

WHAT THE TELESCOPE CAN TELL US ABOUT POSTMODERN THEORY

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“No one ever accused the God of monotheism
of objectivity, only of indifference.”
(Haraway 1988, 587)

Donna Haraway (1988) in her text “Situated Knowledges: the Science Question in Feminism and the Privilege of Partial Perspective” suggests a novel epistemological positioning in natural, human and social sciences—a quest for feminist objectivity based on limited location and situated knowledge (583). This kind of objectivity is supposed to produce a new kind of knowledge based on self-reflexivity and avoidance of the subject/object split—knowledge that makes the knower answerable for the way (s)he ‘sees’ (ibid.). What is particularly interesting in Haraway’s argument is that by trying to overcome the *episteme* of ‘objectivity’—which she humorously describes as imagined like an “invisible conspiracy of masculinist scientists and philosophers”—she develops a critique of postmodern theory and standpoint feminism¹ (575). Such rhetorical move in her argumentation shows not only that the ‘objective’ *episteme* has been shaped throughout history by different scientific and philosophical discourses, but also that some epistemological shifts in science and philosophy can be compared in terms of their *radicalism*.²

Objectivity, as explained by Haraway, takes on a task of ‘conquering gaze’ that entitles the ‘unmarked’ category—positions of Man and White—to claim power and represent while escaping representation (1988, 581). As opposed to this ethical, political and epistemological practice, Haraway comes up with the solution that brings together subjects/objects of knowledge, their locations, responsibilities and historical accounts of the knowledge production. In this sketching of Haraway’s arguments, two things are important: the scientific/philosophical ‘objective’ *episteme* (including criticism of the same) and the contradictory position of the feminist situated objectivity. Haraway’s article can serve as a frame for shaping and comparing through

¹ Haraway names the dichotomy different than this. She calls it “a dichotomy which Harding describes in terms of successor science projects versus postmodernist accounts of difference and which I have sketched in this essay as radical constructivism versus feminist critical empiricism” (Haraway 1988, 580). Nevertheless, it is obvious through reading of her text that she criticizes deconstructionist tradition of postmodern theory as well as standpoint feminism.

² ‘Radicalism’ is in this paper used as analytical tool for marking epistemological shifts. I will explain this in more detail further in the paper.

the ‘mediological’¹ *episteme* some aspects of the 17th century experimental empiricism and postmodern theory/philosophy.

In marking epistemological shifts here, I rely on disciplinary notions and methods of historians of science, for I want to pursue the “epistemology in the making” (Daston 2009, 810): explaining what I assume by indicating certain shifts in epistemology and how those shifts can be articulated today.² However, my intention goes beyond locating shifts and aims at mapping sites of comparison between them. By approaching history of epistemology in such manner, I want to outline some patterns of repetition which, nevertheless, go against the idea of linear and progressive historical development of ideas. In that regard, this paper explores how tensions between postmodernist radical constructivism and feminist situated epistemology resemble tensions in the 17th century around which various scientific debates emerged. Moreover, this paper seeks to point to some similarities and paradoxes these shifts reveal, as well as to present them via different interrelations that can be interpreted as bases for the emergence of another shift—feminist epistemology.

Feminist epistemology is important here not only because it fundamentally relies on the criticism of other epistemological realms, in this case radical constructivism, but also because it always *goes back* to the starting point of its knowledge production, building its insights on the counts of the notions/theories it criticizes. In this way, the feminist epistemology itself offers a certain level of repetitiveness which, at the same time, explains on a meta-level the very embeddedness of this paper in the feminist theoretical background. Experimental empiricism—located in a period of debates over the invention of the telescope—in this paper represents the first shift. The second one is recognized in the “linguistic turn” located in theory/philosophy of deconstruction that, according to some theorists, initiated the “turn”. Finally, Haraway’s proclamation of the feminist objectivity situated in partial perspectives represents the last of the shifts to be analyzed here for, as I will show in this paper, she suggest the *medium* not replacing the subject of the knowledge production, but rather indicating the way the subject produces the knowledge in the first place.

