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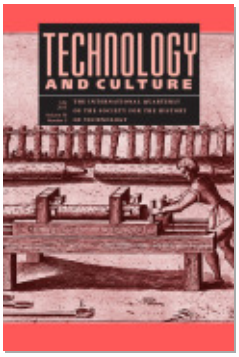

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BEYOND WORDS

Exhibiting *Cosmos*

NASSER ZAKARIYA

Viewings of the thirteen-part 2014 Fox/National Geographic television series *Cosmos: A Spacetime Odyssey* are inevitably refracted through its 1980 predecessor, *Cosmos: A Personal Voyage*, also of thirteen parts.[1] Not only does the first series still possess an enduring life in popular culture, with astronomer and popularizer Carl Sagan a lasting, if now less prominent, icon, but the new series itself explicitly invokes its forerunner. In 1980, the "scientific epic" or "cosmic evolution" projected in the first series was less widely known and elaborated, and the first *Cosmos* played a substantial role in familiarizing a television and reading public with its universal historical account. That history and scope of the universe, and the media devices domesticating it—initially rendered through the earlier computer-graphic and -compositing technologies of the first series—resound through the second series. The continuities from the first to the second *Cosmos*, from personal voyage to spacetime odyssey, include revised subject matter detailing the impossible breadth (historical and spatial) of the cosmos through identical or similar devices used to survey it: among these, the "Ship of the Imagination" to traverse the universe; the cosmic calendar, contracting the entire history of the universe to one calendar year; and natural historical re-creations and human historical reconstructions.

Ann Druyan, Sagan's coauthor and widow, and Steven Soter, his coauthor and onetime graduate student, have authored the new *Cosmos*, as they coauthored the original. Astrophysicist Neil deGrasse Tyson, who narrates the new series, is likely the most prominent science popularizer of today, experienced in explaining science and technology to varied publics, from

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1. The thirteen-part series format was inherited from the BBC, in the productions *Civilisation: A Personal View* (1969) and *The Ascent of Man: A Personal View* (1973). The personal views mentioned in the titles are those of the author and art historian Kenneth Clark and the polymath mathematician Jacob Bronowski respectively.

his early "Merlin" column at the University of Texas, through his directorship of the Hayden Planetarium, his appearances on talk shows such as the *The Colbert Report* (a counterpart to Sagan's appearances on Johnny Carson's *Tonight* show), and his narration of earlier like-minded series, such as *NOVA*'s *Origins*.[2] Given such connections and parallels, comparison and contrast with the old series—how the new reconfigures or departs from the materials of the old, and how the context of the old can be contrasted with the present—if inevitable, are also revealing of the documentary structure and cultural resonance of both series.

The "Ship of the Imagination," transporting each series narrator through the universe, is perhaps the most vivid case of such continuity and reconfiguration. Among the many stations in their voyages, both Sagan and Tyson navigate their ships in view of a galaxy-rise, a vantage point from which the entire Milky Way dawns. In the ninth episode of the original production, "The Lives of the Stars," the galaxy stands out of the window of Sagan's ship. The ship is portrayed as a star-like floret or floret-like star externally, and designed to evoke an almost basilican structure in its vaulted, unadorned hull. The scene is relatively still, the stage-like illustration of the galaxy's spiral arms partly risen over the horizon, marked by superimposition over lapping waves in alien waters. Apart from those waves, the only movement in the scene is the gradual tracking backward out from the window, drawing back to and beyond Sagan, who sits, his back to the camera, taking in the view. The music, a quieter moment from the third movement of Vangelis's *Heaven and Hell*, combined with the vaulting interior of the ship, establishes a sense of almost hushed contemplation. In reviews at the time of initial broadcast in the fall of 1980, this cathedral-like quality, married to the vaulting rhetoric of Sagan, was both celebrated and deprecated as spiritual, as an attempt to evoke a sublime pictured in the ship's window.[3] In this specific scene, there is a theatrical quality, the still, painted Milky Way forming a backcloth behind the solitary studio-stage occupied by Sagan. Even granting the production values of the time, and the emphasis on special effects in the reception of the original series, the viewer was not so much transported to this distant planet as theatrically made aware of the possibility.

In "Sisters of the Sun," the eighth episode of the 2014 series, the Milky Way also rises, as Tyson narrates, "from a planet orbiting a star in a distant globular cluster." The mirroring, sleek, silver pin that is Tyson's new "Ship

2. Though his early relationship to Sagan was limited, Tyson met with the senior astronomer in his adolescence, as the new series emphasizes, and was inspired by him. The recently established Seth MacFarlane Collection of the Carl Sagan and Ann Druyan Archive includes their correspondence, which deepens toward the end of Sagan's life.

3. See, for example, Cecil Smith, "A Window Opens on the 'Cosmos'"; Tom Shales, "'Cosmos'—Public TV's Big Bang"; Richard A. Baer Jr., "TV: Carl Sagan's Narrow View of the Cosmos"; John J. O'Connor, "Putting 'Cosmos' into Perspective."

