

Computer Fiction: “A Logic Named Joe”

Towards investigating the importance of science fiction in the historical development of computing

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Abstract: The bulk of Science Fiction (SF) has not predicted the most influential computer technologies of the late 20th century. This paper begins with an exception entitled “A Logic Named Joe” and its accurate description of the contemporary environment of PCs and the World Wide Web. It then proposes the possible historical and cultural value of SF in techno-scientific development - more specifically computer development - in both the U.S. and Finland, and argues that social science approaches to understanding technoscience should take SF into account when describing those communities of practice.

Keywords: Science Fiction, SF, engineering, science, culture, “Murray Leinster”, “A Logic Named Joe”

1. Introduction

With notable exceptions, the bulk of science fiction (SF) missed the possibilities of some of the most innovative and influential technologies of the 20th century. These innovations include personal computers, networks, the internet and world wide web, and online resources. This paper surveys some of that literature, especially a noteworthy exception – “A Logic Named Joe” – to kick-off the discussion of just how important understanding SF might be to understanding the culture of techno-scientific development and, more specifically, computer development.

2. A Logic Named Joe

Despite the stereotype that ‘Science Fiction imagines and science makes it so’, for a long time SF was thought to not have predicted the rise of technologies like the internet, world wide web, and personal computers. SF published and filmed in the first 2/3 of the twentieth century continually had larger machines and/or more powerful robots that acted as intelligent agents. It was the Frankenstein story told repeatedly, man recreating him or her self in mind or robotic form to reap the ‘reward’. The ‘Frankenstein’ became larger and larger. E.M Forster’s 1909 story

“The Machine Stops” had humanity living in a worldwide city run by computer and the 1970 film *Colossus: The Forbin Project* had a massive computer taking over the world’s nuclear weapons for examples. This continued up to the introduction of real personal computers where the emphasis moved to the dangers of virtual presence and hacking. The ‘villain’ (or potential problem) in these newer stories became the empowered individual – a theme, interestingly, that is found in “A Logic Named Joe” as well.

A short story by the author Murray Leinster (the frequently used pen name of Will F. Jenkins), “A Logic Named Joe,” published in March 1946, in many ways predicted the rise of the internet, personal computers, and the convergence of interactive computing, television, and telephony. Like many stories, it plays with the idea of a ‘naturally occurring’ sentient mechanism - in other words, the machine just somehow ‘woke up a bit more’ when it was created. The difference is the almost prosaic presentation of the machine as a networked appliance. The protagonist himself is portrayed as an ‘average Joe’ computer technician who has a first-person style that evokes a 1940s plumber.

The story is concerned with a “logic” (a personal computer) sitting on a desk in the home of the protagonist. This logic is linked with other centralized and home logics that have become commonplace. In the story, logics have become knowledge resources, entertainment devices, and communication devices in the home. The logic named “Joe” develops a certain level of artificial intellect and then wrecks a bit of well-meaning havoc on society by helping people do exactly what they want – including some less than savory things. The protagonist saves society in the end by unplugging Joe from the network.

The creativity and prescience displayed in the creation of this story is astounding. In 1946, the public might have known of one electronic computer: the ENIAC. It was the size of a room. An army of women who flipped thousands of switches handled the input to the machine. Its output was the hundreds of blinking lights on its front panels. Among many other things, Leinster saw instead an easy-to-use keyboard and screen interface on a machine the size of a breadbox linked to millions of other similar machines. A computer of that size would not exist until the 1970s. The internet would not exist until 1969, the world wide web, not until the 1980s, and the combination would not become commonplace until the 1990s.

Here is some of the text of the story:

Say you punch “Station SNAFU” on your logic. Relays in the tank take over an’ whatever vision-program SNAFU is telecastin’ comes on your logic’s screen. Or you punch “Sally Hancock’s Phone” an’ the screen blinks an’ sputters an’ you’re hooked up with the logic in her house an’ if somebody answers you got a vision-phone connection. But besides that, if you punch for the weather forecast or who won today’s race at Hialeah or who was mistress of the White House durin’ Garfield’s administration or what is PDQ and R sellin’ for today, that comes on the screen too. The relays in the tank do it. The tank is a big buildin’ full of all the facts in creation an’ all the recorded telecasts that ever was made—an’ it’s hooked in with all the other tanks all over the country...[16].

Our question is: Did such a forward-looking story actually affect those developments? The story has a far more accurate description of our current state

of PC and WWW development than Vannevar Bush's "As We May Think" Atlantic Monthly, July 1945 article. Bush's article has been mentioned by both Douglas Engelbart and J.C.R. Licklider for their work in creating the origins of personal computing that includes hypertext and the internet [17, 27].

