

TELESCOPE + MIRROR = REFLECTIONS ON THE COSMOS: UMBERTO ECO AND THE IMAGE OF RELIGION

by Benjamin John Peters

Abstract. Umberto Eco argues that a mirror image is not a sign. At best it is a double, a thing that ceases to be once the reflected object is removed. Harry Mulisch narratively suggests that mirror images function metaphorically as gateways between human suffering and the divine. And interestingly, science employs mirrors and mirror images both to turn our gaze upwards and to show us reflections of our place in the cosmos. Tying together Eco's notion of the double, Mulisch's insistence that mirror images reflect humanity's construction of the divine, and the Giant Magellan Telescope Project's cosmic images, it is my contention that modern, telescopic mirror images are much more than snapshots of the cosmos. They are constructions of human and divine meaning that—signifying—pose the question, what is reflected: the cosmos or humanity?

Keywords: aesthetics; cosmology; divinity; Umberto Eco; hermeneutics; meaning; Charles Sanders Peirce; perception; religion; science; semiotics

*Every creature of this earth
is like a picture or a book:
it is a mirror of ourselves.*

—Alan of Lille (Eco 1986, 59)

INTRODUCTION

The row of reflectors, he explained, was aligned precisely from west to east, a hundred and forty-five yards apart, exact to within a fraction of an inch. Beyond that, however, it was a true straight line: over the distance of a mile the curvature of the earth had also been compensated for. Just imagine!

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And that accuracy was necessary, because the twelve mirrors had to be seen as one gigantic circular telescope with a diameter of a mile, the largest in the world. (Mulisch 1996, 377)

This is a reflection on Umberto Eco and mirrors. Throughout their history, we have used mirrors one of two ways: turned toward us or away from us (Goldberg 1985, xii). With regard to the former, I am neither concerned with Narcissus' reflection nor with what Jacques Lacan has called Narcissus' "mirror stage" (Culler 1981, 165; Borch-Jacobsen 2001, 43–96). For I am gripped by the reflection of a flickering light, which perhaps streamed over Narcissus' shoulder and onto his mirror of water. It is the star that the Thespian spurned for his own reflection—the mirror image of the cosmos—that both entrances and threatens to drown me. In this way, I am preeminently interested in the mirror turned away from us, about which Eco (1999) has said two curious things. One, a mirror "registers what strikes it exactly as it strikes it" (365). And two, "the image we see in the mirror is not a sign, any more than the enlarged image provided by a telescope" (370). I wonder, however, if there is not more to the telescopic mirror image than a nonsignifying reflection? As I will show, the image that results from the light that strikes a telescope's mirror and illuminates our universe is more complex than Eco would have it. For the telescope's image is a cosmic reflection of a vast universe.¹ And though difficult to conceptualize, perchance there is illumination lying somewhere in the epigraphs—intertextually mirroring their content.

Before beginning, however, I find it only fair to reveal and clarify my assumptions, of which there are three: Echian ambiguity, implicit religion, and radical empiricism.

ON AMBIGUITY

An early reader of this article suggested that, perhaps, it needed an accompanying artist's statement. While I do not fancy myself an artist, I must admit that underlying my argument is a desire to *perform* Eco's theory of ambiguity. Eco has explained ambiguity as that which "must be defined as a mode of violating the rules of the code" (1978, 263). Ambiguity is an important device that functions as an introduction to the aesthetic experience, which focuses attention and urges interpretation. Ambiguity produces further knowledge because it "compels one to reconsider the usual codes and their possibilities" (274). In fact, Eco later wrote, "the work of artists always tries to call our perceptual schemata into question, if in no other way than by inviting us to recognize that in certain circumstances things could also appear to us differently" (1999, 223).

One of the governing assumptions of this project then—however hidden it might be—is that academia is a *telling* to fiction's *showing*. If there is a secondary question besides the one indicated in my introduction, then it is

this: Can my governing assumption be inverted? Can academia, utilizing Eco's theory of ambiguity, show rather than tell? For similar approaches outside of the Echian universe, see Daniel Gold's work on "interpretative writing," which seeks to represent its subject more or less accurately while sharpening the author's perspective on it. In this way, interpretive writing is torn between the imagination and rational analysis, grand generalities and particulars. It seeks to bring "reason into play with imagination but not necessarily to make a final pronouncement" (2003, 4–6, 107).

ON RELIGION

What do I mean by religion? I fully admit that I have and will always assume that cosmology—whether scientific or mythological—is religious and worth being analyzed as such. And if I am here seeking to place religion, science, and literature in a mutually informing dialogue that is interested in exploring the ways in which humans construct the divine, then might I quickly recall Alfred North Whitehead's assertion: "Science suggested a cosmology; and whatever suggests a cosmology, suggests a religion" (1926, 141).

