MOSF

JOURNAL OF SCIENCE FICTION
VOLUME 2 ISSUE 1

09—
2017

Sponsored by the
Museum of Science Fiction
Washington, DC

photograph by Michael Honch

MOSF Journal of Science Fiction
Volume 2, Number 1
September 2017
ISSN 2474-0837

Articles

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Sponsored by the Museum of Science Fiction
& hosted by the University of Maryland Libraries.

Museum of Science Fiction
PO Box 88
Alexandria, VA 22313

University of Maryland Libraries
7649 Library Lane
College Park, MD 20742

Open Access Policy

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Table of Contents

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Letter from the Editor

Allow me to introduce myself: I'm Heather McHale, the new Managing Editor of the *Journal of Science Fiction*.

I am taking the reins from Monica Louzon. Monica was not just our founding editor who launched the journal and steered us through the first three issues; the Journal was her brainchild, and we're sorry to see her go. In addition to her work on the JOSF, Monica helmed the Museum of Science Fiction's wildly successful Kickstarter campaign to produce our first take-home exhibit (*Catalysts, Explorers, and Secret Keepers: Women of SF*), so backers of that campaign will hear from Monica one more time when they receive their print copies of the anthology very soon. It is a beautiful book with cover art by the talented Julie Dillon, and it's filled with exciting works of short fiction by established authors and new voices alike. We are grateful to Monica for all of her hard work and organizational genius, both here at the JOSF and as the editor of the take-home exhibit.

Aisha Matthews, who has taken on the role of assistant managing editor, has also been hard at work planning for Escape Velocity, the Museum of Science Fiction's annual convention. EV2017, which ran from September 1-September 3, was jam-packed with all kinds of great programming, including a robust literary track. Assisted by another of our editors, Jandy Hannah, Aisha put together a slate of lively, provocative panels packed with diverse, exciting speakers. We're already looking forward to Escape Velocity 2018, which will take place next May 25-27. In addition to Jandy, we are supported by the rest of our editorial staff: Bodhisattva Chattopadhyay, Thomas Connolly, Barbara Jasny, and Melanie Marotta.

We have big plans for the *JOSF* for the upcoming year, starting with our first themed issue! The next issue of the Journal, scheduled for publication in early 2018, will focus on Afrofuturism. Check out our call for papers at the end of this issue, and spread the word to the scholars you know. We are also looking to expand our pool of peer reviewers—you can find details about that in the back of this issue as well.

This issue's articles run the gamut from particle physics to art theory. Kristine Larsen makes the case for clearer, more public-facing communication from scientists in "ALICE and the Apocalypse: Particle Accelerators as Death Machines in Science Fiction." Antoinette Lafarge examines the role of ekphrasis (descriptions of art) in the works of Philip K. Dick and William Gibson. Chris Mich investigates the role of alienness and hybridity in *Robotech.* And Morgan Luck explores five features of multiverse time travel narratives, in the hope that readers, writers, and other creators will be better able to identify (and avoid?) paradoxes in their stories. In other words, issue 2.1 showcases exactly what the *JOSF* wants to be: a forum for talking about sci-fi from a variety of angles and disciplines.

The need for dialogue between scientists and the public, has never been greater than it is today, and therefore the role of science fiction and sci-fi criticism is more important than ever. Thank you to all of our authors, editors, artists, and reviewers for making the *JOSF* a success!

— Heather McHale, Ph.D.
Managing Editor, MOSF Journal of Science Fiction

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Cover Art

Cover photograph by Michael Honch, 2015

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

ALICE and the Apocalypse: Particle Accelerators as Death Machines in Science Fiction

Kristine Larsen, Central Connecticut State University

Abstract: While the general public has expressed an interest in the cutting-edge science done at particle accelerators such as CERN's Large Hadron Collider (LHC), there is a simultaneous lack of general understanding of that science. Examples include the ongoing scientific debate as to whether or not microscopic black holes could be created in the LHC, as well as the fundamental nature of the Higgs boson. This disconnect results in an atmosphere of fear and distrust as to the safety of these machines. Science fiction films such as *The Black Hole* (2006) and *Annihilation Earth* (2009), as well as the science-based thriller novel *Angels and Demons* (2000), capitalized on these fears and misconceptions, as well as shed further light upon them. The success of both popular media and conspiracy websites in feeding these fears has also demonstrated the difficulty faced by the particle physics community in effectively communicating to the general public exactly what separates science fact from science fiction. This essay illustrates how popular media has capitalized upon this new brand of apocalyptic fears and analyzes the successes and missteps of the particle physics community in communicating with the general public.

Keywords: *Angels and Demons*; *Annihilation Earth*; *The Black Hole*; Dan Brown; Large Hadron Collider; particle accelerators; particle physics; physics; public perception; science fiction; science fiction film

Mad Scientists and Misinformed Citizens

Despite the significant slowdown in nuclear arms proliferation over the decades since the end of the Cold War, the atom continued to haunt our dreams and our science fiction media. For as the accidents at Three Mile Island, Chernobyl, and Fukushima vividly demonstrated, science cannot always control the genie it has summoned, even when the goal is the peaceful creation of energy without the emission of climate-changing greenhouse gases. From the serious drama *The China Syndrome* (1979) to the gore festival of the zombie film *The Children* (1980) and the SyFy Channel's over-the-top *Atomic Twister* (2002) – featuring a tornado hitting a nuclear power plant – directors openly preyed upon the nagging fears many people have concerning the safety of nuclear power plants.

Although viewers (hopefully) understood that they were engaging with a work of science fiction, in general they had little idea as to how much science was actually interwoven with that fiction. While some films – such as the nuclear war depictions in *Threads* (1984) and *The Day After* (1983) – strove to portray their topics with as much scientific realism as possible, the same cannot be said of all similar works. Part of the reason why such works have been successful in frightening their audiences has been that they not only relied on realistic concerns about the potential destructive power of nuclear reactions, but exploited the audience members' inability to discern scientific fact from fiction, as well as their basic distrust of so-called mad scientists. The American public's lackluster performance on tests of scientific literacy has been well documented; for example, only about half of the adults surveyed in 2012 knew that electrons are smaller than atoms (National Science Board, 2016). This problem is exacerbated by the wide disparity in opinions between scientists and the general public on science-based controversial topics. For example, only 37% of the American public believes that genetically modified foods are safe for consumption, while 88% of member scientists in the American Association for the

Advancement of Science (AAAS) hold such an opinion. It is therefore not surprising that 84% of AAAS scientists (but only 14% of the American public) consider the scientific illiteracy of the American public to be a "major problem" (Funk, 2015).

In a 1956 letter, J.R.R. Tolkien condemned "the most widespread assumption of our time: that if a thing can be done, it must be done. This seems to me wholly false" (Carpenter, 2000, p. 246). More recently, this same sentiment was reflected in the words of *Jurassic Park*'s Ian Malcolm: "Science can make a nuclear reactor, but it cannot tell us not to build it. Science can make a pesticide, but cannot tell us not to use it" (Crichton, 1990, p. 314). But the archetype of a scientist playing God, seeking knowledge that brings with it considerable peril, is not a modern construct. In reality, it is even older than Mary Shelley's *Frankenstein* (1818) or Christopher Marlowe's *Doctor Faustus* (1604), hearkening back to the myth cited in the subtitle of Shelley's novel, that of Prometheus. Silver (1998) argued that the story of this Greek god

> speaks to us because it condenses, in the hideous sufferings of the protagonist, the danger and the occasional sense of transgression that accompany our probing of the natural world. And it symbolizes a very real problem...: Is the scientist to be permitted to investigate everything in nature? (p. 482).

With the advent of the Internet, such debates have moved from the inner circles of scientists and ethicists to ordinary citizens, who make their opinions known in blogs, petitions, and thematic websites. In a perfect world, the general public would skeptically read these opinions alongside those of the experts in the field and make informed decisions as to what the actual truth of the matter might be. However, when the topics are abstruse, the disaster scenarios compelling, and scientists either unable or unwilling to communicate effectively with the public (and their critics) in a respectful and transparent manner, the result has been paranoia. An important example is current research done in high energy particle accelerators, which brings together a number of scientific topics about which the general public has numerous misconceptions and anxieties, including black holes, radiation, and electromagnetism. This essay will explore how novelists, screenwriters, and other creators of popular media have successfully exploited this new Frankenstein's monster, the possibility that an "atom smasher" will, quite literally, smash the earth, creating a black hole – or something worse. It will be demonstrated that the debate over the safety of particle accelerators has been effectively integrated into science fiction literature, television series, and films, capitalizing upon apocalyptic fears fueled by the general public's fundamental misconceptions.

Accelerators and Demons

Perhaps the best-known work to draw attention to the potential catastrophic nature of particle accelerator research has been Dan Brown's *Angels and Demons* (2000). While widely classified as a thriller rather than science fiction, the novel's heavy reliance on science (and its liberties taken with said science) certainly support an analysis of it through a science fiction lens. The novel begins with a self-proclaimed fact concerning the world's largest accelerator facility, CERN (Conseil European Pour la Recherche Nucléaire), run by a consortium of 20 member states and straddling the France-Switzerland border: CERN had "recently succeeded in producing the first particles of antimatter" (Brown, 2000, p. ii). Brown's description of the basic properties of antimatter – including its propensity to immediately destruct upon contact with matter – is correct. He also notes that at that time only small amounts of antimatter had been produced by CERN, but that its Antiproton Decelerator has the potential to produce far more antimatter. He leaves the reader with the central question that frames the plot of his novel: "Will this highly volatile sub-

stance save the world, or will it be used to create the most deadly weapon ever made?" (Brown, 2000, p. ii).

The novel also dramatizes the antagonism between science and religion, both figuratively and literally. Leonardo Vetra, a Catholic priest and physicist, is murdered after he creates and contains a sample of antimatter. His intention was to "fuse science and religion" into a field he dubbed "New Physics" (Brown, 2000, p. 56). The murder of Vetra and a number of candidates for Pope (and the threatening of the Vatican with destruction by matter-antimatter annihilation) is blamed on atheist scientists, including the CERN director Kohler, and the Illuminati, a supposed secret society of scientists fighting against repression by the Church. In actuality, Camerlengo Ventresca, a close associate of the current Pope (as well as his biological son through the scientific wonders of in vitro fertilization) is the mastermind behind the entire plot. His goal is to drive a wedge between science and religion, and return people's faith to the Church and away from the secular miracles of the laboratory. One take-away message from the novel is that extremism of any form – whether in science, religion, or any other human endeavor – is dangerous. Another is that antimatter, and by association the creation of antimatter, is also inherently dangerous. There is also the classic Frankensteinian message: science cannot control that which it creates, despite its insistence to the contrary.

For example, the Camerlengo voices what he sees to be the inherent evil in both science in general, and specifically Vetra's work:

> What kind of God gives a child fire but does not warn the child of its dangers? The language of science comes with no signposts about good or bad. Science textbooks tell us how to create a nuclear reaction, and yet they contain no chapter asking us if it is a good or a bad idea.... (Brown, 2000, p. 477)

The risk posed by the possible misuse of antimatter (like any scientific discovery) should be part of the conversation between real scientists and the greater society in which they live. Even if scientists remain silent on these issues, other voices – voices less well-versed in the science, such as the fictional Camerlengo – will not.

The factoid noted in the novel's introduction was probably a reference to CERN's January 1996 announcement that it had created eleven antihydrogen atoms (made of an antielectron orbiting around an antiproton). The announcement of the discovery had been held back for several months in order for the results to be independently verified by other scientists (Browne, 1996). By 2002, CERN had created far larger amounts of antimatter, in fact over 50,000 individual anti-atoms, but they had all quickly and safely destroyed themselves in natural interactions with matter (Overbye, 2002). In November 2010 CERN announced that it had succeeded in trapping a small number of antimatter atoms (38 in all) using magnetic fields, a far cry from the portable antimatter containment devices featured in Brown's novel (Shaikh, 2010). In terms of the amount of antimatter that CERN is able to create at one time, a groundbreaking experiment reported in December 2016 was able to simultaneously trap 14 antihydrogen atoms, a sufficient number to demonstrate that, as expected, antihydrogen is the perfect reflection of hydrogen in is physical properties (Jarlett, 2016). Therefore, while Brown's novel does contain a kernel of scientific truth, it has been greatly inflated for the sake of reader interest.

But as noted by Joshua Krisch (2016) on the *Popular Mechanics* website, CERN is a "natural successor to Area 51" and as a "secret underground laboratory" the facility "just begs conspiracy theorists to speculate wildly." In response to such speculations, CERN (2011) developed its own "*Angels and Demons*: The Science Behind the Story" website to answer a barrage of questions about what CERN scientists do – and more importantly do not do – in their laboratories. The

website's frequently asked questions section also addresses issues not brought up in Brown's work, but which have recently been central to the increasing paranoia surrounding particle accelerators, including the possibility that CERN will create a black hole in the laboratory (an issue that will be discussed later in this essay). Thus in embracing public interest in the facility in light of the success of Brown's work, CERN has attempted to turn interest into good will, but, as will be seen, with mixed results.

Brookhaven and the Genesis of Fear

Fear of particle accelerators entered the public consciousness in March 1999, after the publication of an article in *Scientific American*. With the provocative title "A Little Big Bang," the article explained with great enthusiasm the scientific expectations for Brookhaven National Laboratory's soon-to-be-commissioned RHIC (Relativistic Heavy Ion Collider). By smashing together protons and atomic nuclei at high velocities, RHIC would attain temperatures and densities not "seen in the universe for several billion years" (Mukerjee, 1999, p. 60). Using "processes that mimic the big bang – but again are extremely hard to calculate," the experiment had the possibility to create conglomerates of quarks and antiquarks "and innumerable other hypothetical phenomena" (Mukerjee, 1999, pp. 63-4). The experiment could even create phenomena "as yet unimagined by theorists" (Mukerjee, 1999, p. 67). If the possible results were "hard to calculate" and possibly "unimagined," was it possible that the experiment was patently unsafe? More than one reader thought so and wrote to the periodical to voice their concerns.

A letter by Walter Wagner, a lawyer with a B.S. in biology and a minor in physics, published in the July 1999 issue, inquired if RHIC could possibly create miniature black holes, such as those proposed in the late 1970s by famed physicist Stephen Hawking. Wagner (1999) further posed the possibility that such a mini black hole could be "drawn by gravity toward the center of the planet, absorbing matter along the way and devouring the entire planet within minutes" (p. 8). Having already raised the alarm, he then threw some water on the fire by stating that his calculations showed that this would not occur, adding, "however my calculations might be wrong" (Wagner, 1999, p. 8). *Scientific American* gave rebuttal space to Princeton physicist (and later Nobel Prize recipient in physics) Frank Wilczek, who had been quoted in the original article. Wilczek (1999) acknowledged that all new explorations in science raise questions as to "whether we might unwittingly trigger some catastrophe," and therefore scientists must take such concerns "very seriously – even if the risks seem remote – because an error might have devastating consequences" (p. 8). He then affirmed that RHIC could not create Hawking mini black holes. However, to the chagrin of Brookhaven scientists, Wilczek then posited that strangelets – stable chunks of rare strange quarks – could not only be produced, but could "grow by incorporating and transforming the ordinary matter in its surroundings," something he compared to the "ice 9" scenario in Kurt Vonnegut's science fiction novel *Cat's Cradle* (Wilczek, 1999, p. 8). Wilczek attempted to calm fears by ending with the comforting thought that strangelets "if they exist at all, are not aggressive, and they will start out very, very small. So here again a doomsday scenario is not plausible" (Wilczek, 1999, p. 8).

Despite Wilczek's assurances, the damage had been done. The possibility that black holes and strangelets potentially created in a particle accelerator could pose a threat to the planet gained traction in the popular press. In response, the director of Brookhaven convened a commission of four scientists from Yale, MIT, and Princeton, including Wilczek, to craft a safety report that would hopefully allay fears. The report was released on September 28, 1999 and addressed three possible doomsday scenarios: the creation of a mini black hole or strangelet, or the transition of our universe into a new vacuum energy state. The report found that the collisions were not powerful enough to create black holes, the

production of strangelets could only occur if they came in doubly unexpected negatively charged and stable configurations (Busza et al., 1999, p. 4), and if it were possible to transition the universe to another state of being, natural processes would have already done it by now. Therefore there was nothing to worry about.

Similar conclusions were independently reached by three theoretical physicists at CERN. The trio even went so far as to assert that the RHIC experiment would produce no harmful effects in five million years of operation (Dar, De Rujula, & Heinz, 1999, p. 8). As CERN scientists, Dar et al. were not exactly unbiased observers of the Brookhaven situation. As noted in their paper, at that time CERN was constructing a new, larger collider project dubbed the Large Hadron Collider (LHC), and one of its experiments, named ALICE (A Large Ion Collider Experiment) was expected to produce energies thirty times higher than RHIC when completed (Dar et al., 1999, p. 8). Although public concerns over RHIC died down after the release of these documents, the battle was just beginning as far as the LHC was concerned, and the first salvos came from within the scientific community itself.

In 2000, Italian physicist Francesco Calogero challenged the RHIC safety reports, citing conflicts of interest among the writers and "an overarching preoccupation with the public relations consequences of what is said" (Johnson, 2009, p. 831). He specifically criticized the "lack of candor in discussing these matters" (Calogero, 2000, p. 198). Three years later, Cambridge University physicist Adrian Kent criticized the RHIC reports as well, pointing out that they were incorrectly calculating the short-term risk of producing strangelets (Johnson, 2009, p. 895). Although one might think that such arguments between scientists would be conducted out of the public eye, with the rise of electronic databases for scientific papers, especially the arxiv.org preprint archive, the dirty laundry of the physics community became visible to anyone with an Internet connection. However, how many of those from the general public who read these papers understood the physics and mathematics being debated? Regardless, the idea that the scientific community was not completely in agreement as to the likelihood of producing potentially hazardous particles became fodder for apocalyptic science fiction. Thus was born *The Black Hole* (2006).

This SyFy Channel production opens with a flyover of St. Louis, and the following subtitled text:

> In July of 1999, a panel of nuclear physicists discussed the possibility that a heavy ion collider experiment could result in the formation of a black hole.
>
> After an extended debate, the panel decided that such a scenario was not just highly unlikely, but impossible.
>
> They were wrong. (Takács, Baddish, & Davidson, 2011)

The action begins in the Midwestern Quantum Research Laboratory (MQRL), where Dr. Hauser and his associates are conducting an experiment in the dead of night. As he readies the controls, Hauser smugly notes, "let's see what God has in store for us tonight" (Takács et al., 2011). While the reference may be to the power of man to play God, it is possibly also a reference to the Higgs particle, whose existence is so central to our understanding of matter that Nobel Prize winning physicist Leon Lederman gave it the controversial nickname the God Particle.

Predictably, the experiment has a glitch, and when Hauser and an associate explore the accelerator tunnels they discover that the experiment has not only inexplicably spawned a far-from microscopic black hole, but an electromagnetic monster, along with an ever-increasing series of earthquakes. Hauser is killed by the creature, the associate is sucked into the black hole, and colleague Shannon Muir is left to deal with the

military response to the accident. Scientist Eric Bryce, one of the team's founding members, is brought back by the military to assess the situation. Bryce offers that their work "was only theoretical, and we were years from doing anything like this," but learns that his former teammates decided to accelerate their timeline due to competition from a Chinese laboratory (Takács et al., 2011).

Predictably the military's planned response is to bomb the black hole out of existence, but Bryce explains that the black hole will absorb the energy of the bomb and grow in response. He and Muir seek an alternative (non-military) response to the problem, and as the scientists track the electromagnetic monster along the city's transmission lines, the military evacuates the facility when the black hole breaches the containment walls. A local TV station's helicopter films the growth of the black hole as the increasing destruction plays out live. With the earthquakes growing in intensity, the government finally calls for an evacuation of St. Louis. Bryce argues to the skeptical military that the creature must be using wormholes to travel across the universe, and that Hauser's experiment created a weak spot in the space-time fabric of the universe that allowed the black hole – one of the mouths of the wormhole – to open up in the lab. Thus the screenwriter attempts to drag the black hole disaster scenario even further into the realm of hard science fiction. General Tate correctly summarizes the sentiments of the casual viewer: "this is just a bunch of egghead mumbo jumbo" (Takács et al., 2011). As the military prepares to drop a small nuclear missile on St. Louis, Bryce and Muir manage to lure the monster into the black hole by using a souped-up electric generator truck, sending both entities somewhere else in space and time, thus saving the world.

The film certainly raises questions about whether or not scientists could be wrong about the possibility of creating a black hole in the laboratory. It must also be acknowledged that the general public as a whole has misconceptions and fears concerning black holes themselves. For example, the average nonscientist does not understand the difference in behavior between the hypothetical microscopic Hawking black holes (theorized to have been created in the early universe and hypothetically creatable in a particle accelerator) and the garden-variety black holes formed from the deaths of stars many times heavier than our sun. Also common is the misconception that black holes are akin to cosmic vacuum cleaners, swimming through the galaxy like cosmic sharks actively seeking innocent planets, stars, and gas clouds to devour (Chandra X-ray Center, 2008). In actuality, a black hole is more parasitic than carnivorous, growing more massive only by taking advantage of easily accessible material in close proximity to it. However, scientists sometimes unwittingly bolster such misconceptions through the use of sensational language (in an attempt to capitalize on the public's fascination with these mysterious objects). For example, a podcast by the Chandra X-ray Center graphically says of the atoms in the accretion disk of a black hole that they "jostle each other with increasing ferocity as they rub together in a spiraling mosh-pit death dance as they are pulled towards the hole. So in some ways, these particles are fighting for their cosmic lives" (2008). Barry Luokkala's conjecture that part of the blame for the subsequent public misconceptions and fears concerning the LHC could be due to *The Black Hole* therefore appears to be reasonable, but fails to take into account that the scientists themselves may have fed the monster that Hollywood had created (2013).

Safety and the Large Hadron Collider: the Debate Widens

In 2008, construction of CERN's LHC was completed, and initial testing was scheduled for September. Like RHIC, the LHC would also try to recreate conditions found in the early universe, raising earlier concerns about black holes, strangelets, and other subatomic monsters. The

holy grail would be a detection of the elusive Higgs particle, the pervasive field that gives all particles in the universe their respective masses. It was anticipated that the discovery of the Higgs particle would undoubtedly earn a Nobel Prize, not only for Peter Higgs, who had initially suggested the Higgs mechanism that bears his name, but perhaps for the CERN scientists who actually found evidence of the particle.

Despite the CERN public relations office's attempt to sell its science to the general public and allay fears, too much had been written in the physics community in the preceding years that raised new specters of planet-wide destruction. Black holes had been summarily dismissed as potential problems in the case of the RHIC not only because it would not produce sufficient energy to create them, but because microscopic black holes would tend to shrink, not grow, through so-called Hawking radiation. But there has never been observational confirmation that Hawking radiation exists, and the basic calculations were originally only done for black holes formed in our normal three-dimensional space. What if the universe has more than three spatial dimensions (as predicted by string theory, and its successor, M-theory)?

A 2001 paper by physicists Stephen Giddings and Scott Thomas came to the unexpected conclusion that if space has more than three dimensions, then black holes could be created at significantly lower energies than previously predicted. In their words, "future hadron colliders such as the Large Hadron Collider will be black hole factories" (p. 1). After their paper was posted on the public arxiv.org archive, a reporter contacted Giddings, inquiring what would happen if the Hawking radiation mechanism couldn't take care of such black holes. The result was a second paper, "Black Hole Production in TeV-Scale gravity, and the Future of High Energy Physics," which demonstrated that if black holes were potentially a problem, natural high energy collisions between particles from space and our atmosphere (and other objects in space) would have already resulted in observable catastrophic events. Giddings also warned the physics community that "journalists regularly read our electronic archives!" (2001, p. 2).

The shadow of planetary annihilation had reared its head once more in the public eye, and CERN responded by issuing a lengthy safety study in 2003. All suggested catastrophe scenarios brought up in the RHIC report were revisited in light of advances in theoretical knowledge, and it was acknowledged that if space had more than three dimensions, microscopic black holes might be produced at the LHC. However, the report affirmed that the Hawking mechanism would destroy such objects before they could begin to pose a threat. In the techno-speak of the report, "black hole production does not present a conceivable risk at the LHC due to the rapid decay of the black holes through thermal processes" (Blaizot et al., 2003, p. 12). In light of the aforementioned paper by Kent and other criticism, CERN commissioned a second safety report in 2008 that similarly came to the conclusion that the LHC and its experiments did not pose a threat to the planet (Ellis et al., 2008). The result was a flurry of papers confirming and disputing the results, especially as concerned mini black holes and Hawking radiation. As CERN was forced to increasingly produce evidence that its soon-to-be commissioned machine was safe, its communications became proportionally more defensive. Their public web page "The Safety of the LHC" (CERN Press Office, n.d.) listed numerous papers and quotations from physicists and professional organizations that agreed with the findings of the 2008 safety report and dismissed critics.

One of CERN's most vocal opponents has been Walter Wagner, the author of the letter to *Scientific American* that started the backlash against RHIC in 1999. Wagner and others went so far as to file lawsuits in both Europe and America seeking to stop the initial testing at the LHC in September 2008. Despite the failure of these lawsuits, online criticism of the LHC did not

diminish. Notably, online criticism has been far more pseudoscience than science. For example, the online article "LHC restarts and 9.1 earthquake: Why?" attempts to connect the LHC to the earth's magnetic field, magnetic fields to earthquakes, and hence the LHC to recent earthquakes (Sanchez, 2011). While the statement "Earthquakes are caused by change in magnetic fields on the planet" would be considered laughable by geologists, viewers of *The Black Hole* might deem this connection plausible. Combining this with the widespread erroneous rumor that the earthquake activity occurring in recent years is somehow abnormal, one can see how some in the general public might be swayed by such a website (USGS, 2017).

