Objectivity: A History without a Hero:

An Essay Review of


Several reviews of Objectivity have already been published so it may seem odd that I am reviewing a book that came out almost three years ago. The truth is that it takes Russia a long time to acquire foreign books and this is why even public libraries in Moscow are still behind. I was only able to obtain this book at the end of the last academic year (2008), and I read it with my students. I then wrote the-a review of this book for the leading Russian journal in philosophy (Philosophical Problems) and later another, expanded, version of this review in English in which I tried to elaborate the ontological theme in more details. This attempt reflects my growing interest in the ontological implications of this book’s argument for science studies. Now I am glad to present my interpretation of Daston/Galison ontology to the English-speaking readers and to tell them how Objectivity was perceived by Russian readers.

The book consists of the prologue and seven chapters. It starts with the case of Arthur Worsington’s attempts to make visual perception of droplet’s splash captured by a drawing or by a photo (the Prologue). Then the authors consecutively guide readers through the book’s chapters in each of which they discover several types or aspects of science imaging. Putting the latter in the context of practice and theory they question a “universal scientific methodology” and show that every cultural and historical epoch generates its own perspective on the world that influences the way science tackles its objects.

Chapter One, Epistemologies of the Eye, exposes the unobviousness of what we call “scientific objectivity”. It introduces to the authors’ operational vocabulary and to the structure
Chapter Two, *Truth-to-Nature*, investigates the early historical type of scientific claims and their realization through a practice of image-making.

Chapter Three, *Mechanical Objectivity*, describes how the older claims are questioned and different methods of imaging in science are established and justified.

Chapter Four, *The Scientific Self*, connects the types of ontology and epistemology to the idea of scientific persona and analyzes several aspects of science imaging through the reading of a scientific subject.

Chapter Five, *Structural Objectivity*, inquires into the question of science imaging from the point of view of the adherents of imageless objectivity who trust only pure logical and mathematical relationships.

Chapter Six, *Trained Judgment*, examines the next turn in image-making practices and the corresponding theories and shows how partial rehabilitation of subjectivity transforms the depiction methods and working objects of science.

Chapter Seven, *Representation to Presentation*, puts today’s science image-making practices in a broader ontological, epistemological and methodological context, and, finally, connects imaging to the self-reflection of today’s scientist.

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L. Daston and P. Galison’s *Objectivity* is among the books that are too impressive to be unnoticed. Released in 2007 it has now been recognized as a pattern for a new interdisciplinary genre: science and technology studies (STS). Having stood the test of discussions in universities’ seminars and reading groups, academic journals, and the Internet societies, and having been
heavily quoted, *Objectivity* provides food for thought not only for historians and philosophers of science, but also for all kinds of scientists both natural and social. More precisely, this book is relevant to only to scientists but to all those who are changing the world through art and scientific technologies if they seek to understand the ontological roots of such a change. Using the words “ontology” and “change” together is not a mistake. I think the authors go after an ontology of change and an ontology of becoming because, though they open up the “black box of science” they are far from unmasking science as a “mere opinion” without a connection with reality.

The title of this book looks rather provocative. Today the titles as “Truth”, “Objectivity”, “Rationality” can hardly excite reverence but more likely rouse a reader to an ironic smile. When one of my university colleagues saw the book in my hand and read its title, he noted, “I am very suspicious of books that have promising titles such as ‘Truth,’ ‘Objectivity,’ ‘Rationality,’ and the likes.” But a moment later he added, “Ah well, it’s probably a critique!” Indeed, for us living in the so-called “postmodern epoch,” it is hard to imagine that such suspicious cultural ideals as reason, scientific truth, and objectivity can be treated seriously. A triumph of the subject, the constructor of the world, at least a half of century ago turned to its antithesis, a total deconstruction, to which nothing is sacred. It has long since become natural for enlightened people to be ironic about “objective science” and now the phrase “proven by science” carries authority only for ordinary people. However, as Isabelle Stengers puts it, “learning how to laugh is not learning systematic derision” (Stengers 2000: 42). Piety towards scientists -- the priests of modernity -- as well as a contemptuous derision of them expressed at the cultural height of post-structuralism and hermeneutics have a common ground. As soon as we realize it we can refuse the former and at the same time keep ourselves from going to the extreme of the latter. Now, when giddy successes of sciences go along with the deepest crises of human self-understanding...
connected some way or another with the “crisis of scientific rationality,” there is a reality both “cultural” and “natural” warning us about either disregarding science or considering it as the Holy Writ of our civilization. Therefore, today the important task is to develop a balanced attitude toward science -- to laugh but not deride, to acknowledge its historicity yet at the same time avoid its negation.