HERALDS OF THE RADICAL INSTRUMENTALISM

Historians today interpret the view about the 17th century science, as we know it today, like the reflection of the official self-presentation of Royal Society of London on the one hand, and as imparted by the historiography of our time on the other (Wolfe and Gal 2010, 1). This science is grounded on empirical inquiry as an open, collaborative experimental practice, mediated by specially-designed instruments, stressing accuracy and replicability (ibid.). In his text about the metaphysics of

¹ This term is taken from Hartmut Böhme’s text about the metaphysics of the scientific objects of 17th century science which was conducted exclusively through instrumental experiments (2005). I will be discussing more about this *episteme* in the following pages.

² Lorraine Daston explains the task the history of science by indicating their challenge “to explain how local knowledge [...] became universal science, that is, how context eventually erased itself” (2009, 807-8).

In 1610, a decade after introducing the telescope, Galileo writes instructions for its use, in which he ascribes the instrument a very radical status: namely, that it does not assist or improve the human eye—it replaces it. (ibid., 123). This proclamation triggered a heated reaction from Jesuits, who intended to give the instrument a more traditional role. The tension escalated in a very surprising way, Gal and Chen-Morris conclude, because Galileo was the one who attacked the Jesuit mathematician Horatio Grassi for the claims that seem, if nothing, like acknowledging Galileo’s contribution to astronomy (ibid., 124-5). Grassi had written a scholarly discussion about the appearance of the sequence of three comets in the European sky during the 1618 in which he, among other things, pays tribute to Galileo and his instrument (ibid., 123-4). Despite this, Galileo joins the discussion by attacking Grassi’s justification of the method of observational astronomy—*parallax calculations*—and his belief in the power of the human eye, hence observational experience. Gal and Chen-Morris point out the purpose of Galileo’s assault: “Galileo does not defend the value of the telescope, which Grassi, we saw, has never doubted. Galileo takes the opportunity of the discussion about comets to pursue his (and Kepler’s) new empiricism, in which instruments are to replace the human senses” (125-6).

This debate shows the political value the instrument plays in Galileo’s argumentation of empiricism, in a sense that it legitimates the standard of trustworthiness of an ‘objective’ perspective. Nevertheless, legitimate ‘objective’ perspective comes along with the power that is to be revealed in science’s subsequent development. By bringing in light as a fundamental element that eliminates the role of the eye and accepting empiricism as a valid approach only when mediated through the instrument, Kepler and Galileo contributed to legitimization of the scientific ‘objective’ perspective. More importantly, they introduced abstract, mathematical language as another mediator of the nature, the one that “re-construct[s] observed reality so it can be approached by reason, through the instrument” (ibid., 143). However, there is more at stake here than labeling one “side” of the debate (and debates rarely have two sides), “Jesuit”. I am attempting to depict the displacement of the eye by the instrument as “radical” or “threatening” precisely because it dispenses, theoretically at least, with (human) *interpretation*.

This leads us to Haraway in the 20th century and her re-placement of the ‘objective’ *episteme* in the limited and situated position of interpretation. As I will show in following pages, Haraway’s inquiry sees the ‘mediological’ *episteme* which is based on technology, such as, for instance, the telescope, not as threatening to human’s *interpretation*, but rather necessary for learning how to make a human *interpretation* more *precise*—in a sense recognizing the steps/levels of knowledge production, hence recognizing their possible limits. Before linking this shift to Haraway’s theoretical realms, I will introduce a concept of ‘radical constructivism’ which she uses to show and subvert principles of the knowledge production based on the subject/object split.