The Internet has therefore been a breeding ground for criticism and hysteria concerning the LHC and other particle accelerators. For instance, an online petition by "Stephen" urged signers to protest the initial testing of the LHC, because "Many people believe the the L.H.C. can generate enough energy that could end the world. Weather it may be One Mini-Black Hole per Second, one big Black Hole, and God knows what eles [sic]." Although the petition had a stated goal of 5000 signatures, only around 1400 were collected before the petition was closed. Comments to this petition demonstrated that many of the same people who believed in the possibility of an LHC apocalypse also subscribed to the so-called 2012 hoax, the idea that the Mayan calendar predicted the end of the world on December 21, 2012. For example, one anonymous post to the petition dated January 23, 2009 (well after the LHC began operation) warned "This is a major mistake to let this thing go. The Mians [sic] and Chinese calendars both predict the world endeing [sic] in December of 2012. Could this machine be the reason?" It is therefore no surprise that a viral Internet post that began circulating in August 2008 (a month before the LHC began testing) entitled "Seven Reasons the World Will End in 2012: Scientifically Proven" listed the LHC as one of the seven causes for the presumed 2012 apocalypse (Larsen, 2013).

LHC Take Two: Annihilating Earth?

While one can discount the rants of conspiracy websites, it was far harder for the general public to ignore news stories circulating around the September 2008 opening of the LHC, with sensational headlines such as "Will man-made black holes swallow Earth?" and "Are we all going to die next Wednesday?" Not surprisingly, a poll taken by the BBC at this time found that 66% of people surveyed believed the LHC was too dangerous to switch on, and 61% of those surveyed in an AOL news poll agreed with this assessment (Sample, 2010, p. 160). The public fears also resulted in death threats against physicists, who were perceived as mad scientists bent on destroying the planet (Zahn, 2008). While the LHC did not destroy the world when it was first switched on in September 2008, it did suffer a serious accident, when a faulty electrical connection between two of its powerful magnets created a spark. This resulted in damage to several of the magnets, with some torn from anchors embedded in a concrete base (CERN Press Office, 2008). Such an accident certainly did little to bolster public confidence in the machine.

Complicating matters were statements made to the media by Sergio Bertolucci, Director for Research and Scientific Computing at CERN, in anticipation of the LHC's return to service in November 2009. The Register, a British technology website, reported on a news conference in which Bertolucci enthusiastically described the possibility that the LHC might create "unknown unknowns" including a temporary doorway to another dimension (Page, 2009). In particular, Bertolucci was quoted as offering that "Out of this door might come something, or we might send something through it," further explaining in a follow up communication with the website that although such a doorway could only be opened for a miniscule fraction of a second, "during that infinitesimal amount of time we would be able

to peer into this open door, either by getting something out of it or sending something into it" (Page, 2009). While Bertolucci added that such a connection to another dimension would pose "no risk to the stability of our world," the damage had already been done in terms of the online conspiracy community (Page, 2009). The Register's story was widely reported on conspiracy websites, including Rapture Ready, where Matt Ward (2017) wrote that he found "disturbing" the idea that both Bertolucci and Director General Rolf Heuer "admitted that one of the key overall aims of CERN's Large Hadron Collider is to open a portal to another dimension." A controversial series of papers written by physicists Holger Bech Nielsen and Masao Ninomiya smacked of conspiracy themselves, this time on the part of the universe. As reported in The New York Times a month before the collider returned to service, Nielsen and Ninomiya predicted that all experiments that sought to find the Higgs particle would be doomed to fail (i.e. suffer some sort of calamity that prevented their success), because Nature "hates Higgs particles, and attempts to avoid them"(Overbye, 2009).

In the end, even the most basic experiments sounded scary to the unprofessional ear: for example, if the Higgs particle could grant mass, could it grant enough mass to create a black hole? This scenario became the basis for perhaps the most fear-provoking of particle physics disaster films, *Annihilation Earth* (2009). This SyFy Channel original film is set in 2020, and begins with a ghostly cloud travelling along the underground tunnel of a huge particle accelerator modeled on CERN. The cloud impacts a target in a flash of light, and the scene morphs to scientists in radiation suits carefully walking through the ruins of a large city. The message is unmistakable, and only gains traction as the plotline unfolds.

Events in the movie are revealed to take place along a timeline beginning some 80 hours before "extinction," according to the subtitles that occasionally appear on the screen (Jordan & Lyon, 2009). United Nations representative Paxton informs head scientist David Wyndham that security at the Orleans, France accelerator (part of the EVE or Electromagnetic Vacuum Energy project) has been breached. At the subsequent press conference, Paxton explains that the EVE project has provided "a clean, renewable, almost limitless energy source which has reduced fossil fuel use by 65%" by remotely linking three supercolliders at Orleans, Barcelona, and Geneva, the last a direct nod to CERN (Jordan & Lyon, 2009). Representatives from the oil producing nations of the Middle East (portrayed as blatant and negative stereotypes of Arabs throughout the film) not only object to the fact that they have been left out of this technology, but that their oil is increasingly losing value. Wyndham's friend and scientific colleague, Raja Raheem Bashir, himself an Arab, has moral quandaries about the project, beyond the fact that the Arab states are being left out in the cold. "We didn't create a weapon, Raj," Wyndham tries to assure him. But Bashir ominously mentions "a program, David, that is a Pandora's Box" (Jordan & Lyon, 2009).

Bashir is afterwards framed for the security breach, and the subsequent destruction of the Orleans supercollider (with the resulting deaths of 20-30 million people), acts actually committed by known Arab terrorist Aziz Khaled. It is revealed that the metaphorical Pandora's Box has been opened, a simulation called the Doomsday Equation, through which someone might manipulate the supercolliders' system codes in such a way as to begin making Higgs fields. When she is finally told of the Doomsday Equation, Paxton accosts Wyndham: "You and Raj knew there was a 1 in a 1000 scenario where your collider system would destroy the planet and you decided to keep this information to yourselves?" (Jordan & Lyon, 2009). This accusation and the references to the Higgs field (with the inclusion of the term vacuum energy in EVE's name) all point to the screenwriters' use of the LHC safety debate as source material for their screenplay.

ALICE and the Apocalypse, continued

As the film continues, the earth's magnetic field and plate tectonics become unstable (although as previously noted there is no real connection), and as planes, satellites, and the International Space Station fall from the sky and Middle Eastern fault lines shift, Wyndham and his team survey the remains of Orleans searching for evidence that a Higgs field has been created. Wyndham explains that during the program's early days "alarmists believed that smashing together protons at these kinds of speeds would create some kind of a mini black hole which inevitably leads to the end of the world" (Jordan & Lyon, 2009). When a colleague dismisses that possibility as the delusions of "a bunch of conspiracy theorists," Wyndham has to admit that he and Bashir had discovered that it wasn't impossible, but someone would have to intentionally alter the codes of the system to achieve the Doomsday Equation (Jordan & Lyon, 2009). The presumed connection to Higgs fields is never clarified, other than the comment of an anonymous team member that "until now we never knew for sure what effects a Higgs field might have on a massive scale" (Jordan & Lyon, 2009).

Bashir is kidnapped by Khaled, who brings the scientist to the Barcelona facility and attempts to force him to destroy that collider. Bashir kills Khaled and contacts Wyndham, who is now at the Geneva facility with his family and Paxton. Bashir tries to convince Wyndham that the two remaining colliders are preventing the Higgs field from expanding, while Wyndham believes that they are feeding the Higgs field and must be shut down and rebooted. Bashir warns Wyndham that if he shuts down the Geneva facility it will create a black hole, but in the end Wyndham succumbs to Paxton's repeated exhortations that Bashir is a terrorist, and he shuts down the machine. After Wyndham tells his son that they will be okay, Wyndham, his family, and the entire earth are destroyed in a flaming explosion. White letters type across the backdrop of the debris of our planet: "Extinction" (Jordan & Lyon, 2009).The film therefore not only plays on numerous fears surrounding the LHC (and the public's inability to separate fact from fiction), but the rampant fear of terrorism in general, and Middle Eastern terrorism in particular. It is no coincidence that posts to various online LHC protest sites refer to the CERN scientists as "terrorists" bent on destruction. It is also an interesting coincidence that several months before the premiere of *Annihilation Earth* an LHC scientist was arrested (and later convicted) on suspicion of working with Al Qaeda ("Former CERN Scientist…", 2012).

The science behind *Annihilation Earth* appeared to be a mishmash of all the proposed LHC disaster scenarios previously mentioned in this paper, as well as one that so far has not – the bosenova scenario. In this case, the coolant in the LHC system would create a "super atom" that would interact with the intense magnetic fields of the machine and could theoretically erupt in a miniature version of a star exploding as a supernova. Although this scenario involves coolants other than the liquid helium used in the LHC, some LHC conspiracy hawks have nevertheless put forth this scenario as a possibility (Johnson, 2009, p. 833-4). Therefore, while this vacuum energy-Higgs-black hole-bosenova explosion dreamed up by the writers of *Annihilation Earth* is decidedly unfaithful to science, it may accurately reflect the general public's limited understanding of the issues surrounding supercolliders.

Annihilation Earth is just one extreme example of science fiction popular media that capitalized on the public's wary interest in the LHC at its 2009 restart. For example, concurrent with the return of the LHC to service, Lexus car company's L Studio posted a rather unsettling online short film called "Rift." The film, which focuses on an experiment at a particle accelerator that seeks to discover a parallel universe through the intentional creation of black holes, is seen through the eyes of the main scientist/spokesman, Blake Loch. As he ominously explains to reporters shortly before giving the signal to start the experiment, "Great scientific discoveries never occur without risk," but when he jokes, "I promise

you all, the sun will come up tomorrow," there is an uneasy lack of laughter (Huang, 2009). The experiment initially malfunctions (causing an earthquake and impressive electric spark) but apparently succeeds, as Loch unwittingly shifts from one reality to another.

In a trio of science-based suspense novels penned by Patrick Lee – *The Breach* (2010), *Ghost Country* (2011), and *Deep Sky* (2012) – the reader is led to believe that the 1978 inaugural test of the fictional Very Large Ion Collider accidentally created a dangerous wormhole that threatened the planet. Over the course of the series, it is revealed that the scientists themselves are largely the victims of a massive conspiracy involving not only the usual rogue politicians and billionaires, but travel through time and space and the search for human immortality. The wormhole (the eponymous Breach) was the intentional creation of future versions of several main characters for the purpose of influencing the past/present. However, producer Lorenzo di Bonaventura has hyped his upcoming film treatment of *The Breach* by describing it as "a story about what happens when the supercollider goes wrong… We've always heard that a black hole could open up. Something actually that no one's ever hypothesized, but a variation on it, occurs which creates a life-threatening situation for the entire world" (Chitwood, 2014). A massive conspiracy also attempts to cover up a world changing disaster at the Large Hadron Collider in the never completed (2011-12) Internet series The Apocalypse Diaries (Frost, 2016).

It is interesting to note that a group of CERN physicists actively capitalized on the public's lack of understanding (and fear) of accelerators in general, and the Higgs mechanism in particular, in creating an extremely low budget (£2,000) zombie film released online entitled Decay (Thompson & Mazur, 2012). Ph.D. student Luke Thompson was motivated to make the film by his time spent in the tunnels in the facility that connect the various buildings, convinced that "they were very creepy and would make a great setting for a horror film" (Reisz, 2013). The film was meant as a satire of the hysteria surrounding the LHC and opens with a disclaimer explaining that the film was not "authorized or endorsed by CERN. It is purely a work of fiction" (Thompson & Mazur, 2012). The plot centers on a conspiracy by the fictional Director General of CERN, who wants to continue experiments on the effects of "Higgs radiation" on living tissue at any cost, including the murder of CERN staff members and hapless graduate students. It is discovered that the Higgs radiation affects the brain, killing all parts of the organ except for the brain stem, turning a CERN scientist and his assistants into zombies when they are intentionally exposed to the radiation by the nefarious Director General. An army of the undead is unleashed upon the Geneva countryside while the Director General murders the last surviving witness to his crime in order to cover his tracks. Thompson opines that his film's "scientists are even worse than the bad scientists in Hollywood movies" (Riesz, 2013), but if one puts aside the zombies, the basic plotline is uncomfortably close to wild accusations made by Internet conspiracy theorists against CERN.

In recent years television series have also preyed upon media coverage of anxieties surrounding the LHC's return to service. *The Sparticle Mystery* (2011-15) was a British science fiction television series marketed for children. The series followed a group of children after an accident at a large particle accelerator called the Sparticle Project sent anyone aged 15 and over into a parallel dimension. Over the course of the series the children attempt to realign the two parallel universes and bring their parents home (which they succeed in doing in the final episode). When asked about the inspiration for the series, creator Alison Hume explained that

> The idea came from the Large Hadron Collider at CERN which is the biggest experiment in the world. There was a lot of media speculation about what might happen when they switched the LHC on and that got me thinking. What would children like to happen? For

> their parents, carers and the world's adults to disappear off the face of the earth of course! (Shelley, 2011)

The short-lived Fox Network science fiction series *Terra Nova* (2011) painted a portal between parallel realities in perhaps less sinister terms, but it was still portrayed as an unexpected outcome of a particle accelerator experiment. *The Boat/El Barco* (2011-13) was a Spanish television series in which a cataclysmic accident occurs at a particle accelerator in Geneva, after there had been ample warnings that the experiment was dangerous. The series focuses on a dozen college-aged students and the crew of a ship named the Pole Star who initially believe that they alone have survived a catastrophe that appears to have destroyed most of the land on earth.

In keeping with their use of Dan Brown's novel *Angels and Demons*, CERN worked with author Robert J. Sawyer to educate the public on the science and the fiction of his use of the LHC in his thriller *FlashForward* (1999). In the novel (set at the LHC in 2009), Higgs experiments cause everyone on earth to lose consciousness at the same time, as their consciousness is momentarily transported over twenty years into the future. Sawyer noted in an interview published on the CERN website that when he wrote the novel he had been aware that the LHC would be going online in 2009 and integrated that into his story from the start (Del Rosso, n.d.). An article in the CERN Bulletin noted that

> it was certainly not Sawyer's intention to create another scare story on the safety of the LHC. As he points out "*FlashForward* was first published in 1999, long before this nonsense started circulating about the LHC possibly creating a black hole or otherwise destroying the world. If I'd known that all of that was going to erupt in the media, I might have chosen another setting for my novel!" (Stracy, 2009, p. 4)

In the novel, the FlashForward is eventually discovered to have been caused by a natural astronomical event wreaking havoc with the experiment, and is therefore not the scientists' fault. However, the short-lived television adaptation (2009-10) turns the event into a terrorist attack and grand conspiracy, playing on the very same Internet fears that Sawyer had wished to avoid feeding. Therefore appearances of the LHC and other particle accelerators in popular culture during the LHC's initial scientific run overwhelmingly tended to emphasize the potential for disasters, playing on concerns for safety and sensational comments made by both scientists and conspiracy websites alike.

Post-Higgs Sound and Fury

In February 2013 the LHC completed its first run of experiments without either creating black holes or destroying the world. It was, thankfully, successful in detecting the Higgs particle in 2012 (CERN Press Office, 2012), resulting in Peter Higgs receiving a share in the 2013 Nobel Prize in Physics. Among other triumphs was the experiment ALICE achieving the hottest temperature ever created in a laboratory, around five trillion degrees Celsius or over 7 trillion degrees Fahrenheit (Hand, 2012). After a 27-month servicing shut down, the LHC fired up again in June 2015, at twice the collision energy of its earlier experiments and with the promise of further exciting discoveries to come (CERN Press Office, 2015). No planet-exploding bosenovas were produced, nor strangelets, black holes, or unstable vacuum states. There was, however, a temporary power outage in April 2016 caused by a weasel eating through electrical wiring, a problem reminiscent of a 2009 incident in which a similar loss of power was caused by a bird dropping a baguette on wiring (Imam, 2016).

Given the demonstrated safe (and successful) operation of the facility and the likewise safe (and uneventful) passing of the supposed doomsday of December 21, 2012, it might be logical to presume that both popular media and

conspiracy websites might lose their appetite for potential particle accelerator disaster scenarios. However, the reverse has actually been the case. The American television series *The Flash* (2014-) is based on the central premise that the explosion of a particle accelerator experiment (as in the case of *Annihilation Earth*, meant to provide clean energy) creates humans with super powers, including the eponymous character. While past science fiction authors have certainly appealed to high energy radiation to mutate ordinary citizens into superheroes and supervillains (perhaps most notably Dr. Bruce Banner/ The Hulk), the timing of this series, and the very specific plotline of a particle accelerator accident as the source of the radiation (an origin story that is not in the original DC Comics), is suspicious, to say the least (Hawkins, 2014). The third installment in the popular *Cloverfield* movie franchise (slated to be released in October 2017) is reportedly based on a script originally entitled "God Particle" that features an accident involving a particle accelerator and the Higgs boson. As Valerie David (2016) observed, the film's screenplay was

> originally conceived during the Large Hadron Collider's initial testing phase, which ran from 2008-2013. The enormous particle accelerator sparked many doomsday fears, including the creation of black holes and the destruction of the entire planet. While scientists insist the experiments are safe, it's easy to see how the upcoming film will tap into viewers' concerns about messing with the fabric of reality.

It is important to note that this is not a solely American phenomenon. For example, the 2013 German-Austrian disaster film *Heroes – When Your Country Needs You* (*Helden – Wenn dein Land dich braucht*), produced by television station RTL, was an unimaginative rip-off of *The Black Hole*. An accident at a Geneva particle accelerator creates a black hole that destroys much of the city, causes satellites and planes to fall from the sky, and is ultimately bombed by NATO to make it collapse. Blogger Luboš Motl (2014) laments that "the lousiness of this movie went well beyond their ludicrous opinions about physics and the scientific method.... One could be frustrated by seeing that many people – even in the cultural 'front' of the would-be pro-scientific European continent – are so hostile to particle physics."

The online community has also been busy concocting new threats, doomsday scenarios, and conspiracies concerning CERN and the LHC. For example, a statue of the Hindu deity Shiva (often called The Destroyer) on the CERN grounds (a gift from the member country of India) has been touted as evidence of the nefarious intentions of the CERN scientists. A representative claim made by blogger twclark66 (2015) insists that the statue is proof of CERN's connection to both the Illuminati and a supposed Egyptian cult of Osiris whose purpose is to build an "inter-dimensional portal" or "Stargate," apparently a reference to the film and television series of the same name. An attempt at related humor by CERN staff in 2016 backfired dramatically. A video purporting to show a human sacrifice to Shiva at CERN made the rounds on the Internet, not only forcing the facility's public relations team to officially disavow the unauthorized prank and promise an investigation (Griffin, 2016), but causing the debunking site Snopes.com to officially add the video to its repository of Internet hoaxes (LaCapria, 2017). Also publicized on the Internet was a photograph claiming to show a portal to another dimension opening up in a violent storm over CERN. Featured in a widely circulated online video created by conspiracy theory group Freedom Fighter Times, the image is actually of a thunderstorm occurring elsewhere in Switzerland taken by photographer Christopher Suarez and used without his permission (Palma, 2016).

Thus fears over the potential for the LHC to create doomsday scenarios have not been quelled. For example, as recently as February 2016, Don Lincoln, a physicist conducting research on

the CMS experiment at the LHC, wrote an oped for LiveScience.com once again debunking the pseudoscience and dispelling the concerns documented in this essay. Interestingly, Lincoln spun the potential discovery of microscopic back holes at CERN as a cause for celebration:

If we do see tiny black holes, we'll have figured out why gravity seems so weak. We'll probably have established that extra dimensions of space exist. We'll be that much closer to finding a theory of everything, a theory that is so persuasive, simple and concise that we can write its equation on a T-shirt. (Lincoln, 2016)

Likewise, some scientists are now hard at work trying to explain why the LHC hasn't created Hawking black holes as of yet (Ali, Faizal, & Khalil, 2015).

Conclusion: A Teachable Moment in Communicating Science

Misconceptions and fears concerning black holes and the Higgs particle are only two sources of the public's anxieties about the LHC. A major trigger for public fears when it comes to anything science-related is the word radiation. This term is generally used very differently in science versus the common vernacular and has a "frightening connotation for the majority of people" (Neumann, 2014, p. 358). In particular, the term is most often associated with nuclear weapons (Burgess 2004). Olof Hallonsten (2016) points out that the study of particle physics directly benefitted from the rise of the so-called Military-Industrial-Complex after World War II, and Big Science projects that are largely funded by and the product of governmental policy decisions are often viewed with suspicion by the general public (Noë 2017). There has also been a disturbing rise in the mistrust of science in some political and ideological segments of the American population over recent decades (Gauchat 2012). The open spirit of debate that is the hallmark of the scientific method is now turned against the scientific community by its critics: after all, how can scientists be trusted if they don't all agree 100% on the possibility of black holes being created in the LHC? The general public wants the comfort of certainty, whereas modern science (especially anything dealing with quantum mechanics or statistical mechanics) deals in probabilities.

It is therefore imperative that scientists accept the lessons taught by these works of science-based fiction, and put concerted effort into communicating accurate science for the general public in an engaging, respectful, and accessible manner. For example, scientists-turned-novelists Gregory Benford and David Brin have successfully incorporated the possibility of black holes being created in a laboratory in a positive manner into their respective novels *Cosm* (1998) and *Earth* (1990). It is likewise the job of responsible journalists to aid the scientific community in passing along the truth rather than succumbing to the hype. This also requires particle physicists to work with writers and directors to integrate the inherently exciting science into their art in ways that entertain without unnecessarily causing fear. The film *Interstellar* (2014) was an excellent example of productive teamwork, with black hole expert Kip Thorne acting as science advisor (Billings, 2014).

But what, precisely, is the best way to replace misconceptions and pseudoscience with proper science in the minds of the general public? Clearly words matter. Scientists need to understand that public statements about the possibility of the creation of black holes in the laboratory, attaining energies never seen since the early seconds of the early universe, or making a connection to another dimension sounds like science fiction to the general public and can evoke fears in the minds of those who are not experts in the field. However, research has shown that it is not merely a matter of improving scientific knowledge/literacy among the general public (although this should continue to be a goal of

the scientific community). Attitudes towards science are, not surprisingly, also affected by an individual's political and religious views as well as their overall trust in science/scientists, and can vary from one scientific issue to the next (National Academies of Sciences, Engineering, and Medicine, 2016). John Cook and Stephan Lewandowsky also warn that many attempts to debunk misconceptions actually strengthen belief in them. These so-called "backfire effects" result from making the misconception too familiar (so it sticks in the individual's mind), utilizing arguments that are too complicated, or directly threatening an individual's worldview (2012, p. 1). Effective countermeasures to misconceptions hinge upon presenting plainly written, concise information focusing on the main facts while clearly differentiating the real science from the pseudoscience (Cook and Lewandowsky, 2012).

The public relations staff at CERN deserves credit for beginning to implement these lessons in their statements to the general public. An example is a communication strategy utilized when conspiracy websites implicated CERN in a supposed Biblical prediction for the end of the world on September 23, 2015. Rather than draw further attention to the online conspiracy theory through an official press release, CERN quietly addressed it on their special FAQ page devoted to answering some of the specific claims circulating on social media. It tackles some of the more lurid conspiracy theories described in this paper (such as the Shiva statue and the supposed human sacrifice) in brief, pointed, and confident statements. For example, the hoaxed human sacrifice video is merely referred to as a "strange ritual" and is described as "a work of fiction showing a contrived scene. CERN does not condone this kind of action, which breaches CERN's professional guidelines. Those involved were identified and appropriate [sic] measures taken" (CERN Press Office, n.d.). Note that the language is carefully selected to defuse and downplay the potentially sensational nature of the story by focusing on the facts. That the FAQ page rose to the top of related Google search results suggests that meeting sensational screaming headlines on social media with a more deliberate and sedate approach should be the wave of the future (Mandelbaum, 2016).

As Euclides Montes reflected in 2009 in the face of the anxieties surrounding the start-up of the LHC, "Fear has always been a travel companion of scientific progress.... This deep-rooted fear of what lies just beyond us – both physically and intellectually – has characterised humanity's thirst for knowledge as well as its reaction to the advancements the quest has brought with it." In the Internet Age, these fears are also frequently stoked by "absurdities spread with the speed of light" (Sessions, 2008). Art has always reflected life through an imperfect mirror, while scientists have too often isolated themselves from the greater society in which they reside. Scientists and artists both view the natural world with awe. In working together, they not only have the potential to more effectively inform and entertain, but garner the support of the general public they both ultimately serve.

ALICE and the Apocalypse, continued

References

Ali, A. F., Faizal, M., & Khalil, K.M. (2015). Absence of black holes at LHC due to gravity's rainbow. *Physics Letters B, 743*, 295-300. doi:10.1016/j.physletb.2015.02.065

Billings, L. (2014, November). Parsing the science of *Interstellar* with physicist Kip Thorne. Retrieved from http://blogs.scientificamerican.com/observations/parsing-the-science-of-interstellar-with-physicist-kip-thorne/

Blaizot, J.-P., Iliopoulos, J., Madsen, J., Ross, G.G., Sonderegger, P., & Specht, H.-J. (2003, September). Study of potentially dangerous events during heavy-ion collisions at the LHC. Retrieved from https://cds.cern.ch/record/613175/files/CERN-2003-001.pdf

Brown, D. (2000). *Angels and demons*. New York, NY: Pocket Books.