If more must be said, then let me clearly state that I see religion similarly to theorists of implicit religion. In this way, religion is seen as one or more "commitment(s)" that intentionally nudge the secular/sacred balance off kilter (Bailey 2010, 2011). I see an implicit religion in the commitments that scientists have with regard to collecting data and telling science's story (see below). In fact, one can see this implicit religion in two recent articles published by National Public Radio (Greenfieldboyce 2016) and *The New York Times* (Overbye 2016), respectively. The first explores the artistry (and, yes, commitment) that goes into constructing images from the data collected by telescopes. The second examines the long fight of maintaining indigenous sacred spaces in the face of a scientific imperialism dressed up as an objective and empirical secularism. In both cases, I would argue, religion (implicit or otherwise) is on display. In the end, I am assuming (not proving) two things about religion: one, religion and cosmology are entangled categories and, two, there is an implicit religion (commitment) underlying the scientists who gather, arrange, and display the data collected from modern telescopic images.

ON RADICAL EMPIRICISM

As stated in the Introduction, this article is a reflection on Eco. The tone that I have taken is one of congeniality, deference, dialogue, and ambiguity. I am not interested in harshly disproving anyone's theory. I am interested, however, in graciously posing questions before seeing how they might or might not be answered in an arena that accounts for multiple human experiences. In this way, I am highly influenced by Mary Dunn's

radical empiricism, which seeks to account for the “unknowable more” that juxtaposes a multiplicity of narratives in the hopes of engineering an encounter between the scholar’s world and that of her subjects (2016, 885).

In this case, I am preeminently concerned with placing religion, science, and literature in conversation in such a way that no *one* experience is privileged. Following N. Katherine Hayles, Bruno Latour, and Eco, I see these human experiences as mutually informing. To end the beginning then, I am interested in ruminating on Eco (not *necessarily* images), because Eco not only piques my curiosity but also points me toward an unknowable more. Though I do not place myself in the same category as Eco, I would be remiss in not admitting that my style is deeply indebted to his. For much of Eco is Peircean abduction and Borgesian curiosity writ large. Though I fail in comparison to these masters, my work must be approached through that influencing lens.

MIRRORS

He remembered from the plans that a line of hospital huts had been demolished to make way for the mirrors. The camp was already no longer what it had been during the war, but even if everything were to disappear, it would still be the spot for all eternity. The house by the barrier . . . had been the house of the camp commandant . . . Here, on the road, perhaps on the spot where he was now walking, his mother had gotten into a cattle truck . . . after which the door was slid shut and the bolt fastened. Here her last journey had begun. (Mulisch 1996, 378)

A semiotic approach to mirrors is one rife with turbulence. When Eco (1984) poses the question, “Is the mirror image a sign?” (202), one is conceivably justified in slapping his or her own forehead in poststructuralist lament. What do mirror images and signs (let alone religion) have to do with one another? And, for that matter, what the hell is a sign anyway? “Ah!,” Eco might quickly retort, “we assume we know everything about the mirror,” but we do not. In fact, there is a reason why semioticians have so long enamored themselves with the mirror (Leone 2004, 115–16): because if we can better understand the mirror and its image, then we can better define the sign as a concept. If nothing else, then through the mirror we might come to apophatically see what the sign is not (Eco 1984, 202). And, of course, as we turn our attention to cosmic reflections as they are displayed in processed telescopic images, it would behoove us to have a proper understanding of what a mirror image can or cannot signify.

So, from the beginning, what is a mirror? We define a mirror as any polished surface reflecting incident rays of light (Eco 1984, 204). This mirror can be either plane or convex, reflecting virtual images, or concave, creating real images (yes, there are trick mirrors, but for our purposes, they will not be considered). A virtual image is a reflection that is perceived to

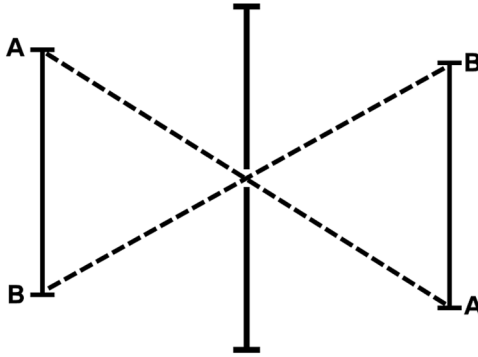


Figure 1. Reversed Reflection

be inside the mirror and cannot be reproduced. A real image is a reflection that might both be mistaken as a physical object and projected onto a screen. Our mirror image then, whether virtual or real, does not (against common perception) reverse its reflection (Fig. 1). It, rather, reflects exactly where the right and left sides are (Fig. 2). “It is the observer,” Eco suggests, “who by self-identification imagines he is the man inside the mirror and, looking at himself, realizes he is wearing his watch on his right wrist” (205). When we speak of mirrors, then, we are speaking not of reversal but of absolute congruence. In this way, mirrors do not lie, translate, or interpret; they record, rather, “the truth to an inhuman extent” (208). The apparent reversal of an image, in other words, is simply a frame of reference phenomenon (Giant Magellan Telescope 2015; <https://goo.gl/ZpEjop>).

