

"Technology's Other Storytellers: Science Fiction as History of Technology"

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Abstract: Science fiction and the history of technology have far more in common than is usually acknowledged. Both construct narratives of technological change, showing the consequences of the invention and adoption of technologies on social worlds. Both are marginal within their broader fields, tend to be written by people with technical training, and are often the subject of special pleading for unique critical standards. Perhaps more surprisingly, both are fundamentally about the past. Using the work of critics such as John Clute, David Langford, Thomas M. Disch I argue that all science fiction is historical fiction in that it reflects social attitudes and technological understandings of an era during (or more usually prior) to the time of its first publication and thus requires its readers to understand enough history to chart its divergence from our own world. Focusing on the use made of information technology by science fiction writers, my analysis contrasts the “future histories” constructed by “golden age” authors such as Heinlein, Asimov and Clark with the more playful and self aware attitude to history and technology displayed in the work of cyberpunk and postmodern space opera writers such as Bruce Gibson, William Sterling, and Ian M. Banks.

More than twenty years ago John Staudenmaier helped to codify the concerns, themes and vocabulary of the history of technology, a field of study then completing its emergence as an academic discipline, in a book entitled “Technology’s Storytellers.”¹ I have always found that title interesting since it could also and perhaps more obviously, be applied to science fiction writers. Having grown up as an avid reader of science fiction and retained an interest in the genre and its criticism I was surprised, while training as a historian of technology, at how infrequently historians referenced works of science fiction when exploring cultural attitudes towards technology. Science fiction writers seemed to be dealing with similar issues and themes to historians of technology, but this kinship was rarely if ever acknowledged on the part of historians.

Science fiction writers themselves, in contrast, turn out to have a considerable self awareness regarding the historical dimensions of their work and some critics of science fiction have begun to situate the internal development of science fiction within the broader technological, cultural, and social histories of the western world.

HIDDEN KINSHIPS BETWEEN SCIENCE FICTION AND THE HISTORY OF TECHNOLOGY

What does science fiction have to do with the history of technology? Both are marginal within their broader fields, tend to be written by people with technical training, and are often the subject of special pleading for unique critical standards. Both fields create narratives of technological change, showing the consequences of the invention and adoption of technologies on social worlds. Both require their authors to build worlds as well as stories.

Science fiction, in the sense I am concerned with it here, is a genre that emerged in the United States during the 1920s and 1930s. Many important aspects of the genre can be traced back further in time, sometimes as far as classical Greece.² Utopian fiction has a long tradition, and key elements of the science fiction narrative have been identified in Mary Shelly’s *Frankenstein* and the “scientific romances” of HG Wells.³ However attempts to define the necessary and sufficient elements of science fiction stories and so demarcate the genre’s boundaries have been notoriously unsuccessful and so it is hard to make an essentialist argument for any particular work as the first science fiction text. This essay is concerned with science fiction as a self-conscious genre, in which readers, writers, editors and publishers share a set of expectations about the future as a setting for fictional work.⁴ The genre existed in a relatively well defined and tightly demarcated form from the 1930s into the 1970s. It has profoundly shaped the way people think about the future.

Within this genre aspiring writers are often told that every science fiction story begins with a question, posed in the form “What if?” Ask “What if we lived in a two dimensional world” and

¹ John Staudenmaier, *Technology's Story Tellers: Reweaving the Human Fabric* (Cambridge, MA: SHOT and the MIT Press, 1985).

² Adam Roberts, *The History of Science Fiction* (New York: Palgrave, 2006).

³ Brian W Aldiss and David Wingrove, *Trillion Year Spree* (London: Victor Gollancz, 1986).

⁴ Thus my perspective here is more closely aligned with that of Gary Westfahl, *The Mechanics of Wonder: The Creation of the Idea of Science Fiction* (Liverpool: Liverpool University Press, 1998).

answer this by writing *Flatland*.⁵ Ask “What if the stars were only visible every few thousand years” and write *Nightfall*.⁶ You get the idea.

At first blush the questions asked by the historian of technology seem to be quite different. We tend to ask “How did this technology/device/system come to be the way it is, and how has it been shaped by society and in turn reshaped it.” But implicit in that question, and lurking behind it, is the realization that things could have been otherwise. Only the existence of an implicit counterfactual narrative makes histories of technology more than pedantic chronicles of inevitable progression. So just behind the surfaces story told by a good historian of technology are always questions about “Why didn’t,” and those really are just questions of “what if” posed in a different way. “Why didn’t we stick with gas powered refrigerators” asked Ruth Schwartz Cowan.⁷ Why didn’t DC power establish itself as the standard for electrical power networks?⁸ Why didn’t Betamax see off VHS?⁹ These questions can only exist because we recognize that things might have been other than how they are.

Science fiction writers and historians are both world builders, working with words as their only tools. Science fiction writers acknowledge this, and indeed savor the activity as one of the defining characteristics of their genre. They construct not just a plot, characters, events, and the other furnishings of a “mainstream” novel but also fabricate the universe in which it takes place. This may be almost imperceptibly different from our present day reality or unrecognizably so. The differences usually involve developments in society as a result of technological change. Early in the genre’s development details of this imagined universe were often conveyed in authorial asides or length passages of stilted dialog in which characters informed each other of what they already knew. This is known as an “infodump” and is disparaged. By the late 1940s more skillful writers were discovering ways of dropping hints and facts about the operating principles of the fictional universe smoothly into the narrative, removing the need for clumsy exposition. Samuel R. Delaney, a practicing writer turned academic critic, has stressed the importance of this activity to the writing of science fiction, and the development of skills in interpreting these hints as a crucial skill acquired by science fiction readers.¹⁰ He takes as a paradigm a single sentence of Robert A. Heinlein’s, “The door dilated.” When faced by a bizarre statement such as this, dropped without fanfare into a story, an unprepared reader might miss its

⁵ Edwin A Abbott, *Flatland: A Romance of Many Dimensions* (Seely & Co, 1884).

⁶ Isaac Asimov, "Nightfall", *Astounding Science Fiction*, September 1941.

⁷ Ruth Schwartz Cowan, "How The Refrigerator Got Its Hum", in *The Social Shaping of Technology*, ed. Donald MacKenzie and Judy Wajcman (Philadelphia: Open University Press, 1985).

⁸ Thomas Hughes, *Networks of Power: Electrification in Western Society, 1880-1930* (Baltimore, MD: Johns Hopkins University Press, 1983).

⁹ Michael A. Cusumano, Yiorgos Mylonadis, and Richard S. Rosenbloom, "Strategic Maneuvering and Mass-Market Dynamics: The Triumph of VHS over Beta", *Business History Review* 66, no. 1 (Spring 1992):51-59. This particular question is one of a handful of examples economists have focused on in debating the existence of “path dependence” in the evolution of technologies and standards. Douglas Puffert, *Path Dependence* (EH.Net Encyclopedia, edited by Robert Whaples, 2003 [cited September 15 2006]); available from <http://eh.net/encyclopedia/article/puffert.path.dependence>

¹⁰ Samuel R Delaney, "About Five Thousand Seven Hundred and Fifty Words", in *The Jewel-Hinged Jaw* (Elizabeth, NY: Dragon Press, 1977).

significance or become frustrated. The science fiction reader asks “What would the world have to be like for this statement to make sense.”¹¹

Reading science fiction thus trains us in one of the crucial cognitive skills needed to research the history of technology. Novelist L.P. Hartley's wrote that “The past is a foreign country. They do things differently there.” A reader of science fiction might replace “foreign country” with “alien world.” Primary sources expose us to fragments of the past in a variety of forms, such as letters, editorials, articles, diaries and advertisements. These can all serve as evidence for some of the crucial underlying questions: how did these people understand their world and their place within it, what expectations did they have regarding a technology, what existing models did they use to understand new technologies, etc. Historians are essentially charged with backward engineering an understanding of the beliefs, customs, and concerns of our historical characters from records of what they said, did, and wrote. We read our sources for clues about the world in which they take place, using the same techniques developed by experienced readers of science fiction. A classic example of this is Carlo Ginzberg's *The Worms and the Cheese* which reconstructs the cosmos as understood by a sixteenth-century miller using hints contained in his statements as recorded in the official records of the inquisition.