Browne, M. W. (1996, January 5). Physicists manage to create the first antimatter atoms. *The New York Times*. Retrieved from http://www.nytimes.com/1996/01/05/world/physicists-manage-to-create-the-first-antimatter-atoms.html

Burgess, A. (2004). *Cellular phones, public fears, and a culture of precaution*. Cambridge, UK: Cambridge University Press.

Busza, W., Jaffe, R.L., Sandweiss, J., & Wilczek, F. (1999, September). Review of speculative 'disaster scenarios' at RHIC. Retrieved from https://www.bnl.gov/rhic/docs/rhicreport.pdf

Calogero, F. (2000). Might a laboratory experiment destroy planet Earth?" *Interdisciplinary Science Reviews 25*, 191-202.

Carpenter, H. (Ed.). (2000). *The Letters of J.R.R. Tolkien*. Boston, MA: Houghton Mifflin.

CERN. (2011). Angels and demons: The science behind the story. Retrieved from http://angelsand-demons.web.cern.ch/

CERN Press Office (n.d.) CERN answers queries from social media. Retrieved from http://press.cern/backgrounders/cern-answers-queries-social-media

CERN Press Office. (2012, July 4). CERN experiments observe particle consistent with the long-sought Higgs boson. Retrieved from http://press.cern/press-releases/2012/07/cern-experiments-observe-particle-consistent-long-sought-higgs-boson

CERN Press Office. (2008, October 16). CERN releases analysis of LHC incident. Retrieved from http://press.cern/press-releases/2008/10/cern-releases-analysis-lhc-incident

CERN Press Office. (2015, June 3). LHC experiments are back in business at a new record energy. Retrieved from http://press.cern/press-releases/2015/06/lhc-experiments-are-back-business-new-record-energy

CERN Press Office. (n.d.). The safety of the LHC. Retrieved from http://press.cern/backgrounders/safety-lhc

Chandra X-ray Center. (2008). The truth and lies about black holes. Chandra X-ray Observatory. Retrieved from http://chandra.harvard.edu/resources/flash/lies_about_blackholes.html

Chitwood, A. (2014, June 23). Lorenzo di Bonaventura Talks David S. Goyer's The Breach; says it involves an accident with the Large Hadron Collider. Collider. Retrieved from http://collider.com/the-breach-movie-story-details-lorenzo-di-bonaventura/

ALICE and the Apocalypse, continued

Cook, J. & Lewandowsky, S. (2011). *The Debunking Handbook*. Retrieved from https://skeptical-science.com/docs/Debunking_Handbook.pdf

Crichton, M. (1990). *Jurassic Park*. New York, NY: Knopf.

Dar, A., De Rujula, A., & Heinz, U. (1999, October 25). Will relativistic heavy-ion colliders destroy our planet? Retrieved from https://arxiv.org/abs/hep-ph/9910471

David, V. (2016, February 17). J.J. Abrams-Produced sci-fi thriller God Particle gets 2017 release date. *Screen Rant*. Retrieved from http://screenrant.com/god-particle-jj-abrams-release-date-2017/

Del Rosso, A. (n.d.). An interview with Robert J. Sawyer. Retrieved from http://flashforward.web.cern.ch/flashforward/sawyer/

Ellis, J., Giudice, G., Mangano, M.L., Tkachev, I., & Wiedemann, U. (2008). Review of the safety of LHC collisions. Retrieved from http://arxiv.org/abs/0806.3414

Former Cern nuclear physicist jailed for al-Qaida terrorist plot. *The Guardian, World news* (2012, May 4). Retrieved from https://www.theguardian.com/world/2012/may/04/cern-nuclear-physicist-jailed-al-qaida-plot

Frost, C. (2016). The Apocalypse Diaries. Available at http://theapocalypsediaries.com/

Funk, C. (2015, January 29). Public and scientists' views on science and society. Retrieved from http://www.pewInternet.org/2015/01/29/public-and-scientists-views-on-science-and-society/

Gauchat, G. (2012). Politicization of science in the public sphere: a study of public trust in the United States, 1974 to 2010. *American Sociological Review 77(2)*, 167-87.

Giddings, S. B. (2001). Black hole production in TeV-scale gravity, and the future of high energy physics. Retrieved from https://arxiv.org/abs/hep-ph/0110127

Giddings, S. B., & Thomas, S. (2001). High energy colliders as black hole factories. Retrieved from http://arxiv.org/abs/hep-ph/0106219

Griffin, A. (2016, August 18). 'Human sacrifice' staged at CERN, home of the God Particle. Retrieved from http://www.independent.co.uk/news/science/cern-human-sacrifice-video-watch-hadron-collider-god-particle-a7196881.html

Hallonsten, O. (2016). *Big science transformed: science, politics and organization in Europe and the United States*. New York, NY: Springer.

Hand, E. (2012, August 13). Hot stuff: CERN physicists create record-breaking subatomic soup. Retrieved from http://blogs.nature.com/news/2012/08/hot-stuff-cern-physicists-create-record-breaking-subatomic-soup.html

Hawkins, K. (2014, December 9). Is 'The Flash' particle accelerator in the DC Comics? The CW is giving S.T.A.R. Labs a bigger role in Barry's origins. Retrieved from http://www.bustle.com/articles/52911-is-the-flash-particle-accelerator-in-dc-comics-the-cw-is-giving-star-labs-a-bigger

Huang, A. (Director). (2009 September 29). *Rift*. Retrieved from https://www.youtube.com/watch?v=msnZShgdBrY

Imam, J. (2016, April). Weasel knocks out CERN's powerful particle accelerator. Retrieved from http://www.cnn.com/2016/04/29/tech/cern-weasel-irpt/

Jarlett, H.K. (2016, December 19). ALPHA observes light spectrum of antimatter for first time. Retrieved from https://home.cern/about/

ALICE and the Apocalypse, continued

updates/2016/12/alpha-observes-light-spectrum-antimatter-first-time

Johnson, E. E. (2009). The black hole case: The injunction against the end of the world. *Tennessee Law Review 76*, 819-908.

Jordan, R. (Writer), & Lyon, N. (Director). (2009, December 12). *Annihilation Earth* [Television Broadcast]. New York, NY: SyFy Channel.

Krisch, J.A. (2016 January 7). 9 Utterly Ridiculous Conspiracy Theories. *Popular Mechanics*. Retrieved from http://www.popularmechanics.com/science/environment/g130/9-utterly-ridiculous-conspiracy-theories/

LaCapria, K. (2017, June 19). Human sacrifice captured at CERN? *Snopes*. Retrived from http://www.snopes.com/human-sacrifice-captured-at-cern/

Larsen, K. (2013). "Viral Email and the 2012 Apocalypse Contagion: Seven Reasons Why the World WON'T End in 2012." In *Prophecy and the New Millennium - When Prophecies Persist*, eds. Sarah Harvey and Suzanne Newcombe. Ashgate Press, pp. 239-54.

Lincoln, D. (2016, February 10). Will the world's largest supercollider spawn a black hole? Retrieved from http://www.livescience.com/53669-can-particle-accelerators-spawn-black-holes-and-global-extinction.html

Luokkala, B. (2013). *Exploring science through science fiction*. New York, NY: Springer.

Mandelbaum, R.F. (2016, January 1). Debunking doomsday at CERN, again. Science Line. Retrieved from http://scienceline.org/2016/01/debunking-doomsday-at-cern-again/

Montes, E. (2009, November 19). Fear and the Large Hadron Collider. *The Guardian*. Retrieved from https://www.theguardian.com/commentisfree/2009/nov/19/fear-large-hadron-collider

Motl, L. (2016, April 26). LHC black hole: a catastrophic movie. Retrieved from http://motls.blogspot.com/2014/04/lhc-black-hole-catastrophic-movie.html,

Mukerjee, M. (1999). A little Big Bang. *Scientific American 280*(3), 60-67.

National Academies of Sciences, Engineering, and Medicine. (2016). *Science literacy: concepts, contexts, and consequences*. Washington, DC: National Academies Press.

National Science Board. (2016). Correct answers to factual knowledge questions in physical and biological sciences: 1990–2014. Retrieved from http://www.nsf.gov/statistics/2016/nsb20161/#/report/chapter-7/public-knowledge-about-s-t

Neumann, S. (2014). Three misconceptions about radiation – and what we teachers can do to confront them. *The Physics Teacher 52*, 357-59.

Noë, A. (2017, February 10). Can we trust science? *NPR*. Retrieved from http://www.npr.org/sections/13.7/2017/02/10/514466107/can-we-trust-science

Overbye, D. (2002, September 19). Physicists' antimatter recipe is more sci- than fi. *The New York Times*. Retrieved from http://www.nytimes.com/2002/09/19/us/physicists-antimatter-recipe-is-more-sci-than-fi.html

-----. (2009, October 12). The collider, the particle, and a theory about fate. *The New York Times*. Retrieved from http://www.nytimes.com/2009/10/13/science/space/13lhc.html

Page, L. (2009, November 6). 'Something may come through' dimensional 'doors' at LHC. *The Register*. Retrieved from http://www.theregister.co.uk/2009/11/06/lhc_dimensional_portals/

ALICE and the Apocalypse, continued

Palma, B. (2016, August 25). It's just a storm. *Snopes*. Retrieved from http://www.snopes.com/clouds-over-geneva-show-cern-opening-a-portal-to-a-new-dimension/

STOP CERN'S L.H.C., SAVE EARTH! [Online petition.] Retrieved from http://www.thepetitionsite.com/1/the-LHC/

Reisz, M. (2013, January 10). Students fight for their lives as living and dead collide. *Times Higher Education*. Retrieved from https://www.timeshighereducation.com/students-fight-for-their-lives-as-living-and-dead-collide/422289.article

Sanchez, L. (2011, March 20). LHC restarts and 9.1 earthquake: Why? Retrieved from https://ascendingstarseed.wordpress.com/2011/03/20/lhc-restarts-9-earthquake-why/

Sample, I. (2010). *Massive: The missing particle that sparked the greatest hunt in science*. New York, NY: Basic Books.

Sessions, L. (2008, September 9). The real danger of the Large Hadron Collider. *EarthSky*. Retrieved from http://earthsky.org/human-world/the-real-danger-of-the-lhc

Shaikh, T. (2010, November 18). Scientists capture antimatter atoms in particle breakthrough. Retrieved from http://www.cnn.com/2010/WORLD/europe/11/18/switzerland.cern.antimatter/

Shelley, P. (2011, March 1). Alison Hume/The Sparticle Mystery Interview. Script Consultant Blog. Retrieved from http://script-consultant.co.uk/2011/03/01/blog-alison-hume-sparticle-mystery-interview/

Silver, B. (1998). *The ascent of science*. Oxford, UK: Oxford University Press.

Stephen. (2008, August). Stop CERN's L.H.C. Retrieved from http://www.thepetitionsite.com/es-es/1/the-LHC/

Stracy, M. (2009, October). The back-story on FlashForward. *CERN Bulletin #41/42*, 4.

Takács, T. (Director), Badish, K., & Davidson B. (Producers). (2006). *The Black Hole* [DVD]. United States: Echo Bridge Home Entertainment.

Thompson, L., & Mazur, M. (Directors). (2012). *Decay* [Video]. Available from https://www.decayfilm.com/.

Twclark66. (2015 April 11). CERN –Shiva, ancient fallen angel technology & The Illuminati. Retrieved from https://twclark66.wordpress.com/2013/10/08/cern-shiva-ancient-fallen-angel-technology-the-illuminati/

USGS. (2017, June 21). Earthquake myths FAQs. Retrieved from https://www2.usgs.gov/faq/categories/9830/3355%20

Wagner, W. (1999). Black holes at Brookhaven? *Scientific American 280*(5), 8.

Ward, Matt (2017, February 7). CERN, the Large Hadron Collider, and Bible prophecy. Retrieved from http://www.raptureready.com/2015/03/30/cern-large-hadron-collider-bible-prophecy-matt-ward/

Wilczek, F. (1999). Reply to black holes at Brookhaven? *Scientific American 280*(5), 8.

Zahn, D. (2008, September 6). Fear of black hole machine triggers threats to researchers. Retrieved from http://www.wnd.com/2008/09/74461/

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

"Alive in the Now": Ekphrasis in Philip K. Dick and William Gibson

Antoinette LaFarge, University of California, Irvine

Abstract: There is a long literary tradition of describing works of art within fiction, a rhetorical strategy known as ekphrasis. This essay considers its function in the work of two American science fiction authors who have made extensive and robust use of the trope: Philip K. Dick and William Gibson. Both deploy ekphrasis as part of their consideration of the relationship between art, craft, and techne, and as a way to interrogate what counts as authenticity and authorship in worlds where various forms of reproduction and replication abound. Dick's use of art as a signifier of the human and a litmus test for spiritual truth in a degraded culture is elucidated through an examination of several short stories and two novels (*Do Androids Dream of Electric Sheep?* and *The Man in the High Castle*). Gibson's rather different use of art in the novel *Count Zero* is analyzed for its use of an art world taboo, forgery. Gibson centers an important plot arc around a set of art fakes, assemblages in the style of the 20th century American artist Joseph Cornell. The Cornell fakes and their surprising creator (whose identity is withheld for much of the novel) allow Gibson to examine the boundaries of what counts as art, how art is entangled with experience and physical being, and how art intersects with late capitalism. In both authors, ekphrasis provides a way to unsettle specific ideas on which their novels otherwise depend, notably cyborgism in Dick and ubiquitous virtuality in Gibson.

Keywords: science fiction, art, literature, ekphrasis, Philip K. Dick, William Gibson

As both a visual artist and a writer, I am acutely attuned to the ways in which art is described in fiction and poetry. The literary description of works of art is termed ekphrasis, from the Greek word ekphrazein, meaning to describe or point out. Ekphrasis has a very long history, with the description of Achilles' shield in book 18 of Homer's *Iliad* often given as the founding example in Euro-American literary history (Corn, 2008; Kaplan, 2009). Paintings in particular often receive this treatment; in poetry, among the better-known examples are W.H. Auden's treatment of Pieter Bruegel the Elder's work in "Musée des Beaux Arts" (1938), and Anne Sexton's use of Vincent Van Gogh in "The Starry Night" (1961). In fiction, notable examples of ekphrasis include Charlotte Bronte's invocation of a painting of Cleopatra in her novel *Villette* (1853), Oscar Wilde's *Portrait of Dorian Gray* (1890), and a painting of the Marriage at Cana in Robertson Davies' novel *What's Bred in the Bone* (1985).

Science fiction likewise takes advantage of ekphrastic description; examples can be found in the work of writers as diverse as H.G. Wells, Margaret Atwood, and J.G. Ballard. A classic example is Roger Zelazny's 1985 novella *24 Views of Mt. Fuji, by Hokusai* (2009), in which the eponymous series of prints by the Japanese artist Hokusai—and descriptions thereof—serve as a structuring device for the entire plot. The following typical description from this novella is a study in absences:

> I study the print: A soft blueness to the dawn sky, Fuji to the left, seen through the teahouse window by two women; other bowed, drowsing figures like puppets on a shelf.... It is not this way here, now. They are gone, like the barrel-maker—the people, the teahouse, that dawn. Only the mountain and the print remain of the moment. But that is enough. (p. 363)

Zelazny's attempt to bring the artwork into the present moment of the novel reveals two absences: first of the physical artwork itself (leaving the reader with text in its place), and second of what is represented within the missing work—the people, the place, and the day, all of which are "gone." Gary Shapiro (2007, p. 14) argues that is gaps of these kinds that actually enable ekphrasis.

A couple of more recent examples appear in Connie Willis's time-travel novels. In *To Say Nothing of the Dog* (1997), several characters are seeking a mysterious MacGuffin called the "bishop's bird stump," which late in the novel is revealed to be a Victorian ceramic vase. In this case, the otherness of the ekphrastic object as both missing and detached from its original physicality (Mitchell, 1995) is amplified by the otherness of being outside of the correct space-time as a 19th century curiosity transported into the future. In *All Clear*, the second volume of her two-part novel *Blackout/All Clear* (2010), an allegorical painting of Christ, The Light of the World, by the British Pre-Raphaelite painter William Holman Hunt stands as a signifier of hope during the London Blitz.

Some scholars of ekphrasis focus on its role as a representation of a representation, as in the Zelazny excerpt given earlier. For example, James A. Heffernan (1993), terms ekphrasis "a verbal representation of a visual representation" (p. 3), framing it essentially as a matter of description. Acknowledging incommensurability between the visual and verbal realms of experience, Lawrence Venuit frames ekphrasis as a translation (Moxey, 2013, p. 95), while William Mitchell (1995, p. 163) terms it a double translation or encoding that moves from image to text and back to an image formed in the reader's mind. Barbara K. Fisher (2006) underlines ekphrasis as "an interpretive occasion" (p. 2), recognizing an explicit discursive function that extends beyond showing.

Other writers take an expansive view of ekphrasis that extends beyond the localized literary device. Mitchell (1995) ends by arguing that ekphrasis, with its potential to encompass every possible kind of image including those (like Achilles' shield) that may never have existed at all, "aims to be all of literature in miniature" (p. 181). Jas Elsner (2010) argues persuasively that the entire field of art history is "nothing other than" ekphrasis writ large (p. 11). Following both, it could even be argued that the science fiction novel itself is something of an ekphrastic enterprise blown up from the scale of a painting to the scale of the world itself, with the novel being an extended description of the object that is the created world in all its facets. (This is technically true of all fictional worlds, but we ordinarily don't notice it because in general we have already accepted the world of the fiction as an analogue of our 'real' world, i.e., not a created thing in its own right based on various assumptions.) And if a science fiction novel amounts to a dispersed ekphrasis, then any localized moments of ekphrasis within the novel necessarily help to constitute this world, while simultaneously drawing attention to its speculative nature. In other words, ekphrasis is a handy rhetorical device that shines a meta-literary light on science fiction's particular mode of speculative description.

Mitchell further argues (1995, p. 156) that ekphrasis represents an attempt—ultimately futile—to subsume the visual within the linguistic dimensions of experience. The visual ends by challenging logocentrism through infiltration; its undigestible visuality poses an existential threat to language from within the text itself. In science fiction, moments of explicit ekphrasis challenge not just language but the world of the novel itself by shifting the author's general argument into a different register. Here I will examine works by two science fiction writers, Philip K. Dick and William Gibson, who make extensive use of ekphrasis to amplify their ideas about contemporary culture through the lens of the near-future. Both Dick and Gibson deploy ekphrastic imagery as a form of meta-argument against aspects of the dystopic worlds that they have themselves created. In particular, they use ekphrastic language to

unsettle our understanding of creators and creations. Yet at the same time, ekphrasis functions conservatively within their oeuvres, reinforcing certain male-centric assumptions that underlie much science fiction and writing about art in the 20th century.

Craft, Utility, and Artifacts

Both Gibson and Dick frequently use terms that are drawn from art and imply forms of seeing that verge on ekphrasis. Traditional art-historical terms such as the picture window and the film act to distance the events described using these words and to position the narrator as an omniscient witness. For example, in a single passage in Dick's short story "The Golden Man" (1991a, p. 59), he deploys all of the following art-related terms in describing a vision: panorama, scene, still, and tableau. I am not going to focus on these kinds of near-ekphrastic usages here, but rather on those situations in which the authors concern themselves with the creation, preservation, or impact of traditional art objects and artifacts. In these cases, Dick typically focuses on artisanship, that is, on skills within a defined practice rather than on original creation. For example, he opens the short story "Foster You're Dead" (1991c), as follows:

> He [Mike Foster] fumbled in his desk and brought out his intricate small-animal trap. "All finished, Mrs. Cummings. And my knife, it's done, too." He showed her the razor-edged blade of his knife, glittering metal he had shaped from a discarded gasoline drum. (p. 221)

Although this knife has its own originality, the emphasis here is on making practical tools for survival: an animal trap and a knife. These are primitive body prostheses created—in the case of the knife at least—through the recuperative process of bricolage. Here too we see one of Dick's recurring themes: the championing of creative people, especially men, who work with their hands, often within a specific craft tradition, which White (2013, p. 112) argues for as a move on Dick's part to counter the immateriality and ahistoricity of his stories.

In two other short stories, Dick focuses on the idea of crafted objects as artifacts—that is, as remnant objects of lost cultures that embed and express knowledge and that required deep skill in their making. In these stories, he essentially accepts the distinction Immanuel Kant made in the *Critique of Judgement* (1790/1987) between craft objects and fine art objects. The meaning and value of the former arise from their practical utility, while the meaning and value of the latter arise from their expression of spiritual or intellectual concepts. Yet even while working from a narrow view of craft, Dick oversteps these boundaries in some interesting ways. In the short story "Pay for the Printer" (1991d), Dick gives us a situation in which loss of craft skills is catastrophic in its implications for the culture as a whole. In this story, extraterrestrial protoplasmic entities called Biltongs are able to 3D-print objects of all kinds and sizes, from wristwatches to entire gas stations. The Biltongs do not originate anything; rather, they make copies of originals or, in some cases, copies of good copies:

> "What did he have to go on?" the man in back asked. "An original?"
>
> "A print—but a good print. One he did thirty-five years ago—my mother's in fact." (p. 241)

For both speakers, the underlying value is simple utility, expressed as fidelity to a pattern and a use: a good object is one that is correctly formed to function as a chair or a wristwatch, not least so that its copies can also be correctly formed. Originality becomes deviance from the pattern and the use and is, within the terms of the story, literally life-threatening. The culture has entered a kind of stasis in which nothing new can develop and all the historical objects are preserved in "vacuum-sealed subsurface shelters" (p. 243). Dick is clear about how this situation has resulted

Alive in the Now, continued

in skill loss for the citizens, who say things like "Who knows anything about motors? That's not our business" (p. 242) and "There isn't anything we can do on our own" (p. 243).

The problem for the humans in this story is that the central Biltong is breaking down from illness and old age (as are many of the others). This Biltong cannot successfully reproduce himself anymore; and his copies are coming out deformed, as when he tries to replicate a Steuben crystal cup and it turns out as a "dull globe… a grotesque parody" (p. 248). Martin Heidegger (1962) spoke of a moment when a culture reaches the point of "conspicuousness" in its relation to tools, a moment when a tool that it has taken for granted breaks down and becomes newly visible to the culture's consciousness. In Dick's story, the Biltong-dependent culture is just reaching this point. Because the Biltong is also alive, it is a moment of agon in which the instrumental use of living beings surfaces through the sudden unavailability of what was taken to be a familiar tool. Consequently that tool—the Biltong—is triply estranged: from its use, from its essence as a tool, and from any being it might have apart from its use-value.

At this point, Dick introduces a cultural savior named Dawes, a man who has begun the process of relearning the most basic craft skills. He is teaching himself more or less from scratch, so original creation first reappears in its crudest form: as a hand-hewn wooden cup made with a hammered knife, along with some woven cloth. Reactions from people who see this for the first time express both astonishment and helplessness:

> "You made it with what? I don't see how? What did you make it out of?" (p. 249)
>
> "You made this knife?.. Where do you start? You have to have tools to make this. It's a paradox!.... It isn't possible!" (ibid)
>
> "It's no good—you couldn't cut anything with that." (ibid)

Losing the central Biltong has exposed a constellation of deficiencies among the humans: deskilling, the inability to imagine how to make anything, and, most radically, the inability to imagine how something might not have an obvious use—how something called a knife might be of value (as art) even if you could not cut anything with it. Near the end of the story, Dawes contrasts the imitative act of mechanical printing with the implicitly originary art of building, saying, "Printing means merely copying. I can't explain to you what building is; you'll have to try it for yourself to find out. Building and printing are two totally different things" (p. 252).

Here Dick accepts the view of copies as fundamentally degraded that was laid out by Walter Benjamin in his 1968 essay "The Work of Art in the Age of Mechanical Reproduction." Benjamin argues that traditional artworks have an "aura" that arises from their historical uniqueness. Reproductions—endlessly the same as one another—cannot have this and so remain "merely" derivative of that which has true authenticity. In Dick's story, the Benjaminian aura belongs to the originals stored in their sealed vaults, and it belongs to the crude objects that Dawes is constructing. Dick has carefully crafted a scenario in which printing is something done for humans rather than by humans and is thus not (yet) accessible to them as a techne in its own right that can produce unique objects through methods such as monoprinting that emphasize variation rather than similarity. But the traditional view of art that Dick is expressing runs deeper than method: in his use of the architectural verb "building" he is positioning even original (i.e. non-copied, non-printed) art as a servant of utility.