It is this absolute congruence that raises the question: Is the mirror image a sign? Before analyzing Eco’s answer to this question, we must first define *sign*. The most common definition is something that stands for something else (Eco 1994, 936). The idea that a sign *stands for* has been discussed by writers as various as Saint Augustine, Charles Sanders Peirce,

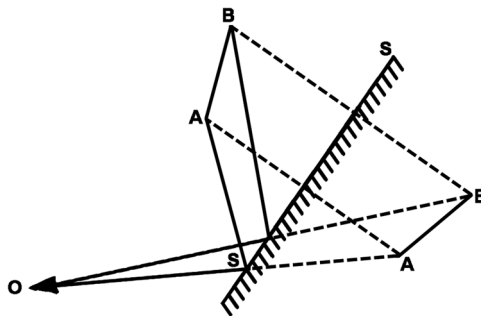


Figure 2. Absolute Congruence

and Roman Jakobson. In most cases, “such a relationship of *standing for* (variously labeled as ‘representation,’ ‘reference,’ ‘meaning,’ ‘signification’) can be taken as a correlation linking the sign to a given representative mental state (interpretant)” (936). The sign, taken in this sense, implies an essential absence, as it stands for that which is not present. The mirror image, according to Eco (1984), cannot be a sign as it provides the viewer with an *absolute double* (210). In other words, in the face of an absolute presence there can be no absence or standing for—an absolute congruence cannot signify (Stoichita 1997, 185). The experience that humans have with mirrors then is unique, “on the threshold between perception and signification” (Eco 1984, 185).

Drifting away from the notion of a sign as that which stands for and toward a more uniquely Echan understanding of a sign as that which “can be used *to lie* about the world’s state of affairs,” we see two other ways in which the mirror image, according to Eco, does not meet the requirements of a sign. First, the mirror image cannot lie. It always tells the truth in such a way that one “cannot lie with and through a mirror image” (Eco 1984, 216). Second, the mirror image cannot be interpreted. The object to which it refers can be interpreted, but the image can only be reflected for, according to Eco, the mirror image is an image without content (216–17). It is the content of an expression that can be interpreted, where an interpretation “not only defines the content of the expression, but also in its own way provides [the receiver] with more information” (215). In looking at a mirror image, the image itself is absolute in such a way that it already contains *all* of its relevant data. There is nothing that can be further known about a mirror image. For Eco the Peircean, this is important, as semiosis always *tells* us something more (Eco 1990, 23–43).

Eco’s contention that the mirror image is not a sign, however, has not gone without its detractors (Bacchini 1995, 211–24; Sonesson 2003, 217–32).² In response to these critiques, Eco chose to revisit his conception of the mirror image and clarify his position. First, mirror images do not signify, so long as the mirror in question is a simple, flat mirror (Eco 1999, 429). Think of the mirror as it is used in the majority of American households. Second, one must know that he or she is using a mirror. When this knowledge is appropriately applied, then the viewer must always “start from the principle that the mirror is telling the truth. It neither ‘translates’ nor interprets but registers what strikes it exactly as it strikes it” (365). Third, and most interesting for our purposes, Eco concludes his return to the realm of the mirror thusly: “the image we see in the mirror is not a sign, any more than the enlarged image provided by a telescope” (370).

In the end, the mirror image is not a sign for Eco. The mirror image is an absolute double that implies the presence of an object, which, as a result, tells the absolute truth in such a way that the reflection cannot be interpreted. The mirror image is exactly what it is, when it is, and as it is.

As we turn our attention to the enlarged image provided by a telescope as it is displayed in a processed telescopic image, we will primarily be keeping in mind Eco's notion of the double or that of absolute congruency. He clearly suggests that the observatory functions similarly to the bathroom—a distinction that should not be taken too far, as it only functions to uphold the tension between Eco's description of the bathroom mirror and his statement about the enlarged image of a telescope—but here one cannot help but wonder if there is more to the telescopic mirror image, which claims to “see objects as they appear thousands, millions, hundreds of millions or even billions of years ago” (Cudnik 2013, 122–223).

