Bridging the Two Cultures: The Case of Science and Natural History Filmmaking

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Abstract

At Montana State University's Master of Fine Arts program in Science and Natural History Filmmaking, our goal is to re-invent these areas of documentary by admitting students with undergraduate science degrees and teaching them both production and film studies in an intensive three-year curriculum. In the course I teach, "Criticism and Theory: Science Studies for Filmmakers," I apply critical theory simultaneously to the study of science and film. There are two significant results: 1) teaching filmmakers using the tools of academic film studies can provide a conduit for the re-invention of a moribund practice such as the "blue chip" nature film; and 2) the disciplines of science studies and film theory, because they draw from the same critical theory substrate, have much more in common than has previously been written about in either the film or science studies literature.[1]

Introduction

In his famous 1959 lecture, *The Two Cultures*, C.P. Snow detailed an institutional split between the sciences and the humanities, a formulation which has had a profound influence on contemporary intellectual life. The teaching of critical theory to graduate students with undergraduate degrees in the hard sciences who want to become professional documentary filmmakers offers a compelling site for re-considering how separate the humanities and sciences need be. I will explore the surprising affinities between the application of critical theory to science (the discipline of science studies) and film (the discipline of film theory). For example, the question of "privilege" as it has been developed in feminist and critical race film theory to grapple with white and male power becomes equally powerful when hijacked to analyze the institutionalization of science in the academy. Does "scientific privilege" aptly model why the United States federal government's National Science Foundation is keeping state research universities financially solvent while the National Endowments for the Arts and Humanities are on life support?

[1] By science studies, here and elsewhere in the paper, I am referring to the field of the humanities that takes science as a cultural practice as its disciplinary focus. In *Science Studies: An Advanced Introduction*, David J. Hess divides the field into four areas: 1) history and philosophy of science, 2) institutional sociology of science, 3) social studies of knowledge, and 4) critical and cultural studies of science. Because of my training and theoretical inclinations as a critical theory scholar, my focus here will be on the last of these categories.

In short, this essay proposes to highlight the wonderful pedagogical results of a true commitment to academic interdisciplinarity. Science disciplines are not equipped to examine themselves, as the appalling lack of scientists on this, and many other such enquiries into science's role in culture, indicates.[2] The discipline of science studies has not yet begun to theorize the relationship between its use of critical theory and that which goes on in film studies and what affect that theory would have on films that attempt to document science. Film studies to date has almost completely ignored the scientific roots and uses of film technology. This essay will report on my attempt to redress these shortcomings through a triangulation of three disciplines: science, film, and theory.

Before agreeing to speak at Oxford University, I had never read *The Two Cultures*. I have, however, lived my entire professional life in between them. I have a Bachelor of Science degree in Electronic Materials Engineering from M.I.T. as well as a Ph.D. in Film Studies. I want to argue today that, at the very least, my M.F.A. students' work represents a potential third interstitial culture, and at most, a deconstruction of the very concept forwarded by Snow at Cambridge 47 years ago.

The notion of a third culture to mediate the naïve binarism of Snow's position is, of course, not new. Indeed, Snow himself addresses the possibility of "at least three cultures" (8)—he has in mind his "American sociological friends"—but "in the end [Snow] decides against" this position (9). Snow's decision is pure folly. The most productive response in this vein is that of Wolf Lepenies, who in 1985 published a book in German called *Die Drei Kulturen*, which was then translated into English in 1988 and published by Cambridge University Press, for some

[2] This essay was written in response to an Oxford Round Table invitation to reflect on the contemporary significance of C.P. Snow. The panel consisted of 40 presenters, one of whom was a bioethicist and another a medical student. The remainder of the presenters were artists and humanists.

reason cornering the British market in science studies, as *Between Literature and Science: The Rise of Sociology*.