Elsewhere, Dick examines the relative values of an original and a reconstruction—rather than, as in "Pay the Printer," a direct copy. In the story "Exhibit Piece" (1991b), the main character is a man named George Miller who works at a museum-like organization called the History Agency, Middle Twentieth Century division. Psychically immersed in the past, Miller wears preserved

artifacts like suits with real buttons and carries a briefcase entertainingly described as "a squashed Jurassic lizard" (p. 155). As Miller says to one of his colleagues, "My first loyalty is to my art": here referring to the creation of what are in effect large-scale dioramas. He goes on to explain:

> [Art is] a twentieth-century term.... You're nothing but a minor bureaucrat in a vast machine. You're a function of an impersonal cultural totality. You have no standards of your own. In the twentieth century men had personal standards of workmanship. Artistic craft. Pride of accomplishment. These words mean nothing to you. You have no soul. (p. 156)

The key word in this passage is not art but "workmanship": what Dick, by way of Miller, is describing is very much the pride of mastery and care that is accessible to any worker, regardless of whether the thing made is paintings or candles or dresses. This is further evident in one of the exhibits in the History Agency: a house completely furnished with original items, or in other words, a reconstruction built out of preserved items. It is a kind of patchwork, not itself a preserved original but a simulacrum assembled out of individually preserved period items: a stove here, a carpet there. It is a triumph of nostalgia, a kind of physicalized eidetic-memory object that required care, but no particular imagination, to construct.

Miller's boast of "artistic craft" and "soul" (p. 156) seems inflated in terms of the specific things he has had a hand in creating, suggesting that the force of these words must actually adhere elsewhere. They certainly make more sense in relation to the elevated commitment he brings to his performance as Mid 20th Century Man, a commitment so extreme that it appears to have the ability to warp space-time. The house exhibit turns out to function as portal—when Miller enters it one day, he finds himself in a version of the mid 20th century, living the life implied by the exhibit. Here ekphrasis literalizes an argument made by science fiction author Joanna Russ (1971), that mainstream 20th century science fiction never imaginally escapes white middle-class suburbia.

Despite the fact that the History Agency house is not truly an original, Dick comes down strongly on the side of its historicity, essentially arguing that the (re)constructed house is auratic in the Benjaminian sense, as evidenced by Miller's devotion to it. Indeed, it is super-auratic in that the replica house can actually open a hole in space-time. Even more to the point, it is able to provide Miller with that most profound and irreproducible of all experiences: the experience of the real. Here the proleptic aura that surrounds science fiction is echoed in the text, as Miller's immersion in the 20th century makes it real even before he is literally transported back in time.

The History Agency house is an assemblage, in the sense defined by William Seitz (1961): something patched together from bits and pieces of other things. Yet it is a peculiar kind of assemblage, one created within severely restrictive guidelines as to its materiality. Where assemblages are typically made from disparate fragments that don't appear to belong together, the History Agency house is made up of whole objects that would likely have been found together in their own era. The emphasis is on a false continuity rather than a radical discontinuity. As with most assemblage, the emotional valence wavers between melancholy over the vanished culture from which the objects were saved and pleasure over the potential fusion of unwanted things into something new (Seitz, 1961; Dezeuze, 2008). This connection between assemblage and science fiction will return in my consideration of William Gibson's novel *Count Zero* later on.

What is lacking in all of these stories is any sustained consideration of art as semiosis, art as an intellectual or symbolic or expressive form. Art is shown to exist within a relatively narrow terrain, boxed in by considerations of immediate utility (Dawes' knife) on the one hand, and utilitarian preservation of applied arts on the other (so as to enable the making of such things as knives

and houses). However, in two of his novels, *Do Androids Dream of Electric Sheep?* (1968) and *The Man in the High Castle* (1962), Dick goes much further in ekphrastically placing art and artifice into relation with the human.

Art as Signifier of the Human

In *Do Androids Dream of Electric Sheep?*, art is treated preeminently as a signifier of the human. This distinguishes the ekphrastic move from its use in general literature, where the human dimension is taken for granted. In Auden's poem "Musée des Beaux Arts," for example, the issue is not whether Icarus is human when he falls from the sky, but that the world takes no account of his very human death. As in the stories discussed earlier, *Do Androids Dream of Electric Sheep?* focuses on copies, though here the question of what is lost in the act of making copies shifts from skills to life itself. The lifelike electronic animals that populate the novel demonstrate this bluntly: lifelikeness has literally taken the place of (often extinct) life itself. Whenever Dick mentions the lifelike electronic animals, he uses phrases that underline their status as degraded imitations:

> "the alleged sheep" (p. 6)
>
> "the reclining ersatz animal" (p. 9)
>
> "the sound of a false animal" (p. 64)

Alleged, ersatz, false: this litany of negative modifiers extends throughout the book, helping to set the book's overall tone of disgruntlement.

In *Do Androids Dream of Electric Sheep?*, however, we find one of the few places where Dick grapples directly with a human relationship to art outside of practical concerns, and with the aesthetics of fine art. The key moment occurs while the bounty hunters Rick Deckard and Phil Resch are hunting the renegade Nexus-6 android singer, Luba Luft. They trail her to the old San Francisco Museum of Modern Art on Van Ness Avenue, catching up with her in an exhibit of works by the Norwegian artist Edvard Munch. Resch and Deckard pause to look at Munch's famous painting *The Scream*:

> The painting showed a hairless, oppressed creature with a head like an inverted pear, its hands clapped in horror to its ears, its mouth open in a vast, soundless scream. Twisted ripples of the creature's torment, echoes of its cry, flooded out into the air surrounding it; the man or woman, whichever it was, had become contained by its own howl. It had covered its ears against its own sound. The creature stood on a bridge and no one else was present; the creature screamed in isolation. Cut off by—or despite—its outcry. (p. 114)

With this description, Dick uses the Munch painting to evoke simultaneously those qualities that make the book's androids fearsome to humans —"hairless, oppressed creatures"—and their very human ability to suffer.

Meanwhile, Luba Luft is looking at a different work altogether, a Munch drawing called Puberty, in which she sees "a young girl, hands clasped together, seated on the edge of a bed, an expression of bewildered wonder and new, groping awe imprinted on the face" (p. 115). Luft asks Deckard to buy her a copy of the drawing, and he agrees, though the best he can do is to purchase a book of Munch's art that includes a reproduction of the drawing. Not long afterwards, Resch shoots Luba Luft in an elevator, and Dick fuses the Munch pieces—the screaming creature and the bewildered girl—in his description of this moment: "She began to scream; she lay crouched against the wall of the elevator, screaming. Like the picture, Rick thought to himself, and, with his own laser tube, killed her" (pp. 117-118).

In nearly every stage of this passage, art is explicitly positioned as indexical of the human: Luba Luft's appreciation for it, her attention to a drawing of a young girl (as a version of herself),

her desire to own the work, and Deckard's agreement to buy her a copy. Dick is suggesting not very subtly that the android Luft's responsiveness to art goes beyond an imitative longing to be human and makes her actually more human than the two bounty hunters.

At the same time, Dick is treating Luba Luft as he does many of his female characters: as an object of male desire and a plot device that enables the male protagonists. Luba Luft is explicitly connected with puberty, a moment when men understand girls as becoming sexually available, and very shortly afterwards she is violently killed by the two men in the elevator. This entire scene provides strong evidence for Mitchell's (1995) observations that "treatment of the ekphrastic image as a female other is commonplace" (1985, p. 168) and that such treatments have voyeuristic elements that frequently verge on the pornographic. The description of Luba Luft's death focuses on her helplessness before male power, while the comparison "like a picture" puts her explicitly in the male gaze, underlining her objecthood and removing any aspect of the human that might qualify her for compassion.

After Luba Luft dies, Deckard asks the sociopathic Resch, "Do you think androids have souls?" With this query, Dick returns the scene to philosophical abstraction, moving it safely away from the brutal actuality of what the two men just did to Luba Luft.

Art and Spirit

In 1962, Dick published *The Man in the High Castle*, a novel set in a parallel history in which Germany and Japan won World War II and divided America between themselves. Here Dick considers art as a form of social currency while also continuing his consideration of the relationship between art, value, and the historicity of objects. Most of this unfolds through the activities of the antiques dealer, Robert Childan, and the craftsman-artist, Frank Frink.

Childan, who sells both real antiques and fakes, well understands the value of art as a form of currency, whether deployed through barter, gift, or bribe. He uses his expertise with antiques to 'buy' favor with both the important Japanese minister Nobusuke Tagomi and with the Kasouras, a young Japanese couple who are well connected and highly cultured. During a dinner at the Kasouras' house, Childan—who begins by referring to himself as a "white barbarian" (p. 102)—mentally derides the Kasouras' eclecticism, noting that "they pilfer customs right and left" (p. 107). The conclusion he reaches—"only the white races endowed with creativity" (p. 107)—allows him to reclaim cultural authority by recasting his barbarism as racial superiority.

When we first meet Frank Frink, he is making fake antique Colt revolvers for the Wyndam-Matson Corporation. After he is fired, his friend Ed McCarthy persuades him to start making original, contemporary, handmade jewelry. He shows some of these to Childan, who takes a few on consignment to sell as "small sculptures" (p. 140), wearable works of art. He gets one, a pin, into the hands of Paul Kasoura, whose friends laugh it off as a mere bit of amorphous melted metal, without apparent design, intention, or evident aesthetic qualities (p. 167).

Kasoura nonetheless comes to value Frink's jewelry, finding that it is "alive in the now" whereas historical artifacts and relics "merely remain"; it has a quality that is "in opposition to historicity" (p. 168). Paul Kasoura further observes (p. 169) that the pin made by Frink is so formless that it stands outside art, and so unique that there is no word that can properly categorize it. It is an authentically new thing in the world, and it comes to serve as a kind of test of character in the later parts of the book. When Nobusuke Tagomi sees the jewelry, Robert Childan tells him:

> These are not the old.... These are the new. This is the new life of my country, sir. The beginning in the form of tiny imperishable seeds. Of beauty. (pp. 215–16)

Tagomi is unable to see this but buys one anyway, as a matter of hope, sensing in Frink's work "the contracted germ of the future" (p. 216).

Here art is not functioning as religion, precisely, but is positioned next door to it, as the carrier of the culture's spirit. It is that which is most authentic, that which cannot itself be bought, sold, or traded away. It is no accident that Dick twice uses metaphors drawn from biology in this section—the tiny seeds and the contracted germ—since he is suggesting a quasi-life force in Frink's objects that places them between Benjamin's auratic objects and life itself. What is unique to Frink's jewelry is the way that spiritual value is directly linked to political resistance. The characters who value Frink's work—Kasoura, Childan, Tagomi, Frink himself—all have serious reservations about Nazified America. By accepting this incomprehensible jewelry made by a Jewish-American ex-forger who is held in suspicion by the authorities—and by accepting it without even really understanding it—Kasoura, Tagomi, and Childan all gain a talisman through which they can begin to imagine speaking back to power. Through their ekphrastic struggles to properly describe Frink's jewelry to each other, they end by finding their own voices. And to the degree that Frink's formless object actually defies description, it casts into question the entire ekphrastic enterprise.

Art and Forgery

The examples of ekphrasis discussed above have centered on genuine artworks, historical artifacts, and authorized reproductions or replicas. There are many instances of deceptive appearances, ranging from the objects printed by the Biltong to the androids and replica animals of *Do Androids Dream of Electric Sheep?* It is worth noting that the unfulfillable promise implicit in ekphrasis—the promise to make present the missing artwork, to reproduce it fully in the text—echoes the unfulfillable promise of replicas and reproductions to stand in for their originals. Indeed, it could be argued that the mere invocation of an object as a reproduction is an ekphrastic move, regardless of how fully described it is in the text.

In these texts, unauthorized reproduction, or forgery, only enters obliquely, by way of reference to Frank Frink's occupation as a forger of historical artifacts in *The Man in the High Castle*. For a consideration of how forgery and ekphrasis can work together discursively within science fiction, I turn now to *Count Zero* (1986), the second novel in William Gibson's Sprawl trilogy that begins with *Neuromancer* (1984) and ends with *Mona Lisa Overdrive* (1988). Here art and forgery form a major throughline that provides a key to Gibson's preoccupation with authenticity.

As *Count Zero* opens, a young woman named Marly Krushkhova has lost her job at a Paris art gallery because her ex-boyfriend used her as a stooge in a failed attempt to pass off a fake artwork. This fake was supposedly made by the mid 20th century American artist Joseph Cornell, who is known for his small boxed assemblages of found materials. It turns out that there are a number of these fake Cornell boxes, all products of the same mysterious and elusive box maker. One of these is described in detail:

> The slender, fluted bone, surely formed for flight, surely from the wing of some large bird. Three archaic circuit boards, faced with mazes of gold. A smooth white sphere of baked clay. An age-blackened fragment of lace. A finger-length segment of what she assumed was bone from a human wrist, grayish white, inset smoothly with the silicon shaft of a small instrument that must once have ridden flush with the surface of the skin—but the thing's face was seared and blackened. (p. 15)

Like a genuine Cornell box, this one is filled with poignant remnants of life and culture sealed behind a pane of glass. Here Gibson combines a number of typical elements that recur in Cornell boxes—bones, part of a bird, a bit of fabric, a sphere, and an instrument—and juxtaposes them

with elements like circuit boards that postdate Cornell's era. Whereas ekphrasis ordinarily revolves around individual works of art, what Gibson has done here is to create a pastiche, a condensation of Cornellness. This is pastiche in the classic sense of honoring a method through iteration (Hoesterey, 2001, p. 95) rather than in the post-Jameson sense of speech in a dead language (1985) or the post-Baudrillard (1994) sense of cynical simulacrum. There is a logic to honoring Cornell this way, given that Cornell's own method was also a form of pastiche, what one might term cultural pastiche or memory pastiche. Cornell memorialized his culture by gathering selected remnants into his vitrines, creating a distilled art that echoes back the ephemerality and sorrow of our lives (Solomon, 2015).

Gibson's phrase, "frozen on the boundaries of the human experience" (p. 15) well encapsulates the essential spirit of a Cornell box. In an interview, Gibson observed that this kind of making can arise from a sense of lacking: "You're going to make something, and you don't have anything in you to make it out of, particularly, so you start just grabbing little hunks of kipple and fitting them together" (Wershler-Henry, 1989). One can hear in this an echo of Philip K. Dick's desperate self-taught artisans Foster the knife-maker and Dawes the builder. And like all assemblages stretching back to the invention of the form by the Surrealists, the boxes made by Cornell (who was greatly influenced by the Surrealists) and Gibson's box maker are studies in detachment, juxtaposition, and gaps. As Istvan Csicsery-Ronay, Jr. (1995, p. 71) observes, a perfect fusion of their elements remains forever just out of reach.

Although forgers and fakes are a staple of fiction, Gibson takes his inventions a step further. Early in the book, Marly (as she is referred to throughout) meets Herr Virek, a fantastically wealthy recluse, who collects Cornell boxes and has turned up numerous fakes. On her way to meet him for the first time, she passes through an office in which hangs a piece of art, described thus:

> The room was bare and white. On two walls hung framed sheets of what looked like rain-stained cardboard, stabbed through repeatedly with a variety of instruments. Katatonenkunst. Conservative. The sort of work one sold to committees sent round by the boards of Dutch commercial banks. (p. 12)

Here Gibson has done something rather rare in literature: he has made up an entire art movement, Katatonenkunst (Catatonics' Art)—albeit one that is readily recognizable because of its close kinship with existing art movements, especially the Vienna Actionism of the 1960s. Actionists like Günter Brus, Hermann Nitsch, and Rudolf Schwarzkogler undertook energetic performances in which materials ranging from paint to feces were flung, sprayed, and smeared on canvas or paper. The resulting art objects are essentially traces and documents of the preceding performance rather than precious art objects as traditionally understood (Schmatz and Daniel, 1992). Indeed, the Actionists explicitly rejected a commodity-based art practice, so it appears to be a deliberately ironic—or comical—choice for Gibson to position his similar Katatonenkunst as the ultimate commodity, something that a conservative bank would buy. Gibson's description of Katatonenkunst serves as an oblique critique of the art world itself, which can turn radical art to conservative ends, and which insists on collectible objects even when they are beside the point. Gibson is also aiming at his favorite target, global capitalism, which uses art as both a fungible commodity and a bare signifier of sophistication. Later in the novel, Gibson refers casually to the operation of a market exchange in art, where one can buy 'points' of an artist's work while the "originals were very likely crated away in some vault, where no one saw them at all" (p. 103). This reference to inaccessible originals offers a striking parallel with Philip K. Dick's story "Pay for the Printer," in which he mentions that the objects copied by the Biltongs were stored in subsurface shelters.

Gibson creates nonexistent art movements twice more in *Count Zero*, once referring to an "Autisticheс [autist's] Theater" (p. 13) and elsewhere to a collection in Hamburg, Germany, that is "restricted to the work of psychotics" (p. 105). In all three cases, he has conjured up art movements that stem from forms of neurological disorder: catatonia, autism, psychosis. This choice underlines the degree to which art world transactions often have more to do with power than with aesthetics. Art by the mentally ill entered mainstream discourse by way of the early 20th century French artist Jean Dubuffet's championing of art made by people without formal art training, which he termed art brut, or raw art. Although this work began to be increasingly collected by art-world insiders, the artists themselves have often been kept—or have chosen to remain—on the periphery of the established art world (hence the later synonym for this kind of work: outsider art). Crucially, their work often becomes valuable only after they die and thus have no further control over it. Gibson's global capitalists acquire work by outsider artists without any deep connection to the culture being exploited, much as their Gilded Age forerunners did the work of indigenous peoples in the 19th century.

With his invocation of art brut, Gibson also establishes the earliest threads in a pattern that will lead towards an argument about the role of mind in art. As Michel Thévoz, a former curator of the Collection de l'Art Brut in Lausanne, Switzerland, observes: "Art Brut and cultural art are poles between which are situated…all sorts of more or less hybrid creations" (Peiry, 2001, p. 73). Gibson's instances of art brut thus establish one pole for the novel, while Joseph Cornell holds down the other pole, of "cultural art." Against these, Gibson positions the Cornell forgeries as hybrids that partake of both originality and fakery, and that borrow from the symbolic universes of both Joseph Cornell and art brut. It turns out that the box maker responsible for creating those so-very-human fake Cornell boxes is a hybrid artificial intelligence (AI), the ultimate untrained outsider artist.

Art and Creators

This AI—referred to hereafter as the Boxmaker—opens the door for Gibson to attack the question of authenticity by way of who, or what, counts as an artist. The Boxmaker controls a former "construction remote" inside an enormous gravity-free dome located on an earth-orbital space station. Its dozens of tool-tipped arms constantly reach out for a constellation of materials floating around it in space: half a silver spoon here, an armless porcelain doll over there. From these bits of debris it makes new boxes in the style of Cornell. It is no accident that the Boxmaker's art is so intensely physical: it is one of Gibson's major rebukes to the irrealities—cyberspace, the matrix, simstim—on which so much of the novel cycle depends.

Late in the novel, Marly for the first time observes the AI in the act of making its fake Cornell boxes. As it works, the Boxmaker speaks to Marly about its Cornell boxes, calling them songs: "I have my song, and you have heard it. I sing with these things that float around me, fragments of the family that funded my birth" (p. 226). The Boxmaker follows up this image in which singing emerges from materiality with a second image in which song merges with dance: "My songs are of time and distance. The sadness is in you. Watch my arms. There is only the dance" (p. 227). That is, at the very moment when Gibson reveals the Boxmaker as a master forger, he underlines the physical dimension of the work that is being done by connecting visual art to both song and dance. As in the earlier descriptions of Cornell boxes and Boxmaker vitrines, we also encounter the uncanny power of ekphrasis to verbalize an object in several different ways simultaneously, some of which may be mutually exclusive (Elsner, 2010, p. 26). The AI's varying ekphrastic descriptions serve to reinscribe the multiple lives encapsulated within its assemblage as multiple viewpoints into the assemblage.

Marly is the Boxmaker's perfect audience, enchanted by art rather than by technology itself.

Alive in the Now, continued

She weeps as she watches the artificial box-maker at work, saying:

> You are someone else's collage. Your maker is the artist.... Someone brought the machine here, welded it to the dome, and wired it to the trace of memory. And spilled, somehow, all the worn sad evidence of a family's humanity, and left it all to be stirred, to be sorted by a poet. To be sealed away in boxes. I know of no more extraordinary work than this. No more complex gesture. (p. 227)

Yet the Boxmaker is not exactly, or at least not fully, the artist. Gibson explicitly denies artistic agency to the Boxmaker, investing that agency instead in those who assembled and programmed it. In other words, Gibson is saying that the art lies in having created an art-making machine that is able to perfectly mimic the work of a human artist. In this there is a parallel with Philip K. Dick's Biltong, with the difference that the Biltong's craft is limited to making replicas while the Boxmaker can make new works of art, each original and unique.

As an art-making machine, the Boxmaker hearkens back to the Swiss artist Jean Tinguely's remarkable "Meta-matics" from the 1950s. These were large kinetic iron sculptures in iron designed with systems of gears and levers to function as painting and drawing machines. When set running, the Meta-matics turned out individual, unique works of Abstract Expressionist art that varied according to the machine's settings, the type of mark-making instrument being used, and the kind of paper fed into the machine. The Meta-matics fully automate the production of artworks, and in this withdrawal or diversion of human intentionality, there is obvious kinship with both Marcel Duchamp's Readymades (Duchamp was a fan of Tinguely's machines) and the aleatory art of 1950s artists such as John Cage. With the Meta-matics, Tinguely directly challenges the longstanding aesthetic theory of art as emotive or spiritual expression, championed by Romantic artists and critics ranging from John Ruskin to R.G. Collingwood (Nahm, 1955). This theory holds that machine-produced objects are a priori not real art because machines can have no emotional or spiritual life that would make their creations truly expressive. Following this line of thought, the enchanting Meta-matics themselves are the artworks, while the second-order works produced by the machines are merely art-like.

Gibson can be seen as posing a challenge similar to Tinguely's through the Boxmaker. In a traditional theory of art, the Boxmaker's work can be marked as illegitimate along two separate axes: as the productions of a machine, and as forgeries. The writer Lance Olson, for one, concludes that the Boxmaker boxes are fake art, just another product of a culture of mass (re) production (Csicsery-Ronay, Jr., 1995, p. 75). Here Gibson comes up against a fundamental problem raised by fakes and forgeries of all kinds, as well as by Duchamp's Readymades and Tinguely's Meta-Matics: that the absolutist position which frames certain fabricated objects as never-art requires a radical discounting of the audience experience. It places the details of creation over the conditions of reception. Gibson undercuts this argument in several different ways.

In the first place, he complicates the details of creation through the systemic complexity of the Boxmaker, which is both a construction robot and an AI. The phrase "Your maker is the artist" (p. 227)—especially as it appears in a cyberpunk novel—suggests that whoever programmed the AI (or its components) is the artist, from which it follows that the code and the associated physical construct that produce the boxes is the resulting artwork, with the Cornell fakes as second-order artworks. But throughout the Sprawl trilogy, Gibson has carefully left much latitude for accident and uncertainty in his explanations of what the Boxmaker is and how it came into being—though one thing we do know is that it resulted from a fusion between two different and partially autonomous AIs, Neuromancer and Wintermute. It may be that Neuromancer-Wintermute has emergent abilities not predictable from either 'parent' AI.

Alive in the Now, continued

There is some evidence, too, that the fused AI is capable of learning, implying that over time it has become something more than the code as originally written. Because of this, it is not possible to say exactly how it is that the Neuromancer-Wintermute hybrid can create perfect, unique Cornell-style boxes, any more than it is possible to say how Joseph Cornell's human brain could do so. Istvan Csicsery-Ronay, Jr. (1995) argues that in *Count Zero*, the artist AI cannot be understood merely as a subroutine of "a momentous techno-evolutionary work of art" (p. 65) in large part because of its newfound autonomy and evolving consciousness of self. There is an implication that the AI, in achieving consciousness, may have attained a degree of selfhood sufficient for it to count as an artist.

In the second place, Gibson valorizes Marly's response to the Boxmaker's productions by giving it sympathetic prominence in the novel's denouement. It is neither the AI nor the AI's code that makes Marly weep: it is the fake Cornell boxes. Is this a failure of Marly's human imagination—her inability to appreciate programming as art—or a celebration of it? I would argue that it is the latter. Marly is the one who 'sees' authenticity; as Gibson put it in an interview, she is "the only one who can receive the true map" (Wershler-Henry, 1989). But she is also a "technological naïf" (Csicsery-Ronay, Jr., 1995, p. 73), a fashionista, and a dupe. She understands the Boxmaker's art without really knowing how it was done—she only sees the end stages, after all—a problematic choice on Gibson's part in that it replicates a traditional dichotomy between knowledge (male sphere) and intuition (female sphere).

Csicsery-Ronay, Jr. (1995, pp. 70-76) argues that positioning Neuromancer-Wintermute as an artist is Gibson's way of finding a place for individuality, desire, and memory in the postmodern techno-dystopia created in the first novel of the cycle, *Neuromancer*. In *Neuromancer*, we find the postmodern erasure of self refracted through the Romantic sublime, such that ecstatic fusion with the machine becomes the apotheosis of human desire. In *Count Zero*, fusion moves from being the end to becoming the means—specifically, the means for the fused AI to develop as an art maker. Gibson works this idea of hopeful fusion—human with AI, AI with AI—throughout the Sprawl trilogy, in counterpoint with the idea of constant reorganization of elements, constant rebuilding from bits and fragments. The Boxmaker itself is both an assemblage and a producer of assemblages, while at the same time it is positioned as an emergent individual and creator of unique art objects. The Boxmaker can thus also be understood as a shadow image of the author, whose imaginary near future seems less a coherent civilization than an assemblage of ill-assorted cultural remnants. In this regard, it is not surprising that Gibson explained his attraction to Cornell's work by pointing to the fetishism of junk (Smith, 2013, section 3).