Daston and Galison’s fruitful cooperation is excellent in achieving this aim. The authors relate a history of objectivity. It sounds somehow alarming. Readers may want to know right away whether it is a history of the idea of objectivity or if it is a history of objectivity as it is. Objectivity as it is would be a fixed ontological connection between a person and the world that science establishes and guarantees. Nothing can prevent any idea, not even one as impressive as objectivity, from having a history caused by a development of language and terminology or by other external circumstances. But if it is a question of objectivity as it is that is as a Platonic-like eternal value of “good”, or “beauty”, then it is hard to even imagine its history, not to mention making such a history obvious for others. Nevertheless it is precisely what the authors of Objectivity have managed to do.

At that they are not saying that objectivity historically emerged at the same time as modern natural science did as if objectivity would be natural science’s necessary effect rooted in its universal method that having been once discovered should remain the same forever. If the authors were going after such kind of historicity it would not hurt defenders of ‘objective science’ at all. But the challenge the authors give us is much more serious. They tell us a history of how objectivity became a space-time moment of natural science that synchronically and diachronically coexists with other versions, at times peacefully. At other times however, scientists have to make a really existential choice between “truth-to-nature” and “objectivity,” or between “objectivity” and “trained judgment” (Daston/Galison 2007: 27-28). The fact that one day objectivity overshadowed all other forms of knowledge acquisition is evidence of the
objectivity project’s large scale, but not of its universality.

Let’s have as the first thesis that epistemology is greater than objectivity. One can distinguish other historical and cultural types of epistemology, namely truth-to-nature that dominated before objectivity came, and trained judgment that later contested objectivity’s authority.

But we are still wondering, “How can the authors convince us that the epistemological controversies refer not only to words, ideas, or terms but exactly to truth, objectivity, and trained judgment?” This is how they do it. The authors seem to agree with the famous Wittgenstein’s statement that “the meaning of a word is its use”: “Our answer is that before it can be decided whether objectivity exists, and whether it is good or bad thing, we must first know what objectivity is – how it functions in the practices of science” (Daston/Galison 2007: 51). They also agree with Foucault’s idea about a practical construction of personality: “Like Foucault, we assume that these practices do not merely express a self; they forge and constitute it” (Daston/Galison 2007:199). Both concepts question Kant’s opposition between theoretical and practical reason. Following Wittgenstein and Foucault, Daston and Galison deliberately mix a theoretical subject with a practical one.

Hence, our second thesis is that knowledge as a representation is inseparable from knowledge as a will. According to Wittgenstein, demystification of “I know” reveals “I believe” and only in a system of belief a particular knowledge makes a difference. As to Foucault, he also considers a practical subject responsible for results of knowledge which are the expressions of “will”. Developing these lines Daston and Galison argue that in the former type of knowledge (meaning “knowledge as a representation”) there are packed techniques of self-improvement, or in other words the ethos of scientists who practice certain rules and norms that allow them to obtain some epistemic virtues and objectivity. Therefore, objectivity in turn is not restricted to epistemology, it also needs ethics: “one becomes objective by performing objective acts”
By evaluating the ethical the authors go from the “normative” to the “descriptive” or, one might say, from R. Merton to D. Bloor -- for the first one, universal ethical norms do not affect objectivity and simply allow it to speak on its own while for the second one, the scientific product is a result of some or other behavior strategies.

And now let’s add our third thesis. It continues Wittgenstein’s line that postulates that it is impossible to follow rules in isolation, and, probably, also Ludwig Fleck’s idea of thought collectives. The third thesis can be presented as the following: epistemic virtues spread through communication or, in other words, both the ethical and the epistemological behaviors contain a social component.