INTRODUCING RADICAL CONSTRUCTIVISM

The “linguistic turn” in philosophy represents an epistemological shift that re-shaped not only Western philosophy of the 20th century, but also a wider range of human sciences: from literary theory to sociology, anthropology, psychoanalysis and history. This shift introduces a new way of thinking, one that focuses on the relationship between meaning and language. According to some theorists, “linguistic turn” in postmodern theory was initiated with Jacques Derrida’s theory of deconstruction (see Kates 2008, Punday 2003). The theory of deconstruction is a wide, complex and contradictory field of philosophical inquiry, which in this paper will be introduced in a simplified manner. I am interested in emphasizing the *radicalism* of the shift it initiated, as well as in its subsequent legacy which developed either towards rejecting or moving beyond deconstruction.

Deconstruction is a technique of reading texts, an activity of reading, a philosophical approach that discloses paradoxes of Western philosophy and culture. It grounds on many postulates such as ideas about the *metaphysics of presence*, *logocentrism*, binary oppositions and *différance*. Derrida writes about *metaphysics of presence* as a fundamental misapprehension of Western philosophy/culture—the idea that meaning reveals itself in its ‘pure presence’, hence the structure of the meaning relies on a presumed center, a locus of presence (Derrida 1978, 1-2). That following, he introduces a new paradigm described as emergence of the ‘event’ in the history of the word ‘structure’—or a ‘structurality of a structure’—deemed as precedent for understanding history of the Western human sciences as “a series of substitutions of center for center” (*ibid.*, 2). He furthermore explains:

From then on it was probably necessary to begin to think that there was no center, that the center would not be thought in the form of a being-present, that the center had no natural locus, that it was not a fixed locus but a function, a sort of non-locus in which an infinite number of sign-substitutions came into play. This moment was that in which language invaded the universal problematic; that in which, in the absence of a center or origin, everything became discourse – provided we can agree on this word – that is to say, when everything became a system where the central signified, the original or transcendental signified, is never absolutely present outside a system of differences.

(*ibid.*)

This “moment in which language invaded the universal problematic”, calls upon another set of Derrida’s discernible techniques: interplay of presence and absence or notions of *logocentrism* and *différance*. Specifically, *logocentric* tradition of the Western thought assumes the preexistence of the idea/meaning that finds its appearance first

in speech and then gets transcribed into writing (Belsey 2002, 80). Following Ferdinand de Saussure's claim that meaning exists only as the effect of a signifier, Derrida concludes that there can be no transcendental meaning, for it is always an effect of the language (ibid.). If *logocentrism* assumes a metaphysical presence, Derrida's *différance* is what implies a metaphysical absence in writing/language. In this sense, meaning is constituted through reiterating sets of differences—in terms of interaction of presence and absence—where one signifier/term/notion/word cannot be excluded from the meaning of its opposite (see Belsey 2002, Derrida 1997). These binary oppositions are the core of the Western philosophy/culture, and together they construct meaning by supporting its absent antithesis (e.g., nature/culture) (see Belsey 2002). Derrida's *groundbreaking* theory/philosophy of deconstruction not only initiates the premise of 'reality' knowable only as mediated through language, but it also announces the belief in uncertainty of the very language that constitutes our meaning/knowledge.

MAPPING THE 'MEDILOGICAL' EPISTEME

It seems rather indicative that some of the predecessors of the deconstructionist line of thinking about language derived their hypothesis from sciences like mathematics. I refer here to writings of Gottlob Frege, analytical philosopher to whom theorists ascribe the initiation of the "linguistic turn" in philosophy. Joshua Kates, for instance, links Frege's philosophy of language directly to some aspects of Derrida's and Foucault's deconstruction (see Kates 2008). By introducing the 'context principle'—accessing the meaning of the word through the way it is used in the sentence—Frege creates a space for thinking about *speech* and *discourse* (ibid., 80-1). By making this connection, Kates suggests Frege's influence on what he defines as two types of deconstruction—one of *sense* and other of *reference*—seen as Derrida's and Foucault's postmodern legacy (ibid., 78-9). By bringing Frege into play here, I seek to create a space for tracing parallels between 17th century scientific paradigm and postmodern philosophical language/meaning inquiry.