Historians of technology are also world builders. We too produce narratives in which the world is changed by (or, as technological determinism is far from fashionable, with) technological changes. Historians, like science fiction writers, are encouraged to create a strong narrative and integrate background material seamlessly within it. We do, admittedly, work with historical documents as our sources and place great stress on fidelity to these sources. But as we conduct our craft we are arranging certain sources, from an almost infinite array, in a certain way and drawing out particular themes, identifying certain individuals or demarcating certain social groups as actors, defining technologies in a particular way, writing with a particular intellectual agenda in mind, and in countless other ways constructing a unique world in which our story takes place.

Both groups of storytellers have tended to have some similarity in personal background. Science fiction writers of the “Golden Age” (the late 1940s and 1950s) tended to have backgrounds, and often advanced degrees, in science or engineering. Isaac Asimov, for example, earned a Ph.D. while writing his early stories and was already tenured at Boston University before finally giving up his career in biochemistry to write full time. Historians of technology were, in the early days of the field, often engineers who initially approached the field as an avocational interest. While subsequent generations of scholars have usually earned Ph.D.s in history, or some variant thereof, an undergraduate degree in engineering or computer science is still a common qualification. Both populations used to be almost exclusively male, and are now merely predominantly male. Both are interested in technology yet able, unlike many engineers, to write coherently and reasonably engagingly about it.

¹¹ Delaney writes that a colleague reported having applied this technique to reading Jane Austen, with informative results. Samuel R Delaney, "Science Fiction and 'Literature'", in [Speculations on Speculation: Theories of Science Fiction](#), ed. James Gunn and Matthew Candelaria (Latham, Maryland: Scarecrow Press, 2005) The game of hiding information has been taken to its extreme by Gene Wolfe, in whose major work crucial details about the imagined world itself, its main characters, their motivations, and narrative developments are implied, mentioned obliquely, or left as a challenge for the deductive powers of the reader.

Finally, both groups have a rather problematic relationship with their parent fields. Science fiction fans are often dismissive of the pleasures of what they call “mainstream” literature, and many adult readers of high- or even middle-brow fiction regard science fiction as a literature for teenagers and the emotionally stunted. Science fiction critics have reached mixed judgments. Some argue that for a work of science fiction to be great it must also be a great work of fiction. They apply the same expectations for prose style, depth of characterization, and elegance of plotting to works within the genre as to those filed by chain bookstores in the category of “literature.”¹² Others engage in special pleading. They argue that science fiction is inherently different from other kinds of fiction, and cannot therefore be held to the same terms.¹³ As world builders their mission is different from that of other writers. Since the 1970s science fiction has become more respectable, and a large and fairly well defined body of “literary” science fiction has emerged. Meanwhile ideas, devices, and sensibilities from science fiction have increasingly appeared in the work of “literary” writers, creating a liminal body of literature dubbed “slipstream” populated by lauded writers such as Don DeLillo, Thomas Pynchon and Steve Erickson.¹⁴

The history of technology has internalized a similar tension. The creation myth of the Society for the History of Technology relates to a split from the History of Science Society owing to the refusal of the latter to treat technology as an important and distinct topic. As the field has developed its scholars have increasingly related their stories and questions to those found in higher status and better established historical fields, particularly social and cultural history. Likewise technology (and its euphemistic twin, “material culture”) have won some legitimacy as objects of historical study among what I have sometimes heard people call “mainstream historians.” Yet the history of technology remains a small and rather insular field, despite efforts by many of its leaders to increase its diversity and import (often with a time lag of a decade or two) ideas from social and cultural history. Others argue that the history of technology has unique concerns, shaped by its early alliance with museums and industrial archeology, and that these must be preserved.¹⁵ As in science fiction this debate began in the 1970s and has shifted in favor of those seeking more integration. This has been particularly noticeable in the growing conjunction of the history of technology and environmental history.

Meanwhile science fiction writers have knowingly been drawn toward historical models and to the idea, no longer fashionable among academic historians, that the mechanics of historical change can be captured in laws, cycles, or grand theories. Ken MacLeod, one of the most successful science fiction writers to emerge in the past twenty years, has argued that “History remains the trade secret of SF... its influence is quite pervasive, among writers and readers alike... History is an inexhaustible source of plots, and an indispensable map of the way in which societies work and how they can change.” He notes particularly the popularity of cyclical

¹² This question is given a thoughtful and insightful examination in David G. Hartwell, Age of Wonders: Exploring the World of Science Fiction (New York: Tor, 1996).

¹³ While the case is often made rather crudely by fan writers, as a rejection of the ability of academic research to illuminate science fiction, it can also be expressed as a call for scholars of science fiction to create their own standards and critical vocabulary, as in Delaney, "Science Fiction and 'Literature'" .

¹⁴ Bruce Sterling, "Slipstream", SF Eye, July 1989.

¹⁵ Terry S Reynolds, "On Not Burning Bridges: Valuing the Passe", Technology and Culture 42, no. 3 (2001):523-530.

notions of history, historical materialism, and the obvious modeling of classics such as Isaac Asimov's Foundation series and Frank Herbert's Dune saga on actual historical models.¹⁶

BUT WHAT ABOUT THE FUTURE?

There is an obvious difference between the two enterprises. Science fiction is, for the most part, ostensibly about the future. Indeed it is perhaps this concern with the future as a locale that sets works of genre science fiction aside from earlier traditions such as the utopia or scientific romance in which adventures took place in the present day (or the past). Exotic locations were distanced more often by space rather than time in the works of authors such as Jules Verne, Arthur Conan Doyle, Edgar Allan Poe, and H.G. Wells. In contrast, claims to apply science and predict what lies ahead were made for the modern genre of "Scientifiction" by its founder Hugo Gernsback (who seems to many of science fiction's more literary-minded critics more a mad uncle confined in its literarily attic than a founding father). They were retained and reinforced by John W. Campbell, who as editor of Astounding Science Fiction exerted tremendous influence over the work and careers of the leading science fiction writers of the 1940s. Campbell aimed to raise both the literary standards of the field and the credibility of its scientific content.

Back in the 1930s and 1940s science fiction fans believed that they were getting a head start on readers of less imaginative work. Science fiction fans agreed with celebrity inventor Charles Kettering when he reportedly stated "My interest is in the future because I am going to spend the rest of my life there."¹⁷ General Motors, Kettering's employer, endorsed a science fiction view of the future with its famous Futurama exhibit at the 1939 Worlds Fair. History on the other hand, is all about what already happened. In fact historians tend to be exceptionally wary about making predictions. This is not because we are likely to be any worse at prognosticating than anyone else, but rather because we tend to regularly come across old predictions are uncomfortably aware that they are invariably wrong. So the historian and the science fiction writer might seem to be the two heads of Janus. One stares at the past, and tries to imagine how it might have been different and why it wasn't. The other stares at the future, and wonders how it will be.

Yet I think the relationship between the two genres is more fundamental. Kim Stanley Robinson has argued that science fiction is "an historical literature." When we say that stories are set in the future this implies that in each "sf narrative, there is an explicit or implicit fictional history that connects the period depicted to our present moment or to some moment in our past." Thus science fiction and historical fiction "are more alike, in some respects, than either is like the literary mainstream."¹⁸ Similarly, Istvan Csicsery-Ronay included future history as one of his "seven beauties" of science fiction in his book of that title, noting that "by maintaining a sense of the integral connections between the present and the future, sf constructs micromyths of the

¹⁶ Ken MacLeod, "History in SF: What (Hasn't Yet) Happened in History", in Histories of the Future: Studies in Fact, Fantasy, and Science Fiction, ed. Alan Sandison and Robert Dingley (New York: Palgrave, 2000).