The story of this paper begins at Syracuse University Special Collections Research Center where the William S. Jenkins' papers are deposited, a collection of records that take up 68 linear feet (72 boxes) of documents and there are at least three boxes strictly of letters [22]. Under his pen name of Murray Leinster he is often called the "dean of science fiction" and he wrote hundreds of stories and books between 1919 and 1975.

We could find no direct correspondence that linked those creating the computing technologies of the twentieth century with "Joe" or any other Leinster story. However, what was found was a continual effort on the part of Jenkins and other authors to maintain science and scientific veracity and uphold those ideals in the fictional form they termed SF. In addition, we found evidence of the interaction and mutual support between scientific and SF worlds. The work established his network of correspondence and pointed the way to further investigation.

3. Why Look At Science Fiction?

To those of us in the computer world, the possibility of science fiction's impact on science and technology – and specifically computing development - seems obvious. We name servers for characters and locations from SF novels and movies. The language of SF seems frequently used in technical conversations. A 2006 Discovery Channel television program entitled "How William Shatner Changed the Universe" had the stories of a number of technologists and scientists crediting the 1960s television show *Star Trek* as influencing their career choices. The special has Marty Cooper inspired by the "communicator" to create a mobile phone with voice recognition and a flip top; Dr. Mae C. Jenison inspired to become an astronaut, and John Adler inventing the cyber knife inspired by the "tricorder". Authors such as Ben Bova (himself a retired aeronautical engineer) have been heard to say that "everyone who landed on the moon liked science fiction" [5]. A conversation between Astrophysicist Kip Thorne and Carl Sagan influenced both the science and science fiction of Worm Holes [38].

Although not an academic work, a James Frenkel book of essays looked historically at the 1979 SF work *True Names* by Vernor Vinge [12]. Vinge's book was another prophetic story about identity and security on the world wide web. In it, a highly capable web hacker is able to utilize resources on the web and then finds himself in a U.S. government led effort to capture an unknown hacker that threatens the security of the country. It pre-dated the web yet captured two important things. One was some of the critical issues of internet access we are faced with today where free access must be balanced against security and the possibilities of stolen identities. The other was one of the interesting characteristics of humans to create a "second self" or virtual identity through the

computer; an idea that was studied extensively in the 1980s by Sherry Turkle [39]. Her book came out the same year (1984) that the very popular-fiction-influencing *Neuromancer* [13] came out that began the ‘cyber punk’ genre in SF.

Frenkel’s volume contained essays from some of the seminal figures in the development of computing (including Vernor Vinge). Some of the authors not only complemented the story’s predictive qualities but wrote about how influential the story was in their development efforts of the speculated but (at the time) still-not-created computer technologies that are so prevalent today. They included Danny Hillis (founder of Thinking Machines), Timothy C. May (former chief scientist at Intel), Marvin Minsky (cofounder of MIT AI Lab), and Richard Stallman (developer of GNU Emacs, founder of Free Software movement, and the GNU General Public License CopyLeft scheme).

Other examples of the influence of SF abound. J.C.R. Licklider (nicknamed “Lick”) proposed the origins of the internet in his 1960 paper “Man-Computer Symbiosis”. He called it the Intergalactic Network. In 1963, Lick wrote a lengthy memo to the prospective members of the Intergalactic Network in which he expressed his frustration over the proliferation of disparate programming languages, debugging systems, time-sharing system control languages, and documentation schemes.

“Is it not desirable or even necessary for all centers to agree upon some language or, at least, upon some conventions for asking such questions as ‘What language do you speak?’ At this extreme, the problem is essentially the one discussed by science-fiction writers: How do you get communications started among totally uncorrelated sapient beings?” [27].

There seems to be many SF references in the open source/free software community. In the 2001 documentary *Revolution OS* Richard Stallman receives an award from Linus Torvalds and he makes a somewhat obscure analogy between the history of open source and some characters in the original *Star Wars* movie. The audience of 3000+ laughs in a way that shows they obviously get the reference. Eric S. Raymond in his *The Cathedral and the Bazaar* argues that becoming a good hacker requires enjoying science fiction [30]. Between 2005 and 2006 a conference called *Linucon* attempted to combine open source hacking and SF [28]. The search for examples is an ongoing effort.

4. Theoretical Background

Fiction and literature that deals with science and technology in some way is critical for understanding the culture that creates that literature, and, reflexively, the science and technology that is created by that literature. There is a circularity of influences whether we are describing the technological culture at large or the specific ones of technological development. If we accept computer development as community, culture, or social process then there are cultural requirements. There are decisions by members of that culture as to who is in and out of that culture, language that informs and creates it, networks of relations woven, organization that is created and evolved.