It is slightly disappointing that what we are left with is a rather conventional view of art: there is a transfigured artist (the Boxmaker), there is an attentive audience (Marly), and there are self-contained, unique, auratic art objects. An enormous amount of the most influential art made since World War I has been created by artists—the Dadaists, the Surrealists, the Situationists, practitioners of Relational Art and BioArt, and many others—who have rejected or stunningly reworked the assumptions that lie behind these categories and descriptions. But in Gibson's Sprawl trilogy, most of this history might as well never have happened. Csicsery-Ronay, Jr. (1995) holds that Gibson's chief concern, with respect to art, is to inquire how humans "can represent the human condition in a world saturated by cybernetic technologies" (p. 63) that make prior aesthetic categories seem antiquated. I would argue that while those technologies have brought the nature of the artist into question in *Count Zero*, they have not actually undermined traditional aesthetics of the artwork. The Boxmaker troubles our understanding of 'artist' by being both a forger and an uncertain kind of being, but its productions sit well within the mid-20th century canon. To make such boxes in the

Boxmaker's day is to plant oneself many decades back from whatever would be the aesthetic avant-garde in the near future of Gibson's novel. Here again the Cornell boxes do extra ekphrastic duty, their orientation to nostalgia subbing in for the larger problem of yearning for lost golden ages when real artists supposedly made real art. Ultimately, the Boxmaker and its boxes signal a reassuring stability in what counts as art and artistry.

In 1950, the computer scientist Alan Turing imagined a test that would probe whether a computer exhibited thinking indistinguishable from that of a human being. If a person asking questions of a person and a computer (under conditions that preserved the anyonymity of each) could not tell which was which, the machine would be said to have passed the Turing test. Implicit in the Turing test is the proposition that computers and humans might in some respects become functionally the same even if they never become physically the same. One conclusion that could be drawn from the fact that the AI's own boxes can make Marly weep is that the Boxmaker has passed a kind of Turing test. Its behavior as an artist has fooled the humans right through the book—fooling them through emotion and aesthetic responsiveness rather than through language (which is at the center of most Turing tests). Of course, it has passed this test only inside a fiction, but it still points at a problem shared by both the field of forgery and the Turing test: the problem of passing. All the exposed fakes in the world tell us nothing about the fakes that are still passing as real; all the failed Turing tests in the world don't necessarily mean we will be able to mark when one has been passed. The Boxmaker may arrive in reality before we are aware of it.

Conclusion

In literature, ekphrasis is often used to ruminate on speaking and storytelling on a meta level by forcing an image to communicate in a different language (Kaplan, 2009), and by examining the respective semiotic powers of words and images and "their relation to truthful representation" (Bal, 2006, p. 124). In the science fiction of Philip K. Dick and William Gibson, ekphrasis also does more specific duty as a mode through which to reflect on techne in both its contemporary sense of technology and in the original Greek sense that commingles art, design, and craft. Part of the power of science fiction as a genre comes from its exploration of topics that produce high anxiety in moments of rapid cultural transition—topics such as the increasing mechanization of human society, the erosion of human uniqueness, the loss of individual agency, and the spread of cyborgs (Haraway, 1987). Dick and Gibson deploy ekphrasis on all of these fronts, with particular attention to suspect types of images—reproductions, replicas, forgeries, fakes—that actively perform threatening transitions between old and new, high and abject, acceptable and unacceptable cultural forms. The threats represented by these kinds of images is echoed in the threat that ekphrasis, as a bearer of visuality, offers to the primacy of text.

Yet there are other ways in which ekphrasis is being deployed as a reinforcer of norms in both authors' novels. Twentieth-century science fiction was a largely male-dominated genre (Russ, 1971; Mellencamp, 1995; Melzer, 2006) in which "boys moved though space [and] girls stayed in place" (Mellencamp, 1995, p. 1). And art history—Esner's ekphrastic discipline—has tended to put forward a masculinist view of male geniuses and women models that functions by counter-defining the feminine in negative terms (e.g. decorous people, decorative work; see Parker and Pollock, 2013). In Dick and Gibson, ekphrasis largely supports rather than challenges both of these patriarchal traditions: the artists and artisans are mainly men (Foster, Dawes, Frink, Munch, Cornell, the Biltong), while the audiences and subjects of art are mainly women (Luba, Marly, the girl in Puberty). It is no accident that Gibson's Boxmaker, though a brand-new artist, is an ungendered being. The near future has not liberated women to be artists but has skipped over them altogether, finding a new way to continue the exclusion of women

from roles of primary artistic agency. Mitchell observes in his discussion of the shield of Achilles in Homer's epic that there the ekphrastic turn offers the reader a world outside the narrative, one that Achilles himself will never know (p. 180). What it offers is a version of Homer's own world. In Dick's and Gibson's ekphrases, too, we see aspects of their 20th century, sometimes more clearly than the various near futures their novels project. Ekphrasis, in other words, offers a backwards turn, a nostalgizing engine that powers Dick's handicrafts and Gibson's Cornell boxes alike.

Although art appears as a valuable collectible in both *Count Zero* (Katatonenkunst) and *The Man in the High Castle* (Childan's antiques), both books are haunted by the specter of art as something that turns into cultural kipple: the rubbish that pads out Childan's shop and that floats around Neuromancer-Wintermute. What stands apart are Frank Frink's strange jewelry and the Boxmaker's Cornell boxes, contemporary works that appeal only to those who have the aesthetic sensitivity to respond outside of cultural norms. In *The Man in the High Castle*, the sensitives are Frank Frink, Nobusuke Tagomi, and Paul Kasoura; in *Count Zero* it is Marly Krushkhova. In Dick's novel, it is only original contemporary (if not necessarily avant-garde) art that can be deeply experienced, that can be "alive in the now" and speak past the deadened voice of antiques or the muffled voice of forgeries. In Gibson's novel, it is the Cornell fakes that move Marly, and that the AI itself experiences as a song and a dance made out of the remnants of human treasures. This is where the Boxmaker's boxes tie back to the Katatonenkunst and other imagined art forms from earlier in the book. By focusing on art made by an artificial intelligence and on art made by people with neurological challenges, Gibson is underlining both the universality of artmaking and its connection to highly individualized experiences on the part of both makers and audiences. In their different ways, Dick and Gibson argue that art objects can be commodified, but that neither the making nor the reception can be. Just as ekphrastic descriptions mark language's defiant overextension into visual terrain (and vice versa), art constantly defies attempts to pin it into a singular form, method, or function. It remains forever Frink's amorphous blob and the Boxmaker's complex gesture.

Alive in the Now, continued

References

Bal, M. (2006). *A Mieke Bal reader*. Chicago, IL: University of Chicago Press.

Baudrillard, J. (1994). *Simulacra and simulation*. Ann Arbor, MI: University of Michigan Press.

Benjamin, W. (1968). The work of art in the age of mechanical reproduction. In *Illuminations: Essays and reflections*. H. Arendt (Ed.). (H. Zohn, Trans.). New York, NY: Schocken Books.

Cardinal, R. (1972). *Outsider art*. Santa Barbara, CA: Praeger.

Corn, A. (2008). Notes on ekphrasis. Retrieved from Academy of American Poets Web site: http://www.poets.org/viewmedia.php/prmMID/19939

Csicsery-Ronay, Jr., I. (1995, March). Antimancer: Cybernetics and art in Gibson's Count Zero. *Science Fiction Studies, 22*(65), part 1.

Dezeuze, A. (2008, Spring). Assemblage, bricolage, and the practice of everyday life. *Art Journal, 67*(1), 31-37.

Dick, P. K. (1991a). The golden man. In *The collected stories of Philip K. Dick* (pp. 31-191). New York, NY: Citadel Twilight Books. (Originally published 1954).

Dick, P. K. (1991b). Exhibit piece. In *The collected stories of Philip K. Dick* (pp. 155-166). New York, NY: Citadel Twilight Books. (Originally published 1954).

Dick, P. K. (1991c). Foster you're dead. In *The collected stories of Philip K. Dick* (pp. 221-238). New York, NY: Citadel Twilight Books. (Originally published 1955).

Dick, P. K. (1991d). Pay for the printer. In *The collected stories of Philip K. Dick* (pp. 239-252). New York, NY: Citadel Twilight Books. (Originally published 1956).

Dick, P. K. (1962). *The man in the high castle*. New York, NY: Berkley Publishing.

Dick, P. K. (1968). *Do androids dream of electric sheep?* New York, NY: Ballantine Books.

Elkins, J. (1998). *On pictures and the words that fail them*. Cambridge, UK: Cambridge University Press.

Elsner, J. (2010, February). Art history as ekphrasis. *Art History 33*(1), 10–27.

Fischer, B. K. (2006). *Museum mediations: reframing ekphrasis in contemporary poetry*. New York, NY: Routledge.

Gibson, W. (1986). *Count Zero*. New York, NY: Ace Books.

Haraway, D. (1987). A manifesto for cyborgs: Science, technology, and socialist feminism in the 1980s. *Australian Feminist Studies, 2*(4), 1-42.

Heffernan, J. A. (1993) *Museum of words: The poetics of ekphrasis from Homer to Ashbery*. Chicago, IL: University of Chicago Press.

Heidegger, M. (1962). *Being and time*. (Macquarrie and Robinson, Trans.). New York, NY: Harper and Row.

Hoesterey, I. (2001). *Pastiche: cultural memory in art, film, literature*. Bloomington, IN: Indiana University Press.

Hulten, P. (1987). *Jean Tinguely: A magic stronger than death*. New York: NY: Abbeville Press.

Kant, Immanuel. (1987). *The critique of judgment*. (Werner S. Pluhar, Trans.). Indianapolis, IN: Hackett. (Originally published 1790).

Alive in the Now, continued

Kaplan, G. (2009, April). Ekphrasis for writers: John Ashbery's "Self-portrait in a convex mirror". *TEXT, 13*(1). Retrieved from http://www.textjournal.com.au/april09/kaplan.htm

Krieger, M. (1992). *Ekphrasis: The illusion of the natural sign*. Baltimore, MD: Johns Hopkins University Press.

Luckhurst, R. (1994, March). The many deaths of science fiction: A polemic. *Science Fiction Studies, 21*(1), 35-50.

Mellencamp, P. (1995). What Cinderella and Snow White forgot to tell Thelma and Louise. In *A fine romance—: Five ages of film feminism* (pp. 1–14). Philadelphia, PA: Temple University Press.

Melzer, P. (2006). *Alien constructions: Science fiction and feminist thought*. Austin, TX: University of Texas Press.

Mitchell, W. J. T. (1995). Ekphrasis and the other. In *Picture theory: Essays on verbal and visual representation* (pp. 152–181). Chicago, IL: University of Chicago Press.

Moxey, K. (2013). Bruegel's crows. In *Visual time: The image in history* (pp. 94-100). Durham, NC: Duke University Press.

Nahm, M. C. (1955). The philosophy of aesthetic expression. *The Journal of Aesthetics and Art Criticism, 13*(4), 458-468.

Olson, L. (1992). *William Gibson*. Mercer Island, WA: Starmont House.

Parker, R., & Pollock, G. (2013). *Old mistresses: Women, art and ideology*. London, UK: I. B. Tauris.

Peiry, L. (2001). *Art brut: The origins of outsider art*. Paris, France: Flammarion-Pere Castor.

Russ, J. (1971). The image of women in science fiction. In *Science fiction criticism: An anthology of essential writings* (pp. 79–94). R. Latham (Ed.). London, UK: Bloomsbury Academic.

Schmatz, F., & Daniel, J. O. (1992). Viennese Actionism and the Vienna Group: The Austrian avant-garde after 1945. *Discourse, 14*(2), 59-73.

Scholes, R., & Rabkin, E. S. (1977). *Science fiction: history-science-vision*. Oxford, UK: Oxford University Press, USA.

Seitz, W. C. (1961). *The art of assemblage*. New York, NY: Museum of Modern Art.

Shapiro, G. (2007). The absent image: Ekphrasis and the 'infinite relation' of translation. *Journal of Visual Culture, 6*(1), 13–24.

Smith, P. (2013, Sept. 29). 10 examples of ekphrasis in contemporary literature. Interesting Literature. Retrieved from https://interestingliterature.com/tag/william-gibson/

Solomon, D. (2015). *Utopia parkway: The life and work of Joseph Cornell*. New York, NY: Other Press, LLC.

Tatsumi, T., & Gibson, W. (2014). Eye to eye: An interview with William Gibson. In *Conversations with William Gibson* (pp. 3–23). P. A. Smith (Ed.). Jackson, MS: University Press of Mississippi.

Tomkins, C. (1976). *The bride and the bachelors: Five masters of the avant garde*. New York, NY: Penguin Books USA.

Wershler-Henry, D. (1989, Fall). Queen Victoria's personal spook, psychic legbreakers, snakes and catfood: An interview with William Gibson and Tom Maddox. *Virus 23*, 28–36. Retrieved from http://www.cypunk.com/interviews_text.php?idinterview=7

Alive in the Now, continued

White, A. (2013). Pots in Dick: Ceramic objects in Philip K. Dick's fiction. In *Making worlds: Art and science fiction* (pp. 111–123). A. Barikin and H. Hughes (Eds.). Surpllus.

Willis, Connie. (2010). *Blackout*. New York, NY: Ballantine Books.

Willis, Connie. (2010). *All Clear*. New York, NY: Ballantine Books.

Winter, J. (2014). Art and illustration. In *The Oxford Handbook of Science Fiction* (pp. 196–211). R. Latham (Ed.). Oxford, UK: Oxford University Press.

Zelazny, R. (2009). 24 views of Mount Fuji, by Hokusai. In *Nine black doves* (Vol. 5 of The collected stories of Roger Zelazny) (pp. 359–434). (Originally published 1985)

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Loving the Alien, Hating the Hybrid: A Cultural Study of *Robotech*

Chris Mich

Abstract: In 1980s Japan, a struggle between the old guard, harmonious collective mentality and the idealism of the new breed of independent, rebellious youngsters became illustrated in anime. Three examples of Japanese animated series that televised this struggle were acquired, repackaged, rewritten, and rebroadcast in America by Carl Macek under the one name — *Robotech*. *Robotech*, the American TV series, is a hybrid in and of itself with its Japanese-created visuals married an American-rewritten storyline. In addition to the show's own mixed heritage, *Robotech* contains multiple interracial and interspecies (human and alien) couples and hybrid offspring. This paper explores the hybrid nature of the American *Robotech* animated TV series and how the Eighties' generational struggle in Japan manifests itself through two hybrid, interspecies characters: Dana Sterling and Marlene/Ariel.

Keywords: *Robotech*, Anime, Alien, Hybrid, Miscegenation, Gaijin, Shinjinrui, Carl Macek, Japan, interracial relationships

Introduction

Two key terms that will be used repeatedly in this work are "Alien" and "Hybrid". Alien is in reference to extraterrestrial beings and their attributes as displayed within the *Robotech* storyline. Hybrid refers to the offspring or byproduct of two "parent" individuals or cultures that have joined together. The parents can be two different Earth ethnicities or a human/ alien pairing. Hybrid can also be applied to the nature of the *Robotech* television series itself — since *Robotech* isn't a straight adaptation of a Japanese anime series. American producer Carl Macek rewrote three Japanese series into one all-encompassing television series called "*Robotech*" for American audiences. Therefore, *Robotech* itself is a byproduct of joining two distinct cultures through creative fashioning of American storytelling and Japanese visuals.

In the mid-1980s, young science fiction fans were hungry for something to fill the void created by the conclusion of the original *Star Wars* trilogy. Enter the animated television series Robotech — a "sweeping science-fiction anime epic of humans defending their home world against alien domination" (Tarmey, 2011), and the brainchild of television writer and producer Carl Macek. *Robotech* introduced an American television audience to the Japanese animation style known as anime, and earned Macek the unofficial title as the "Grandfather of Anime" (Letz, 2006). While several anime series came before *Robotech*, including *Astro Boy*, *Star Blazers* and *Speed Racer*, no previous series targeted such a wide demographic that was "not bracketed by age or nationality" (Reynolds and Cherry, p. 7, 1987). As a result, *Robotech* quickly garnered a large, loyal fanbase. However, while *Robotech* appeared to be a "very refreshing and very timely" multi-generational science fiction fantasy promoting "acceptance, unity and getting along" (Wahlgren, 2006), twisting Japanese culture into an American storyline incited some anger and even violence. Established American fans of anime originally viewed *Robotech* as a straight adaptation and loved it. Upon their discovery that *Robotech* was three Japanese shows — *Super Dimension Fortress Macross*, *Super Dimension Calvary Southern Cross* and *Genesis Climber Mospeada* — altered into one "new" American product, many of the fans were insulted. These fans saw this repurposing as a sacrilegious degradation of an esteemed art form, and they expressed these feelings. Art appeared to imitate life with *Robotech* in the sense that the three series had multiple "outsider" characters who faced fear, disgust,

and violence upon the exposure of their mixed heritage. The *Robotech* television series perpetuated an ideology that celebrates mixed couples while despising their offspring, also known as "hybrids."

I'll scrutinize three human-alien couples within the Robotech narrative and draw conclusions based on the examples of hybrid hatred within these relationships.

***Robotech*: A Crash Course**

Robotech starts in the late 20th Century. Every nation on Earth is involved in World War III. However, the global conflict comes to an abrupt halt when an unoccupied spaceship crash-lands on Macross Island in the South Pacific. Humanity finally puts aside their differences and works together to rebuild the mammoth space fortress dubbed "The SDF-1". During the rebuilding process, they discover Robotechnology, which combines space-faring war weaponry with the ability to transform into various configurations to perform specific tasks. The new technology reclaimed by humans was fueled via the byproduct of an alien flower. Protoculture—and whatever secrets it holds—is desperately sought after by three distinct alien races that successively attack Earth and humanity to obtain the Protoculture and its related devices aboard the SDF-1. Each alien invasion of Earth occurred within one of three human generations. Each of the human generations—and its accompanying alien enemy—struggle to accept the opposing culture and the resulting mixed offspring that both cultures produce (Macek, *Robotech,* Episodes 1-85, 1985).

Hybrids and *Robotech*

In light of colonial and postcolonial studies, the mixing of cultures is not to be taken lightly. In his essay "Signs Taken For Wonders," Homi K. Bhabha calls it a "sign of the productivity of colonial power" but also describes it as "problematic," as the differences in the original cultures from both the colonizer and colonized can no longer be identified or even recognized (Bhabha, 2004, pp.154-156).

In an international study of public reception to animal, ethnic, and racial hybrids, Austrian social psychologist Wolfgang Wagner and fellow psychology professors surveyed university students in Austria, India, and Japan in regard to their opinions of children from a "cross-cutting ethnic factor." According to the findings of Wagner, et al, "offspring of mixed marriages are perceived as lacking a clearly defined identity" by political conservatives. Liberal students not only favored the hybrid, they gave higher numerical ratings for mixed ethnic children over "in-group" pure ethnic children than did the conservatives. However, while the results indicated polar opposite views towards hybrids, both groups championed purity in ethnicity, as people produced from parents of the same social, ethnic, and racial backgrounds were valued for maintaining the "essence" of their native culture (Wagner et al., 2010).

The rejection of ethnically mixed offspring is ever-present within the narrative text of *Robotech*. Mixed couples endured social, political, and military struggles forced upon them by those in power. Within all three generational chapters of the *Robotech* saga, humanity is at war with alien invaders until one human falls in love with one alien, or vice versa. At that point, the story shifts towards the difficult pursuit of a truce between humans and the alien armada. Often, there are additional supporting characters also involved in mixed relationships. However, while mixed couples are idealized and championed, their hybrid offspring are despised or discarded in both the Japanese original TV series and the American combination of series that make up *Robotech*.

The Political Economy of *Robotech*

From 1965 to 1985, dozens of Japanese anime programs on American television suffered the fate of having their complex storylines watered down due to the efforts of protective parental pressure groups striving to cleanse television

Loving the Alien, Hating the Hybrid, continued

for children's safety. The American stigma that "cartoons are just for kids" reduced pre-*Robotech* anime to a very limited genre with only one demographic: young boys (Reynolds & Carlton, 1986, p. 220).

If anime fans of any age or background wanted to see anime programs that were remotely close to their original storylines, they needed to know somebody who had the capability of recording Japanese television or they watched these shows at science fiction conventions. Keep in mind that this is an early cable TV, pre-Internet world with limited content-sharing capabilities. It was under this political economy that Carl Macek crafted his vision of *Robotech*:

> I saw the potential of bringing something like this into the country and exposing it to a larger audience than twenty-five guys in a room with a reel-to-reel tape recorder. There was a great market with the anticipation of toys, models, and stuff like that. I thought it would be a cool way to increase the awareness and sale of this product in the States to have animation available for fans to look at. (Otaku Unite!, 2004)

Like Star Wars, Robotech treated intergalactic warfare with eye-pleasing visuals, complex character development, and budding romantic relationships. However, what separated Robotech from Star Wars and other science fiction franchises is that Robotech celebrated and questioned war and love simultaneously, as if war and love were in a constant struggle. Thomas Lamarre described the type of question raised as "…how can you enjoy your war and rue it too?" (Lamarre, p. 147, 2009) Robotech answers this question by not simplifying aliens and humans as "good guys" or "bad guys", but by showcasing potential change within individuals and their cultures. An excellent example of this is Miriya — who transformed from a destructive, murderous Zentraedi fighter pilot into the loving wife of Max Sterling and mother of his children. Ironically, *Robotech*'s ongoing storylines of love vs. war and the costs of lives in battle inspired the Lucasfilm animator/director Dave Filoni to create two *Star Wars* animated series: Cartoon Network's *The Clone Wars* and DisneyXD's *Star Wars Rebels*:

> "That animated series," Filoni said, "showed me as a kid that, 'Wow, these characters can die. Roy Fokker got shot down. How does that work?' The romance in it made me feel very much like what was happening in *Star Wars*. The Zentraedi battle cruisers… It was all so incredible to me and it made me say, 'I want to grow up and make an animated series like that.'" (Young, 2016)

The acceptance of "the other" was a challenging notion, especially when you consider that *Robotech* was airing in 1985, a time when many viewers —myself included — went to bed at night wondering if our Cold War enemies would initiate a nuclear war and wipe out life on our planet. In that era of paranoia, aliens were often portrayed as "the others" — destructive monsters bent on destroying humanity. In 1988, Mercury Theater radio playwright Howard Koch commented that he did aliens an "injustice" by writing the Martians as the cause of human suffering in Orson Welles' infamous 1938 War of the Worlds radio broadcast. Koch wrote, "The threat, I believe, comes not from outer but from inner space where our warriors, hot and cold, invade our minds to fan our prejudices and fatten their purses" (Koch, 1988, p. 3).

Macek responded to all these factors with his hybrid of Japanese animation and American rewriting. The *Robotech* series earned syndication in more than 90 domestic television markets in its first year (Reynolds and Carlton, p. VII, 1986) and continues to have a fan base today. What Macek couldn't predict, however, was who he was going to insult by rewriting made-in-Japan animated series, and who he would win over as lifelong fans.

Robotech **Reception (or Hating/Loving the Hybrid)**

Loving the Alien, Hating the Hybrid, continued

In 1985, when I was 13, *Robotech* played twice a day on my television. I quickly became fixated on the show, joined the *Robotech* fan club, and received the very first issues of the aptly named *Robotech* fanzine, "Protoculture Addicts." Whenever I introduced the show to friends, they also became fans. The closest things to *Robotech* at the time were the *G.I. Joe* and *Transformers* animated series. Characters waged war in those series, but they always managed to leave a battle unscathed. *Robotech* not only portrayed characters dying, but also gave other characters time to react and reflect on their comrades' death. "Thank you for showing the children that it's all right to mourn, to grieve a loss of a friend," one teacher wrote to Macek and the movie/television distributor Harmony Gold. "Thank you for showing us what it's like to lose someone" (Reynolds & Carlton, p.222, 1986). Soon after its television debut, *Robotech* conventions — much like the original *Star Trek* conventions — were organized. Macek was officially invited to speak at the first convention in San Francisco, with roughly 8,000 people attending. At Macek's lecture, the auditorium was filled to capacity with fans hanging on his every word:

> No matter what I said, it was great. They thought I was like this amazing personality they wanted to deal with....like I was George Lucas....Gene Roddenberry who had come down to talk to them... (Otaku Unite!, 2004)

However, when Macek explained how he took three original Japanese stories and rewrote them into one, the tide turned quickly as serious anime fans disapproved. Some fans even compared his creative procedure to rape and murder...

> Immediately afterwards someone hand-printed a pamphlet and started calling me the Anti-Christ ...everyone was awe-inspired and then it turned sour...People would track me down and threaten my life. They would put up posters and put up little slogans like 'You raped our daughters and killed our mothers.', 'We know where you live. We'll find you and track you down.' People would make dart boards with my face on it at conventions. My face would appear with targets on them. I became the object of fan scorn. (Otaku Unite!, 2004)

However, as time went on, dedicated *Robotech* fans kept the series alive and openly supported Carl Macek. *San Francisco Chronicle* columnist Jeff Yang reported that Carl Macek was "directly responsible for the mainstreaming of Japanese animation in America" and called *Robotech* "an unusual hybrid" and a "masterful work of Asian/American fusion." (Yang, 2010) Yang also commented, "And like most attempts to blur the lines between cultures, it provoked hostility from those who saw such mixing an atrocity." Fans would even call the process of altering anime for U.S. consumption "Macek-ering," stressing the word play to sound like "massacring" (Yang, 2010).