¹⁷ This phrase has been widely attributed to Kettering, though as far as I can see never with a citation to a primary source.

¹⁸ Quoted in the SF Encyclopedia entry on Definitions of SF. That suggests that the original source is Kim Stanley Robinson, "The Profession of Science Fiction", Foundation 1987 – however this turns out to be incorrect. I believe the actual source may be Kim Stanley Robinson, "Notes for An Essay on Cecelia Holland," Foundation (UK) 40 (Summer 1987): 54-5.

historical process...” He observes that “Unlike real prophecies, sf’s are narrated in the past tense. They don’t pretend to predict a future, but to explain a future past.”¹⁹

This relationship is most obviously true in the case of alternate history stories, science fiction set in an era prior to the time in which they were written. These tend to hinge on wars and battles: worlds in which the Nazis won the Second World War, the South did not lose the Civil War, or the Spanish Armada brought an early end to the English Reformation. Harry Tutledove, one of the most successful writers of alternate history, had clarified the relationship of this kind of fiction with other science fiction in a way that makes it clear all science fiction stories are, in a sense, historical writing.

Both [alternate history and science fiction] seek to extrapolate logically a change from the world as we know it. Most forms of science fiction posit a change in the present or nearer future and imagine its effect on the more distant future. Alternate history, on the other hand, imagines a change in the more distant past and examines its consequence for the nearer past and the present. The technique is the same in both cases; the difference is when in time it is applied.²⁰

When, as it often is, this change is technological the result is a sense of history which resonates with Marx’s sense of historical materialism, as in his famous suggestion that “The windmill gives you society with the feudal lord: the steam-mill, society with the industrial capitalist.”²¹ Darko Suvin, a pioneering Marxist critic of science fiction, has posited the “novum” as a defining element of science fiction. In the words of Csicsery-Ronay this is “the historical innovation or novelty in an SF text from which the most important distinctions between the world of the tale from the world of the reader stem.... In practice, the novum appears as an invention or discovery around which the characters and setting organize themselves in a cogent, historically plausible way. The novum is a product of material processes...”²² This is an interesting position to take, as historians of technology have increasingly stigmatized the idea of “technological determinism” by which social changes take place inevitably in response to an external process of invention and discovery.²³ Science fiction writers, in contrast, love to present their fictional universes as the inevitable result of a particular development or set of developments because, being fictional, they are unavoidably at risk of appearing arbitrary or inconsistent.

Science fiction was, however, never really about the future. Valiantly as they often tried, its creators have achieved a pretty terrible record in the prediction department. Sometimes science fiction writers score with a technical prediction or two. Robert A. Heinlein, for example,

¹⁹ Istvan Jr. Csicsery-Ronay, The Seven Beauties of Science Fiction (Middletown, CT: Wesleyan University Press, 2008), 6, 76.

²⁰ Quoted in Andy Duncan, "Alternate History", in The Cambridge Companion to Science Fiction, ed. Edward James and Farah Mendlesohn (Cambridge, UK: Cambridge University Press, 2003), 211.

²¹ Karl Marx, The Poverty of Philosophy (Chicago: Charles H. Kerr & Company, 1910), 119.

²² Istvan Jr. Csicsery-Ronay, "Marxist Theory and Science Fiction", in The Cambridge Companion to Science Fiction ed. Edward James and Farah Mendlesohn (Cambridge, UK: Cambridge University Press, 2003), 119.

²³ Merritt Roe Smith and Leo eds Max, Does Technology Drive History: The Dilemma of Technological Determinism (Cambridge, MA: MIT Press, 1994).

believed himself to have invented the waterbed.²⁴ He put a waterbed in his 1942 novel *Beyond This Horizon* before they were commercially available. As we know, the waterbed was an essential item for the swinging bachelor of the 1970s. Score one for science fiction! Likewise Arthur C. Clarke was a space flight enthusiast, and claimed to have published²⁵ the first proposal for a geosynchronous communications satellite in 1945, and John Brunner invented a fictional “tapeworm” program in 1975 that inspired the creation of self replicating worms and viruses in the real world. Most famously of all, *Astounding Science Fiction* ran a series of editorials and stories featuring atomic power and atomic weapons during the late 1930s and early 1940s. In 1944 Campbell, received a visit from Army intelligence officers after publishing a story that happened to have some technical elements in common with the real-life, and highly secret, Manhattan Project. Atomic technology remains science fiction’s proudest accomplishment as a literature of prediction.

By the 1960s science fiction writers themselves were becoming uncomfortable with the idea that they were charged with predicting the future. Space travel had left the pages of science fiction and entered political reality, but proved, particularly for the group of writers gathering in Britain under the banner of “New Wave” science fiction, something of a disappointment. They rejected claims for the genre’s powers prediction alongside its faith in technological progress and fascination with gadgets and machines.²⁶ J.G. Ballard mocked the iconography of the space program, and called for the examination of “inner space.”

To focus on the occasional widget or doodad brought to life in science fiction shortly before its appearance in the real world is to miss the obliviousness of most science fiction writers to the social and cultural developments not just of the future (which is hardly their fault) but of the present in which they were writing. Let’s reconsider Heinlein’s triumph with the waterbed. Heinlein tied many of his stories together into the grandly titled “Future History” series, collected with a detailed table summarizing humanity’s political, cultural and technical progress over the next But Heinlein’s futures have a distinctly nineteenth century feel. He never accepted the New Deal or the rise of big government and big science in the Cold War period. He didn’t really seem to approve of big business either. In Heinlein’s future (given in the 1950 story “The Man Who Sold the Moon”) the moon landings are accomplished in 1978, not by the military-industrial-academic complex that brought us the Apollo program but by an entrepreneurial hustler and “robber baron” who finances the project via schemes such as designating the rocket as a post office so that stamps can be cancelled on the moon and sold to collectors.

Science fiction writer Brian Aldiss, one of the prominent figures in this movement, has baldly stated, “It is part of sf’s gaudy misleading label that it predicts.”²⁷ His fellow writer Gwyneth

²⁴ Robert A Heinlein, *Expanded Universe* (New York: Grosset & Dunlap, 1980), 516-518. Heinlein never built a waterbed, but featured them in several stories and claims to have offered a sufficiently detailed description of the modern waterbed to prevent the idea from being patented once real-world models were produced. According to Wikipedia, however, earlier designs were in use since the nineteenth century.

²⁵ Arthur C. Clarke, “Extra-terrestrial Relays”, *Wireless World*, October 1945.

²⁶ Roberts, *The History of Science Fiction*, ch. 11.

²⁷ Brian Aldiss, *The Detached Retina: Aspects of Science Fiction and Fantasy* (Syracuse, NY: Syracuse University Press, 1995), 189.

Jones agrees. She has written that science fiction “more than any other literary genre... reflects the exact preoccupation of the present.” The future invoked

has to be as close as possible to a future which is seen as likely or relevant by most people at the time of writing. Otherwise nobody will think it is any good. Thus, the very books that seem to critics and audience the most intelligent, most exciting, the most uncannily accurate future-guessing, become ten years later the most dated—providing merely an *uncannily accurate* reverse image of the year in which they were written. Tell me what you think is going to happen tomorrow, and I'll tell you what is happening to you today.”²⁸

Critic John Clute used a similar logic to suggest the concept of a “real decade” in which a story takes place.