For our purposes we can trace some of the academics generally investigating scientific and technological communities. For example, Robert K. Merton's 1942 "The Normative Structure of Science", created the Sociology of Science. Seminal works followed such as Thomas Kuhn's *The Structure of Scientific Revolutions* in 1962 [23] and Bruno Latour and Steve Woolgar's 1979 *Laboratory Life* ethnography [25] which started Actor-Network Theory (ANT). Applying similar approaches to history of technology led to Thomas P. Hughes' 1983 *Networks of Power* [21], who along with Wiebe E. Bijker and Trevor J. Pinch created The Social Construction of Technology (SCOT) field. Louis L. Bucciarelli's 1994 *Designing Engineers*, a participatory ethnography came out of this [8]. The various historical, sociological, anthropological, and, to a lesser extent, managerial and economic approaches have been consolidated into the field known as Science and Technology Studies (STS) – a multidisciplinary approach to understanding the social aspects of science and technology. Effective journalistic ethnographies of technological communities have proven informative as well, such as Tracy Kidder's 1981 *The Soul of a New Machine* [24] and Scott Rosenberg's 2007 *Dreaming in Code* [31]. Donna Haraway's "A Cyborg Manifesto" has initiated a great deal of examining women in computing and computing culture [19].

Obviously, given the list above, techno-scientific culture has been given considerable academic attention. There has been far less examining of Science Fiction as a component of anthropological, sociological, philosophical, and historical studies of science and technology, but the exceptions and possibilities are interesting.

The bulk of study on SF that has occurred has taken place in Literary Studies and multi-disciplinary "Digital Culture" programs. For those interested in these approaches there are two journals: *Extrapolation* (which uses the term Speculative Fiction rather than Science Fiction) [11] and *Science-Fiction Studies* [33] that take theoretical approaches to examining science fiction. In addition, many of the SF authors themselves, such as Brian Aldiss [2], Ursula K. LeGuin [26], and Bruce Sterling [36], have taken a number of interesting theoretical approaches.

SF has been examined in anthropological and sociological ways in Finland somewhat. A sample includes Jaakko Suominen who wrote a monograph that examines the role of popular culture (including Science Fiction) on preparing the Finnish public for computers even before the first personal computer arrived [37]. Petri Saarikoski wrote about personal computer interest in Finland from the 1970s to the mid-1990s that touched on some literary influences [32]. Marja Vehvilainen has touched on literature and its effects on women in technical fields in her writings [40]. Suominen and Saarikoski are both writing from Digital Culture Studies perspectives. Vehvilainen is writing from a Women Studies/Feminist perspective.

There are interesting convergences occurring via many of the above noted disciplines that might benefit from some focus on SF. The history of technology and science has been moving in the direction of the lesser-known actors for more than two decades. For example, Shapin and Schaffer's *Leviathan and the Air Pump* [34] partially looks at the role of media for promoting/enrolling the public and, to some extent, removing the separation between those inside and outside of

science. Examining the intersection of the user and technology, various approaches – SCOT, ANT, Feminist theory, Media Studies, Consumer Studies – came together in an edited volume, by Nelly Oudshoorn and Trevor Pinch, entitled *How Users Matter: The Co-Construction of Users and Technologies* [29]. In that book they conclude with the co-creation (adaption, adoption, and non-adoption) that occurs between consumers and producers of the technology. They credit feminist approaches for bringing this forward, rely on SCOT for its focus on the creative forces and the culture of invention in technological creation, and credit Media Studies as examining how media has influenced consumer choices. According to the historian Kimmo Ahonen “Thanks to the influential studies of Robert Brent Toplin and Robert Rosenstone, fiction film is [controversially] considered to be a useful source for various research questions [in historical research]” [1]. Finally, while admittedly little studied at this writing, some computer-human interface scholars have even begun to borrow from literary studies by creating “pastiche scenarios” that use literary resources. These resources are characters from fiction (including potentially science fiction but, interestingly, the authors were somewhat dismissive of the weak characterizations in the genre) – to create use cases that resonate more with designers and their customers [4].

