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Performing Science: An Ecocritical Reading of *Cosmos*

I want to open today with a clip from the series finale that provides a nice teaser for examining how *Cosmos* constructs its environmental message. Though this is not the best transfer, hopefully you can catch the sounds of bird song working with the mise-en-scene to provide effective audio/visual punctuation to Sagan's discussion of the arms race – an issue representative of establishment science. I should point out that I'm splicing together two sections of the episode for the sake of time.

For the clip that best frames the issues discussed in the paper please see Cosmos: Episode 13: Who Speaks for the Earth?, beginning with the images framing Sagan in his ship of the imagination returning to Earth through the subsequent images nuclear war and Sagan's following discussion.

In his series *Cosmos*, which first aired on Public Television in September, 1980 and reached an estimated television audience of over 400 million, Carl Sagan performs the role of skeptical yet thoroughly Romantic scientist. As numerous reviewers and critics have noted, Sagan (culminating in *Cosmos*) succeeded more than anyone else of his generation in giving science a human face and rebuilding public trust in scientific ethos. In October, 1980 Sagan graced the cover of *Time* magazine, a testimony to the public spotlight he had entered after his influential role in the Viking missions and his first appearance on *The Tonight Show* in 1973. As Frederic Golden explains in his cover article, "In a turnabout as sudden as some of the scene shifts in *Cosmos*, ennui has turned into enthusiasm. Public curiosity about science, if not financial support of it, seems to be rocketing upward."¹ Though the public would have much to

remain skeptical about following decades, I contend that this shift toward a more positive view of science in American life has been crucial to the growing public acceptance of the scientific validity of global warming and the need to respond collectively, despite concerted efforts throughout the 1980s, 90s, and 2000s, by those seeking to create doubt about the claims of science. Historically, *Cosmos* is a touchstone environmental documentary because it represents a shift in the non-fiction science documentary toward an increased attention to the relationship between human society and the natural world and demonstrates the ability of the genre to influence cultural discourse on the environment.

In short, I am interested in how the series formally constructs a cultural logic of ecology that complicates the dominant logic of industrial capitalism. Combining Sagan's star persona with location shooting, dazzling cinematography and visual effects, and an emotive sound track, *Cosmos* delves headlong into its personal, popular, and political discourse of science. My talk is divided into three connected sections organized to reflect the three interrelated themes that I argue structure the program's environmental discourse. These sections focus on first, the individual; second, the public; and third, connectedness. *Cosmos* returns to these three themes repeatedly over the course of the program's thirteen episodes, discernable directly in Sagan's narration and abstractly through the televisual presentation. These three interrelated and ideologically charged concerns represent one framework through which to understand how *Cosmos* constructs its ecological vision.

The raptured individual. Dubbed the prince of popularizers by one contemporary reviewer, Sagan's star text served to bridge the gap between the scientific community and the general public by investing science with emotion. I agree with Richard Dyer that stars are the at once product of calculated institutional and self promotion and simultaneously arise in response

to a particular needs in society.² Though I acknowledge that his Cassandra-like predictions were not always accurate, Sagan identified and popularized three ecocultural catastrophes that have arguable been the central environmental concerns of the late modern era: ozone depletion, nuclear winter, and global warming. During the 70s and 80s, at a time of rapidly changing technology, shifting economic policies, and worries about energy, the public needed someone to explain science in a way that both educated and entertain the television audience; and no one filled that need quite like Sagan.

Sagan's star text was well established by the time he was approached in October, 1976 by KCET-TV in L.A. to write and star in his famous series of 13 one-hour presentations. Despite a series of setbacks discussed at length in biographies, his professional success at Harvard and then Cornell had earned him a solid reputation among scientists. As an author, Sagan's unique ability to explain complex scientific concepts in Whitmanesque, poetic/democratic diction, earned him a wide reading audience, while *The Dragons Eden* (1974) earned him a Pulitzer in general non-fiction. But it was, of course, Johnny Carson who cemented Sagan's rise to media stardom. In *Cosmos* his unique cadences and authentic passion for science were be put to their best use.

Sagan exercised a great deal of creative control over the production of *Cosmos*. The structure of the series is modeled after the award winning 1973 BBC series *The Ascent of Man*, directed by Adrian Malone and written by and starring Jacob Bronowski. Malone was brought in to craft Sagan's vision. Malone's skills as a director are crucial to the film's multi-faceted investment in the individual. Malone's direction, though critiqued for including too many close-ups of Sagan in his spaceship, is characterized by the effective use of camera movement, close-ups, shot height, and lighting to emphasize the importance of the individual.