TELESCOPES

It was time, he thought, that tore everything to shreds . . . the silent, majestic entry of the mirrors into the camp. . . . He crouched down and put his hands on the rusty iron, stood up and looked again at the row of antennas, all pointing to the same point in the sky. And suddenly he thought of the yellow star that his mother had had to wear on her left breast during the war. A star! Stars! All those tens of thousands here had worn stars. . . . He remembered from the papers discussions on the question of whether there should be a monument to the deported in Westerbork. The survivors had been against it; everything should now be forgotten. But it was there anyway! What was the synthetic radio telescope finally but a monument, a mile in diameter, to the dead! (Mulisch 1996, 379)

The bathroom and the observatory, according to Eco (1999), have something in common. They both utilize prostheses that extend our vision, allowing us to look where our eyes cannot reach (366). One might employ a mirror in order to spy on the back of his or her head, or a telescope in order to first see and then magnify the rings of Saturn. Mirrors and telescopes allow us to accomplish what our eyes alone cannot (for a concise historical summary of the telescope, see Goldberg 1985, 191–209). Although we are all mostly familiar with the way in which a bathroom looking glass can extend our vision, we may not all be well acquainted with the scientific “ins-and-outs” of the telescope. Before thinking through Eco's theory of the mirror in relation to the telescopic or cosmic image, we will briefly summarize what a telescope is and how it functions.

Light can be focused through a lens to create an image (Fig. 3). This is done through a positive or convex lens. When two positive lenses are put together, a telescope results (Fig. 4; Andersen 2007, 37–38). “The first lens (the primary),” Geoff Andersen writes, “simply produces an intermediate image of the distant object,” while the second lens (the secondary) magnifies the image (38). It is this simple, refracting telescope that produces real images, which can be captured on film. If the secondary lens is moved closer to the primary lens, then the image that results is virtual—it cannot be projected onto a screen.

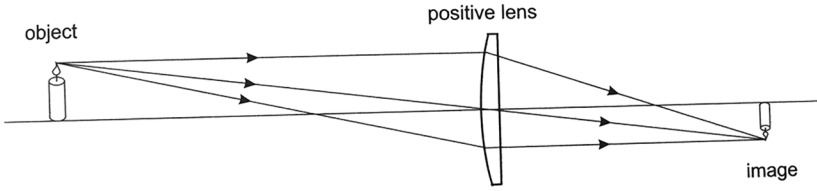


Figure 3. Convex Lens

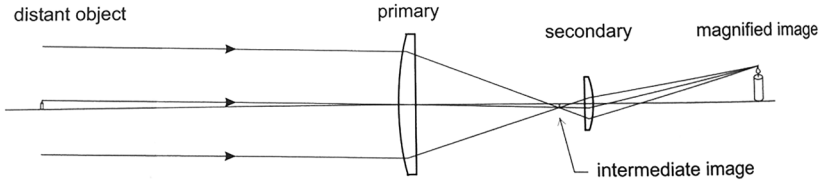


Figure 4. Refracting Telescope

It was Sir Isaac Newton who took the refracting telescope, similar to the one developed by Galileo Galilei, and improved it by changing the primary lens to that of a concave mirror (Andersen 2007, 41). In this new reflective telescope (Fig. 5), a concave mirror collected and focused light onto a “pick-off” mirror that reflected the primary image onto the magnifying lens. It is Newton’s reflective telescope, though advanced, that is still in use today (42). In fact, the telescopic mirror arrangement that we are most interested in, the Giant Magellan Telescope’s (GMT), uses a type of Newtonian reflection.

Currently in production, the GMT will utilize seven roughly 30-foot-diameter mirrors in its final design. With one mirror in the center and six circling it, the GMT will reach to a nearly 82-foot maximum diameter (Andersen 2007, 212; Rosenberg 2013, 32–41). While the design of the GMT is that of a Gregorian telescope (Fig. 6), the overall size “of the

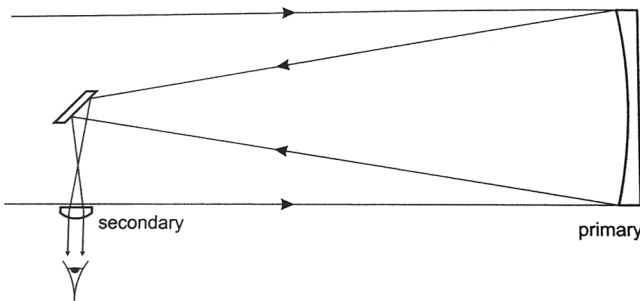


Figure 5. Reflective Telescope

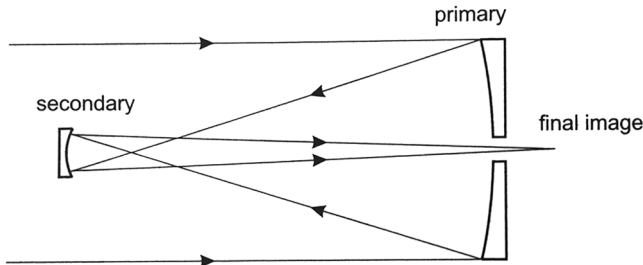


Figure 6. Gregorian Telescope

mirror ‘segment’ was chosen as this is the largest single mirror which can be fabricated by the Steward Observatory Mirror Lab at the University of Arizona” (Andersen 2007, 212). The reason for such a large primary is that with a larger mirror a greater amount of light will be collected, “and thus give us brighter images of distant objects and allow us to take images in a shorter amount of time” (Rosenberg 2013, 33). It is the hope of astronomers and physicists that—given the GMT’s size—they will be able to peer into “the beginning of the universe” (32). If this sounds strange, then that is because, for the uninitiated, it is. “The bottom line,” Brian Cudnik (2013) suggests,