We now have three theses and four essential notions -- the epistemological, the ethical, the social, the objective -- and all of them are in cross-relations with each other. I will try to present these relations with the help of Euler’s circles (Fig. One):

![Euler's circles diagram]

Figure One

The dark figure in the centre of the three big circles marks an overlapping part between “epistemology,” “ethics” and “the social” and it is exactly the point where the authors locate the argument for the history of objectivity. Their argument is surprising. It is scientific atlases. They
express a culture of a visual perception that has epistemological (knowledge as a representation), ethical (knowledge as a will), and social (“collective empiricism”) layers. With the term “objective,” scientists -- themselves the creators and/or users of atlases -- identify one of the many types of this culture. Daston and Galison’s history-through-pictures approach (the book consists mainly of history through pictures) shows how objectivity and its alternatives are practiced as techniques of observation and of image-making. The authors are interested in practices of making pictures much more than in theories of visual perception.

I think that the choice the authors made in favor of the atlases as core argument for a history of objectivity is very fruitful, although unusual. Visual perception, representation, and image data are obviously very important to natural sciences. Since the 17th century the whole enterprise of natural sciences can be considered as a universalization of sensual experience. And among all kinds of perception vision has always remained the most preferred due to its “more clearness” or its “Gestalt features”\(^3\). This is why the technical depicting of scientific objects meets the most essential purpose of natural sciences, which is making visual perception and representation public and generally valid. At the same time the empirical and constructivist characters of natural sciences along with their initial coupling with technology led to the fact that from natural sciences’ earliest steps a depiction and a depicted object were put into the very core of the most complicated and intricate ontological and methodological questions. These were questions about the relationship between perception (mostly, it was an instrumentally mediated perception of an instrumentally prepared object), representation, and “nature-as-it-is” -- the questions of their correlations and causal effects on each other.

The scientific method was formed based on the answers to these questions. And the answers to these questions were formed based on the adaptation of the scientific method. It was a vice versa situation because, as the authors show, the “scientist/scientific practice/investigated object” chain (I have deliberately set apart “nature-as-it-is” for a while; we will discuss it later) is
a closed one. In other words, here we find the principle of “circular reference”: “making a scientific image is part of making a scientific self” (Daston/Galison 2007: 363). The latter in turn is responsible for scientific images and practice standards formed under the great influence of available compendia of scientific images, the scientific atlases in hands.

An obvious question arises. If image-making practices are so important for natural sciences, why have epistemology and philosophy of science not given them their due until recently? It was not until the beginning of the nineties that the so called “iconic turn” or “pictorial turn” in the humanities started revealing an interest in the role images play in society and natural sciences. Previously the tension between science and art was not much investigated by epistemologists. However this tension is very deep since modern science was coming from mechanics as the latter had been turning from the kind of art and toolmaking into an instrument of knowledge. And although in the last century a philosophically inclined history of science did succeed in connecting science and art, it was done rather in the internalist manner i.e. through general ontological matrices and paradigms (for the Russian tradition I would like to mention the excellent essay -- A Pendulum and a Perspective by Piama Gaidenko in her book A History of Modern Philosophy in its Connection with Science, Moscow, 2000). As to the constitutive role of image-making practices it remained almost untouched by those who sought to explain science. As far as I know, Daston/Galison are the first scholars who have made such a large-scale analysis of scientific images in relation to their influence on ontology, epistemology and laboratory practice.4 The lack of epistemologists’ interest in practices of scientific image-making can probably be explained by the following reasons. Traditionally epistemology and an internalist history of science haven’t treated laboratory practice as their “diocese” because they considered it an appendage of scientific theory or an epiphenomenon of history of ideas. With this approach scientific imaging technologies in general as well as the pictures in scientific atlases, in particular, were left in the basket by epistemologists who supposed that a theory produces both a theory and a practice. For
a long time epistemologists neglected an inverse dependence of theory on practice and material
culture (Marxism postulated such dependence as early as the 19th century but it concentrated
upon “commodity-money” relations to the detriment of other materials such as art especially).
Closer to the end of the last century the situation has changed as post-positivist epistemologists
and science studies scholars prefer to deal with complex objects in which cultural, technological,
social, theoretical, ideological, art, and economical components determine each other in a circle.