Sometimes, reading a novel, one is able to play a game with the thing. Disregarding the ostensible date of the narrative, which may of course be anywhen at all, one can try to estimate the real decade in which the story is set. This real decade will be the period most nearly reflected by the book's characters in their feelings about the proper relationship between the sexes, for instance, or about the thread of international communism, or about how great an economic sway should be exercised (across the galaxy) by entrepreneurial capitalism, or about the inevitability of man's victory over the stars in their courses.... It is of course a fundamental rule of this game that no sf novel... can be actually set in the future... [in fact] sf novels tend to be set much further into the past than most 'mainstream' non-generic novels.²⁹

Personally I'd date most of Heinlein to 1890 and some aspects to the 1930s. Reading him today one is struck by just how alien his assumptions and ideas are. Heinlein retains a considerable libertarian following, and is famous for the free-market, small-government ideas he showcases in his novels. He was clearly unhappy with the social changes of the New Deal. In his story “The Roads Must Roll” (1940) he presents unionized workers as the irrational dupes of populist agitators.³⁰ One of his earliest books, *Beyond This Horizon*, is also his most explicit attempt to document a utopia. In many ways the society on view is an exemplar of romanticized individualism, with considerable crossover appeal to readers of Ayn Rand. Men are expected to carry guns, so that insults lead rapidly to deadly duels, which Heinlein suggests are very effective as a means of encouraging social harmony (“an armed society is a polite society”). Yet, lurking incongruously in his utopian novel is the Department of Finance, in which sits a “huge integrating accumulator.” Every economic transaction in North and South America is encoded onto holes punched onto paper tape inside each “auto-clerk”. The data, suitable aggregated, is constantly fed into this special purpose machine, which in turn manipulates subsidies, adjusts government allowances and makes other economic tweaks necessary to “make the production-

²⁸ Gwyneth Jones, "Getting Rid of the Brand Names", in *Deconstructing the Starships* (Liverpool, UK: Liverpool University Press, 1999), 15-16.

²⁹ John Clute, *Strokes: Essays and Reviews: 1966-1986* (Seattle: Serconia Press, 1988), 32. This review originally appeared in 1977.

³⁰ Farah Mendlesohn, "Corporatism and the Corporate Ethos in Robert Heinlein's 'The Roads Must Roll'", in *Speaking Science Fiction: Dialogues and Interpretations*, ed. Andy Sawyer and David Seed (Liverpool: Liverpool University Press, 2000).

consumption cycle come out even.”³¹ His libertarian duelists are, in matters of economics, heavily regulated big government Keynesians who have surrendered monetary and financial policy to a giant machine run by unelected experts. Suddenly one gains an appreciation for the wrenching shock the Great Depression gave Heinlein, and others of his generation, and the enormous amount of intellectual and cultural work done in the decades since to make personal freedom and macroeconomic deregulation appear inherently related.

COMPUTERS IN GOLDEN AGE SCIENCE FICTION

The absurdity of science fiction as a literature of prediction, and its merit as a genre of historical writing, can be seen particularly clear in its treatment of computing, my own field of historical and technical expertise.

Computers show up in science fiction in the early 1950s, mirroring their arrival in the real world. As everyone knows the computers of the 1940s and early 1950s were slow, unreliable and massive machines based around clicking relays and glowing tubes. They were used primarily for scientific calculation. Science fiction writers, even those with scientific backgrounds who prided themselves on their skills as prognosticators, generally believed that the computers of the future would work in very much the same way. Consider the early appearances of computers in the work of Asimov, Heinlein, and Clarke – three prolific authors of short stories during the Golden Age of magazine science fiction in the 1940s who established themselves as bestselling authors of science fiction books as that market emerged in the 1950s.

Computers were unknown in Asimov's best known work this era, the *Foundation Trilogy* (originally published 1942-1950).³² Fifty thousand years from now scientists have achieved some miracles of miniaturization including shrinking nuclear reactors to the size of walnuts for use in atomic powered dishwashers and personal force fields. But they don't seem to have invented computers. A separate stream of popular stories concerned the three laws of robotics, depicting the development of ever more intelligent and human-like machines powered by the rather nebulous technology of “positronic brains.” Although robots are common computers remain very rare: a handful of “thinking machines” with “super robot brains” are used for economic control and scientific research. Asimov also wrote, from 1955 onward, a handful of stories concerned with a giant computer named Multivac, built with vacuum tubes and buried deep underground. This machine too fits the “giant brain” paradigm, and comes eventually to rule the world.³³

Clarke was, like Asimov, a successful writer of popular science and journalistic futurology as well as an outstandingly successful writer of science fiction. Nobody, in the 1950s, knew high technology or the future better. Yet Clarke's computers are similarly bulky. In his 1960 story “Into the Comet” a spaceship visiting a remote comet faces disaster after its room-sized onboard computer malfunctions. Calculating the course for Earth would take “a hundred thousand separate calculations,” seemingly impossible to carry out by hand when the computer was “a

³¹ Robert A Heinlein, *Beyond This Horizon* (Reading, PA: Fantasy Press, 1948), 3-7. See also the discussion of economics and the role of government on pages 71-72 and 102-3.

³² To give Asimov his due, when the *Foundation* stories were first assembled in book form he did add a new opening chapter. In this he gives Hari Seldon, the heroic founder of *Foundation*, a kind of programmable calculator with glowing red digits. This is small enough to be carried on the waist.

³³ The Multivac stories are available in Isaac Asimov, *Robot Dreams* (New York: Berkley, 1986).

million times faster.” Fortunately a radio reporter on board had a Japanese grandfather and thus remembers more traditional calculating practices. He launches a successful effort to equip each crew member with an abacus and a part of the complex calculation. Soon they are saved.³⁴ Clarke’s novel A Fall of Moondust (1961), set in a mid twenty-first century which manned missions have reached Pluto and tour buses ply the moon, describes a computer as “a handful of cells and microscopic relays.”³⁵ In the real world, by the end of the 1940s relays had already given way to vacuum tubes as the building blocks of computer logic.

Heinlein’s stories from this era made an effort to keep up to date with current developments in computing, but did little to significantly extrapolate any continued development. Again this was a notable contrast with his assumption of rapid developments in space travel. In 1947 he published a short story, “Space Jockey” in the *Saturday Evening Post*, giving is broad readership a depiction of a typical day in the life of a rocket pilot of the mid-1980s. Heinlein anticipated regular commercial flights to Lunar City to be operating within a decade after the initial moon landing. Responsibility for navigational calculations a man identified as a “computer” (a usage soon to vanish in the real world).

When the Skysprite locked in with Supra-New York, Pemberton went to the station's stellar navigation room. He was pleased to find Shorty Weinstein, the computer, on duty. Jake trusted Shorty's computations—a good thing when your ship, your passengers, and your own skin depend thereon. Pemberton had to be a better than average mathematician himself in order to be a pilot; his own limited talent made him appreciate the genius of those who computed the orbits.

So calculating routine flight paths remained a matter for human virtuosity. Shorty did not work entirely without electronic assistance though, as some undefined contribution to his work was made by “Mable, the giant astrogation computer filling the far wall.” Mable could not be miniaturized – Pemberton later wanted to make a correction to his course but acknowledged that “his little Marchant electronic calculator was no match for the tons of IBM computer at Supra-New York, nor was he Weinstein.”

Likewise his novel Citizen of the Galaxy, published in 1957, shows ship-to-ship space combat in the distant future conducted with fire control computers very similar to those used in World War II but with a simulation capacity and the ability to record data similar to that advertised for the SAGE system in the late 1950s. Like other writers, Heinlein remained committed to the giant computer paradigm well into the 1960s, even as minicomputers proliferated in the real world. In The Moon is a Harsh Mistress (1966) a major lunar city apparently holds just one computer.³⁶

In May 2075, besides controlling robot traffic and catapult and giving ballistic advice and/or control for manned ships, Mike controlled phone system for all Luna, same for Luna-Terra voice & video, handled air, water, temperature, humidity, and sewage for Luna City, Novy Leningrad,

³⁴ Arthur C Clarke, "Into the Comet", in Best of Arthur C. Clarke (London: Sphere, 1973).