The concept of sociology as the third culture is not without its problems. The positioning of the social sciences in between the so-called hard sciences and the humanities does not necessarily attack the fetishization of the former in a technocratic culture such as ours. Indeed, it is my belief, as a former scientist who now writes film criticism for a living, that the capitalist hierarchy of science over the humanities does great damage to our future well being as a civilization. So before moving on to building a model of filmmaking as a kind of anthropological third culture, a direct return to Snow's argument is required, as a critique of capitalism's role in science funding is most definitely not the function of the 1959 Rede Lecture.

In fact, having studied Snow's lecture in quite some detail, I am pretty firmly convinced that returning to it does more harm than good in the contemporary debates known as the science wars. While Snow's bipolar metaphor in general continues to have currency—"I believe the intellectual life of the whole of western society is increasingly being split into two polar groups," he begins (3)—the specific details of his argument now seem bound to a Cold War context which no longer presses our social policy. The entire third section, "The Scientific Revolution," is driven by a bizarre end-of-empire British lament that because his nation has lots of snooty literary theorists but no practical engineers, the US and the USSR will dominate the latter half of the century. Snow was rightfully optimistic about the United States' ability to catch up to the USSR (after the Sputnik victory), but the problems with science in the United States in a post-Cold War context now are very different: the NSF is scrambling to train US graduate students in science to defeat not communism, but third world capitalism: it is easy to fill US graduate

programs in science with Indian and Chinese applicants, but terribly difficult with American nationals, who when interested in science, want to go to medical school.

But more fundamentally, Snow's argument is based on the belief that scientists are inherently optimistic because they can act in the world productively, while the literary figures he cites are critiqued for their fascism. Snow positions scientists as optimists because they can do something about, for example, the underfed world population, while William Butler Yeats and Ezra Pound "bring Auschwitz that much nearer" (7). Having been trained in a cultural studies Ph.D. program in the 1990s, with its post-structural emphasis on applying progressive social theory to the history of textual culture, Snow's reduction of literary culture to the conservative wing of high modernism—or more precisely his channeling of his unnamed scientist colleague at this moment—is shockingly appalling. While I have no interest in replicating F.R. Leavis' bitter 1962 critique of *The Two Cultures*, for my purposes here, it is crucial to emphasize how quickly Snow's argument situates literary production under the shadow of fascism. This, I think, allows him to gloss over the most glaring anti-social example of science in the twentieth century, the development of the atomic bomb, in lieu of its ability to cure world hunger, which as we now know is not a scientific problem at all, but a political matter of distribution. Science has produced exactly what Snow said it would, an abundance of food, but this has tragically had little effect on the number of people starving to death.

A wide array of alternative political positions, even within modernist literature, could be lined up to challenge Snow's emphasis on the fascist modernists. Snow claims generally that early 20th Century art is productive of "the most imbecile expressions of anti-social feeling" (8), which, even if one accepts it as a statement of fact, can lead to querying: Anti-social to whom, and why? For example, one thinks of the scatological ending of Book 11 of James Joyce's

Ulysses in which Leopold Bloom uncontrollably flatulates while reading the text of Irish nationalist Robert Emmet's last words in a bookshop window, clearly anti-social, but in the most progressive sense of political parody. Or, more pressingly, since almost all of progressive film art (from Jean-Luc Godard to Douglas Sirk to contemporary experimental cinema) is based on Brechtian theory, one should consider the pre-modernist Bertolt Brecht play, *Baal*, written during the collapse of German monarchic society in the late teens, as anti-social a piece of literature that was ever written, a comic portrait of a rapist serial killer, but politically quite the opposite of the fascist T.S. Eliot. To seal this critique, one only need look to the virulently anti-fascist modernist Virginia Woolf, who indicts British fascism for almost precisely the same reasons that Snow does. Her *Between the Acts* is a chilling indictment of a proto-fascist British aristocracy on the brink of destruction at the hands of World War II. Is Snow's ignorance of Woolf's brand of left modernism anything other than misogyny? Does his calling high modernist literature "the traditional culture" with science being the force of progressivism, bear any reality to our current, post-structuralist understanding of the literary history of the 20th century? I certainly hope not.