So I can get to other things today, let me just summarize some of the key aspects of Sagan's performance. In his dress and demeanor, he transforms the idea of the traditional scientist (whether quirky and out of touch or puffed-up and clinical) from the lab coat clad representative of institutions to the turtleneck and blazer clad representative of everyday life (who just happens to have access to all corners of the world and heavens). Sagan's scientific ethos and crisp prose explanations of scientific concepts are combined with elaborately built sets, computer models, and video footage from NASA work to convince the reader of their accuracy on a number of levels. Whether cruising through the stars on his spaceship of the imagination, passionately holding forth on the dangers of nuclear arms, or pricking his finger to demonstrate the commonality between himself and an oak tree, Carl Sagan plays the raptured scientist. His passion for science takes corporeal form in his speech and body language.

In *Cosmos* Sagan negotiates a line between scientist and star, between education and entertainment that engaged millions of viewers, upset many scientists who disagreed with his arguments, and raised questions that continue to apply to such science documentaries as Brian Green's *The Elegant Universe*, Al Gore's *An Inconvenient Truth*, and Leonardo DiCaprio's *The 11th Hour*. Sagan made science attractive to the televisual viewer and also invests it with a moral significance at a critical moment in history. Like Gore, Sagan believed that science had caused our planetary problems and therefore has a moral obligation to solve them.

Science as a moral force is most strongly captured in the image of the raptured individual, both in Sagan's screen personal and other scientists portrayed in the series. In combination with Sagan's performative engagement with the beauty and elegance of the cosmos, the raptured individual is also crafted through the show's focus on individual scientists. In Episode 3, "The Harmony of the World's," Sagan and Malone turn their attention to Johannes Kepler, the 17th

century German astronomer/astrologer. The episode makes the common move of using actors and sets to (re)enact history. Like almost all of the show's featured scientists, Kepler is framed as living and working against the grain of his time. Setting Kepler within the cloister, the film works to highlight his longing for scientific truth in the face of religious indoctrination.

For a clip the best illustrates the film's use of Kepler, see Cosmos: Episode 3: The Harmony of the Worlds, especially the second half of the episode.

As a light from heaven pours in through the cloister window, Kepler is raptured with the revelation that geometry and God are one. A rapture of the secular soul. Visually foreshadowing Sagan's commentary, the slow camera pan highlights the geometric pattern in the set. The shot of Kepler walking into the light symbolizes the individual, stepping out from the shadows of the dominant ideology to make his own way in the world. Passion and skepticism work in Kepler to produce the ultimate scientist (as Sagan sees things). Realizing that that what he was learning from the Ancient Greeks contradicted the sacred teachings of the Lutheran Church, Kepler's ideas, according to Sagan, would take Europe out of the Dark Ages.

Sagan took heat from some colleagues for holding up Kepler to such heights. Certainly, the episode imbues Kepler with an importance not typically granted him in scientific history. But that seems to be precisely what Sagan had in mind. Sagan biographer Key Davidson speculates that Sagan may have concentrated on Kepler for two reasons: first, to make a point that "scientific ideas occasionally emerge from a pseudoscientific context" and second that "like Kepler, Sagan was a contradictory figure, a man with one foot in science and the other in imagination."³

Whatever reasons one may give for Kepler's inclusion, I think it more important to see the Kepler segment in its role as part of show's focus on and identification with the individual.

If a focus on the individual typifies the way *Cosmos* hails its audience, it's well worth asking why it resonated so strongly with viewers to attract so many.

Science and the Public.

