and the marks the outcome of more than thirty years of reflections in this theoretical field. But in contrast to the growing tendency to focus on the specific – sometimes bordering on the idiosyncratic – and on the short and contemporary temporality, this book intends and claims to be necessarily comprehensive – in terms of the scientific disciplines analyzed, the geographic reach included and the broad chronology selected. However, it does not aim at totality – and on this point the work differs from the more traditional and usually positivist earlier works. It has been a long time since this kind of panoramic view has been attempted, fearful of the methodological criticisms that would automatically follow. However, after decades of isolated micro-cases, there has been a lack of a more general and, if possible, integrating overview. The authors' explanation for their approach is that "looking at micro-contexts can tell us much – but can also hide the whole, in the same way as a view of an image pixel by pixel" (p. 36).

This approach allows the emergence of a new, richer, more multifaceted and thus methodologically and theoretically more powerful understanding of what science and its making is all about. In the words of Daston and

Galison: "granting a history to objectivity is also to historicalize the referential framework in which much of philosophy, sociology and the history of science has been inserted in recent decades. The opposition between science as a set of rigidly followed rules and algorithms versus science as tacit knowledge (Michael Polanyi with a heavy dose of late Ludwig Wittgenstein) no longer appears to be the confrontation between an official ideology of the scientists, sustained by the philosophers of logical positivism, versus the facts on how science is concretely made, discovered by sociologists and historians. Instead, both sides of this opposition emerge as ideals and practices with their own histories – which we call 'mechanical objectivity' and 'trained judgment'" (p. 377). Likewise, the text rejects the trap of choosing either a linear and continuous history, or the narrative of abrupt discontinuities (à la Kuhn, or even Bachelard). In a beautiful analogy, the authors compare the entry of objectivity into science as an avalanche: "at first, a few rocks trembling, branches falling and insignificant quantities of snow slipping; but later, when the conditions have ripened, isolated events, though small, may provoke an enormous downward flow" (p. 49).

The implications for education – in relation to scientists and scholars of science alike – are clear. Not even the image of science and scientists can continue the same, much less can the training of future scientists neglect the 'inculcation' of the scientific self specific to the discipline in question. Moreover, this approach adds renewed vigour to the analyses of scientific controversies,

so dear to the Social Studies of Science and Technology and so present in the day-to-day practices of the sciences. Because when different epistemic virtues collide, scientific selves are also simultaneously clash: “where one side sees a threat to scientific integrity, the other may see faithfulness to the highest standards of a particular discipline. The differences that provoke mutual offences may explode in the context of generations, disciplines or research groups. But they are never merely idiosyncratic, one personal style clashing with another” (p. 367). They are, rather, postures, practices, theoretical schema and ways of thinking specific to a particular scientific field and its practitioners, who find it enormously difficult – if not impossible – to admit divergences.

Another light is shone on the biographies of scientists, especially in terms of understanding the various theoretical matrices in which they were/are produced. A

life is not of interest just in itself. Insofar as each personal history contains the scientific self of the discipline, he or she counts as an individual specimen capable of acting as an example of the whole and thus, with the person’s career duly retold and expurgated, begins to serve towards the shaping of the collective self in a self-feedback process. “What interests us,” Daston and Galison write, “is precisely the normative force of these historically specific personas, including the authentic distortions required to make the biography fit into its mould in order to transmute odd individuals into examples” (p. 44).

Undoubtedly, this book is polemical and provides (much) food for thought. But it has already become an obligatory reference for serious research in the history, philosophy, sociology and anthropology of science and technology and in my opinion deserves a meticulously translated version in Portuguese. 