³⁵ Arthur C Clarke, A Fall of Moondust (1961), 21.

³⁶ To be fair to Heinlein, one should note that this can also be read as a reflection of the then-fashionable idea of the computer utility – so he may truly be reflecting the late 1960s as well as the late-1940s. Also his entire plot of a computer aided revolution depends on the colony having decided to centralize all administration and control activities in a single computer.

and several smaller warrens (not Hong Kong in Luna), did accounting and payrolls for Luna Authority, and, by lease, same for many firms and banks.

Computers in science fiction settled down into a comfortable pattern. In physical appearance and interface style they generally resembled those in the real world. On the other hand they frequently developed intelligence. This generally took place spontaneously, as an accidental result of their increasing complexity. (That is in itself an interesting departure from the pattern with space and atomic technologies: in science fiction warp drives and nuclear reactors were usually the result of research and experimentation). Science fiction writers embraced the idea of the computer as a giant disembodied brain, functioning as an oracle to be questioned. (The same idea can be seen in cartoons well into the 1980s.) Robots, meanwhile, had been around long before the computer but were now understood to include, or be controlled remotely by, some form of computer. Giant computers continued to oppress mankind well into the 1970s, whereas the potential of computer networks to connect people with each other was rarely acknowledged.³⁷

This is particularly odd given the importance of the future to the computer industry. Since the 1940s computer technology has been characterized by rapid obsolescence and abrupt technological shifts. New ideas and fads came along constantly, and received wide discussion in the trade press. These were invariably promoted with predictions of the near future in which the technology or approach in question (for example management information systems, bubble memory, or timeshared computer access on a public utility model) has become ubiquitous. By the late 1970s personal computers were selling by the million and a thriving home computer industry had emerged. Widespread speculation over the impact on the near future of the “microcomputer revolution” and the shape of the “information society” drove product developments, political policies and educational initiatives. Parents purchased computers to make sure that their children had the “computer literacy” needed to survive in this new world. Moore’s Law provided a self fulfilling prophecy of rapid technological advance in the capabilities of semiconductors. Yet the science fiction writers of the 1970s lagged behind this broader discourse, even as industry leaders, politicians, market research analysts, futurologists and journalists embraced the techniques and sensibilities of science fiction to promote the idea of a world remade by computers.

THE OLD TIMEY FUTURE: “FIRST SF”

The science fiction future remained a place where information technology had little direct influence on the lives of ordinary people. Since the 1950s the science fiction future has gradually developed from something that at least claimed to be a good-faith attempt to predict the future development of technology and society into a backdrop and set of symbols as familiar and comforting as that of the western or popular romance. Or rather evolved into a set of instantly identifiable generic futures. There’s the post apocalypse survivalist future, the galactic empire space opera future, the robot uprising future, and (perhaps most ubiquitous of all) the gee-wiz 1950s Jetsons future. Science fiction images and aesthetics, once confined to obscure magazines and books, have permeated popular culture. A host of technologies are instantly identifiable as

³⁷ The literature is summarized with respect to real world changes in Brian Stableford, Science Fact and Science Fiction: An Encyclopedia (New York: Routledge, 2006). In particular the entries on Computer, Artificial Intelligence, Virtual Reality, and Robot.

futuristic: flying cars, domestic robot servants, jet packs, virtual reality helmets, meals ingested in pill form. Nobody necessarily believes any more that these things will ever be commonplace, but they remain part of The Future nonetheless.

Again John Clute has captured the essence of this.

American genre SF began around 1925... and it entered the valley of the shadow around 1975 though its flashier icons only came to dominate popular culture after the kind of SF that created them had begun to die.... tall tales of the future as a platform we could pass into, a frontier we could pierce, an unknown we could domesticate. What this central spine or braid of American SF said for 50 years was that the future was us, and that it worked.³⁸

Clute has used the term “First SF” to describe the genre as defined by this consensus.³⁹ Since 1980, Clute believes, “the relationship between sf and the world” had “altered... almost out of all recognition. The genre which differed from the world in order to advocate a better one” had become simply “an institution for the telling of story.” Much science fiction continued to be “a set of stories about the American Dream,” written from the viewpoint of the industrialized western world in which science, progress, the control of nature and the “taming of alien people on other worlds” were unquestioned. This meant that “there is a decreasing resemblance between the world we inhabit today” and the still popular vision of the future traditionally found in science fiction. While many ambitious writers have challenged or subverted this vision, Clute feels that the First SF future “was deeply loved, even after it had become a kind of historical fiction, a form of defensive nostalgia in the minds of many....”⁴⁰

Science fictions failure to get to grips with computers, Clute believed, was the single most important reason for the obsolescence of its collective vision of the computer. Writers had “almost deliberately, ignored the transistor” and “described computers in terms of bulk rather than invisible intricacies.” Thus, with the rise of the Internet, “sf as a set of arguments and conventions... had been blindsided by the future.”⁴¹

But, as Clute noted, elements of the First SF future have passed into the cultural mainstream. In 1942 when Isaac Asimov came up with the “jump drive” as an enabling technology for his galactic empire he had to carefully explain it. By 1977 George Lucas could just have Hans Solo announce a “jump to light speed,” run short light shows to mark its entry and exit from hyperspace, and deliver the Millennium Falcon promptly to its destination without any further exposition.⁴² Recent shows such as Battlestar Galactica and Firefly have likewise relied on our common knowledge that starships have engines that propel them with great rapidity over

³⁸ John Clute, Scores: Reviews 1993-2003 (Harold Wood, UK: Beacon Publications, 2003), 92-93.

³⁹ Clute has used the term in many reviews, with a clear and influential definition in John Clute, Look at the Evidence: Essays and Reviews (Liverpool, UK: Liverpool University Press, 1995), 8-11. Cite the First SF essays in Polder. http://www.amazon.com/Polder-Festschrift-Contemporary-Science-Fiction/dp/1882968344/ref=sr_1_1?ie=UTF8&s=books&qid=1259213628&sr=8-1.

⁴⁰ John Clute, "Science Fiction from 1980 to the Present", in The Cambridge Companion to Science Fiction, ed. Edward James and Farah Mendlesohn (Cambridge, UK: Cambridge University Press, 2003).

⁴¹ Ibid .

⁴² Which is just as well. Light still takes a very long time to move between solar systems (at least from the viewpoint of those not travelling close to the speed of light). But the phrase is enough to invoke our background memories of warp speed, hyperspace and relativistic effects. It gets the job done.

interstellar distances. We know this without being told, just as we know that vampires need to be staked through the heart and leprechauns should not be trusted. Programs like Futurama and Mystery Science Theatre 3000 play with our generic expectations for these future settings while parodying the more earnest efforts of earlier decades. Modern science fictions authors likewise subvert and recombine elements from the genre's history.

There's another reason the First SF future seems so familiar. We are living in it. Scientists and engineers grew up reading the stuff, and have done their best to bring its promises to life. Now of course they have been constrained in this. People watched Star Trek the Next Generation and decide to build sentient androids, but despite this artificial intelligence research has made little progress. On the other hand, our ubiquitous array of electronic gadgets have been styled after and inspired by their science fiction counterparts. Most strikingly, early cell phones were styled directly after the communicators in Star Trek. (They started out a little bigger, but are now far smaller than their fictional counterparts). Recent graphical user interfaces, iPods, and the glowing lights and gages found in modern cars all betray the influence of science fiction aesthetics. Thomas M. Disch captured this phenomenon brilliantly when he called a book of reflections on science fiction The Dreams Our Stuff is Made Of: How Science Fiction Conquered the World.⁴³

CYBERPUNK – THE NEWISH FUTURE

The cyberpunk movement of the 1980s was, deliberately and self consciously, an attempt to update the increasingly obsolete future of First SF with the technologies and attitudes of the electronic age. Its breakthrough achievement, the novel Neuromancer, embraced personal computers, brand name fashion, and portable media players. Its concerns mirrored the then-novel rise of Japan as the superpower of personal electronics and the video glitz of MTV. Indeed, while several puns have been discerned in the book's title I have always fancied that another can be found there: "New Romantic" was a term used by music journalists to describe the colorful fashions, heavy makeup, and asymmetric haircuts of electronic pop bands such as Spandau Ballet, Ultravox, and (most relevantly) Japan.