In short, Snow's attack on literary culture seems so precisely focused on one moment in British literary history, and a selective version of it at that, that the argument strikes me as having merely a symbolic importance for the work that lies ahead of us. As a teacher, I want my filmmaking students, who come to our program with science degrees from the best American universities, to begin thinking like humanists. Sometimes this project will come to dovetail, if only in a negative way, with Snow's argument. For example, in Section II, "Intellectuals as Natural Luddites," Snow claims that literary intellectuals have not bothered to understand the industrial revolution (22). In my course, I have the students read Wolfgang Schivelbusch's *The*

Railway Journey as a model for how to do meaningful work on the history of technology. In that book, Schivelbusch deploys a Germanic brand of cultural studies to connect social material—for example, the development of the department store—to technological change, in this case, the transformative arrival of the railroad in the 19th century. I want my students to leave our program with the ability to make films about the history of technology with the clarity and intellectual rigor of Schivelbusch's book. This is a desperate project, since the kinds of science films being made, particularly in the United States, but also in Britain and Europe, are strong on entertainment, wavering in quality in terms of science content, and utterly devoid of social analysis. For example, a recent National Geographic special on train travel celebrates the experience of moving on a train, but does not make any gestures toward Schivelbusch's astonishing analysis of the fundamental transformation—both productive and damaging—in human experience initiated by the invention, innovation, and dissemination of railroad technology.

My project, quite different from Snow's, is a positioning of my science filmmaking graduate students as productive practitioners in a third culture, visual anthropologists who deploy humanities methodologies to understand the cultural importance of nature, science, and technology in our world. Building this third culture takes a tremendous amount of intellectual work. As the insistence of this round table on continuing to talk about C.P. Snow indicates, the academic literature in this area is still in its infancy. However, I think the basic research is there; it remains for us to package this work into more productive pedagogical frames. For example, when I tell my filmmakers to become visual anthropologists of science, they do not know what I mean, nor can I tell them precisely how to accomplish this goal. But at least a book like Bruno Latour's and Steve Woolgar's *Laboratory Life: The Construction of Scientific Facts* exists. In

that seminal work, Latour resided at a the Jonas Salk Institute in San Diego, studying bench science culture as an anthropologist would a remote tribe on some Pacific Island. Getting filmmaking students to think of themselves as anthropologists, and biology and chemistry as a culture of difference, is of course a precise example of Lepines' idea of sociology as a third culture.

However, I want to suggest a more radical, deconstructionist position. Much of twentieth century anthropology, from Claude Levi-Strauss onward, has attempted to build a participant ethnographic method in order to defeat the binary oppositions which poisoned traditional anthropology, the most pressing of which is the assumption that the tribe under study was primitive and the anthropologist civilized, a crisis easily witnessed in the current incoherent presentation of artifacts at the Pitt Rivers Museum on Oxford's campus. The design of our M.F.A. program, by admitting only students with undergraduate science degrees, tries to dismantle such binaries, sending scientists trained as filmmakers into science labs in order to document the exciting and important work that is going on there.

This project is desperately important for our society's well being. The journalistic popularization of science, and its corollary, the science film, has up until now been marred by basic theoretical problems, resulting in lifeless work. In my course, I argue passionately for the need to reinvent science and nature filmmaking by using a triangular model; there are three basic areas in need of change: art, theory, and science. That is to say, traditional science film is simultaneously not artistic enough, not theoretical enough, and not enough about science. It is probably not possible to invent an ideal science film that would do all three simultaneously. Filmmaking is a kind of zero sum game in which one agenda begins to override the other: the greater the science content, the less chance it will be couched in some artistically engaging way.

The history of educational science films, from the torturous McGraw-Hill filmstrips I suffered through in the 1970s, to the current Discovery in the Classroom projects, attests to this quite clearly.