is that in many cases, observing faint objects connects the astronomer with light that has traveled through interstellar or intergalactic space for up to hundreds of millions or even billions of years. As a result, we are witnessing directly the history of the universe: we see objects as they appear thousands, millions, hundreds of millions or even billions of years ago. So astronomy not only involves a look at distant objects in the universe but also a look back in time, at the history of this same universe. (xiv, 122–23)

When an astronomer views a raw image as reflected and magnified by a telescope such as that of the GMT (Fig. 7), then what he or she sees is a cosmic reflection of the past. For objects within our galaxy, “we are seeing these as they appear decades to millennia ago” (Cudnik 2013, 123). As one astronomer has claimed, the GMT’s research is “the scientific version of the story of Genesis” (Rosenberg 2013, 32). In fact, a recent article in *Nature* revealed some of the findings of a mirror constructed similarly to those of the GMT’s mirrors (Howes et al. 2015, 1–12). The stars observed by the Magellan Clay telescope had low metallicities, orbits, and binding energies that make them “prime candidates for being direct descendants of the very first stars, probing a cosmic epoch otherwise completely inaccessible currently” (1).

The telescopic image as utilized by the GMT is set to answer, according to the project’s director, a string of titillating questions: Are we alone? How did the first galaxies form? And what is the fate of the universe? In this way,



Figure 7. Rendering of the Giant Magellan Telescope

the observatory's "mirror"—as opposed to Eco's nonsignifying bathroom looking glass—will allow us to "find new answers and new meaning for who we are" (Giant Magellan Telescope 2015; <https://goo.gl/PPb0nR>). The GMT (and the telescope in general) roots out cosmic "facts" to explore notions of meaning and existence, which raises an interesting question: If the enlarged image provided by a telescope does not function as a sign, as Eco suggests, then how exactly are we to understand a cosmic reflection that is the absolute double of a vast universe?

REFLECTIONS OF THE UNIVERSE

Perhaps it was ultimately all a question of words. *Endlösung* was what the Germans had called the mass murder of Jews. What was more beautiful than the 'final solution' of something, the definitive result, the decisive result of the division of zero? It was almost like the physicists' Theory of Everything. . . . He saw the sheets very clearly in front of him. . . . And suddenly it was as though a great light were turned on in him: he understood everything! He knew the answer. . . . The so-called infinite velocity of MQ 3412 was not an error, as his colleagues all over the world thought, but revealed a constellation that had not occurred to anyone. . . . The supposed infinite velocity pointed to a distortion of perspective! It was like the vanishing point. . . . Quasar MQ 3412 wasn't a quasar at all. . . . Perhaps that was not a black hole but the primeval singularity itself: the point in the firmament where the Big Bang could still be seen! (Mulisch 1996, 521, 524–25)³

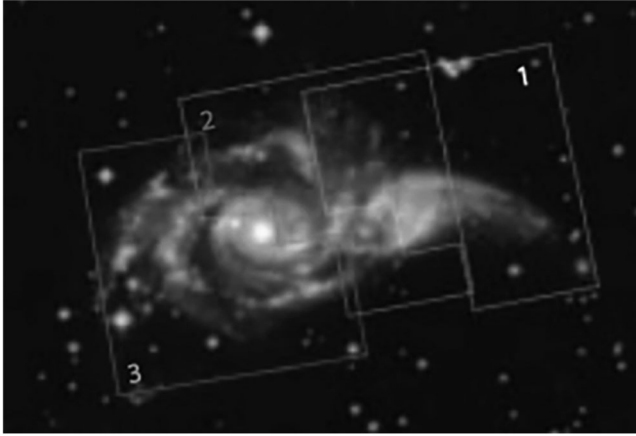


Figure 8. Stitched Together Pointings

When we peer into the ever-expanding universe and collect raw images of faint objects so far away, what exactly are we seeing? According to Ray Villard and Zoltan Levay (2002), not a lot (28–34). Raw telescopic images are often (if not always) blurry, distorted, and riddled with “noise.” In order to *see* with any clarity, these images are finely combed over with Adobe Photoshop. “Creating an honest full-color image from astronomical data,” Villard and Levay write, “is as much an art as a science. When processed correctly, an attractive and evocative picture brings out the scientific content within” (30). There is so much manipulation that accompanies the construction of a cosmic reflection that Andersen has questioned if what we are seeing is in fact the “real deal?” For him (2007), it is a “surprisingly complex question” that, given the subjective nature of vision, leads to much “uncertainty” (71). As Villard and Levay (2002) have stressed, when manipulating a cosmic reflection, they strive to tell “a science story” (30).