In Neuromancer characters "jack in" to an immersive virtual world known as "the matrix." This involves a piece of consumer electronics known as "a deck" with which they have the same kind of relationship as a fanatical biker with his motorcycle. William Gibson shows us with model numbers, brands, and implications that decks can be tinkered with and souped up but never tries to explain what they do or how they work. All we know is that they are connected, at least for best results, directly to some kind of interface implanted in the head of the user. Cyberpunk represented a shift from the producers of technology to its users, and from the massive, thundering technologies of the space age to the more personal technologies of consumer electronics. Gibson understood that the VCR, the home computer, and the Walkman had a much more profound impact on our daily lives than the Apollo Program ever did. His imagined technologies of implants and genetic engineering turned technology inward, remaking the human

⁴³ This of course reversed the phrase "The stuff that dreams are made of," from the Maltese Falcon, which it turn was patterned on Shakespeare's "Of such stuff that dreams are made on" from The Tempest.

body itself.⁴⁴ This shift parallels the development, around the same time, among historians of technology of a new appreciation for users and for the technologies of everyday life.

Gibson did not write from any position of special technical expertise, but rather as a consumer of technology and someone with an eye for popular culture. Indeed he knew famously little about computers or networking when he wrote *Neuromancer* and its companion short stories, composing them on an antique Hermes manual typewriter. Given the enormous power of this network connection it came as a shock to Gibson's more computer savvy readers when the book's hero, facing a particularly tricky situation while jacked into the matrix, asks his companion to hand him a modem.⁴⁵ Compare this with another influential early treatment of what would soon be called virtual reality: Vernor Vinge's classic novella "True Names," published a few years before *Neuromancer*. There are similar elements: conspiracy, a powerful network, a rogue artificial intelligence, and connection via brain electrodes to a network known as "the Portal." Vinge was a real life mathematics professor and computer expert, and hence his treatment of technology is much more specific than Gibson's. He discusses baud rates and gives a detailed account of hopping around the network from bulletin board to satellite relay to dusty APRANet facility. He even creates a plot excuse to have his protagonist use a simple textual user interface. But Vinge's reliance of actual computer technology has made his story date faster than Gibson's, and provides an odd contrast with the implausibility of his actual plot which is a classic science fiction confection of superhuman transcendence in the service of a world-shaking battle between good and evil.

Vinge was not unusual in this respect. Science fiction plots are often crude, sharing with comic books an interest in stories of individuals transcending to states of superhuman mastery. But even First SF stories less blatantly invested in teenage wish fulfillment tend to be written from the viewpoint of the creators and masters of large scale technologies. Heinlein's heroes, often dubbed by critics "competent men," were masters of their fate.⁴⁶ They could wield a slide rule, program a computer, patent an invention, or patch a space suit. They were prone to philosophize at length on the manly importance of controlling one's fate with such skills, and had little sympathy for those unable or unwilling to thrive in a frontier world. One of the most popular science fiction short stories of all time, "The Cold Equations" by Tom Godwin, sets up a situation in which the reader is led to identify with the protagonist as he explains to a sweet, silly "girl" looking for "an exciting adventure" who has hidden in the bathroom of his little spaceship that her willful ignorance of the laws of physics mean she will need to throw herself out of the airlock without a space suit if their vital humanitarian mission is to succeed.⁴⁷

In contrast, Gibson borrowed from film noir the idea of the protagonist as a small-time, marginal figure who blunders through secret conspiracies and the machinations of the powerful and corrupt with little idea of what is actually going on. They are not world shakers or history

⁴⁴ This aspect of cyberpunk has been widely discussed in academic circles, most famously in Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century", in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991) though she does not, oddly, cite Gibson.

⁴⁵ William Gibson, *Neuromancer* (New York: Ace Books, 1984), 143.

⁴⁶ Alexi Panshin, *Heinlein in Dimension* (Chicago: Advent Publishers, 1968).

⁴⁷ Tom Godwin, "The Cold Equations", *Astounding Science Fiction*, August 1954. The story continues to provoke considerable discussion – for example http://home.tiac.net/~cri_d/cr/1999/coldeq.html.

makers. David Langford summarized this elegantly in his review of the anthology Burning Chrome, noting that the title story is “that one about the young punks who get hold of a .45 and try the big heist, only Gibson’s punks are computer jockeys and the .45 is a Russian military killer program.”⁴⁸ Neuromancer’s convoluted plot echoes that of the film noir classic The Big Sleep. In both cases what endures in your mind is not the precise detail of the complex series of double crosses and revelations but the general sensation of perverted conspiracy among the privileged overwhelming the cynicism of a small time protagonist who fancied himself street-smart. When noir heroes are foolish enough to make a moral stand they generally cause problems (most notably at the end of the film Kiss Me Deadly when the protagonist’s actions appear to trigger a nuclear explosion). Darko Suvin noted that “there is a real rebellion in the best of Gibson; there is sympathy for the little people.”⁴⁹ This mirrors the shift of academic history during the 1970s and 1980s toward the social history, characterized by an interest in representative experiences, neglected perspectives, and a skepticism towards the idea that historical change is driven by the decisions of great men. E. P. Thompson, one of the founders of the “new social history,” called this approach “history from the bottom up.”

During cyberpunk’s brief career as an active literary movement its chief propagandist was Bruce Sterling. His Schizmatrix, the other seminal novel of the cyberpunk movement, provides a similarly bracing challenge to the historical assumptions of First SF as it blends cyberpunk ideas and aesthetics with the sweeping interplanetary settings. Sterling’s novel follows the life of one individual, Abelard Lindsay, across several hundred eventful years. As in much of the science fiction of the 1950s (Heinlein’s early work, for example) the solar system has been colonized and political intrigues have factionalized humanity. And like a Heinlein hero, Lindsay is implausibly capable, excelling as a political leader, theatre promoter, diplomat, business man, professor, explorer and pirate. The technologies are different of course. Pretty much everyone has transformed their minds and bodies, and the main ideological issue driving the book’s wars is whether this is best accomplished via computer implants or genetic engineering. Lindsay himself comes to espouse the “posthumanist” cause. But what strikes me most about the book is its sense of the fragility of political arrangements, the tendency of nations and eras to collapse and shatter the dreams of even individuals. Wars rage hot and cold, aliens arrive, economies boom and bust, ideologies wax and wane, states are founded and fall. All that is solid melts into air, again and again. This view of history might seem intuitive to someone from, for example, Central Europe. It was not, however, well represented in American science fiction. In First SF heroes overthrow existing political orders, struggling at the beginning of the story but eventually imposing happy endings on mankind as part of a superhuman destiny. Lindsay, resourceful as he is, plays important roles in shaping history but often fails and is repeatedly forced to flee upheavals and begin again as a refugee. As he notes, towards the end of the book, “Nations don’t last in this era. Only people last, only plans and hopes.”⁵⁰

⁴⁸David Langford, The Complete Critical Assembly (Holicong, PA: Wildside Press, 2002), 145. Originally published in White Dwarf, 1986.

⁴⁹<http://www.depauw.edu/SFs/interviews/suvin54.htm>.