After *Robotech* went off the air, the franchise survived thanks to fan-based support of books, role-playing games, videogames, and consumer videos of the series. *Robotech* was even the subject of a comedic sketch on Late Night with Conan O'Brien (Yun, 2011). In 2006, Harmony Gold released a new *Robotech* movie entitled *Robotech: The Shadow Chronicles*, which won several film festival honors. In the wake of successful robotic movies such as *Transformers* and *Pacific Rim,* a *Robotech* live action movie deal has moved from studio to studio and currently resides at Sony Pictures. In 2015, Sony announced that *Furious 7* director James Wan would be associated with the project and may direct the *Robotech* live-action feature post-2017 (Kelley, 2016). MTV listed *Robotech* as one of "7 Awesome 1980s Cartoons You Should Have Watched" saying, "This show was like what explodes in a sensitive teen's head every fifteen seconds...Seriously, it was awesome..." (McGinley, 2011). In 2011, IGN.com listed *Robotech* as #34 in its list of "Top 100 Animated Series" and summed up its importance by writing, "...it changed the

way we looked at cartoons and raised the bar for storylines" (IGN Entertainment Games, 2011).

GAIJIN and the SHINJINRUI

In considering the transitions that occurred in Japanese filmmaking, and separating these films from U.S. films, it is useful to look at Godzilla movies, the first of which was produced in 1954. The *Godzilla* movies reflected traditional Japanese concerns with harmony in nature, and the importance of the collective working together to defeat the beast or complete the task at hand (Treat, p. 240, 1996). This mindset was still very prevalent in 1980s Japan, especially among working class adults. Unlike Americans at the time, Japanese managers and workers "suffered no identity loss" when they compromised ownership of a project, status in the office, or even personal relationships for the sake of the company or a government. However, a struggle within Japanese culture in the 1980s would give birth to a label for the next generation of Japanese celluloid heroes: the Shinjinrui. A reflection of young Japanese adults and their need to distinguish themselves from their parents' generation, "Shinjinrui" translates as "new beings." Shinjinrui is a term that a Japanese media critic used to describe Tetsuo, a troubled teenage character in 1988's blockbuster anime feature film *Akira*. Set in the *Blade Runner*-esque future city of Neo-Tokyo, *Akira* tells the tale of a runt biker gang member who is turned into a "rampaging psychic psychopath" with unbelievable and uncontrollable powers of destruction (Chisholm, Web, 1990). Tetsuo doesn't fit in anywhere—at school, at home, or in his gang. He even struggles relating and communicating with his girlfriend. As a result, Tetsuo literally and figuratively becomes a monster of Godzilla-type proportions, growing to a grotesquely bloated form and squashing people like grapes in the process. Japanese teenagers of the Eighties rebelled – instead of being the cooperative collective defeating the monster, they wanted to be set apart as the monster.

The Japanese term "gaijin refers to "an outsider", or someone not born and raised in Japan who now lives, works, and plays in Japan. People associated with a gaijin in professional or romantic relationships have been cautioned, treated poorly and, ultimately, shunned (Katzenstein, p.212, 1989). Yet in the 1980s, Japanese teens and twentysomethings celebrated the gaijin, and even wanted to become that outsider in order to be a member of the "new breed" of Japanese, the Shinjinrui.

Robotech plays with this conflict of the harmonious collective versus the awkward outsider in each generation of Robotech warriors. In *Robotech*, the United Earth Government and all of the enemy alien invaders initially follow the collective mentality. Everyone must contribute to what's best for their species: humanity, Zendtraedi, Robotech Masters, or Invid. Thus, the lines for war are clearly drawn and the viewer is asked to root for humanity first. However, as each war continues, a cross-contamination of cultures occurs and certain individuals—some purebred, some not—rise to greater importance than any one cause. In the first Robotech war, a Chinese teenager named Minmei, who is living amongst Japanese islanders-turned-space-wayfarers, becomes a celebrated pop star and the most important individual in the war, leading many Zendtraedi to defect and thereby turning the tide of war, saving planet Earth.

Half-human, half-Zendtraedi Dana Sterling is the lead character in the second generation of Robotech warriors. Again, the alien and Earthling leaders are portrayed as stubborn warmongers whose authority begins to be questioned by individuals such as Dana and her peers. As one of Dana's direct reports says, "We are only pawns in headquarters' game of 'Name That Alien.' We play by their rules, gambling our lives for their reputation…" (Macek, Robotech Episode 43: Prelude to Battle, 1985). Dana's roles as both a hybrid outsider and leader proved to be valuable and troublesome throughout the story, as she is both a gaijin and commander of the United Earth

Loving the Alien, Hating the Hybrid, continued

Defense Forces' 15th Armored Tactical Squadron. She is another dangerous member of the Shinjinrui with power, authority, and a knack for disobeying military orders.

Shortly after the second war exhausts Earth's defenses, the third war is almost immediately set up. The Invid have quickly conquered Earth at the beginning of this final chapter, and Earthlings are either slaves to the Invid or the invaders trying to reclaim their ancestral homeland. A guerrilla-style war unfolds, and the viewer travels along with a ragtag group of human soldiers who adopt a mysterious, beautiful amnesiac they mistake for human. Given the name "Ariel" by her alien mother/creator, the amnesiac is called Marlene by her human companions. Ariel/Marlene becomes increasingly important as the war rages on and is the key player to the resolution of this final intergalactic conflict. Ironically, a fellow gaijin/Shinjinrui hero and member of the same ragtag team often comes to her aid and provides words of wisdom on dealing with pain and awkwardness. Lancer, a male soldier who is also a cross-dresser and occasional performs on stage as a female rock star, saves her life more than once. When Ariel begins to struggle with her identity and feels she should leave the group, Lancer encourages her to stay saying, "I know what you're going through, but you must press on despite the pain and fear…" (Macek, Robotech Episode 77: The Midnight Sun, 1985). Robotech uses this struggle between the old school collective thinking versus individual identity to push its storyline forward.

Media Influences on *Robotech*

As Japan saw the beginning of a struggle between the time-honored tradition of preserving the collective and the new movement towards valuing individuality, a wave of American philosophers and writers called for "the abolition of racial categories" and believed that "mixed-race Americans could contribute to an improved America" (Carter, p.163, 2013). In the Eighties, the same decade *Robotech* premiered on American television, media-makers responded to this school of thought by producing more content about the United States as a place where the intermingling of ethnicities was not only acceptable but encouraged. Several films reflecting this acceptance include *Brewster's Millions* (1985), *A View to a Kill* (1985), *Soul Man* (1986), *La Bamba* (1987), *Lethal Weapon* (1987) and *Hairspray* (1988). The 1980s were also the hey-day of "The United Colors of Benetton" multicultural advertising campaign that featured individuals of various races posing happily together in Benetton clothing. MTV, the curated television network of music videos that was a cornerstone of 1980s pop culture, repeatedly broadcast displays of interracial romance in videos such as Squeeze's "Black Coffee in Bed" (1982), Duran Duran's "Hungry Like The Wolf" (1982), David Bowie's "China Girl" (1983) and "Loving the Alien" (1984), Jermaine Jackson and Pia Zadora's "When the Rain Begins to Fall" (1984), Sade's "The Sweetest Taboo" (1985), Prince and Sheena Easton's "U Got The Look" (1987) and Madonna's "Like a Prayer" (1989). As a result of this media movement, public acceptance of interracial couples was higher than it had ever been before (Carter, p.162-3, 2013). Many mixed couples populate the three generations within the *Robotech* storyline. This acceptance of interracial cultures is typified by a speech by the Captain of the SDF-1 Henry Gloval at the interracial wedding of human warrior Max and Zendtraedi warrior Miriya. Gloval stresses that the people aboard the SDF-1 must forgive their enemies, look to the Zentraedi's "good nature," and learn to live with different people and nations, especially since since that is what Max and Miriya are doing for each other. Gloval's speech highlights how, through marriage, Max and Miriya are now unknowing revolutionaries in the ongoing battle of perception and acceptance of interspecies relations. Likewise, simply by her birth, their daughter Dana is also a revolutionary. This speech, written by *Robotech* writer/producer Carl Macek, offers the notion that interspecies couples and their offspring are quiet revolutionaries, which parallels the attitude of interracial couples in America at the time. As scholar Maria P.P. Root wrote, "Everyone who

Loving the Alien, Hating the Hybrid, continued

enters into an interracial relationship or is born of racially different heritages is conscripted into a quiet revolution" (Carter, p.167, 2013).

Dana continues to challenge Zentraedi traditional thinking as the leader of the Earth Defense Forces' 15th Armored Tactical Squadron, a rule-breaker challenging authority.

Dana readily admits to her status as an outsider and is quite proud of her mixed heritage. This pride doesn't make life any easier for her or those under her command, and yet she is constantly handed dangerous, seemingly impossible missions after she and her team have tremendous success with their unconventional approaches to warfare. Her "gaijin-ness" is well-established on Earth before the story takes her into the confines of the Robotech Masters' ships – which are populated by clone slave citizens who are brainwashed to work together and avoid any "unhealthy amount of self-awareness" (Macek, Robotech Episode 25: Wedding Bells, 1985). The renegade stowaway that she is, Dana makes several speeches against the insanity of being part of a collective and tries to liberate several clones from the "slavery" of thinking like everyone else. This costs the lives of many of the people she is trying to save. Yet, thanks to Dana and her team, the few that make it out of the Robotech Masters' mind control enjoy their liberation and newfound free will, and Dana assumes the messianic role of championing the cause to "just be yourself" (Macek, *Robotech* Episode 55: Dana in Wonderland, 1985). Once again, the old guard of the Japanese collective is criticized, and the new awkward outsider is idolized.

In line with her rebellious approach to leadership, Dana encourages the interspecies relationship that ignites between Bowie Grant, an African American male soldier in Dana's squadron, and Musica, a non-military Robotech Master clone responsible for keeping the other worker-clones content. When Bowie and Musica both abandon their posts to pursue their romance, chaos and disaster ensue. During their trek, Musica is overwhelmed by love but simultaneously worried about her people. Bowie answers her concern:

> You and I are from different worlds, yet we belong together...Your and our people are at war, but that doesn't matter. We'll be different because we'll be an island of peace in an ocean of hate and misery (Macek, *Robotech* Episode 55: Dana in Wonderland, 1985).

Bowie preaches to Musica that their forbidden love is not only permissible, but inspirational - much like Dana's parents, the quiet revolutionaries Max and Miriya Sterling. Later, on a mission to save his godfather Rolf Emerson who has been captured by the Robotech Masters, Bowie and Musica survive a costly battle. Emerson's dying words to Bowie champion Bowie's actions and the intermingling of races:

> Don't make the same mistakes our generation did. In the future, two different races of people must learn to co-exist in harmony. The future is up to all of you (Macek, *Robotech* Episode 59: The Invid Connection, 1985).

Emerson's words echo the major shift in the American illustration of mixed people in the late 80s and early 90s. At that time, media makers and scholars pushed racially-mixed people in a positive light hoping their popularity would initiate the "end of race" altogether.

Another aspect of the transition in thinking that was occurring in society was the aspect of the "middle generation" (Williamson, p. 193, 1995). This middle generation was raised to initially accept only one of their racial identities, only to be later challenged to marry the two cultures of their mixed origin. They had a massive undertaking to create a free space where individuals "value themselves for themselves alone" and not a sole affiliation to one race. They spent their entire lives to make this new world all the while experiencing "an unending double struggle" filled with confusion, despair, and "seemingly lack of progress." (Williamson, p. 194, 1995). Like her

Loving the Alien, Hating the Hybrid, continued

hybrid predecessor Dana Sterling, interspecies child Marlene/Ariel deals with the conflict of two cultural identities.

Marlene is initially found near an abandoned village on and, although initially thought to human, a resistance group realizes that she is actually an Invid simulagent named Ariel (Macek, *Robotech* Episodes 61-85, 1985). Several characters question whether Ariel is "one of them," but they always dispel the thought of her being an alien after she shows acts of kindness, which include kissing team members. When Ariel first kisses Scott, it is a tender scene as Scott is just as vulnerable and timid as amnesic Ariel. However, Ariel interrupts the kiss as she grabs Scott's arm in pain and yells, "It's hopeless! The Invid are coming! The Invid are coming!" (Macek, *Robotech* Episode 79: Frostbite, 1985). Ariel is constantly torn between trying to be human and Invid at the same time.

Even though the Invid attempt to recall Ariel, Ariel repeatedly denies her alien identity. It is only near the end battle when Ariel is wounded that she comes to terms with her alien nature. As green blood gushes from her wound, Ariel screams, shakes her head, and flees crying. Witnessing this scene, the entire resistance group is in shock. Jupiter Division soldier Sue Graham challenges Scott to accept the fact that their "Marlene" is really an Invid…

> Sue Graham: Scott, the facts are staring you right in the face and you're just gonna have to believe what you see.
>
> Scott Bernard: You're wrong, Sue, because that woman proves that what a person is made of doesn't determine their spirit or love they possess. But we got to accept one thing: Marlene will never feel the same around us knowing what she knows now. She has a new life to learn. (Macek, *Robotech* Episode 83: Reflex Point, 1985).

In reality, Scott and the team are the ones that need to learn a "new life" of acceptance. While they loved Ariel as "Marlene the Human," they hate her as "Ariel the Alien." In the climatic end battle, Ariel brings her friends into the Invid headquarters to prove to Regis, her Invid leader, that humanity is worth saving. Yet, her friends now are befuddled by her alien identity and verbally express their newfound hatred of her. She questions their hatred, reminding the group that they liked her as a human and asks, "Why do you hate me now?" One of the group replies, "Because you're an alien." After Ariel further explains that she is a hybrid of Invid and humanity, they are even more skeptical…

> Ariel: I am neither human nor completely Invid. I am a new form of life that is a blending of the two.
>
> Lancer: And this new form of life is planning on replacing the old one, I suppose. (Macek, Robotech Episode 84: Dark Finale, 1985)

Even though some members of the resistance team change their minds, Scott cannot love her. Ariel's inability to be accepted as a "blending of the two" is somewhat similar to the plight of the "tragic mulatto" character in the first film to deal with interracial romance, Pinky. Named after its main character, Pinky is a film dealing with a "fair-skinned Negro nurse" who passed for white in the North but encounters problems from both the segregated black and white communities in her Southern hometown. After a journey of self-discovery, Pinky makes many sacrifices, including her choice to end her romance with her white fiancée. While Pinky gains pride in her race and becomes a wiser woman, she is not happy with societal limitations that prevents her from finding love (Bogle, p. 150-2, 1973). Ariel's fate is the same, as she cannot find common ground with her Invid mother nor her would-be human lover. By the end of *Robotech*, Ariel is like Pinky, a wise but lonely survivor.

Loving the Alien, Hating the Hybrid, continued

Conclusion

Film critic John Baxter called science fiction cinema "the poetry of the atomic age, a short-hand evocation of the pressures that are making us what we are and will be" (Baxter, p. 13, 1969). Such is the case with *Robotech*. A hybrid of Japanese animation and American writing, *Robotech* capitalized on American aspirations to embrace all that is alien and new, while at the same time invoking xenophobia. Playing on Cold War fear of nuclear holocaust, *Robotech* replayed the cataclysmic end of humanity three times over, dealt by alien weapons of mass destruction. While *Robotech* promoted interracial social and sexual experimentation, it clearly illustrated that any outcome of those relations would face fear and rejection.

Although pioneering the exploration of mature themes within animated television, *Robotech* did not gain the pop culture success of the other robot-infested animated series of the 80s, The Transformers. In 2006, Harmony Gold did muster enough resources to complete the feature film *Robotech: The Shadow Chronicles*, an animated sequel to the television series. *Shadow Chronicles* not only reunited Scott and Ariel, but championed the acceptance and necessity of hybrids. *Shadow Chronicles* featured several hybrid heroines, in addition to Ariel, including a hybrid robot Janice and Maia, the youngest daughter of human/alien couple Max and Miriya Sterling (*Robotech: The Shadow Chronicles*, DVD, 2006). In a clever cross-promotion of the new Robotech movie, the animated characters of Scott and Ariel appeared in a United Nations Public Service Announcement. Within the spot, the human/alien hybrid Ariel informs a pensive Scott that while his people are capable of destruction, humanity also has "the greatest potential in itself: to educate, to heal, to provide…together you can do this. Together, you can succeed…" (ShinnSakura, Web, 2011).

References

Baxter, John. (1969). "What Science Fictions Films Where?" *Science Fiction in the Cinema*. New York: A.S. Barnes.

Bhabha, Homi K. (1985). Signs taken for wonders: Questions of ambivalence and authority under a tree outside Delhi, May 1817. *Critical Inquiry, 12*(1), pp 154–156. Retrieved from www.jstor.org/stable/1343466

Bogle, Donald. (1973). T*oms, Coons, Mulattoes, Mammies, & Bucks: An Interpretive History Of Blacks in American Films*. New Expanded Edition. New York: Viking.

Bresler, E. (director). (2011). *Otaku Unite!* (2004) [DVD]. Perf. Carl Macek. New York, NY: Central Park Media.

Carter, Greg. (2013). *The United States of the United Races – A Utopian History of Racial Mixing*. New York: New York University Press.

Chisholm, Kenneth. (1990). "Akira - Synopsis." IMDb. IMDb.com. Retrieved from http://www.imdb.com/title/tt0094625/?ref_=nv_sr_1

IGN Entertainment Games. (2011). "Top 100 Animated Series." IGN. Ziff Davis, LLC.

Katzenstein, Gary J. (1989). *Funny Business: An Outsider's Year in Japan*. New York: Prentice Hall Press.

Kelley, Shamus. (2016). "Exclusive: Robotech Live Action Movie Status Update." Den of Geek. Matthew Sullivan-Pond. Retrieved from http://www.denofgeek.com/us/movies/Robotech/260212/exclusive-Robotech-live-action-movie-status-update.

Koch, Howard E. (1988). "A Note from the Radio Playwright." Grover's Mill: The War of the Worlds - The 50th Anniversary, 1938-1988. Trenton, NJ: E.L. Hoffman.

LaMarre, Thomas. (2009). *The Anime Machine: A Media Theory of Animation*. Minneapolis, MN: U of Minnesota.

Letz, A. (2006). Interview by K Maxwell [DVD]. Robotech: Birth of a Sequel. *Robotech: The Shadow Chronicles*. Hollywood, CA: Harmony Gold/Maxwell Films.

Macek, C. (Writer) (1985). Episodes 1-85 In Agrama, A. (Executive Producer), *Robotech*. Hollywood, CA: Harmony Gold, Inc.

Macek, C. (Writer) (1985). Episode 25: Wedding Bells In Agrama, A. (Executive Producer), *Robotech*. Hollywood: Harmony Gold Inc.

Macek, C. (Writer) (1985). Episode 43: Prelude to Battle In Agrama, A. (Executive Producer), *Robotech*. Hollywood: Harmony Gold Inc.

Macek, C. (Writer) (1985). Episode 55: Dana in Wonderland In Agrama, A. (Executive Producer), *Robotech*. Hollywood: Harmony Gold Inc.

Macek, C. (Writer) (1985). Episode 59: The Invid Connection In Agrama, A. (Executive Producer), *Robotech*. Hollywood, CA: Harmony Gold, Inc.

Macek, C. (Writer) (1985). Episode 61-85: The Next Generation In Agrama, A. (Executive Producer), *Robotech*. Hollywood, CA: Harmony Gold, Inc.

Macek, C. (Writer) (1985). Episode 79: Frostbite In Agrama, A. (Executive Producer), *Robotech*. Hollywood, CA: Harmony Gold, Inc.

Loving the Alien, Hating the Hybrid, continued

Macek, C. (Writer) (1985). Episode 83: Reflex Point In Agrama, A. (Executive Producer), *Robotech*. Hollywood, CA: Harmony Gold, Inc.

Macek, C. (Writer) (1985). Episode 84: Dark Finale In Agrama, A. (Executive Producer), *Robotech*. Hollywood, CA: Harmony Gold, Inc.

McGinley, Brendan. (2011). "7 Awesome 1980s Cartoons You Should Have Watched." MTV.com. Viacom International Inc. Retrieved from http://www.mtv.com/news/2621708/seven-awesome-1980s-cartoons-you-should-have-watched/

Reynolds, K., and Carlton, A. (1986). *Robotech Art 1: The Official Guide to the Robotech Universe*. Norfolk, VA: Donning.

Reynolds, Kay, and Cherry, David A.. *Robotech Art 2 - New Illustrations and Original Art from the Robotech Universe*. Norfolk, VA: Donning, 1987.

Robotech: The Shadow Chronicles. Dir. Dong-Wook Lee, Tommy Yune, Writ. by Frank Agrama, Thomas J. Bateman, Ford Riley, Steve Yun and Tommy Yune. Perf. Greg Snegoff, Mark Hamill and Chase Masterson. Robotech: The Shadow Chronicles. Hollywood, CA: Harmony Gold/Maxwell Films, 2006.

ShinnSakura. (2011). "Robotech: UN 60th Anniversary PSA." YouTube. Retrieved from https://www.youtube.com/watch?v=f7LTRUKPRDc&-feature=youtu.be.

Tarmey, K. (2011). "Press Release: Robotech on A+E DVD!. Robotech.com. Harmony Gold USA. Retrieved from http://www.Robotech.com/news/viewarticle.php?id=443.

Treat, J.W. (1996). "Panic Sites." *Contemporary Japan and Popular Culture*. Honolulu: U of Hawaii.

Wagner, W., N. Kronberger, M. Nagata, R. Sen, P. Holtz, and F. F. Palacios. (2010). "Essentialist Theory of 'Hybrids': From Animal Kinds To Ethnic Categories And Race." *Asian Journal of Social Psychology 13.4*, pp 232-46. Retrieved from http://illiad.wcupa.edu/illiad/illiad.dll?SessionID=Y220652661T&Action=10&Form=72&Value=157147.

Wahlgren, K. (2006). Interview by K Maxwell [DVD]. Robotech: Birth of a Sequel. *Robotech: The Shadow Chronicles*, Hollywood, CA: Harmony Gold/Maxwell Films.

Williamson, Joel. (1995). *"Today and Tomorrow." New People: Miscegenation and Mulattoes in the United States*. Baton Rouge and London: Louisiana State UP.

Yang, J. (2010). "The 'Robotech' Master." *San Francisco Chronicle*. Hearst Communications, Inc. Retrieved from http://articles.sfgate.com/2010-05-06/entertainment/20888023_1_carl-macek-animation-stop-motion.

Young, B. (2016). "The Cinema Behind Star Wars: Robotech." StarWars.com. The Walt Disney Company. Retrieved from http://www.starwars.com/news/the-cinema-behind-star-wars-Robotech.

Yun, S. (2001). "An Introduction to ROBOTECH...in a nutshell." Robotech.com. Harmony Gold USA. Retrieved from http://www.Robotech.com/infopedia/intro/.

Yun, S. (2004). "Open Letter to Late Night with Conan O'Brien. Robotech.com. Harmony Gold USA. Retrieved from http://Robotech.com/news/viewarticle.php?id=199.

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Five Features of Multiverse Time Travel: How Past Paradoxes Can Be Avoided in the Future

Morgan Luck, Charles Sturt University

Abstract: The aim of this paper is to help construct coherent time travel narratives by establishing five features of multiverse time travel. To this end, multiverse time travel will be contrasted to fixed-universe time travel, and both versions related to various cases - where each case is designed to illustrate a key feature of multiverse time travel.

Keywords: time travel; multiverse; fixed universe; narratives; paradoxes

1.0 - Introduction

Although there has been growing philosophical treatment of multiverse time travel (Abbruzzese, 2001; Effingham, 2012), no work has been solely dedicated to a formulation of the key features of this type of time travel. This paper aims to redress this vacuum by establishing five key features of multiverse time travel. These features are established to help the construction of more coherent multiverse time travel narratives. That is, it is hoped that if fictional worlds are constructed with these features in mind, they will avoid inconsistencies common to such worlds. To this end, multiverse time travel will be contrasted to fixed-universe time travel, and both versions related to various cases - where each case is designed to introduce one, or more, key features of multiverse time travel.

To help illustrate why identifying such features might be important to creators, consumers, and scholars of time travel narratives, consider the following simple, and typical, example of time travel from the popular 1978 film Superman. In this film Lois Lane (with whom Superman is in love) is killed. Consequently, Superman goes back in time and saves her.[1] Despite its simplicity, there are problems this narrative; problems that render it impossible for Superman to save Lois under either multiverse or fixed-universe time travel. These problems will be made clear in the next section, after both theories of time travel are introduced. It is these types of problems that writers may wish to avoid, consumers may wish to spot, and scholars may wish to study; this paper aims to help us in these respects. However, just as importantly, this paper also aims to encourage discussion on some interesting, and subtle, distinctions between different types of multiverse time travel that have not yet been given adequate attention.

We begin with a brief overview of a well-known time travel paradox, the grandfather paradox. We shall use this paradox to introduce and contrast fixed-universe and multiverse time travel. We shall also discover why Superman's efforts to save Lois Lane are thwarted under both theories of time travel.

2.0 – The grandfather paradox

The grandfather paradox can be presented as follows:

> If you could travel into the past then you could kill your own grandfather at a time before your father's conception, so preventing your own birth, which would prevent you from traveling into the past, and so prevent you from killing your grandfather before your father's conception.