I have meandered around this topic—sometimes dangerously, as I am by no means a philosopher of science—in order to get to deploy what I am good at, film criticism. I want to develop a textual reading of science filmmaking in order to suggest a radical deconstruction of Snow's two cultures. That is to say, while the populist presentation of science on American television has tended to be neither artistic nor theoretical, and its science content is spotty at best, this is not an inherent trait of the genre.

Take the case of Carl Sagan, arguably the most important popularizer of science in the United States in the second half of the twentieth century (although my comments would apply similarly to Stephen Jay Gould and others). I want to analyze Sagan's popular science writing first, but only because of his status as the creator of *Cosmos* (Adrian Malone, 1980), a remarkable moment in the history of science filmmaking in the United States. In a subsequent book, *The Demon-Haunted World: Science as a Candle in the Dark* (1996), Sagan develops a passionate defense of science as human civilization's best tool against barbarism. Here, Sagan's project dovetails quite precisely with Snow's. Sagan prefaces the book with a homily to his science teachers, which stands in remarkable contrast to cultural studies scholar Andrew Ross's cheeky dedication of his book, *Strange Weather: Culture, Science and Technology in the Age of Limits*, to "all the science teachers I never had."

Throughout *The Demon-Haunted World*, Sagan performs a traditional—yet important and effective—defense of reason as a tool for analyzing data. He rightfully critiques American New Ageism and other forms of occultism. His favorite contrast is that between astronomy and

astrology. However, in one small chapter, Sagan conflates what he calls pseudoscience with antiscience, his name for post-structural and post-modern critiques of science, a position that I am here advocating. Whereas I speak of scientific privilege, an adaptation of critiques of white and male privilege from whiteness and feminist theory, Sagan speaks of science envy, the roots of which perhaps emerge, unknowingly for sure, from Freud.

Sagan believes postmodern theory leads to an indefensible relativism, which of course it does not as an a priori condition. One can worry about the distorting effects of dominant ideology on the construction of knowledge without lapsing into an irrational relativism. For example, Sagan argues, "Postmodernists have criticized… Darwin's evolutionary biology for being motivated by a wish to perpetuate the privileged social class from which he came, or to justify his supposed prior atheism; and so on. Some of these claims are just. Some are not. But why does it matter what biases and emotional predispositions scientists bring to their studies—so long as they are scrupulously honest and other people with different proclivities check their results?" (257). The answer of course is that social construction, the dominant theoretical humanities apparatus of the past thirty years, dictates that even well-meaning people can inherit the subconscious biases of their era, and not be able to see beyond them. In my own work, I have come to replace my scientist's positivism, not with relativism, but with a historical materialism, a belief that there is an external world that science should quest after understanding, but with the realization that its tools, however perfected, will always be contaminated with ideological clouds for which we can never fully account. Usefully, David Hess labels this method "post-constructivist," in which frame our work would be political, cultural, evaluative, and positioned (152-154).

Sagan ends his chapter on "Antiscience" with an object lesson on how ideology destroys science, the case of Trofim Lysenko, who was charged with inventing a dialectical materialist botany in Stalin's Soviet Union. Sagan's positivist position with regard to Lysenko is implicitly critiqued in Richard Levins' and Richard Lewontin's treatment of the same historical material in *The Dialectical Biologist*. Levins and Lewontin advocate the importance of critical social theory in science in general, and the Marxist dialectic in particular. Their chapter, "The Problem of Lysenkoism," treats the same failure of the Marxist imposition of ideology onto genetics as does Sagan, but they conclude with the observation that "Lysenkoism is held up by bourgeois commentators as the supreme demonstration that conscious ideology cannot inform scientific practice and that 'ideology has no place in science'" (191). In his positivist naivete, Sagan takes the exact position that Levins and Lewontin critique: "Americans have prided themselves on being a practical, pragmatic, nonideological people" but he never interrogates the ideological implications of science's position in the capitalist political economy of the United States, which thrives off technological innovation. Levins and Lewontin highlight exactly this situation, following the discussion of Lysenko immediately with a chapter entitled, "The Commodization of Science," whose very first line is, "Modern science is a product of capitalism" (197).