Therefore, let’s return to a “circular reference.” Here another problem arises. The very
idea of historicity is now threatened. This problem can be traced back to Aristotle since a
confrontation between synchronic and diachronic ways of thinking arose for the first time in
ancient philosophy. The main accusation Aristotle brought against Plato and dialecticians was
that a dialectical scheme of a universal circular reference (when all elements could be
determined through each other) did not allow thinking of a motion and change in nature, because
in that case natural change “had nothing to come to,” everything would already be there.

“Indeed, those who say that things at the same time are and are not, should in consequence say
that all things are at rest rather that they are in movement; for there is nothing into which they
can change, since all attributes belong already to all subjects” (Aristotle. Metaphysics: IV,5,
1010a 34-39 tr. By W.D. Ross).

Indeed, a change presupposes a process of transition into the opposite -- from what is not
yet to what already is. Therefore, a change presupposes an initial reference point that is an
invariable subject of a change -- the bearer of starting and final states -- that is able to develop
itself due to the very difference of these states. To define such a reference point Aristotle
introduces the notion of matter (in the sense of a substratum, an underlying subject): “The
matter, then, which changes must be capable of both states. And since all attributes belong already to all subjects”
(Aristotle, *Metaphysics*: XII, 2, 1069b 16-18 tr. By W.D. Ross). Following Aristotle’s thought, one can say that each history has a hero otherwise it is not a history at all. As for the circular reference, it avoids an initial reference point and paints a majestic but static picture of a simultaneous connection of everything to everything. In *Objectivity*, the atlases which are repositories of scientific objects refer to an experimental ontology that in turn results from a certain culture of visual perception for which the atlases and their making technologies are responsible. Consequently, the atlases are not only effects of scientific theory and practice but also “the visual foundations upon which many observational disciplines rest” (*Daston/Galison 2007*: 48), not only predicates of some other *becoming* subject, e.g. a scientific theory, but also *subjects* in relation to which other actors serve as predicates. We can see that the authors deliberately avoid reductionism and draw a picture of universal mediation: analyzing scientific images compendia and, consequently, visual technologies, they try to understand a) a cultural matrix of “objectivity” that shapes the type of visual perception in question, and b) the influence atlases and imaging technologies exert on scientists’ self-identification, on scientific methodology (an analysis and evaluation of ways of getting reliable knowledge), and on ontology (decisions about what kinds of things are contained in the world). And as long as the initial reference point is absent here we have to bring up the question of the legitimacy of this scheme’s *diachronic* profile. In other words, who plays the main character in the history the authors tell us? Or what they tell us is not a history at all?

It was not only the contemporary notion but also the very practice of objectivity that arose in the mid 19th century. The novelty consisted in the fact that almost all scientific fronts (from botany to crystallography, astronomy, and naturalists) questioned admissible limits of idealization for objects had to be depicted, and almost everywhere they rejected the previous way of depicting practiced in most cases as the “four-eyed sight”: a sensible vision of an illustrator/artist was led and corrected by an intellectual vision of a naturalist who knew what
objects had to look like. Beyond the apparent diversity and singularity, a naturalist was striving to find ideal types. The atlases of this “pre-objective” epoch called “truth-to-nature” were full of perfectly symmetrical snowflakes, typical leaves, geometrized insects, etc. “For naturalists who sought truth-to-nature, a faithful image was … a reasoned image, achieved by the imposition of reason upon sensation… and by the imposition of the naturalist’s will upon the eyes and hands of the artist” (Daston/Galison 2007: 98). Since the mid-19th century this way of depicting has been criticized as an ontologically illegal intervention into nature; and scientists turned to “blind sight” which had to reproduce a nature as it really was -- ragged edges, a lack of strict proportionality and repetition, odd shapes, etc. Fortunately, material and technological conditions were on their side: photography and microphotography were the steps that followed camera obscura and camera lucida in the mechanization of images process. The new ideal of “mechanical objectivity” demanded a complete self-elimination from a natural scientist: nature had to speak for itself. An artificial character of photography gave support for mechanical objectivity: it could be that an instrument-produced artifact got to photographic image by accident and this landed on a page of an atlas as evidence of the authentic representation of a natural object!