⁵⁰Bruce Sterling, Schizmatrix (New York: Arbor House, 1985), 259. This shift from triumphant supermen to individuals adrift in the currents of history may reflect a return to the perspectives of what critics have termed the Scientific Romance, work such as the stories of H.G. Wells written before the establishment of science fiction as a genre and the associated spread of First SF norms. John Clute has summarized the difference in attitude thus: “The

STEAMPUNK AND RETROFUTURISM

Gibson himself has argued that a science fiction fan of his generation, coming of age reading First SF classics written twenty years earlier, had to become a kind of historian of technology to appreciate the genre. Recalling his boyhood he writes

I learned of science fiction and history in a single season.... Much of the science fiction I was reading, American fiction of the nineteen-forties and fifties, had already become history of a sort, requiring an acquired filter for anachronism. I studied the patent Future History timeline Robert Heinlein appended to each of his novels and noted where it began to digress from history as I was coming to know it. I filtered indigestible bits of anachronistic gristle out of this older science fiction, reverse-engineering a model of the real past through a growing understanding of what these authors had gotten wrong.⁵¹

His first published story, “The Gernesbeck Continuum” made explicit Gibson’s fascination with the history of technology and the rediscovery of old futures. A freelance photographer agrees to photograph surviving examples of the futuristic architecture of the 1930s, for a book to be called The Airstream Futuropolis: The Tomorrow That Never Was. He starts to glimpse, in the manner of characters in many Philip K. Dick novels, flashes of another reality lying beneath our own. Seeking out futuristic gas stations and crumbling factories he finds himself haunted by images of a distinctly fascist urban landscape of crystal spires, zeppelins and silver cars. Rejecting as totalitarian the vision shared by Hugo Gernersback, early industrial designers, and corporate propaganda of the 1940s he saves himself only through immersion in the “really bad media” of the 1980 (game shows, soap operas, and porn). He chooses “the human near-dystopia we live in” over the inhuman grandiose elegance of the gleaming First SF future.

Despite its neon sheen, Gibson’s early fiction acknowledges the messiness of everyday life and the tiny marks history leaves all around us. In Neuromancer the Third World War was contained, we never learn exactly how, before it wiped out urban life entirely. But people function in a world of junk, navigating the wreckage of the past as they go about their futuristic business. It is not so much the radioactive wasteland as the more familiar run-down urban world of thrift shops, yard sales, and obsessive hoarders. Technological gadgets new and old are piled on the floor of shabby apartments or stuffed into the back rooms of shady establishments. In an afterword included in more recent editions of the book, Jack Womack notes “how many reference you find therein to events or incidents that occurred at some unspecified time before the narrative begins, and to nostalgic reveries of That Which Is No Longer the Way It Was; how often his characters grow dimly aware of vague regrets for which they have no name.” This, he suggests, leads Gibson to images of “evocative clutter and disarray.... The outmoded toaster ovens, the mildewed paperbacks, the scratched LPs... detritus that accumulates in the desk’s bottom draws; the lint in the navel of a private civilization, hinting at an apocalypse that (if apocalypse at all) could have been nothing other than personal.”⁵² Philip K. Dick warned that kipple (defined as “useless objects, like junk mail or match folders after you use the last match”) proliferates while

protagonists of the Scientific Romance tend to be observers of the great world, while American heroes tend to *win* it.” Clute, Look at the Evidence: Essays and Reviews, 81.

⁵¹ William Gibson, Time Machine Cuba (The Infinite Matrix, January 23 2003 [cited]; available from <http://www.infinitematrix.net/faq/essays/gibson.html>.

⁵² William Gibson, Neuromancer (New York: Ace Trade, 2000).

we sleep so that “No one can win against kipple, except temporarily and maybe in one spot.”⁵³ In the gleaming futures of the 1930s kipple had been banished by authorial fiat. Gibson shows us what life looks like after kipple has won.

Even the phrase “cyberpunk” itself, so often taken as a defiant assertion of modernity, reveals the influence of retrofuturism. It comes, of course, from “cybernetics,” a phrase coined by Norbert Wiener in the 1940s.⁵⁴ A scientific fad, cybernetics was widely discussed in the 1950s as a new metadiscipline able to unify hitherto unrelated areas of knowledge. The vocabulary and imagery of cybernetics made its way into popular culture and business by the 1960s.⁵⁵ The Cybermen lumbered threateningly out of quarries and across television screens in *Dr. Who*. In the early 1970s efforts were even made to reorient the Chilean economy on cybernetic principles.⁵⁶ CDC launched a new “Cyber” range of scientific supercomputers. By the 1980s, however, cybernetics had fallen from scientific respectability and was increasingly the domain of cranks. Even within popular culture its luster had faded. Thanks to Gibson, of course, “cyberspace” spearheaded a revival of cyberterms closely associated with the spread of the Internet in the 1990s.⁵⁷ But when Gibson was writing “cyber” was slipping into the realm of the obsolete future, the charmingly obsolete. Even *Neuromancer*'s much quoted first line “The sky above the port was the color of television, turned to a dead channel” now dates the work. So contemporary and media-savvy when it came out, it describes an analog technology now almost extinct. Digital televisions do not show snow. Analog televisions now show nothing else, regardless of how the turning dial is turned.

Bruce Sterling's subsequent career further demonstrates the importance of the technological history to the cyberpunk sensibility. By the early 1990s it was apparent that cyberpunk had run its course, its once radical sensibilities having been assimilated into a new kind of communal future in which body modification, cyberspace, and petty crime were now familiar and even reassuring elements of genre fiction.⁵⁸ A decade after launching cyberpunk as a movement Sterling went back to pamphleteering mode to compose a new manifesto: the Dead Media Project. This title was a humorous complement to the then-fashionable term “New Media.” Sterling called for “a deeper, paleontological perspective right in the dizzy midst of the digital revolution.”⁵⁹ The result was an online community, powered by a website and email list, devoted to digging out (and properly footnoting) the details of obscure and forgotten media technologies

⁵³ Philip K Dick, *Do Androids Dream of Electric Sheep* (New York: Doubleday, 1968), 65.

⁵⁴ Norbert Wiener, *Cybernetics, or Control and Communication in the Animal and the Machine* (Cambridge, MA: Technology Press, 1948)

⁵⁵ Stafford Beer, “What Has Cybernetics to Do with Operational Research?”, in *Management Systems*, ed. Peter P. Schoderbek (New York: John Wiley & Sons, Inc., 1967).

⁵⁶ Eden Medina, “Designing Freedom, Regulating a Nation: Socialist Cybernetics in Allende's Chile”, *Journal of Latin American Studies* 38, no. 3 (2006):571-606.

⁵⁷ The process by which “cyberspace” was picked up beyond the science fiction community and applied to real-world networks is discussed in Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006), 162-174.

⁵⁸ For a perspective on this from Sterling himself, see Bruce Sterling, “Cyberpunk in the Nineties”, *Interzone*, June 1991.

⁵⁹ http://www.alamut.com/subj/artiface/deadMedia/dM_Manifesto.html

such as the stereopticon, pneumatic mail tubes, automatic typewriters, hectographs, and even defunct computer platforms. Perhaps fittingly, the project itself has now vanished from the net.

This historical sensibility was reflected in the 1990 novel *The Difference Engine* composed jointly by Sterling and Gibson. This was the most important work to date in the emerging “steampunk” genre. Steampunk works are hard to categorize, but tend to be playful work set in alternative pasts where high technology artifacts (cloning, artificial intelligence, robots) have been created with incongruously old fashioned means. Seizing on Charles Babbage’s vision of a programmable mechanical computer, Sterling and Gibson describe a Victorian world in which steam driven calculating engines have transformed politics and society. Like most computers in science fiction they are developing self awareness. Thematically the novel is rather bleak, but the authors have great fun with this setting, making Byron prime minister, turning America a patchwork of little countries, and having Ada Lovelace discover what appears to be the Church-Turing thesis.