So how might the story of a telescopic image read? Figure 8 shows a typical ground-based collection of a distant universe. It is stitched together from what Villard and Levay call pointings, three in this case (Fig. 9a–c). Both the three pointings and the image overlay are, as can be seen, blurry and inexact. For reasons that Andersen (2007) thoroughly explains, you cannot zoom a cosmic reflection to increase its clarity. The problem lies with what he calls the “resolution limit” (46–52). For Andersen then, the processed image tells us little else besides the story constructed by the likes of Villard and Levay. When examining these images, he suggests (2007), there is little to nothing that is revealed in the way of scientific evidence (71). “So how do we know,” Andersen (2007) asks, “so much about [cosmic] objects? The answer is that we have other techniques which we can bring to bear on the problem” (71). All of this is not to suggest that Villard and

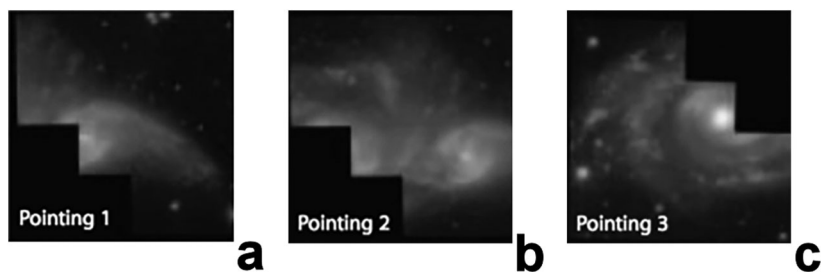


Figure 9. Individual Pointings



Figure 10. Resulting Composite

Levay's scientific art is dishonest, but rather than what we see or commonly experience as a cosmic double may not, in fact, be as simple as peeking into a bathroom looking glass. The resulting composite (Fig. 10) is clear, concise, and conveys a cosmic story. The question remains, however, if this is the absolute double as produced by the likes of the GMT's team, then how is it that Eco (1999) can claim that "the image we see in the mirror is not a sign, any more than the enlarged image provided by a telescope?" (370).

It is important to reiterate that Eco gives little thought to either Lacan or his mirror stage. Eco is interested in understanding the mirror image as an image. If Lacan can say that the mirror image is a psychological, threshold phenomenon, then Eco wants to reclaim the mirror image for semiotics. "In the event [that Lacan's] conclusions are valid," Eco (1984) writes, "they only tell us what the mirror is (or, better, what use it is for) at a single moment in the subject's ontogenesis. On the whole, the considerations of the mirror stage do not exclude that, at any further stage

in the development of symbolic life, the mirror may be used as a semiotic phenomenon” (204).

In exploring the processed cosmic image as a sign then, we are considering the mirror at a further stage in its development—the mirror turned outwards. Presumably, humanity has already had its Lacanian moment, reconciling itself to its obscure place within the cosmos (Culler 1981, 165; Mechior-Bonnet 2001, 270–74; Leone 2004, 116). While fascinating, analyzing cosmic images as Lacanian subject–object, threshold phenomena answers a different set of—most likely already considered—questions. For our purposes, we are interested in the telescope’s mature afterlife and if, thinking through Eco’s theory of the mirror, we can say anything about how or what a cosmic image might signify.

It is my contention that the processed telescopic image is not as simply understood as the reflection in my bathroom mirror. My image, brushing its teeth back at me, may not signify. But a blurry image of a vast universe cobbled together by countless hands and much coding most definitely does. Looking at Figure 10, I cannot help but ask: What is absent in this cosmic image? How can it be used to lie? What content is or is not present? Can it be interpreted? And, finally, is it a sign?

The answer (or at least mine) is that cosmic images—first collected by a telescope’s mirrors and then processed by a team of scientists—are constructions of human meaning (see also Latour 2010, 93–95). The absence implied by the “reflection” is the hands and hidden programming that make such an image possible. It is an arrangement of the cosmos that signifies the story of science, the ideal galaxy that captures humanity’s attention and stirs its exploratory soul. I do not see, for I cannot, the actual *thing*—it is at a distance that I could never travel. Its realness does little more than allow me to understand my place in a sea of stars. I look up, in other words, and see my own reflection (Mechior-Bonnet 2001, 270).