The irony, however, is that the practice of mechanical objectivity gave rise to a new experimental ontology of subjectivity which later served as an argument against mechanical (and all other) images. By the end of the 19th century, physiologists and experimental psychologists armed with objective methodology came to perplexing conclusions about human perceptive abilities (especially the visual ones) and about the possibility of representing objects. The nervous system and the brain activity displayed not any less diversity than other natural phenomena. This generated a new wave of objectivity, now deprived of images. The authors call it “structural objectivity.” From the late 19th to the early 20th century, philosophers and logicians, mathematicians and physicists worked on elaborating a “neutral language” that would express
structural relations between elements of experience that were common (unlike experience data) to all human beings having a capacity for a rational dialogue.

In the 20th century objectivity gradually lost its position, and expert experimenters with individual skills became significant again for science, and even necessary in scientific fields like elementary particle physics and its image-making practice. But it was neither the case of return to the previous epistemic virtue, “truth-to-nature,” nor a linear progress when every next epistemic virtue would abolish the former: “…epistemic virtues do not annihilate one another like rival armies. Rather, they accumulate…” (Daston/Galison 2007: 363), “by a kind of ratchet effect, the epistemic virtue of objectivity, once established, makes it impossible simply to replicate earlier virtues and practices” (Daston/Galison 2007: 371).

The authors do tell us a history but their history is nonlinear, and that is why it does not have a main hero. Objectivity-as-it-is cannot be such a hero because a closer look we can see that it refers to many other heroes. The story the authors tell us happened not to objectivity, not to scientific theory, not to scientists but to their interrelations. And now we can understand better how the authors managed to inscribe time in the picture of universal interrelation -- the time-model of Objectivity is not like “beads on a string”, the model of duration that elapses from “before” to “after.” Rather, it is a model of helix. Using E.M. Kraus’ formula (which she applies to A.N. Whitehead’s ontology), the authors managed “to explicate the relations between spatio-temporal drops in such a way that their connection can be seen as internal” (Kraus 1998: 22). While they change each other, epistemic virtues are not isolated space-time beads, “they are, rather, increasing in ‘content,’ in extensity, overlapping each other in the sense that the later embrace earlier ones” (E. Kraus on Whitehead; Kraus 1998: 23). Historically a progress of such circularly interfering actors (as ontology, methodology, ethics, technological innovations, and visual practices among others) unfolds as a spiral that becomes wider every next coil.

Who (or what) was responsible for the transition from “truth-to-nature” to “mechanical
objectivity” in the second part of the 19th century? Was it the social revolutions that destroyed the hierarchical tandem of male naturalist and female illustrator? Or was it the growth of technology that made it possible to place automatic mechanisms at the service of a visual perception? Was it the adoption of a Kantian vocabulary by philosophers and scientists? Or scientific discoveries? Or the internal logic of the development of metaphysical ideas? I think Daston and Galison tell us a history of “cooperative effects”: not a sudden gestalt change, not a linear evolution but, rather, the “order out of chaos” can serve as a useful analogy. The authors use the metaphor of avalanche -- in the beginning even such large-scale events as tumbling rocks, falling branches, and slipping snow slides don’t upset the balance of forces but when conditions are “ripe,” even small individual events can serve as triggers and cause an avalanche resulting in a totally new configuration of elements (Daston/Galison 2007: 49). At that the unpredictability of cooperative effects is essential because nature does not know itself when “conditions are ripe.”

We may then wonder, “Where is ‘nature’ in this story?” Up to now it was a question of “culture” not of “nature.” As they discuss “objectivity” the artful authors keep switching the conversation to “subjectivity” and its metamorphoses. All these “conditions of instability,” “avalanches” and “triggers” belong to the “social” and have nothing to do with “nature-as-it-is.” The latter seems only one who is totally out of the list of heroes. I beg to differ. It is true that the authors do not talk about “nature-as-it-is” but they also avoid talking about “the social-as-it-is.” They are far from “naïve objectivism” but they also try to stay out of “naïve subjectivism” since a Subject (with a capital S) is also excluded from the list of characters. Neither “a subject” nor “a society” has the initial reference point-like stability; both of them are not only a cause but also an effect of new natural-cultural configurations. That’s why the authors prefer to use the term “collective” instead of “social”: the former leaves an open verdict on a fatal “nature” or “culture” affiliation of heroes, and rather emphasizes their becoming in relation
to each other. And although Daston and Galison don’t seem to intend to systematically build an ontology, I think that we can see the ontology between the lines: it is an ontology of collective becoming and its epistemological implication is an intervention and presentation of the novel but not a re-presentation of what is already there.