One could then say how Frege's mathematical analysis of the sentence structure (that parts of sentences that have a job of referring to individuals are represented through a variable and the rest of the sentence as functions ranging over them) resembles scientific desire to legitimate experimental findings through a mathematical language—something recognized in Galileo's and Kepler's efforts in 17th century astronomy. Frege's distinction between the reference and the sense, as well as Saussure's recreation of the notion of reference in language, created grounds for the final act of language in creation of 'reality' and 'meaning'. This "language of words" that deconstruction reveals introduces a new paradigm: "Language or discourse thus does not have to refer in order to have a meaning, a stance that obviously makes apparently non-referential uses of language." (Kates 2008, 84).

If everything we know is accessible only through language, and hence language does not have to refer to 'reality' in order to have a meaning, then language as a

phenomena in scientific experimental empiricism, Hartmut Böhme introduces the concept of ‘mediological’ *episteme*—sensory representations of scientific objects, created in media-based experimental situations which became “models of an *episteme* that operates through media” (2005, 363). According to this *episteme*, Böhme identifies four fields of scientific objects which he finds crucial for the birth of the ‘new science’: human anatomy, mathematical astronomy, microscopic botany and zoology, and pneumatic-hydraulic experimentations of Newtonian mechanics (ibid.).

I will focus here on the domain of mathematical astronomy, because the invention of the telescope opened a new space for debating a desire for (controlling) knowledge. More specifically, my intention is to emphasize the outcome of debates around the invention of the telescope—between Galileo and Kepler on the one side, and Jesuit mathematicians on the other. The newly invented optical instrument allowed a possibility of peering into the most far (telescopic) or smallest (microscopic) spheres of nature and was meant to answer fundamental questions and resolve cosmological riddles, as Ofer Gal and Raz Chen-Morris describes it (2010, 121). In the text “Empiricism Without the Senses: How the Instrument Replaced the Eye”, Gal and Chen-Morris write about the epistemological shift initiated by Kepler’s and Galileo’s writings about the instrument’s features. There are two things important here: Kepler’s and Galileo’s novelties in approaching astronomy and optical instruments, and debates provoked by the radicalism of these novelties.

Five years before Galileo’s advent of the telescope, Kepler introduced the public to his instrument – the *camera obscura* – which demonstrated that the image constructed through it is the very observed object (ibid., 134). Nevertheless, this was not the origin of the novelty:

Neither the phenomenon of pinhole images, on which the camera obscura is based, nor its account in terms of intersecting rays is new to the optical tradition. [...] Kepler’s novelty is in setting the stage to the radical instrumentalization of observation he would share with Galileo by eradicating from his explanation any references to the eye and human vision (ibid., 135).

Not only did he set the stage for the radical instrumentalization of observation, but he also took a step further in trying to legitimize it by turning optics into mathematical-physical study of the construction of images by light (ibid., 136). If we define optics as a theory of visual perception, Kepler’s inauguration of light as the necessary agent that produces objects on any kind of a background can be seen as a form of alienation from the human eye. In this way, light as the fundamental agent allows us to observe celestial phenomena *clearly*, due to the mathematical nature of light that turns distance into an element of geometrical analysis of observation (ibid., 138). This turned out to be an excellent foundation for Galileo to enter with his radical rhetoric in defending the telescope and optics.

mediator of the meaning has the ultimate power. Such a conclusion allows asking if the replacement of the eye with its mediator, the instrument, is the same kind of shift that happened when radical constructivism announced language as a mediator of meaning. Seen from a broader perspective, the first shift marked the beginning of the Modern Age, while second marked the age of Postmodernism. More concretely, introduction of the instrument in the 17th century empirical ‘science’ influenced a whole new way of thinking about ‘nature’ and its meanings. As opposed to the sensory empiricism of “faithful eyes”, technological instrument was supposed to guarantee standard provided by optics, abstract mathematics and logic (see Böhme 2005). This ‘self-evident’ character of abstract sciences can be seen as one of the ways of legitimating scientific truth as the objective knowledge (see Böhme 2005, Shapin 1996, Hooykaas 2003, Gal and Chen-Morris 2010). On the other hand, emergence of deconstruction in 20th century theoretical realms triggers an abrupt change in the way of thinking about ‘thinking’ and its meanings. Again, unlike ‘scientific truth’, deconstruction’s totalizing textual system relies on a sceptical belief that the subject/object gap in knowledge production can never be overcome (see Punday 2003).