Carl Sagan's rise to stardom coincides with both a positive shift in the American public's attitude toward science and, perhaps more importantly, the rise to ascendancy of neoliberal economics. As the sociologist Ulrich Beck has noted, the widespread adoption of neoliberal market economics in Western culture has coincided with a marked shift in the significance of the individual. "The ethic of individual self-fulfillment and achievement is the most powerful current in modern society. . . . Any attempt to create a new sense of social cohesion has to start from the recognition that individualism, diversity and skepticism are written into Western culture" (22-23). Beck argues that society has entered a period of "reflexive modernity." While institutions play a diminished role in shaping identity, the notion of individualism is now so deeply written into the institutions of globalization that we are all compelled to search for self-identity. *Cosmos* aired at a transitional moment in American society, in which the drive for self-identity rather than community provides the bases of social cohesion. Though not directly responding to neoliberalism, Sagan knew that an informed and sympathetic public would be essential for scientists interested in convincing the public of the dire consequences of unchecked industrialization. If the increased atomization of the individual is the hallmark of the late modern era (as Beck conceives it), *Cosmos* responds to this cultural shift by recognizing that under a neoliberal paradigm, influencing collective societal decision-making on economic, political, and environmental policy questions relies more keenly than ever on rhetorical and media strategies designed to speak directly to the individual member of society.

As noted before, an estimated 400 million viewers worldwide tuned in to watch *Cosmos*. More than ever before, these viewers watching not as nations, tribes, groups, or families, but as individuals. Thus, *Cosmos*'s attempt to influence public opinion by focusing on the individual demonstrates its ability to address a public that was increasingly a collection of individuals. Seeing the education of individual citizens as a vital aspect of future policy change Sagan anticipates such works as Alan Irwin's influential 1995 book *Citizen Science*. Irwin argues that because citizens today are barraged with competing information and ideological about science and technology the need for an informed public is more important than ever. Identifying such indicators of increased public interest in green issues as voting patterns, media attention, and green consumerism, Irwin argues that we are on the verge of a new wave of participatory science, in which the public will have increased access to the decision making process. To argue that Sagan has been a vital figure in this transition is why I came here.

Certainly the issue that seems most pressing today (though it does not diminish my fear of nuclear war) is climate change. For this last clip, I've edited together two sequences from Episode 4: "Heaven and Hell" in which Sagan and Malone use visual spectacle (including actual images from the Venus) to create a causal link between Sagan's research on the greenhouse effect on Venus to potential for global warming on earth.

The clips that illustrate this causal link are taken from Cosmos: Episode 4: Heaven and Hell," in which Sagan, over the course of the program first narrates and visualizes his own peer-reviewed and widely accepted research on the greenhouse effect on Venus combining recently shot Soviet footage from the planet and special effects and later in the episode discusses the possibility of a greenhouse effect on earth.

I'd like to close with my last section, **Connectedness**.

Though the use of multimedia spectacle to create “edutainment” has been roundly criticized by reviewers and critics, shows like *Cosmos*, *Planet Earth*, and *An Inconvenient Truth* (to name but a few) allow us to examine the potential for a paradigm shift in scholarship on the documentary. In his recent examination of the shows *Walking with Dinosaurs* and *The Elegant Universe*, José van Dijck argues convincingly that “the multimedia mix of words, sounds, and images both reflects and transforms our claims to knowledge. In fact science documentaries do not illustrate but *enable* scientific claims; they visualize knowledge while sustaining hypotheses.”⁴ Like so many science documentaries *Cosmos* works by effectively connecting the dots between ideas.

On a larger scale, it is, again, telling that *Cosmos* works so hard to encourage participatory science by focusing on the individual. The series confers a high degree of importance on the individual while blaming institutions for their repression of the raptured scientist. *Cosmos* anticipated contemporary environmental discourse, which reminds us constantly that we are connected to the planet. We are all (human and nonhuman) made up of the same star stuff, Sagan explains, and if we recognize our connection to the planet perhaps we stop thinking of nature primarily in terms of its exchange-value. *Cosmos* constructs the human as a liminal space, clearly distinguishable from the rest of nature, clearly human, yet socially interwoven with the non-human. There is more to say about the show than this paper allows, but I think if anything, the series should be considered canonical in the environmental documentary genre because it so keenly argues that the key to a preventing catastrophe is to understand the interrelated nature of the universe and that human action taken as a whole presents us with real consequences to which we must respond together as individuals on a global scale

¹ Frederic Golden, “The Cosmic Explainer,” *Time* (10/20/1980): 1-7.
<http://www.time.com/printout/0,8816,951539,00.html>

² Dyer, *Stars* (1999 version), 10-19.

³ Keay Davidson, *Carl Sagan: A Life* (New York: John Wiley & Sons) 1999.

⁴ José van Dijck, "Picturizing Science: The Science Documentary as Multimedia Spectacle," in *International Journal of Cultural Studies* 9/1 (2006): 5-24.

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