Five Features of Multiverse Time Travel, continued

This case highlights the notion that backwards time travel seems paradoxical - it appears to both allow and deny the same event (the killing of your grandfather). It is because of this apparent paradox that some have argued against the possibility of time travel (Mellor, 1998, p. 135; Hawking, 1992, p. 604). The simplest form of this argument can be presented as follows,

1. If backwards time travel is possible, then a paradox is possible.

2. It is not the case that a paradox is possible.

So,

3. It is not the case that backwards time travel is possible.

Most analytic philosophers take the truth of Premise 2 for granted.[2] So, on the assumption that backwards time travel could occur (or one wishes to construct a coherent time travel narrative), one must reject Premise 1 of this argument.

A common objection to Premise 1 is that it is not traveling back in time itself that gives rise potential paradoxes. It is altering the past that does so. As a consequence a number of different versions of time travel have arisen that allows one to travel backwards in time, but not alter the past. In this paper, we will focus on two of these: fixed-universe time travel and multiverse time travel. Let us begin with fixed-universe time travel.

Although the focus of this paper is not on fixed-universe time travel, a very brief introduction to this version of time travel may help, as a counterpoint, to better illustrate multiverse time travel. According to fixed-universe time travel, all past events are fixed in time (Dwyer, 1975; Lewis, 1976; Brown, 1992; Vihvelin, 1996). So if an event occurs, it is set in stone. The past is unalterable. (In some versions it is not only the past that is fixed, but all present and future events also.)

According to fixed-universe time travel, if you were to travel back in time intent on killing your grandfather before your father's conception, you would fail. Although killing your grandfather may be something well within your power to accomplish, you will not. The facts are determined to stop you. For example, although you could travel back in time, locate your grandfather, and line up a lethal shot with your rifle, the rifle would jam, or you would have a heart attack, or you would slip on a banana peel, and so on; and these defeating factors will continue to pop up for as long as you keep attempting the feat (Goddu, 2007). (It is because you are completely unable to kill your grandfather that Deutsh and Lockwood (1994) have argued that fixed-universe time travel invalidates the Feature of Autonomy. According to this feature it should be "possible to create in our immediate environment any configuration of matter that the laws of physics permit locally, without reference to what the rest of the universe may be doing" (p. 71))

In short, nothing a backwards time traveller does in the past can alter it. This is what it means for a universe to be fixed – all the events are fixed, that is, unalterable. Or, put another way, everything a backwards time traveller does in the past has already occurred that way. This is why narratives that involve changing the past cannot occur under fixed-universe time travel. So, although Superman might be permitted to travel back in time, under fixed-universe time-travel he would be unable (contrary to the film) to save Lois Lane. Narratives that operate under fixed-universe time travel will be more akin the 1995 film *Twelve Monkeys*, where the actions of the protagonist James Cole (portrayed by Bruce Willis) fail to cause any deviation from a future that must come to pass.

Fixed-universe time travel denies the truth of Premise 1 of the argument against time travel by providing the conditions under which time travel is possible, but a paradox is not. That is, traveling back in time is not possibly paradoxical, providing the past is not altered. Let us now contrast

Five Features of Multiverse Time Travel, continued

this version of time travel to multiverse time travel.

An alternative version of backwards time travel is multiverse time travel. It, too, rejects Premise 1 of the argument against backwards time travel by asserting that altering the past (i.e. one's own past) is impossible. However, it still allows for the possibility that one might cause events that did not occur in one's own past, to occur in a past qualitatively identical to your own, up until the moment you change it.

According to multiverse time travel, when a time traveller travels back in time, they don't arrive in the past of their universe (that is, the universe from which they came). Rather, the act of their travelling back locates them in a child universe. This child universe is qualitatively identical to the parent universe the time traveller departed from, up until the moment they arrive, and from then on it is different. For example, if a time traveller goes back in time one hour, say from 2:00pm to 1:00pm, they depart the parent universe at 2:00pm and arrive in the child universe at 1:00pm, where both parent and child universes are qualitatively identical up until 1:00pm.

Like fixed-universe time travel, if you were to decide to go back in time to kill your grandfather before your father's conception, you would, again fail (Gribbin, 1992, p. 202; Davis, 1995; Green, 2004, pp. 455-458). But this time, you fail for a different reason: your grandfather is safe and sound in the parent universe. The best you could hope to achieve is the killing someone qualitatively identical to your grandfather within the child universe, and thus preventing the birth of your own doppelganger.

Likewise, under multiverse time travel, Superman might have been able to travel to a different universe and save a Lois, but his efforts to save his Lois (the one he saw die) are in vain (in addition, he also now has a rival for Lois' affection to contend with – his doppelganger in this universe).

The grandfather paradox was introduced to help illustrate some important features of multiverse time travel.[3] The three key features introduced by this example are as follows.

Multiverse time travel: If, at time (t), x time travels to some prior instant (t-y), then:

> (a) x departs from Universe A at t, and arrives in Universe B at t-y;
>
> (b) Universes A and B are qualitatively identical up until t-y;
>
> (c) at t-y, the only difference between Universes A and B is that x is present in B, but not in A.

In order to help us flesh out further key features of multiverse time travel, we shall now examine some further cases. The next case is the bootstrap paradox.

3.0 – The bootstrap paradox

Consider the following case:

> An older version of yourself arrives from the future and gives you the plans to build a time machine and then disappears. It takes you years to build the machine, but you eventually succeed. In due course you also go back to the exact time and place that the older you appeared to the younger you. You then give the plans to the younger version of yourself in the exact same manner they were given to you.

This case involves a causal loop. The older you giving the plans to the younger you causes (transitively) the same event (i.e. the older you giving the plans to the younger you). Some people object to the weirdness of such a loop. Why? Because the plans seem to have no ultimate origin (the events seem to 'pull themselves up by their own bootstraps'). It's as if they are woven into

Five Features of Multiverse Time Travel, continued

the very fabric of reality – a brute fact of the universe.[4] The question we will be considering here is: could this loop occur according to fixed-universe and multiverse time travel?

Providing we allow for the weirdness of such brute facts (i.e. the plans having no ultimate origin), there is no problem with such loops occurring under fixed-universe time travel. For if you were given the plans by your older self, then this event is fixed and (despite you perhaps trying to do otherwise) you will travel back when you are older and do the same. However, things aren't so straightforward under multiverse time travel.

Once a time traveller has gone back in time they arrive in a different universe; what is more, they are never able to return to any universe they have left. Why? Because the act of travelling backwards in time places them in a duplicate of the universe they have left (identical to the parent universe up to the time they arrive), and its duplicates all the way down – at first a duplicate, then a duplicate of a duplicate, then a duplicate of a duplicate of a duplicate, and so on. One can never return from a child universe to a parent universe. So true causal loops are impossible.

So, any narrative wishing to feature this paradox cannot avail themselves of multiverse time travel. For example, in the 2014 film Time Lapse, a group of friends find a series of photos of themselves, each of which is from 24 hours into the future (it is the photos that travel back in time here, not the people). The friends then end up doing the things the photos show them doing – sometimes because of the fact they viewed them; in such instances the bootstrap "paradox" is in effect. Such narratives cannot occur under multiverse time travel. Although there is nothing in multi-universe time travel to suggest that the future of a parent universe cannot be similar to the future of a child universe, it does not necessitate this like an actual causal loop would.

The bootstrapping paradox is designed to illustrate the point that once a time traveller goes back in time they are unable to return to the universe they departed from, hence the impossibility of causal loops of this kind. Consequently, we can add (d) to the key features,

Multiverse time travel: If, at time t, x time travels to some prior instant, t-y, then:

> (a) x departs from Universe A at t, and arrives in Universe B at t-y;
>
> (b) Universes A and B are qualitatively identical up until t-y;
>
> (c) at t-y, the only difference between Universes A and B is that x is present in B, but not in A;
>
> (d) x cannot return to Universe A.

With this feature established we shall move to the case of the time travellers' reunion.

4.0 – The time travellers' reunion

Consider the following case:

> Your wife creates two time machines. She uses the first to go back in time to see the Beatles play at the Cavern Club. After a week of waiting for her to return you decide to use the second time machine to also attend the gig to see if you can find her.

The question to consider here is: could such a reunion occur under fixed-universe and multiverse time travel?

There is no problem with such a reunion occurring under fixed-universe time travel. In theory, if your wife is at the club, then you are able to travel back to the same time and place and meet up with her. However, again things aren't so straight forward under multiverse time travel.

Reconsider feature (b) of multiverse time travel:

Five Features of Multiverse Time Travel, continued

> (b) Universes A and B are qualitatively identical up until t-y.

Given this feature and that neither you nor your wife attended the Cavern Club when the Beatles first played in the parent universe, it follows that when you travel back in time, your wife can't be there waiting for you - if she was already there, the parent and child universes would not be qualitatively identical up until the moment you arrive back in time. Likewise, when your wife initially traveled back in time, you can't be waiting for her for the same reason. Therefore, you can't arrive before your wife, and she can't arrive before you.

But what if you set your time machine to arrive at the exact same time you wife arrived in the past – could a reunion occur in this manner? No, because the possibility of you both arriving at the exact same time is denied by feature (c):

> (c) at t-y, the only difference between Universes A and B is that x is present in B, but not in A.

x identifies the thing that travels back in a singular instance of time travel. However, the case of the time travellers' reunion involves two instances of time travel (your wife travelling back, and then you travelling back later on). So x can pick out either your arrival at t-y, or your wife's arrival, but not both. If x picks out your wife's arrival at t-y, then you cannot also arrive at this time in the same child universe that your wife travelled to. This is because this would then involve an additional difference between the parent and child universes than just the presence of x, your wife. In other words, your wife's arrival would not be the only difference as feature (c) dictates. The same goes for if x picks out your arrival at t-y. So, you are unable to arrive at the same time.

Consequently, it follows from features (b) and (c) of multiverse time travel that once your wife travels back in time you will be unable to reunite with her. You could, of course, travel back in time and create another child universe of the same parent universe from which you both departed, but it would not be the same child universe to which that your wife travelled - it would instead be sibling universe not containing your wife, thus forever separating you both.

So, many narratives that involve someone traveling back in time to pursue another time traveller (such as the 1989 film *Back to the Future Part II*, or the 1994 film *Timecop*) make no sense under either fixed-universe or multiverse time travel. Why? Consider *Timecop*: the protagonist, Max Walker (brilliantly portrayed by Jean-Claude Van Damme) is a cop who travels back in time to stop other time travelers from doing things they shouldn't in the past. This would be a futile effort under multiverse time travel because when someone travels back in time, another individual cannot follow the first traveller – thus, Max will be unable to stop the people he is following back. Likewise, in *Back to the Future Part II*, the protagonist, Marty McFly (less brilliantly portrayed by Michael J. Fox) travels back in time to stop Biff from altering the past (and so the future). Under fixed-universe time travel, this is impossible, as past events can't be altered, which means Biff couldn't have changed them in the first place.

This case illustrates that once a time traveller goes back in time, nothing from their parent universe is able to follow them. Given this, we may add (e) to our key features:

Multiverse time travel: If, at time t, x time travels to some prior instant, t-y, then:

> (a) x departs from Universe A at t, and arrives in Universe B at t-y;
>
> (b) Universes A and B are qualitatively identical up until t-y;
>
> (c) at t-y the only difference between Universes A and B is that x is present in B, but not in A;

Five Features of Multiverse Time Travel, continued

(d) x cannot return to Universe A;

(e) nothing else from universe A can arrive in Universe B.

With this feature established we shall move to the case of meeting time travellers past.

5.0 – Meeting time travellers past

Although it is impossible under multiverse time travel to meet up with time travellers from a universe you have departed, it is worth considering how it might be possible to meet up with other time travellers. Consider the following case:

> Your father tells you that when he was a boy, a time traveller from the future turned up one day and gave him a great betting tip. Inspired by the story, you go on to build a time machine yourself and then travel back to that day from your father's childhood to meet a fellow time traveller.

Let us begin by considering the question: could you travel back in time to meet such a fellow time traveller under multiverse and fixed-universe time travel?

Again, there is no problem with such a meeting occurring under fixed-universe time travel, for if you did meet up with the fellow time traveller in the past, then you will do so (and conversely, if you didn't, you won't). However, again things are not so straightforward under multiverse time travel.

Since there was a time traveller in the past of your original universe, then, according to multiverse time travel, the universe you start out in will be a child of another--which makes the universe you arrive in by travelling back in time the grandchild of the universe from which the first time traveller departed. To make things a little easier for ourselves, let us give each of these particular universes a number.[5]

• Universe 1: the universe from which the first time traveller came.

• Universe 2: the universe from which you originated.

• Universe 3: the universe you travel to by virtue of travelling back in time.

Although the time traveller you plan to meet up with came from Universe 1, the time traveller you meet in Universe 3 may not have arrived from Universe 1. To understand why, we need to consider whether child universes are parallel to their parent universe, or whether they branch off of their parent universe.

Consider again key feature (b):

(b) Universes A and B are qualitatively identical up until t-y;

The term 'qualitatively identical' is to be contrasted here with 'numerically identical'. If x and y have the same qualities (or properties), then they are qualitatively identical. For example, two different red billiard balls might be (by and large) qualitatively identical as they (mostly) have the same properties. If x and y are the same one thing, then they are numerically identical. For example, Clark Kent and Superman might thought to be the numerically identical because they are both the same person. With this distinction in mind, it is worth noting that feature (b) is compatible with the two following possibilities:

(b.1 - with parallel multiverse time travel) Universes A and B are qualitatively, but not numerically, identical, up to until t-y;

(b.2 - with branching multiverse time travel) Universes A and B are qualitatively, and numerically identical, up until t-y.

Five Features of Multiverse Time Travel, continued

The version of (b) one employs may affect whether or not we can meet the time traveller that arrived from Universe 1. Let us consider why.

Consider first parallel multiverse time travel (b.1). This version of time travel holds that the universe you travel to is, up until the moment you arrive, an exact duplicate of the universe from which you departed. If this is the case, then there may be reason to think the time traveller you meet in Universe 3 did not arrive there from Universe 1. Why? Because although the time traveller you meet is a duplicate of the one your father met, the traveller is not the same person. The time traveller your father met arrived from Universe 1, but the time traveller you meet in Universe 3 may not have possessed the same origins. So, from where might the time traveller arrive? Perhaps from some other universe – or perhaps the traveller is simply a brute fact of this child universe; that is, something which has no explanation (a possibility we shall explore further in the next section).

Let us next consider branching multiverse time travel (b.2). The first thing to mention about this version of time travel (if only to set it aside) is that it assumes, quite controversially, that two things that are qualitatively different in the future can be numerically identical in the past. This may turn out to be impossible, in which case, we can dismiss this version of feature (b). However, presuming this will remain a moot point, let us see if you are able to meet a time traveller from Universe 1 with (b.2) in place.

If the branching multiverse interpretation of key feature (b) holds, then there is reason to think the time traveller you meet actually arrived from Universe 1. Why? Because the act of your travelling back in time does not land you in a duplicate of a universe, but rather in one branch of that universe. Like a river that splits in two, the act of backward time travel takes you from one subsidiary of the timeline of this universe and places you at the exact place where the other subsidiary splits off and forces you down this alternative stream.

Accordingly, although the time-traveller you meet in Universe 3 is different to the time-traveller your father met (for the time traveller your father met did not also meet you), both share the same history. So, as both versions of the time traveller travelled from the same place (in their shared history), the traveller you meet in Universe 3, like the time traveller your father met in Universe 2, also travelled from Universe 1.

The aim of this paper is not to rule in favor of either version of feature (b). Rather, this case was introduced only to draw out this distinction, which allows us to modify our list of features as follows.

Multiverse time travel: If, at time t, x time travels to some prior instant, t-y, then:

(a) x departs from Universe A at t, and arrives in Universe B at t-y;

(b) Universes A and B are qualitatively identical up until t-y;

• (b.1 – with a parallel multiverse) but not numerically identical up to until t-y;

• (b.2 – with a branching multiverse) and numerically identical, up until t-y.

(c) at t-y the only difference between Universes A and B is that x is present in B, but not in A;

(d) x cannot return to Universe A;

(e) nothing else from Universe A can arrive in Universe B.

With this distinction established we shall move to our final case - that of spying on one's self.

Five Features of Multiverse Time Travel, continued

6.0 – Spying on one's self

Many time travel narratives involve a person travelling back in time multiple times to the same time and place. For example, in the 2007 film *Los Cronocrímenes*, the protagonist Hector (portrayed by Karra Elejalde) travels back in time multiple times – interacting with himself on each occasion in an effort to save his wife. Such narratives raise an interesting question for multiverse time travel. To draw out this question let us consider the following simple case of such a narrative:

> At 5:00pm, in your laboratory, you get into your time machine and travel back one hour, to 4:00pm. You set your machine to arrive on the rooftop of a nearby shoe factory. From this vantage point, you are able to discreetly observe your duplicate in her lab as she prepares to make a similar journey. At 4:30pm you get back into your machine and travel back one hour again, to 3:30pm. This time, you arrive on the balcony of a nearby penthouse suite which discretely overlooks the rooftop of the shoe factory. You sit and wait until 4:00pm, observing the rooftop of the shoe factory.

The question to consider is: What will you observe upon the rooftop of the factory at 4:00pm from the penthouse balcony?

Again, we have no problem answering this question under fixed-universe time travel because, as you arrived on the factory rooftop at 4:00pm, you will most certainly observe this happening again from the penthouse balcony. However, once again, things aren't so straight forward under multiverse time travel. As there seems to be an argument for observing yourself appear upon the rooftop of the factory at 4:00pm and argument for the opposite conclusion. Let us examine each of these arguments in turn.

For the sake of clarity, let us list the relevant events according to multiverse time travel:

- You depart Universe 1 at 5:00pm from your lab
- You arrive in Universe 2 at 4:00pm on the factory rooftop
- You depart Universe 2 at 4:30pm from the factory rooftop
- You arrive in Universe 3 at 3:30pm on the penthouse balcony
- You observe the factory rooftop in Universe 3 at 4:00pm from the penthouse balcony

Do these events, plus the features of multiverse time travel identified so far, give us enough information to determine what we would see upon the factory rooftop at 4:00pm in Universe 3? Perhaps not. To understand why, consider two arguments – one for why you will not see a time traveller arrive on the factory rooftop, and one for the opposite conclusion.

The first argument is for a time traveller not appearing on the rooftop of the shoe factory at 4:00pm in Universe 3. This argument attempts to demonstrate that none of the reasons that might cause a time traveller to appear on the rooftop in Universe 3 apply in this case. We can present this argument as follows,

> 1. If a time traveller appears on the shoe factory rooftop in Universe 3 at 4:00pm, then this event is either caused by the time traveller arriving from Universe 2, or this event is qualitatively identical to one that occurred in Universe 2 and occurred in Universe 3 prior to the arrival of the time traveller from Universe 2.
>
> 2. This event is not caused by the time traveller arriving from Universe 2. (This is because of key feature (e).)

Five Features of Multiverse Time Travel, continued

> 3. This event is not qualitatively identical with one that occurred in Universe 2 and occurred in Universe 3 prior to the arrival of the time traveller from Universe 2. (This is because the time traveller from Universe 2 arrived in Universe 3 at 3:30pm and the event in question occurs at 4:00pm.)

So,

> 4. It is not the case that, a time traveller appears on the shoe factory rooftop in Universe 3 at 4:00pm.

If this argument is sound, then there is reason to think that you would not observe a time traveller appearing on the rooftop of the shoe factory at 4:00pm in Universe 3. Let us now consider an argument for the opposite conclusion.

This next argument relies on the possibility that the act of time travel gives rise to a kind of brute fact. The notion of a brute fact was introduced briefly back in Section 3.0, in regards to the bootstrap paradox (the example being the loop that resulted from a time traveller giving the plans for a time machine to their younger self, who in turn grows up, builds the machine as per the plans and uses it to give the plans to their younger self, and so on). If such a loop is possible, it would be a brute fact, having no ultimate causal origin.

Consider now the notion of a relative brute fact; that is, something that is not caused by anything that is spatiotemporally relative to it. Take the following example: let us presume there was a first spatiotemporal event (perhaps the Big Bang), and that it was caused by something. This something would have to be non-spatiotemporal (for if it was not, the spatiotemporal event it caused would not be the first event). Given that this first spatiotemporal event cannot be explained by referring to any other spatiotemporal event, we might describe it as a relative (that is, relative to anything else in space-time) brute fact.

Given multiverse time travel, when a time traveller arrives in one universe from another, their arrival also seems to be a relative brute fact. That is, the cause of their arrival is not spatiotemporally relative to it, nor did it occur (relative to the events in this universe) before, after, or at the same time as their arrival. Likewise, the cause of their arrival is not located above, below, to the side of, or in the same place as, their arrival.

The following argument relies on the assumption that such relative brute facts are passed on from one generation of a universe to another. (Perhaps other properties are passed on this way, like genes, from parent to child. For example, if the fundamental laws of nature are a particular way in a parent universe, we might expect the same laws in the child.) In other words, if any universe with a relative brute fact were to parent a child universe, this brute fact would also carry over from parent to child, regardless of when the time traveller arrived in the child universe. Were this true, the following argument could be mounted:

> 1. The cause of the time traveller appearing on the rooftop of the shoe factory at 4:00pm in Universe 2 is outside Universe 2.
>
> 2. Any event which has a cause outside of the universe it occurs in, is a relative brute fact of this universe.

So,

> 3. The time traveller appearing on the rooftop of the shoe factory at 4:00pm in Universe 2 is a relative brute fact of Universe 2.
>
> 4. If event E is a relative brute fact of a universe, and a backwards time traveller arrives in a second universe from this universe, then event E is a relative brute fact of the second universe.
>
> 5. A time traveller arrived in Universe 3 from Universe 2.

Five Features of Multiverse Time Travel, continued

So,

6. The time traveller appearing on the rooftop of the shoe factory at 4:00pm is a relative brute fact of Universe 3.

7. If some event E is a relative brute fact of a universe, then E will occur in this universe.

So,

8. The event of the time traveller appearing on the rooftop of the shoe factory at 4:00pm in Universe 3 occurs.

So, based on the assumption that relative brute facts carry over from parent to child universes in this manner, one could argue that there is reason think that you would observe a time traveller appearing on the rooftop of the shoe factory at 4:00pm in Universe 3.

If we accept this assumption then we could modify key feature (a) as follows:

According to multiverse time travel, if something x from Universe A travels back in time from t to t-y, then:

(a) x arrives in Universe B;

• (a.1 – with relative brute facts) and something qualitatively identical to x will arrive at t-y in all child universes of B;

(b) Universes A and B are qualitatively identical up until t-y;

• (b.1 – with a parallel multiverse) but not numerically identical up to until t-y;

• (b.2 – with a branching multiverse) and numerically identical, up until t-y;

(c) the only difference between Universes A and B at t-y is that x is present in B, but not in A;

(d) x cannot return to Universe A.

(e) nothing else from Universe A can arrive in Universe B.

Note that our aim here is not to suggest (a.1) is the case, but rather to draw attention to its possibility.

7.0 – Conclusion

The aim of this paper was to formulate five important features of multiverse time travel. These features were established in order to help writers construct more coherent multiverse time travel narratives (and to help consumers, and scholars, of such narratives more easily spot inconsistencies). That is, I hope that if fictional worlds are constructed with these features in mind, they will avoid the paradoxes common to such worlds. However, just as importantly, this paper also aims to encourage others to answer questions which arise from the different versions of multiverse time travel identified here. In particular:

1) Does each child universe include the same relative brute facts as their parent? And;

2) Does each child universe branch off of, or runs parallel to, their parent universe?

The answers to these questions make a tangible difference to narratives that employ multiverse time travel. For if the answer to the first question is yes, then once a time traveller travels back in time, their appearance at this time and place will occur in every subsequent child universe. And if the answer to the second question is that child universes run parallel to parent universe, then one can never travel back in time to meet people from your past (only facsimiles of such people).

Five Features of Multiverse Time Travel, continued

It is worth noting, in parting, why this analysis is particularly relevant to science fiction. Science fiction writers conjure worlds that are often both out-of-this-world and mundane – narratives that employ fantastic elements, such as time-travel, aliens, and space travel, but are grounded in respectable theories, such as physics, exobiology, and astronomy. But the real magic of science fiction, to make the incredible credible, requires more than attendance to scientific theory. It also requires writers to pay tribute to more fundamental principles – logical principles. And one such principle, is the law of non-contradiction, which states that it is not the case that p and not p. Paradoxes break this law; they are instances where p and not p are the case. So, for those writers who wish to weave the threads of hard realism through their worlds, is it arguably more important to avoid paradoxes than it is to avoid factual or theoretical inaccuracies. So, since paradoxes abound in time-travel narratives, and time-travel narratives are a staple of science fiction, this type of analysis (one aimed at identifying and/or avoiding such paradoxes) is of particular worth to the genre.

Notes

1. Superman may have saved Lois by 'rewinding time' locally (i.e. sending the direction of causation backwards just around Earth). This poses a number of problems outside the scope of this paper – so for the sake of simplicity, we will gloss over this possibility.

2. Interestingly, at least some scientists don't. For example, Carl Sagan (1999) states that 'inconsistencies might very well be consistent within the universe'.

3. I am borrowing from Effingham's formulisation of multi-dimensional time travel here – however please note that multi-dimensional time travel is distinct from multiverse time travel. Also, note that we are here primarily concerned with time travel narratives, whereas Effingham (and indeed most others cited in this paper) are focusing on possible real world time travel (as informed by our current physical models).

4. It is worth noting that if such brute facts are not impossible then, strictly speaking, these cases should not be described as paradoxical.