The cosmic image, as I have analyzed it, can be used to lie as well. As Andersen suggested, it tells us little in the way of scientific fact (whatever that means). It rather, along with Villard and Levay, tells us a story. But stories, Paul Ricoeur (1984) reminds us, are emplotted things, arranged just so (31–51). In this way, stories—and processed cosmic images—are perspectival, revealing a place from which to view the swirling galaxies (Harries 2001). What I see is not what you see, exactly; and how I emplot my perspective is most definitely not the way in which you emplot yours. This is not to say that an artful cosmic image is ontologically manipulative, but that it can be used to manipulate or, rather, that the processed telescopic image always signifies an emplotment, an arrangement of a story so that it can be better understood. In other, quantum words, the observer changes the observed. The object may not lie, but the perspectival observer forces the object to tell a story (Greene 2004, 77–123; Glesier 2014, 217–30). Likewise, the cosmic image does not lie, but in viewing it, I force it to tell

me something from within my own perspective. In this sense, the notion of quantum entanglement is problematically analogous to the processed telescopic image viewed from a terrestrial perspective. The cosmic image signifies—for it must *speak*—almost as soon as it is glimpsed.

The processed telescopic image is also a content-laden expression that can be interpreted. This is difficult to untangle, but we now know a few things about telescopic mirrors that might clarify Eco's theory. First, telescopic mirrors do register what strikes them exactly as it strikes them. But, and this is a significant difference, what strikes them is an "old" light, riddled with "noise," that, by its very nature, results in poor resolution. In other words, the light that strikes a telescopic mirror has traveled a greater distance than the light striking the looking glass' surface in my bathroom.

Second, the image reflected and magnified by a telescopic mirror is an image of the past. When I view my bathroom reflection, however, I see myself *almost* as I am in the present. When I regard the image reflected in that of a telescope, I see history—the cosmos as it was thousands and millions (and even billions) of years in the past. The cosmic image as history cannot help but signify. By its nature, a processed telescopic reflection tells me something more (provides me with new information) about the past.

Third, the cosmic image as history is only possible, as I understand it, because the universe is ever expanding and, potentially, infinitely large. This being the case, I could theoretically (with a powerful enough telescope) reflect the edge of the Big Bang, as remnants of that first light still linger. The processed telescopic image is much more than a simple reflection of that which first struck the telescope's mirror. It is a construction that implies a vastness that is difficult for terrestrial beings to comprehend.

A cosmic image is more than an absolute, nonsignifying double. It is, in its raw form, a blurred and obfuscated thing. In order to actually see it, many hands and well-wrought coding must first construct a picture that tells a story. When finally perceived, the processed image cannot help but signify. In the end, it speaks of cosmic history, place, and a vastness that ignites the imagination. It provides new information even as it emplots the cosmic story. It speaks and then it asks, as Andersen (2007) has suggested, "Are we alone?" (218). And in that question, the cosmic image is realized not only as a human arrangement, but also as a way in which to construct terrestrial notions of the divine (Csordas 2004, 164). I gaze at the stars to see myself and to clarify my conceptions (or nonconceptions) of the gods (Edgerton 2009, 6–10). The telescope and the mirror allow me to see that which I would not ordinarily be able to conceive of—the vastness of the universe—and therefore must signify within my already existing perceptual categories (Lotman 2000, x, xii, 54, 123–30).

But perhaps I have gone too far and there is a distinction between that which "registers what strikes it exactly as it strikes it" and the image that is constructed by many hands and much coding. For in the end,

the distinction that Eco would like me to uphold is the dividing line between Peirce's Firstness, Secondness, and Thirdness (Hoopes 1991; Abrams 2004, 627–65; Cantens 2006, 93–115; Forest 2007, 728–40; Short 2007; Broekman 2010, 3–36), which is the gap between the icon and the hypoicon. Firstness is similar to that which registers what strikes it exactly as it strikes it, like intergalactic light traveling immense distances through a dark cosmos before lapping onto the shores of the GMT's construction of mirrors. The moment it hits is "so tender that you cannot touch it without spoiling it" (Eco 1999, 100). All we can say about Firstness is that it *is* before it "induces us to pass on to Secondness, to take account of several qualities" (100). Secondness is the moment when we have to admit to something being there, opposing us. It is the instance that interpretation begins, the second that we see a fuzzy star or galaxy or universe taking shape. Thirdness then is the naming of the thing, the recognition of likeness, and the place in which semiosis is established (102). In an instance of perception then, we move from there *is* to there *is something* to there *is a star*. In this Peircean scheme, Firstness is the icon and Thirdness is the hypoicon, which, as Eco makes clear, can be both visual and nonvisual. But one helpful way of imagining the difference is by understanding the Firstness of the icon as similar to that of the *mental image* and the Thirdness of the hypoicon as similar to that of the sign as *picture* (340).

Why bring Peirce up here and now at the end of an already long reflection? Simply to clarify. The mirror image is not a sign for Eco because light striking a mirror—whether in the bathroom or the observatory—is an instance of Firstness, a moment of there *is*. This cannot, for Eco, signify, and while Eco's theory of the mirror has been thoroughly analyzed by Sonesson, I will again clarify that what I am doing here is neither critiquing Eco nor illuminating Sonesson. I am, rather, seeking to understand what Eco was up to—rightly or wrongly—in *Kant and the Platypus* as an entry point into both reflecting on mirrors as they are used in telescopes and on the mirror's role in the construction of cosmic images.