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FIG. 1 "Cosmic Ice Sculptures: Dust Pillars in the Carina Nebula." A black-and-white version of a composite of different Hubble Space Telescope observations. The layered process of producing such images and assigning colors on the basis of varying concerns—including the necessity to create contrast and the desire to embed or reflect information concerning atomic spectra—highlights the ways in which the many connotations of exhibition and simulation are entangled with one another. The final, fabulaic product simulates a mimetic representation; the process of simulation entailed in the compositing and coloring process is guided by exhibitionary production values. Such images inform and share in the sensibility of the new *Cosmos* series and other documentaries aspiring to exhibit cosmic splendor. (Source: NASA, ESA, and the Hubble Heritage Project (STScI/AURA); courtesy of M. Livio and N. Smith.)

of the Imagination"—a physical model within a green-screen, composited with CGI views—threads through the cosmos, Tyson standing at its spherical eye, with the air of a chief executive officer navigating from a moving, glass-framed office. Every view here is panoramic and in motion: the galaxy rises quickly over the seas now, in a simulation of a sped-up video track—as if the galaxy rise had first been filmed on site in true time—the lights of the galaxy shimmering across the waters in accelerated motion (fig. 1). Music, intonation, and image are in crescendo, punctuated by the necessary transition to the next commercial advertisement.

Differences in format also shape differences in content; the most obvious is in the matter of sequence punctuation. Lead-ins to the advertisements, themselves cutting into the duration of the programs as compared to their public television counterparts, tend in the second series to be dramatized as moments of high tension or expectation. Much faster paced, filled with event and drama, the series gives less time for the contemplative mood often sustained in the original. If Sagan's voice was to some spiritual,

it was rarely energetically ecstatic; Tyson's voice is more emphatic, eventful, and suspense-oriented, reminiscent at times of voiceover in high-production film trailers. With computer-generated imagery so much at the forefront, less room is made for milder, quieter illustrations. Instead, the sensibility of the contemporary series is to visit exotic realms and times, to nurture a sense of their concreteness by opening up further the spaces where the ship of the imagination can go. So Tyson visits the slippery world of the cell, or the violent event horizon of a black hole.

The series do share a historiographic sensibility, each focusing on specific scientific figures, depictions that have elicited critique on the basis of historical fact and in relation to perceptions of the dynamics of scientific change. Early criticisms from the perspective of history of science, technology, and/or religion have been less dismissive of the overall project of the new *Cosmos*, but they too have indicted these portrayals.[4] Where the matrix of history of science, religion, and culture is represented as at play in both productions, analogous criticisms emerge. But the heat of the debates over universalism and multiculturalism, of the validity of the species voice that those such as Sagan (or Jacob Bronowski before him) adopted, has since cooled. The lessons from those debates were already felt in Sagan's attempts to move away from a culturally "provincial" view, not only as a matter of attempting to define a cosmic perspective but by working toward an appreciation of world culture (although to some this reinforced the very Western-centered universalism such critiques targeted). The new series emphasizes more, and more confidently, the scientific contributions of others than the famed "dead white men" haunting those past intra-cultural and cross-cultural debates. This emphasis does not have the character of special pleading, and relies less on prior mythic truths in order to find continuities between Western science and Near or Far Eastern mythos. That different relationship in each series to past and varied cosmological truths itself underscores the greater polarization between politicized putatively pro-scientific and pro-religious camps.[5] The political/cultural atmosphere the current series addresses takes this opposition as largely given, as playing a role in resistance not only to historical truth but to the contemporary dangers of pollution and global warming.

The overall differences in documentary sensibility between *Cosmos* old and new might be captured by attention to standard uses of the terms

4. So, while holding out hope for the series, and appreciating its efforts and effects, historians of science Robert Goulding of the University of Notre Dame and Michael Crowe, emeritus of the same, critiqued an animated segment on Giordano Bruno in the first episode of the new *Cosmos*. They found the representation of Bruno as a casualty of a conflict between dogmatic religious authority and scientific imagination historically inaccurate. See Adelaide Mena, "Science Historians Critique New 'Cosmos' Series."

5. And so Bruno, if not the figure of the scientist as a matter of his method, becomes the figure of the scientific martyr as a matter of his opposition to authoritarian religion.

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"simulation" and "exhibition." Simulation has a number of connotations inherited from or invested in scientific or computer modeling, or historical re-staging, and more recently, in the intersection of these with film and media studies.[6] As a matter of investigation of the natural world, it can often be understood as open to the future, as a process awaiting further refinement or revision. In this latter sense, it is also porous, on the understanding of simulation as requiring a feeling for the theoretical tools necessary to stage it and/or the possibility of revising it. Exhibition, in the evidentiary sense, has a slightly more enclosed connotation—as exhibiting facts presumed or presented as decided (even if the exhibitors understood that not all accept such facts in this way). The forms of participation in dominant paradigmatic exhibition, depending on the weight given to different performative contexts, have tended to be sealed off enough that disruptive or interactive installations still have the power of surprise—the surprise of being free to touch an object or circulate in a no longer rigidly demarcated space, or even to contribute to the content of an exhibit.