The popularity of steampunk in recent decades surely reflects changing experiences among the readers and writers of science fiction. As Gibson noted, to grow up as a science fiction fan in the 1970s or later has been to learn the history of technology by assimilating the detritus of dead futures. The works of Clarke, Asimov and Heinlein have become, to modern readers, a kind of inadvertent steam punk with their giant, self aware vacuum tube computers and nuclear powered dishwashers. Reading them requires a similar sensibility to reading the work of H.G. Wells or Jules Verne. Meanwhile the cyberpunk future is a dead end, and the traditional science fiction future seems itself a charmingly outdated historical artifact. Furthermore the technologies of steampunk function on a recognizably human scale and lend themselves to creation by mad scientists and lone inventors, unlike the impersonal and often invisibly small triumphs of modern engineering, computing, and materials science. So there’s a sense in which the vogue for steam powered computers is merely an acceptance of the science fiction’s natural evolution and a reaffirmation of its traditional pleasures.

A FEW RECENT FUTURES: ROBINSON, BANKS & MACLEOD

Steampunk is not, of course, the only development in science fiction’s relationship to history during the quarter century since the publication of *Neuromancer*. Neither is it the most representative. Science fiction has, in recent decades, become increasingly hard to generalize about. Films and television series have come to dominate over the written word, and while science fiction fandom has boomed its members have drifted away from the classic works of the 1950s, and indeed from the written word in general. Meanwhile boundaries between the genres of science fiction and fantasy have largely collapsed, driven by the growing popularity of fantasy and the ever dwindling credibility of the claim that science fiction is a separate enterprise concerned with real science and rigorous extrapolation rather than a subset of fantasy with a specialized set of props and expectations. In 2001 the Hugo award for best novel, the field’s highest honor, was given to a Harry Potter book. Fantasies of magic won again in 2004, 2005 and 2009. Meanwhile much written science fiction, even that not based on Star Trek or other major franchises, continues much as ever with stories about wars, space ships, giant alien artifacts, and the like.⁶⁰

⁶⁰ The evolving place of written science fiction within the broader genre is discussed thoughtfully in Roberts, *The History of Science Fiction*, 295-325.

Yet a brief consideration of a few of the major current authors of science fiction reveals a continuing evolution in the genre's attitude to history. Kim Stanley Robinson, one of the most respected American authors of science fiction working today, was never associated with the cyberpunk movement. But, like Gibson, he is obsessed with the workings of history. His major work, the three volume Mars Series, deals with the terraforming of Mars and its achievement of independence from the Earth. This is the most exhaustively detailed and plausible future history ever created, conjuring not just political and social developments but also the fictional trajectories for developments in economics, science, and engineering. His early novel, Icehenge, is based around multiple incompatible reconstructions of future history based on the same evidence. Three of his other early novels provide a deliberately contrasting set of futures for Southern California in the mid-twenty first century. Many of his short stories, collected as Remaking History, are concerned with counterfactual history and the unpredictable implications of historical agency. Meanwhile his recent novel The Years of Rice and Salt, tells ten different stories over a six hundred year period in a world where Christianity was largely extinguished by the Black Death. Robinson's stories of future life on Mars, like his alternative history stories, are grounded in serious interest in the dynamics of historical change, the subjective nature of historical narrative, and the interplay of technology and society. As he has said, "Science fiction is the history that we cannot know."⁶¹

Space opera (stories featuring interstellar warfare and rousing adventure) has enjoyed a surprising renaissance in recent years, largely in the hands of Scottish writers. The most successful has been Iain M. Banks with his stories of the "Culture," a mostly utopian updating of the traditional galactic empire setting. Inside the Culture life is, for the most part, leisurely and satisfying as the peace is kept by enormously powerful military vessels equipped with artificial intelligence, devastating weapons, and whimsical names such as Grey Area, Unfortunate Conflict of Evidence, or Little Rascal. The Culture's main challenges are boredom and smugness, so plots generally resolve around its efforts to deal with threats from lesser civilizations (such as ours) without compromising its ethics.⁶² Ken MacLeod, another Scottish writer, is best known for his Fall Revolution series, set in a high technology near future of political instability and utopian revolutionary movements. MacLeod's background includes both radical student politics and computer programming, and his books are in part a deadpan examination of a world in which the splinter conflicts of the Trotskyite far left in the 1970s really did turn out to be a crucial turning point in world history.⁶³ Both Banks and MacLeod clearly love tinkering with the traditional apparatus of First SF stories, playfully rearranging them to different ends under a very different set of assumptions about human nature, politics, and historical progress. Their work reflects the end of the Cold War. The Culture often seems to be a parody of America's self-image as an unchallenged superpower with good intentions but a

⁶¹ Bud Foote, "A Conversation with Kim Stanley Robinson", Science Fiction Studies 21, no. 1 (March 1994):51-60.

⁶² Patrick Thaddeus Jackson and James Heilman, "Outside Context Problems: Liberalism and the Other in the Work of Iain M. Banks", in New Boundaries in Political Science Fiction, ed. Donald M Hassler and Clyde Wilcox (Columbia, SC: University of South Carolina Press, 2008).

⁶³ See Butler, Andrew M.; Mendlesohn, Farah (2003). (eds.). ed. The True Knowledge Of Ken MacLeod. SF Foundation. [ISBN 0-903007-02-9](https://doi.org/10.1007/978-0-903007-02-9).

tendency to meddle in other cultures without understanding them⁶⁴, while MacLeod challenges the traditional dominance of liberal and libertarian politics within the genre (“What if capitalism is unsustainable and socialism is impossible?”).⁶⁵ Their work simultaneously celebrates and undermines the science fiction traditions they inherited, an attitude I would characterize as fundamentally postmodern.

CONCLUSION

In recent decades authors such as Bruce Sterling, William Gibson, Ian M. Banks and Ken MacLeod have shown a deep understanding of the history of their own genre and the complex relationship of imagined futures to present day concerns. Likewise John Clute and other science fiction critics have begun to attain historical distance from the genre's “golden age” of the 1950s, historicizing its concerns and linking them to broader currents in American history. This challenges historians of technology to begin a similar dialog, engaging with science fiction as a complex cultural phenomenon and treating science fiction works as substantive contributions to the underlying discussions shaping our own field.

All science fiction is grounded in the concerns and assumptions of the era in which it was written, exposing not just the beliefs of its authors about their futures but also their understanding of the historical trajectory leading to their current position. I find it more rewarding to consider the genre as a set of fables about technology, history, and social change. Science fiction writers, like historians of technology, tell stories about where technologies come from and how they shape the direction of history.

Science fiction is not, and never really was, a literature of prediction, science, or serious futuristic extrapolation. But it is not worthless just because it tells us about the past rather than the future. Leszek Kołakowski was a Polish philosopher and intellectual historian who began as a Communist but eventually won fame as a critic of Soviet Marxism. His robust defense of humanism, and skepticism toward all assumptions of historical determinism, is captured in his remark that “We learn history not in order to know how to behave or how to succeed, but to know who we are.”⁶⁶ Science fiction, I have argued here, is best read and often written through the lens of history. Its study and historical analysis offers a similar reward: to know who we are, who we were, and how we have changed.

⁶⁴ In other respects, however, the Culture is clearly a pointed divergence from American society – Banks believes in the superiority of a planned economy, dislikes religion, and thinks greed and work are something humanoid species will outgrow.

⁶⁵ “The Falling Rate of Profit, Red Hordes and Green Slime: What the Fall Revolution Books Are About” – *Nova Express*, Volume 6, Spring/Summer 2001, pp 19-21.

⁶⁶ Leszek Kołakowski, “The Idolatry of Politics”, in *Modernity on Endless Trial* (Chicago: University of Chicago Press, 1990), 158.