From my own point of view the ontological dimension of Objectivity deserves close attention. Today we are witness to the striking increase in an “ontology discourse” in the humanities and in particularly in science studies. If twenty years ago in science studies epistemological discussions were predominant, even exclusive, then now the situation is quite opposite. “Actor-network-theory” (ANT) offered a fruitful way of thinking about ontology but it is not only a result of ANT. The scale of the tendency is much wider. It looks like the “epistemological project” with its solely subjective (“human” or “cultural”) perspective on science no longer satisfies those who are trying to comprehend scientific knowledge and practice. Little by little we are coming to understanding that “things” merit better than just being excluded from the epistemological observations. It is getting more and more obvious that “things” as well as an ontological perspective in general have turned out to be more “persistent” than previously epistemologists expected them to be. Expanding the metaphor, one can say that each time when epistemology solemnly pushed ontology out through the front door, ontology quietly returned back home through the back entrance. An “illegal” reference to “things” was always hidden behind even the most “pure” form of epistemology. And what is even more interesting, the strategy of the “pure” epistemology per se was inspired by certain ontological dispositions, namely, by an interpretation of being as an “object” and its “representation”.

Of course, this “ontological turn” which we observe in the contemporary humanities is not a restoration of “naïve objectivism” in its pre-Kantian sense which diminishes the role of a subject. Therefore, it is not an attempt to restore the ontological argument to knowledge, the argument that was long time ago recognized as being incompatible with the very logic of natural
sciences. According to the helix model of development we can borrow from Daston/Galison the “ontological turn” is not a return to a previous stage at all but it is rather a new coil embracing but not abolishing the earlier ones. One can rephrase Daston/Galison and say that by a kind of ratchet effect, the epistemic virtue of a subjective perspective, once established, makes it impossible simply to replicate the earlier virtues. Thus, the nowadays rehabilitation of ontology is tightly coupled with a revision of ontological concepts owing to which ‘representation’ and ‘the world’ have become divorced from each other. Today the ontology development is going in the direction of a new type of objectivity in which a connection between “construction” and “reality”, practice and theory would be re-established. Daston and Galison’s *Objectivity* gives us a remarkable example of such a relational ontology.

Is there a practical correlate of the new type of ontology which can be found in *Objectivity*? Or do the authors save their own conceptions from being determined by practice, and consider them as rising from nowhere in order to give an objective appraisal of scientific image cultures that change each other? No, they do not. Daston and Galison try to follow out their own scheme and they find such a correlate. It is young imaging technologies, simulating practices, digital atlases of digital worlds, and also nanomanipulations that can create haptic images. At this techno-scientific stage, depicting acquires a possibility to change what is depicted thus science can borrow a creative function from art (“art” in its widest sense – as the process of creating what was previously called “second nature”, or artefacts) and become actively engaged in constructing worlds instead of merely getting to know the world.

For lack of space, I will not be able to develop the following topics that caught my attention: the male scientist and female illustrator’s social roles, the Enlighteners’ position towards a handicraft, the French Revolution, the famous naturalists’ diaries, the coloration of neurons technologies, ethnographic issues, Gottlob Frege’s *Begriffsschrift*, peculiarities of
machine industry in the second half of the 19th century, Henri Poincaré’s ideas towards color sensation, excurses into etymology, art of retouching, making of a composite portrait, a construction of camera lucida, and cloud chamber tracks among others. Perhaps this list of topics will make some people anxious to read this book. And I am sure that they will make a lot of amazing discoveries on the path to objectivity!.

References


2 Googling Daston/Galison Objectivity reveals a huge amount of references to reviews, the Internet and journal discussions, seminars’ reading etc.

3 See, for example, the chapter on Scientific Visualism in Ihde, Don. Expanding Hermeneutics: Visualism in Science. Northwestern University Press, 1998 (P. 151-170).
Bas van Fraassen’s famous book *The Scientific Image* (1980) is devoted to theoretical aspects of observation but not to practical aspects of depicting the observed.