The collage of images that comprise the Whirlpool Galaxy then, the processed cosmic image of the universe as we have come to relate to it, is an instance of Thirdness. It is the place in which semiosis flourishes. Perceptual identification might happen in the blink of an eye when in the bathroom, but is stretched out in the observatory because there the icon (as opposed to the hypoicon) is a reflection of a vast universe. It is a perceptual Ground that staggers the imagination (Eco 1999, 100–06). In the observatory then, Firstness is that which strikes the mirror in all of its vast, blurry, and epochal glory. It is Eco's nonsign. Secondness is the detection of that image by the digital detector's pixels. It is the resulting raw image. And Thirdness is the mirror image as hypoicon, the final result of processing the raw image into a palatable construction. It is that which astronomers like Villard and Levay accomplish when they emplot their

image into a compelling and understandable story. In this way, perhaps we can say that Eco is right. Raw telescopic reflections do not signify in their Firstness. They are simply a collection, a brute working of the physical universe. But as soon as their light has scattered into the recesses of the observatory's computer and the initial image blooms onto the astronomer's screen, a shift has taken place and semiosis has begun.

CONCLUSION: THE COSMIC IMAGE OF RELIGION

Perhaps last night the [telescope] had received signals from the other side right through the vanishing point. . . . hence, a mathematical point, and at the same time with infinite density, infinite curvature of space-time, and infinitely high temperature. There, both the general theory of relativity and the quantum theory collapsed. . . . the whole of cosmology was the victim of an optical illusion! And wouldn't it in fact be idiotic if the beginning of the universe were not linked with infinities? . . . Who was the wretched man? Himself, looking through the vanishing point into the negative space-time to the far side of the Big Bang? God? . . . Was it all nonsense? . . . Had the [telescope] really seen the primeval singularity, perhaps seen right through it, into another, timeless world, which was therefore larger than the universe? (Mulisch 1996, 525, 528–29)

In the end, the cosmic image, in its drawn-out process from Firstness to Thirdness, is a sign. The resulting reflection from the light that strikes a telescope's mirror and illuminates our universe is more complex than Eco would have it. For the processed image is a cosmic reflection of a vast universe. Harry Mulisch in his *Discovery of Heaven*, helps mere terrestrials understand what is signified by a universe (and world) viewed as immense and indifferent. The string of mirrors that make up his fictional mile-long telescope is a monument to those lost in the "final solution," built on the grounds of a concentration camp. And it is there, in the place of humanity's greatest depravity and suffering, that the mirror turned outwards glimpses heaven, located beyond the vanishing point in negative space. If a cosmic image is a human construction reflecting back onto us our own fabrications of that which we can potentially conceive of as infinite, then it also, Mulisch suggests, is intimately connected to the ways in which we understand and give meaning to human suffering—a different kind of vastness. And perhaps, that is what the epigraphs, intertextually mirroring their content in an instance of infinite regress, tell us: the mirror turned away is not so different from the mirror turned toward.

NOTES

1. Because the Earth is 13.8 billion years old, we can assume that the universe is not infinite in time, and since the observable universe is something like 91 billion light-years across, we cannot currently assess and comment on either its finiteness or infiniteness. For further reading, see "Is the Universe Finite or Infinite? An Interview with Joseph Silk,"

European Space Agency, accessed August 2, 2016, available at http://www.esa.int/Our_Activities/Space_Science/People/Is_the_Universe_finite_or_infinite_An_interview_with_Joseph_Silk.

2. Göran Sonesson contests Eco's theory of the mirror on numerous occasions (2003, 2010, 2011, 2015). Is Sonesson correct in his analysis? Yes. Is he disproving Eco? No. Why? Because, as Sonesson even admits (2003, 12), Eco's ruminations on the mirror were philosophical thought experiments. What was needed, which Sonesson subsequently provided, was a semiotic approach to the scientific study of the mirror image. But, and this is a strong "but," if Eco is misread here as anything other than a thought experiment, then much of his nuance will be missed. Sonesson, to put it differently, overlooks both Eco's genre and the qualifications surrounding Eco's argument. Even if Sonesson is thoroughly correct in his analysis, then he still does not account for the curious statement that Eco makes: "the image we see in the mirror is not a sign, any more than the enlarged image provided by a telescope or the one we can see through a periscope" (1999, 370). In other words, what Sonesson seeks to do with regard to Eco's theory of the mirror and televised images, I am seeking to accomplish in regards to that same theory and the mirror as it is used in the modern telescope.

3. The Big Bang is, of course, everywhere. In his insistence on a cosmic vanishing point, Mulisch is employing a novelist's creative license. Do not judge him too harshly, for even the inventions of a novelist can inform our comprehension of human experiences.

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