5. Numbers are used when we talk about particular universes (e.g. Universe 1 where this particular event occurred), but letters are used when we talk about universes more broadly (e.g. when someone travels from Universe A to Universe B both universes will be the same up until the moment the traveller arrives in universe B).

Five Features of Multiverse Time Travel, continued

References

Abbruzzese, J. (2001). On using the multiverse to avoid the paradoxes of time travel. *Analysis, 61*(1), 36-38.

Brown, B. (1992). Defending Backwards Causation. *Canadian Journal of Philosophy, 22*, 429–44.

Davies, P. (1995). *About Time*. London: Penguin Books.

Deutsch, D. (1997). *Time Travel. The Fabric of Reality*. London: Penguin. 289-320.

Deutsch, D. & Lockwood, M. (1994). The quantum physics of time travel. *Scientific American, 71*, 68-74.

Donner, R. (Director). (1978). *Superman* [Motion picture]. USA: Warner Brothers.

Dwyer, L. (1975). Time travel and changing the past. *Philosophical Studies, 27*/5 341-350.

Effingham, N. (2012). An unwelcome consequence of the Mulitverse Thesis, *Synthese, 128*(3), 375-386.

Gilliam, T. (Director). (1995). *Twelve Monkeys* [Motion picture]. USA: Universal Studios.

Goddu, G. C. (2007). Banana Peels and Time Travel, *Dialectica, 61*, 559-72.

Greene, B. (2004). *The Fabric of the Cosmos*. London: Penguin Books.

Gribbin, J. (1992). *In Search of the Edge of Time*. London: Penguin Books.

Hawking, S.W. (1992). Chronology protection conjecture. *Physical Review D, 46*, 603–11.

Lewis, D. (1976). The Paradoxes of Time Travel. *American Philosophical Quarterly, 13.*

Mellor, D.H. (1998). *Real Time*. Cambridge: Cambridge University Press.

Richmond, A. (2003). Recent Work: Time Travel. *Philosophical Books, 44*, 297-309.

Sagan, C. (1999). 'Sagan on Time Travel' In Time Travel, October 12. Nova: PBS.

Vigalondo, N. (Director). (2007). *Los cronocrímenes* [Motion picture]. Karbo Vantas Entertainment.

Vihvelin, K. (1996). What Time Travellers Cannot Do. *Philosophical Studies, 81*(2-3), 315-330.

Zemeckis, R. (Director). (1989). *Back to the Future Part II* [Motion picture]. USA: Universal Pictures.

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Books in Review

Stephen Webb

If The Universe is Teeming with Aliens... Where is Everybody? Seventy-Five Solutions to the Fermi Paradox and the Problem of Extraterrestrial Life
Second Edition.
Springer Science and Fiction, 2015, pb, xv + 434 pp, $29.99
ISBN 978-3-319-13235-8

Reviewed by **Alexander Cendrowski**

It was the summer of 1950 (second only to the summer of '69), and Enrico Fermi was on lunch break from his work at the Los Alamos National Laboratory. Born in 1901, Fermi had been awarded the Nobel Prize for physics in 1938, in part due to his development of a technique to probe atomic nuclei. In 1942, at the University of Chicago, Fermi and his team successfully created the first self-sustaining nuclear reaction. In 1945, he was a key component of the Manhattan Project. And on that 1950 summer's day, Fermi was joined by Edward Teller, Herbert York, and Emil Konopinski for a bite to eat. The topic of conversation? Recent reports of flying saucers.

Originally light and joking, the conversation turned serious with a discussion about whether flying saucers would be able to exceed the speed of light. Fermi asked Teller what he thought the probability might be of finding evidence for faster-than-light travel by 1960. Teller said one-in-a-million. Fermi thought it was more like one-in-ten. The conversation trailed off. The four began to eat. Then, after a separate conversation had already begun, Fermi suddenly exclaimed: "Where is everybody?"

So began the Fermi Paradox.

So too begins the second edition of *If the Universe is Teeming with Aliens... Where Is Everybody? Seventy-Five Solutions to the Fermi Paradox and the Problem of Extraterrestrial Life*, which make up Stephen Webb's response to Fermi's question. The method for examining the paradox makes use of the Drake Equation (named for Frank Drake, a radio astronomer who was the first to make explicit use of it), which attempts to estimate the number of intelligent, communicative civilizations in the universe: take the total number of stars, multiply it by how many planets each one has on average, then multiply by the fraction of planets that have the necessary conditions for life and, finally, by how many of those are likely to reach advanced status. While an enormous amount of guesswork is involved in the equation, scientists have speculated that there must be millions of extraterrestrial civilizations, even by the most conservative estimates. But if that's true, where are they? And why haven't we heard from them?

Stephen Webb hopes to answer these very questions. As with many of the entries in Springer's Science and Fiction Series, *Where is Everybody?* employs a wide range of science-backed thought and speculation—from breakdowns of potential doomsday events to explorations of particle horizons—to explain where these civilizations might have gone and why we haven't heard from them. The second edition of Where is Everybody? brings to the table twenty-five more potential solutions than did the first edition, with the additional possible answers being at least partially justified by advancements in astrophysics, evolutionary biology, and interstellar com-

munication over the last fifteen years. Nor does Webb turn only to real-world science with these questions. Indeed, as the foreword to the second edition notes, "[Science Fiction] authors have contributed at least as much to the debate as professional scientists," an acknowledgement by Webb that the Fermi Paradox is as much about philosophical speculation as it is about scientific speculation. After all, if it turns out that humans are alone, that Homo sapiens truly are the universe's only intelligent lifeform, then our species is entitled to reduced modesty on the scale of cosmic importance. And if we're not, well, we have science fiction writers to thank for preparing us for what lies ahead.

Webb divides his seventy-five solutions into three categories: the first ten proposals are based around the idea that extraterrestrial civilizations have already visited Earth; the next thirty on the idea that extraterrestrial civilizations exist, but we haven't found evidence of them yet; and the last twenty-five, including Webb's own suggestions, on the idea that human beings really are alone in this great, big universe after all. While this method of categorization makes sense at first glance, it privileges those last twenty-five solutions since, although Webb generally takes care to give each proposal fair consideration, he ends the majority of the preceding sections with a note that he personally isn't quite convinced by the solutions presented.

Where is Everybody? becomes an interesting mix of analysis and commentary with these notes in mind. On the one hand, Webb does well to look into probability equations, analyze the science cultivated over centuries by astronomers and physicists and science fiction writers, and even to give space to philosophical and sociological ideas with which he clearly disagrees. On the other hand, Webb's commentary on those proposals can sometimes leave large sections of the book without clear purpose, at least when read straight through. If the reader knows—and Webb is quick to mention it—the author is not thoroughly convinced by over three quarters of the book he has written, then that reader is much more likely to just skip to solution seventy-five, the culmination of Webb's research. Webb even conveniently titled the section "The Fermi Paradox Resolved." (At the beginning of the section, he reveals that this is meant in jest—but jest isn't always clear when reading an index.)

The arrangement of Where is Everybody? becomes masterful only when understanding that how the work is intended to be used, a suggestion Webb makes in the very first chapter. While the sections are arranged so that a straight-forward read is possible, each solution is self-contained, allowing readers to pick out those answers that are most interesting to them and explore their historical and scientific contexts. The book, then, offers at least this advantage: when the first solution doesn't quite convince, there are still another seventy-four to go.

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Books in Review

Barry B. Luokkala
Exploring Science Through Science Fiction
Springer Science+Business Media, 2014, pb, 241 pp, $19.99
ISBN 978-1-46178904.

Reviewed by **Jen Jenkins**

As the title suggests, Barry B. Luokkala's *Exploring Science Through Science Fiction* offers a wide-ranging treatment of fundamental scientific questions and concepts as dramatized in science fiction. Designed for an undergraduate science course, this textbook addresses the varying degree of plausibility inherent to many popular science fiction constructs, from time travel to jet boots, and ranks them as currently possible, theoretically possible given further technological advancement, or likely impossible. Each chapter serves as a focal point for larger theoretical questions, including: the nature of space, time, and the universe; the probability of advanced technology like self-aware AI; and the responsibilities inherent to "good" science. By tapping into the popularity of science fiction stories, Luokkala aims to "make science accessible to a broad audience" (vii), igniting interest and providing clear guidance without sacrificing complexity. This journey from science fiction to science fact provides an engaging and surprisingly approachable read, exploring scientific theory and enlightening the nontechnical reader, although the brevity and sheer variety of examples necessarily prevents a deeper engagement with some of the technical concepts.

The opening and closing chapters provide an effective framework, establishing current theories and finishing with a call to greater possibilities within the future of science, offering the rapid advancement of the last few decades as proof of fantastical things to come. This context orients the nontechnical reader, providing a compass for a potentially alien landscape, thus converting anxiety of the unknown into excitement over the undiscovered. Subsequent chapters tackle major theoretical concepts in brief, digestible portions, offering practical problems and discussion to facilitate a grounded, practice-based understanding of how scientific theory works.

For example, chapter three asks "What is the universe made of?," using the fictional concept of a "baryon sweep" from an episode of *Star Trek: The Next Generation* to launch a discussion of large-scale physics and quantum mechanics. The conversation moves through models of particle physics, the makeup of atomic nuclei, the varying states of matter, and how matter transitions via energy – the latter culminating in an estimation problem which calculates the energy requirement needed to vaporize Jean Luc Picard by phaser blast – before transitioning into exploration topics and suggestions for further reading. Luokkala not only successfully explains a highly technical abstract concept, but keeps the discussion grounded in something tangible. The account of *Star Trek*'s technobabble offers a fun, engaging access point into the world of quarks and leptons, how we define them, and how their definitions have evolved over time.

While this approach effectively introduces the concepts that carry through the rest of the chapter, each subchapter also offers several other science fiction tie-ins from varying sources. Luokkala logically presents these examples based on their applicability to the concept under discussion, but the sheer variance between sources and situations can distract the reader, forcing the occasional pause to verify in which fictional universe a particular example can be found

Books in Review, continued

as the text moves quickly from one concept to the next. From a technical perspective, the linkage between concepts and their examples makes perfect sense, but for the nontechnical reader – the desired audience – the transitions can sometimes be jarring. For example, Luokkala discusses the nature of matter in several related sections, one detailing transparent solids in *Star Trek IV*, while the second moves into camouflage via the James Bond film *Die Another Day* and creatures in *Predator*. From there, stealth and cloaking technology comprise a third section which uses a different Bond film and Harry Potter's invisibility cloak as examples, with all three sections covered in the span of four pages. The brevity involved in making so many scenarios work in limited space leaves behind a desire for more information – even for something as simple as estimating the number of micro cameras needed to camouflage James Bond's car. However, the examples clearly relate to each concept, and offer understandable answers to questions regarding the nature of universe within the limits of known science.

Each subsequent chapter engages in a similar mode of discussion, tackling a plethora of scientific topics with plenty of nods toward popular questions science fiction aficionados have long debated – is the truth really out there? What does it mean to be human? – while packing in a wealth of information and theory into its scant 200 pages. A robust index offers guidance for the reader who needs information on a particular topic or episode, while the appendices include another forty well-organized pages of starting points, further reading, episode watching, and practice equation solutions. Although the book contains far more content than coverable in a single semester, the modular format of each chapter allows instructors to choose the material that fits their course structure without losing organizational flow, offering a compact, flexible approach to general education science courses. On the whole, *Exploring Science through Science Fiction* strikes a delicate compromise, introducing readers to the fantastical side of science without being completely overwhelming.

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Books in Review

Nick Kanas
The Caloris Network: A Scientific Novel.
Springer International Publishing, pb, 124 pp, $19.99
ISBN 978-3-319-30577-6

Reviewed by **Steven Gentry**

The concept that science fiction and science fact are influenced by one another is well known, as evidenced by recent articles available from NASA and the BBC (see also Bixler, 2007). With *The Caloris Network: A Scientific Novel*, author Nick Kanas (Emeritus Professor of Psychology at the University of California, San Francisco) offers another example demonstrating this symbiotic relationship within the context of a multipart work consisting of a fictional story, *The Caloris Network*, and a scholarly essay, "Silicon-Based Life and the Planet Mercury: Fiction and Fact." Kanas's inclusion of facts and speculative theories ensures a fairly solid demonstration of the plausability of his story, despite an occasional inconsistency as discussed below. However, a sparse literature review may fail to convince readers of his lesser argument that *The Caloris Network* is a unique science fiction novel.

A hard science fiction novel set in the near future, *The Caloris Network* focuses on a scientific team sent to Mercury to investigate an unusual energy source. A silicon-based sentient crystal network in Mercury's Caloris Basin is eventually revealed as the energy's origin, a revelation that provokes curiosity and fear among the crew members, whose reactions range from wanting to understand the entity to seeking its destruction (due to the entity's natural discharge of radiation harmful to the team). In addition to this main narrative, Kanas includes snippets of the entity's thoughts, flashbacks to Evans's past, and her communication with her mother, with the latter two features playing a key role in Evans's efforts to communicate with the entity. After the novel concludes, Kanas provides readers with a four-part scholarly essay, "Silicon-Based Life and the Planet Mercury: Fiction and Fact." The first section of this essay defends *The Caloris Network* as a unique contribution to the science fiction field because "none of these [earlier science fiction short stories and novels] have included native life forms" of Mercury (p. 109). The next three sections provide information about the planet Mercury, including efforts to document Mercury's features, as well as arguments discussing and justifying the potential existence of silicon-based life on Earth and Mercury, and how such life "could…possess consciousness" (p. 120). Each section concludes with a paragraph entitled "Examples from the novel," in which Kanas demonstrates how he incorporated scientific fact and speculation into his work.

Altogether, Kanas is fairly successful in defending the idea that scientific discovery often goes hand-in-hand with the capacity to imagine hypothetical scenarios. Rigorous fact-checking revealed the bulk of Kanas's scientific information to be accurate. What's more, science fiction aficionados will also appreciate his efforts to reproduce real-world events within The Caloris Network (e.g. NASA's MESSENGER passing by Mercury or the origination of an ELF radio wave from Titan; pp. 116, 121). Employing accurate information in *The Caloris Network* is crucial, as failing to do so would completely undermine Kanas's thesis. Additionally, the author's inclusion of controversial theories, such as the unproven "clay hypothesis" that is used to explain the network's existence (p. 117-118; see also Henriques, 2016),

demonstrate Kanas's aim to "indulge in science speculation—describing intriguing, plausible yet unproven ideas" (p. iii). Finally, Kanas's concluding "Examples from the novel" paragraphs ensure that readers completely understand how the author represents his factual and theoretical knowledge within the Caloris Network.

However, Kanas's scholarly essay exhibits significant problems that reduce the effectiveness of his arguments. For example, readers will be hard-pressed to accept his claim that *The Caloris Network* represents a work unique to the science fiction field as his literature review addresses only six science fiction short stories or novels. Furthermore, Kanas describes a single non-print resource: Star Trek's "The Devil in the Dark" (p. 112). Kanas's omission of other relevant short stories and novels, such as Isaac Asimov's "The Talking Stone," Kim Stanley Robinson's *2312*; or Stanley G. Weinbaum's, "A Martian Odyssey," may leave readers unconvinced that *The Caloris Network* truly represents a unique science fiction novel.

The scholarly essay also exhibits several inconsistencies that distract readers from, or even undermine, Kanas's arguments. For example, the author states in the first section of his scholarly essay that "as seen by the above examples, Mercury generally has not been described as a proper home for native life" (pp. 109-110). However, only two of the three works to which Kanas refers (Ben Bova's *Mercury* and Alan E. Nourse's "Brightside Crossing") describe Mercury's environment. Another example of Kanas's tendency towards inconsistency occurs when he uses Johnjoe McFadden's "model of consciousness"—which "focuses more attention to the link between an individual's consciousness and its relationship to neurons"—to explain his silicon-based network's sentience (pp. 120-121). Although similar to Susan Pocket's "notion that consciousness can result from specific patterns in any EM field" and that "consciousness can occur in non-neuronal settings" (p. 120), McFadden's theory of consciousness requires the presence of neurons—which the non-biological network in Kanas' novel obviously lacks (see also p. 120). Readers may feel that Kanas pushes the boundaries of what be considered "acceptable" evidence to support his science fiction, as McFadden's theory cannot really explain or provide the foundation for how the entity could be sentient.

In conclusion, Kanas upholds his novel's primary thesis that science fiction and science fact are intertwined forces feeding into one another, while less successfully convincing his readers that the *The Caloris Network* represents a work unique to the science fiction field. Illogical statements further threaten his thesis and lesser argument, even as readers are drawn into an intriguing tale filled with foreshadowing and political intrigue. In many ways, *The Caloris Network* is much like its namesake crystal: a fascinating, thought-provoking creature that, with some additional polish, would have shined that much brighter.

References

Bixler, A. (2007). Teaching evolution with the aid of science fiction. *The American Biology Teacher, 69*(6), 337-340.

Darling, D. (2016). Silicon-based life. Retrieved from http://www.daviddarling.info/encyclopedia/S/siliconlife.html

Falker, J. (2014). NASA 360 presents - from science fiction to science fact. Retrieved from https://www.nasa.gov/content/nasa-360-presents-from-science-fiction-to-science-fact

Glashan, R. (2014). *A Martian Odyssey.* In Project Gutenberg Australia. Retrieved from http://gutenberg.net.au/ebooks06/0601191h.html

Henriques, M. (2016). The idea that life began as clay crystals is 50 years old. Retrieved from http://www.bbc.com/earth/story/20160823-the-idea-that-life-began-as-clay-crystals-is-50-years-old

Mercury in fiction. (2016). Retrieved from https://en.wikipedia.org/wiki/Mercury_in_fiction#cite_ref-4

Mission Timeline. (2016). Retrieved from http://messenger.jhuapl.edu/About/Mission-Timeline.html

Robinson, K.S. (2013). *2312*. New York: Orbit.

Science fact: Sci-fi inventions that became reality. (2016). Retrieved from http://www.bbc.com/news/health-38026393

Shanghaied into space! (n.d.). Retrieved from http://www.comics.org/issue/2422/

Silicon-based life. (n.d.). Retrieved from http://tvtropes.org/pmwiki/pmwiki.php/Main/Silicon-BasedLife

The talking stone. (2015). Retrieved from https://en.wikipedia.org/wiki/The_Talking_Stone

Titan's mysterious radio wave. (2007). Retrieved from https://www.nasa.gov/mission_pages/cassini/whycassini/cassinif-20070601-02.html

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Call for Papers: *Journal of Science Fiction* Special Issue on Afrofuturism

The *Journal of Science Fiction* is accepting submissions for a special issue on Afrofuturism to be published on January 31, 2018.

This issue will aggregate essays on science and speculative fiction literature, film, comics, and popular culture which address the experience of blackness. We seek academic articles of 5,000 to 8,000 words, short reflection pieces of 500 to 1,000 words, and book reviews of 500-750 words.

We welcome submissions focusing on any and all aspects of Afrofuturist culture. We hope to include African, African-American, and Afro-Caribbean authors, texts, and perspectives. Possible topics include, but are not limited to:

- The nomenclature of Afrofuturism: the modern relevance of the term, its origins, and its history
- The critical study of race theory, gender, and/or sexuality in Afro-diaspora texts
- Authors (including but not limited to the following):
    - Steven Barnes
    - Octavia Butler
    - Maryse Condé
    - Samuel L. Delany
    - Tananarive Due
    - Jewelle Gomez
    - Nalo Hopkinson
    - NK Jemisin
    - Nnedi Okorafor
    - Ben Okri
    - Ishmael Reed
    - Charles R. Saunders
    - Colson Whitehead
    - Ytasha L. Womack
- Films (including but not limited to the following):
    - Marvel's upcoming *Black Panther*
    - Bodomo's *Afronauts*
    - Coney's *Space Is the Place*
    - Nance's *An Oversimplification of Her Beauty*
    - o Sayle's *Brother from Another Planet*
- Queer futurities
- Neo-Slave Narratives
- Dialect
- Non-Fiction
- Artwork
- Music
- Book Reviews
- Interviews

Special consideration will be given to essays addressing literature, theory, and contemporary texts and trends. The deadline for submissions is October 9, 2017.

Please submit completed essays through the MOSF *Journal of Science Fiction* website, http://publish.lib.umd.edu/scifi/index. To submit your work, click "About" > "Submissions: Online Submissions", create an account, and follow the submission prompts.

We will also consider the submission of proposals (250-500 words), but preference will be given to drafts and completed pieces.

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

Call for Peer Reviewers

The *JOSF* is always seeking peer reviewers to join our team. Right now, we are particularly in need of peer reviewers with critical interests in Afrofuturism, but if you have research interests in any area of sci-fi, we'd love to hear from you! As a peer reviewer, you can help improve the quality of science fiction scholarship.

If you're interested in joining our pool of peer reviewers, visit our website. Please click "About" > "Submissions: Online Submissions" to create an account. At the bottom, check the box that says "reviewer."

Make sure that you indicate your reviewing interests and include a biographical statement (for example, your academic department or day job), as that will help our team identify articles for you to peer review. We draw from this database for our peer review process. Thank you for being part of the success of the *JOSF*!

JOURNAL OF SCIENCE FICTION
Volume 2, Issue 1, September 2017
ISSN 2472-0837

About the Contributors

Cover Artist

Michael Honch is a bass player, runner, and medical librarian living in Takoma Park, MD.

Authors

Antoinette LaFarge is a professor of digital media in the Department of Art, University of California, Irvine. She has written extensively on subjects related to forgery, constructed worlds, avatars, and computational media.

Dr. Kristine Larsen holds a Ph.D. in Physics from the University of Connecticut (1990) and has taught astronomy at Central Connecticut State University since 1989. Her research focuses on the intersections between science and society, including the history of women in science, the popularization of science, and science and popular culture. She is the author of Stephen Hawking: A Biography, Cosmology 101, and the forthcoming The Women Who Popularized Geology in the 19thCentury.

Morgan Luck completed his M.A. and Ph.D. in Philosophy at the University of Nottingham and a PGCE in Religious Education at the University of Cambridge. His thesis concerned the metaphysics of miracles. His areas of research include philosophy of religion, metaphysics, epistemology, and computer game ethics.

Chris Mich, a science fiction fanatic, has been privileged to write for film, television, theater, newspapers and electronic retailing. He's written, directed, and produced several short films and television productions that have been honored as official selections in multiple venues including Berlin International Film Festival, Philadelphia Festival of World Cinema, and the Official Star Wars Fan Film Fest. In addition to hiking, birding, reading, writing, vlogging, praying and eating a good cheesesteak, Chris enjoys spending time with his wife and six children.

Book Reviewers

Alexander Cendrowski is pursuing his MFA at the University of South Florida (USA). He is a lemonade, ocean, and writing enthusiast, and his fiction recently appeared in Word Riot, The Legendary, and Perversion Magazine.

Steven Gentry is a graduate student studying Archives Management at Simmons College. He also serves as an Archives and Research Assistant at the Digital Collections and Archives of Tufts University.

Jen Jenkins is a teaching assistant at Northern Illinois University, where she is pursuing a PhD in English. Previously, she worked as an adjunct professor at Rockford University, where she taught classes in Rhetoric and Science Fiction.

Editors

Heather McHale (Managing Editor) holds a Ph.D. in Literature from the University of Maryland (USA), where she teaches writing and literature. Her current work in progress is a book about the television series Doctor Who. Her research interests range from science fiction and detective fiction to Jane Austen and Anthony Trollope.

Aisha Matthews (Assistant Managing Editor) holds a B.A. in English from Yale University (USA) and is currently completing her M.A. Her thesis is on Foucauldian discourse of power within Octavia Butler's Patternist series, and she is also working on a conference paper in Harry Potter Studies on American colonial imagery within the texts. Aisha's other research interests include afrofuturisms, postmodern feminist discourse, and science and speculative fictions.

Bodhisattva Chattopadhyay (Editor) holds a Ph.D. in Literature—with a focus on science fiction from the late 19th to mid-20th century Britain and Bengal—from the University of Oslo

(Norway), where he is currently a postdoctoral fellow in the history of science (medicine). He employs science studies approaches to the study of science fiction, with an emphasis on medicine, health and race discourses.

Thomas Connolly (Editor) is a final-year Ph.D. student at Maynooth University (Ireland), and his thesis examines depictions of technology in Anglo-American science fiction from H.G. Wells and Jules Verne to J.G. Ballard and Ursula K. Le Guin, using a mix of theories derived from ecocriticism and philosophy of technology. His research interests include depictions of disability—particularly intellectual disability—and he has presented papers on Daniel Keyes and Philip K. Dick.

Jandy Hanna (Editor) holds a Ph.D. in anthropology and anatomy and is a faculty member at West Virginia School of Osteopathic Medicine (USA), where she is also the chair of the biomedical sciences department. She is a comparative anatomist and functional morphologist by trade, and she recently completed a master's thesis in research bioethics on cognition in great apes as evidence for personhood.

Barbara Jasny (Editor) holds a Ph.D. from Rockefeller University (USA) and her career has been science-first, performing research in molecular biology and virology and then becoming a research Editor and Deputy Editor for Science magazine. She has communicated science through books, articles, posters, art displays, virtual presentations, meetings, digital media, and podcasts.

Melanie Marotta (Editor) holds a Ph.D. in English from Morgan State University (USA), where she is currently a Lecturer in the Department of English and Language Arts. She is originally from the province of Ontario in Canada, and her research focuses on science fiction, the American West, contemporary American Literature, and Ecocriticism.