The treatment of science and history tends to simulation in the first series: the viewer is given time and programming space to reason and weigh the truth of the contemporaneous scientific views (whether relativity or atomic theory), the self-described speculations of the *Cosmos* authors themselves (as with the probability of life on other worlds), and the worlds they construct as visualizable and explorable. By contrast, the historical episodes and scientifically disclosed worlds in the present series tend somewhat more to (conventionally understood) exhibition. Viewers are still invited to reason along with the filmmakers over the emergence of scientific belief through, in particular, their treatment of historical subjects—especially in certain episodes such as the representation of Clair Patterson's work on lead dating and contamination in the seventh episode, "The Clean Room," or Marie Tharp's work on continental drift in the ninth episode, "The Lost Worlds of Planet Earth." But the pace and production values (now in a wider meaning) tend more to evidentiary display, in the sense of "come and see."

In this context, the most obvious difference in visual palette between the first and second series plays a slightly more ambiguous role: the extensive use of animation in the latter series. History in Sagan's *Cosmos* was constituted by costume drama, in the second *Cosmos*, by animated depiction, from Giordano Bruno to Patterson and Cecilia Payne-Gaposchkin. The logic of the animation, and the popular cultural associations with it, tend to signal less wonder-inspiring or tantalizing exhibition, and more

6. See, for example, Mark J. P. Wolf, "Subjunctive Documentary," for his claim that "computer imaging and simulation represent a shift from the perceptual to the conceptual" and for the consequences of that shift for an understanding of documentary in a "subjunctive" mode (p. 289). Note that compositing and "false color" in astronomical images are among Wolf's examples (pp. 276–78).

good-humored entertainment or youth-oriented pedagogy. As such, the strategies for promoting historical interest and for inviting intergenerational appreciation in the latter series turn less on exhibit as such, and more on the friendliness of approachable cartoons.[7] In such a medium, the subject of history, even when depicting the burning of Bruno or the gender biases experienced by Tharp, isn't foreboding. The animation in turn tends to leaven and lighten the "great person" historiography focusing on great scientific figures, presenting them somewhat less as otherworldly geniuses, or true science as the preserve of a distant elect.[8]

The reception for and context of this argument and advocacy for science have also changed since the first *Cosmos*. Some elements of these differences are already clear, with perhaps the greatest difference of reception that can already be gleaned related to that of ritualized viewing and documentary sensibility. The old series produced simultaneous viewership over broadcast television, a collective conversation preparing viewers for that evening's showing, digesting it together during and post-screening. The more flexible viewing possibilities in the present tend to less-ritualized, still more individualistic viewings of a less personal odyssey.

Such differences in aesthetics, content, and context also direct attention to the developing institutionalization of universal history since the broadcast of the original series. The possibility of and the search for life on other worlds, Sagan's particular passion throughout his life and career, are largely bracketed by the second series. Absent from *Cosmos* 2014 is discussion of the "Drake equation," posited by Sagan's Cornell colleague Frank Drake in order to estimate the number of civilizations in the galaxy possibly contactable by means of radio astronomy—an equation to which Sagan

7. Animation, it is perhaps worth emphasizing, has a long history of varied use, and the attendant theorization of it and its contemporary use in film and media need not function in ways consistent with mainstream or primetime televisual connotations.

8. The modes of computer-generated exhibition (cosmic space, evolutionary time) and cartoon-animated historicity (human time) can produce tensions both in the definitions of science posited by the new series, and in its historiography. So, initiating cosmic exploration, in the first episode Tyson speaks to the camera and testifies explicitly to a traditional view of the scientific method: "Test ideas by experiment and observation. Build on those ideas that pass the test. Reject the ones that fail. Follow the evidence wherever it leads and question everything." He adds, as commanding invitation: "Accept these terms, and the cosmos is yours. Now come with me." But bracketing the question of the validity of historical representation as raised by Goulding, Crowe, and others, Bruno is not depicted as a scientist in the animated history the series itself projects—not by the lights of the definition of the scientific method launching the odyssey. This defiant Bruno is imaginative and soars in reveries beyond the world, but speculatively, without experiment or observation. Whether Bruno of *Cosmos* is a kind of proto-scientist or a scientific/natural philosophical fellow traveler (as a freethinker) is unclear. But to include him in the lists of scientific thinkers—in the intergenerational "cooperative enterprise" embracing Sagan and Tyson as described at the end of the same episode—at the very least renders problematic the characterization of the progression of scientific thought the series emphatically posits.

devoted several minutes of broadcast time, explaining its terms on paper, by hand, and in direct lecture. Though there is the suggestion of the existence of other life in the new series, it advocates no search for it, nor is other life presented as a focal point of contemporary cosmic evolution.

If a similar cultural resonance (and dissonance) might be in store for the new series as it was for the old, that resonance is unlikely to be the result of a collective disclosure of a new "epic myth" the shape of which has already been portrayed—unless it succeeds in finding/establishing new publics still unaware of the enveloping narrative of material and organic evolution. *Cosmos* 2014 might more easily play a structuring role in emergent technologies of scientific exhibition, in the persuasive construction of fabulaic worlds, inviting new viewers to new vantage points overlooking a multiplicity of scientific worlds.

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