Behind both the ‘instrument mediological’ and ‘language mediological’ *episteme* lies the same principle: every *mediation* assumes failure to represent the ‘true’ *present* meaning. The difference is that when Galileo and Kepler debated for the instrument, they did not think about the metaphysical aspect of the instrumental pursuit of knowledge. By inventing an instrument to replace the eye, Galileo and Kepler tried to reach the unreachable. From detaching their inquiry from metaphysics, their experimental outcome ended up in the very center of it—the telescope *constructed* its objects. Telescope constructs objects that are not, and cannot be, seen with the human eye. This, nevertheless, had to be ‘approached with Reason’, as Gal and Chen-Morris explain it, which is why abstract mathematics and optics were a necessary feature of knowledge production. One could then notice how such a paradox shaped the following development of science, giving precedence to abstract, ‘hard sciences’ that can translate the unreachable into the knowable. Deconstruction, on the other hand, relies on the paradox of ‘not knowing’ and becomes a *modus operandi* for much of the subsequent postmodern Theory. That following, empirical science created space for legitimating ‘objective’ Truths, while deconstruction opened up a space for radical skepticism: claiming that there is no objective Truth because we can never grasp the pure meaning in the language. Or it could be said that “pure truth” is akin to evolutionary nature—always changing and branching out and diversifying (hence the reliance on evolutionary metaphors, including that of difference in deconstructionist work). In this way, for both deconstructionist and Baconian empiricists, to grasp truth as a human being through subjective perception means to render it already suspect.

INTERSECTION(S) OF ‘MEDILOGICAL’ AND ‘OBJECTIVE’ *EPISTEME*

After sketching features of both epistemological shifts in natural and human sciences, I return to Haraway’s article once again for it brings together these confronted, and yet very similar, forms of knowledge production. Haraway criticizes the social radical constructionist point of view:

From this point of view, science – the real game in town – is rhetoric, a series of efforts to persuade relevant social actors that one’s manufactured knowledge is a route to a desired form of very objective power. Such persuasions must take account of the structure of facts and artifacts, as well as of language-mediated actors in the knowledge game.
(Haraway 1988, 577)

Here, another paradox is at stake. Haraway criticizes radical constructivism for turning science into rhetoric, a “language-mediated knowledge game”, but the idea of instrumentally-mediated knowledge production lies in the core of the modern science since its very beginnings in the 17th century. One could say that such paradoxes outline ‘mediological’ *episteme* not as a historically bound formation of knowledge production (17th or 20th century), but that they rather indicate a certain repetitiveness and non-linear historical development of epistemology.

This does not mean that Haraway suggests relinquishment of both above discussed epistemological paradigms. On the contrary, she criticizes them in order to move beyond their shortcomings and, moreover, to bring them together in a quest for claiming feminist situated objectivity. Why is then a radical constructivist critique of science a problematic approach? Haraway puts it like this:

I, and others, started out wanting a strong tool for deconstructing the truth claims of hostile science by showing the radical historical specificity, and so contestability, of every layer of the onion of scientific and technological constructions, and we end up with a kind of epistemological electroshock therapy, which far from ushering us into the high stakes tables of the game of contesting public truths, lays us out on the table with self-induced multiple personality disorder.
(*ibid.*, 578)

“Epistemological electroshock therapy” and “multiple personality disorder” metaphorically illustrate the ultimate outcome of the deconstructionist legacy in theory. The subtext of her critique is that one cannot live like that—thinking in

binaries, assuming constant *sliding* of the meaning or denying possibility of any kind of ‘truth’—which is why her claim attempts to go beyond the deconstructionist legacy. Seen from a different angle, Haraway uses the argument of technological instrument as the mediator (and measurement) of the object of knowledge production:

It is a lesson available from photographs of how the world looks to the compound eyes of an insect or even from the camera eye of a spy satellite. [...] The “eyes” made available in modern technological sciences shatter any idea of passive vision; these prosthetic devices show us that all eyes, including our own organic ones, are active perceptual systems, building on translations and specific ways of seeing, that is, ways of life.