My point here is not to engage in an extended defense of historical materialism and its critique of both positivism and relativism. Instead it is to suggest that science popularizers like Carl Sagan are on shaky footing when they try to critique contemporary humanities methods that seek to understand science as a cultural artifact. This is lamentable because, in sum, science films, when made with care and foresight, are completely compatible with the theoretical humanities work that I teach and for which I am here advocating. For example, in my lecture on nuclear criticism, an application of post-structural theory to atomic culture, I have the students

read Jacques Derrida's essay, "No Apocalypse, Not Now," a manifesto which argues that literary critics are as important as atomic scientists in understanding our nuclearism. Derrida points out that what is at stake in a nuclear war, as opposed to a conventional war, is the very existence of the archive of human civilization. Literary critics, he suggests, are the interpreters of the archive, and thus are experts in nuclearism for this reason.

Derrida's position has merit but is clearly open to a critique of relativism; my point however is that the French philosopher's eclectic take on nuclear civilization is almost identical to the one that Carl Sagan takes in *Cosmos*. In the last episode of that series, "Who Speaks for Earth?," Sagan stands in front of a green-screen computer reconstruction of the Library at Alexandria and tells the story of how Hypatia, its female scientist director, was flayed to death by anti-intellectual political zealots, and the contents of the library burned to the ground. Sagan uses this moving and elegant story in order to warn of our own imminent destruction at the hands of a Cold War nuclear exchange. Throughout this segment, Sagan does a good impersonation of a literary critic, commenting upon the significance of the destruction of most of Sophocles' plays, likening it to us having Shakespeare's *A Winter's Tale*, but only having vaguely heard of the existence of others such as *Hamlet* and *King Lear*, now lost to us. Thus, for this one spectacular moment, Jacques Derrida, the literary scholar protecting the archive, and Carl Sagan, the anti-poststructural science popularizer, exist in not two cultures, but only one.

It is in this one culture that I want to live. The one culture is characterized by the acquisition and dissemination of knowledge, to wit, the fundamental mission of the academy. The content of that knowledge, whether scientific data or humanist speculation about the meaning of film texts, is inconsequential. As a former engineer who now writes film criticism, I see no reason, theoretical or otherwise, why we cannot work toward producing this one culture.

Concessions on both sides will clearly need to be made. On the one hand, scientists will have to recognize that humanists are the best trained for discussing science as a cultural artifact. On the other, humanists will have to accept that in a technocratic society, scientific privilege is normative: funding in a capitalist economy will rightfully flow toward disciplines that produce what is seen as more practical knowledge.

The way I have chosen to work to create this one culture is by training filmmakers to mediate between these seemingly entombed and separate worlds. There is virtually no extant literature or sample film work to guide the way. Instead, we have to work with the shards of cultural artifacts from both worlds that open the way toward synthesis. As a scholar of science filmmaking, *Cosmos* (along with *Connections*, *Watch Mr. Wizard*, and a handful of others) light the way. Is *Cosmos* a great science film, the object that I would want my students to submit as their thesis films? Of course not. However, it is a remarkable piece of art that has, at individual moments, solutions to the two cultures impasse. Was Carl Sagan a post-structural theorist? No. But inside the Library of Alexandria, he accomplishes exactly what Derrida does in one of the masterpieces of post-structural theory, "No Apocalypse, Not Now." *Cosmos* is not a great science film, but it is so much better than what the Discovery Channel offers American viewers in 2006.

In *Watching Wildlife*, Cynthia Chris performs an ideological critique of Discovery's nature films. In the last chapter, she observes that, during the week of President Bush's "axis of evil" speech, two Discovery Channel documentaries shot in Iran refused to situate the Iranian animals in relationship to Iranian people. As a matter of profit maximization, nature films refuse to represent people, because to do so, they would have to engage political questions of ecology, which might cause people who blindly reject global warming to switch the channel. *Cosmos*, for

whatever its faults, is the most political science film ever made, celebrating the wonders of advances in cellular biology and astrophysics, while also raging against a Cold War politics which threatens our planet with nuclear annihilation.