(*ibid.*, 583)

However, she conceptualizes it differently from Galileo. Instead of concluding that the camera is more accurate than the human eye in detecting the world—what Galileo did in inaugurating the telescope—Haraway suggests using the accuracy of the instrument (camera) in order to (im)prove the human perception. Such conceptualization overcomes subject/object or man/instrument binaries and allows for ‘objective’ and ‘mediological’ *episteme* intersecting, because feminist objectivity is “about limited location and situated knowledge, not about transcendence and splitting of subject and object” (*ibid.*).

CONCLUSION

The emergence of the new vocabulary in the 17th century, accompanied by technology and empirical methodology, created conceptual grounds for subsequent scientific and philosophical ‘development’. By ‘development’ I do not mean a linear and progressive development, but rather a set of different historical emerging of human thought, which throughout history have changed in a certain way. Such framing allows me to use 17th century concepts in order to discuss similar tensions in historically different contexts, such as the 20th century.¹ What I have shown is that coming back to certain conflicts reveals a form of repetitiveness in history of epistemology.

In this case, it was a debate over the invention of the telescope that introduced a new epistemological paradigm—instrumental mediation in search for knowledge.

¹ On a similar note, Ian Hacking in his chapter “What about natural sciences?” discusses the possibility of talking about natural sciences as being constructed. He tries to extrapolate patterns of disagreements – science wars – over natural sciences that were made contemporary by referring to ‘social constructs’ (Hacking 1999, 63). What he means by ‘made contemporary’ is that such disagreements have existed long before the emergence of the phrase ‘social construct’. In that sense, he speaks about wars between realism/nominalism and aristotelianism/platonism as something that existed in pre-Modern times, but which nevertheless still exists as a heated discussion.

On the one side, there were Galileo and Kepler, proclaiming radical instrumentalism, and on the other, Jesuit mathematicians who still believed in the strength of the human eye. It was the point of emergence of the ‘mediological’ *episteme* in which the instrument was supposed to grant accuracy and standardization of the ‘objective’ knowledge. The ‘mediological’ *episteme* is here also recognized in the “linguistic turn” of the 20th century: a theory/philosophy of deconstruction. However, the relation between ‘mediological’ *episteme* and ‘objective’ knowledge in this context is fundamentally different. Deconstruction denies the possibility of ‘objective’ knowledge, due to its genuine mistrust in the mediator itself—the language. With Haraway’s entry into the discussion, both ‘mediological’ and ‘objective’ *episteme* become reframed in terms of feminist-situated knowledges overcoming the subject/object gap. Instead of medium (instrument/technology) replacing the subject, Haraway suggests the medium explaining/indicating the way subject produces the knowledge in the first place. In this way, subject becomes the object of knowing which reduces the space of one’s accountability for what is known. This, on the one hand, represents one of the specificities of feminist epistemological inquiries: a constant awareness of the subject’s positioning in processes of producing knowledge. On the other hand, feminist epistemology as a third level of comparison here pinpoints Haraway’s contribution to debates around ‘objectivity’ as a *fundamental scientific lens*, and technology as its major product.

I tried here to create a space for debating about certain repetitiveness of conflicts and paradoxes that can be found in history of epistemologies. Hence, this is one way of mapping parallels and similarities between historically and nominally different epistemologies such as scientific experimental empiricism of the 17th century, radical constructivism, and situated feminist epistemology of the 20th century.

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