Cosmos is full of science content, particularly about astrophysics, and it, even if accidentally, engages contemporary humanities theory. However, our program grants a Master of Fine Arts degree. Is *Cosmos* an example of great film art, the third vertex on my re-inventing science documentary triangle? My students would enter my class saying absolutely not. It features five-minute static shots of Sagan speaking into the camera about some scientific point, a taboo in documentary filmmaking. It also relies on incredibly dated special effects, essentially seventy-year-old trickery (used, for example, by 1933's *King Kong*) of filming on one plane and matting other film material into the image on another. Today, Computer Generated Imaging dominates science documentary production, making the generation of complicated images a simple computer exercise.

However, ease of construction does not necessarily translate into great art. There is a moment in *Cosmos*, in the episode, "Travels in Space and Time," in which Sagan explains to us Einstein's theory of special relativity. The film invents a simple visual analogue: a teenaged boy drives his moped away from his young brother, sitting stationary on a park bench. Sagan explains that if the moped's speed of 40 kilometers an hour were in fact the speed of light, when the teenager returned from his trip around the Italian countryside, he would be greeted by an elderly man on the park bench, his brother now grown old. The sequence ends with an elegant, masterful dissolve of the wrinkled face of the brother sitting on the park bench into the face of his boyhood.

I find this one of the most moving images in all of science film. For my purposes here, I want to compare it to *2001* (Stanley Kubrick, 1968), clearly one of the masterworks of the history of the narrative cinema. At the film's end, astronaut Dave Bowman (Keir Dullea) has traveled at the speed of light through the star gate, and is now, mysteriously, housed, along with his pod-like space capsule, in some alien zoo. Inside his space suit, an aging Bowman explores his cage, a simulation of a terrestrial 18th century antechamber. Through a doorway, Bowman sees an elderly man eating at a table. The man stops eating, gets up, and walks toward the camera. It is clearly Bowman himself, but grown much older, with white hair but still mobile, he is perhaps seventy years old. This Bowman then sees another version of himself, now an extremely elderly man, well over 100 years old, lying on his deathbed. This ancient Bowman sees the enigmatic monolith and points to it. Kubrick cuts back from the monolith to the bed, on which is now the star child, a baby in a bubble, the future of human civilization. Kubrick cuts to the famous Earthscape that ends the film. The camera pans down. The right side of the image, the glorious Earth, is now matched on the left by the similarly-sized, spherical star child. The film ends with Richard Strauss' "Thus Spoke Zarathustra" blaring out of the quadraphonic soundtrack.

Is *2001* a science film? With its intricate participation by science-fiction author Arthur C. Clarke, and its inventive presentation of multiple temporal possibilities in one physical space, it most certainly depicts revolutionary ideas in astrophysics. Is that presentation as educational as that in *Cosmos*? No, but the science of *2001* is engaging enough. Correlatively, is *Cosmos* an art film? With its elegant dissolve from the face of the elderly man, it is as emotionally stirring as the end of *2001*. Is it as great an artistic achievement as *2001*, with that film's graphic matches and other Kubrickian flourishes? No, but as an artistic experience, *Cosmos* is engaging enough

for me to still be obsessing about it twenty-five years after it made me want to become a scientist.

In sum, I have tried to bring an art film, *2001*, into contact with a science film, *Cosmos*, as exemplars of cultural artifacts produced within Snow's two cultures. However, it is clear to me that these two films are not as diametrically opposed as Snow's model would imply. At the very least, we should see filmmaking as a third culture, a bridge between the two. More radically, I am arguing that there is only one culture, and that *Cosmos* and *2001* merely inhabit difference places within it. The world I would like to inhabit is one in which scientists and humanists alike come to appreciate the importance of both of these cultural artifacts as giving us the "star stuff" out of which to grown into better, more knowledgeable, and more human beings.

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