Lastly, returning to history for a potential exemplar, there is *Doomsday Men: The Real Dr Strangelove and the Dream of the Superweapon* by P.D. Smith [35]. Smith focuses not only on the history of physics and military technology but the literature of apocalypse begun in the nineteenth century and specifically, H.G. Wells’s *The World Set Free*. According to Smith astrophysicist Szilard read Well’s work in 1932, “the year before he came up with the idea that a nuclear chain reaction could be used to power a bomb, and said that Wells should be credited as ‘father of the atom bomb’”. *Different Engines: How Science Drives Fiction and Fiction Drives Science* by Mark Brake and Neil Hook [6] also looks at the historical influence of fiction on the scientific enterprise from its inception. They note the importance of fictional works such as Francis Godwin’s *The Man in the Moone* and Francis Bacon’s *New Atlantis* as spurring, even preceding, scientific discovery and discussion.

5. Surveying Technologists on the Importance of Science Fiction

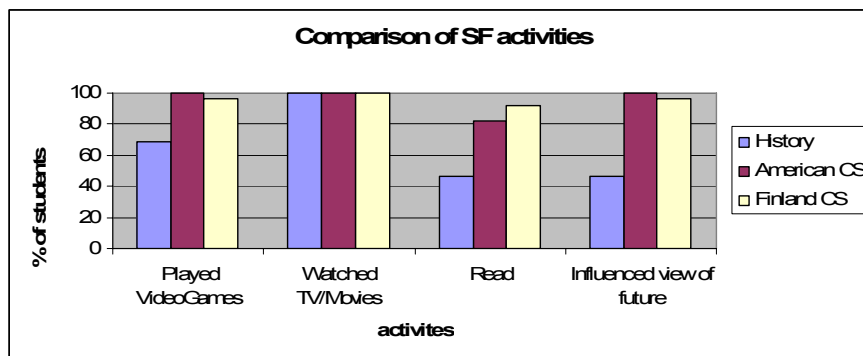
The authors conducted a survey to attempt to add primary research results to the questions related to the importance of SF as an aspect of those engaged in technoscientific endeavours, The authors wanted to document the type of literature and media important to students who chose technoscientific fields of study, compared to those who had not, and how it influenced their views of society. In addition, we wondered how that might translate across national borders. That we can find no similar study points to the hole in our understanding of engineering culture as well as our stereotypical assumptions. Indeed, regarding assumptions, a student in one of the questionnaires noted “News Flash: Geeks like Sci Fi!” However, what is the evidence that they do and, much more importantly, what does it mean?

A survey was created that compared university students in three classes. These are four of the questions that were asked: "Had the survey taker:

- Played Science Fiction oriented video games
- Watched Science Fiction movies or shows
- Read Science Fiction for pleasure
- Thought that Science Fiction had influenced their views of the future?"

All three samples are small at this preliminary stage. In all, 67 students in three locations were given a survey: 13 in a general history class and 25 in a computer science class, both at an American university, and 28 in a computer science class in Finland. The history class consisted of students of many disciplines, including some technical/scientific fields.

The results show that the computer science classes in Finland and the U.S. track pretty well together, with both groups of CS students showing high levels of participation in all three activities of playing, watching, and reading SF oriented entertainment. The general history class in the U.S. was lower in games and much lower in reading. Most interestingly, the majority of students (54%) in the history class felt that SF had not influenced their perception of the future. The vast majority of the CS classes in both Finland and the U.S. felt that it had.



6. The Evolution of Science Fiction and its Scientific Literacy

The results of this survey should not surprise us. Isaac Asimov, after a long break from writing fiction notes in 1967 "We are living in 'science fictional' world" – a world of increasingly realized scientific and technological advances [14]. If SF plays a large role in the 'science fictional' culture at large, one could speculate that it might play a larger role in the engineering and scientific communities that are closer to the creation of the 'science fictional' creations. The origins of SF included the idea of popularizing science and technology all along. It spoke to and was written by members of scientific and technological communities. As a result, SF became part of the Lingua Franca of those communities.

In the nineteenth century, the British originally used the term “scientific romance”. Americans used “invention stories”. Other terms included “off-trail stories, impossible stories, different stories, highly imaginative stories, weird-scientific stories, pseudo-scientific stories, scientific fiction, and scientific novels”. Hugo Gernsback, editor of *Modern Electronics* and other magazine that often combined electrical hobbies with fiction, coined “scientific fiction”, then “scientification”, and finally “science fiction” in June of 1929 and since universally adopted [41]. Arguably, the most important award for a SF author is the Hugo Award, named for Hugo Gernsback. Finland appears to have followed the English terminology.

Science Fiction has been termed the literature with a sense of wonder with the Universe. From an interview with James Gunn:

“Yes. Generally speaking, people who are close to science, or people who are close to the science element in science fiction, maintain their hope and maintain their faith in science. The... you find them going around and explaining that while there are bad effects, most of the good effects are yet to come.” [15].

The trust in techno-scientific advance and adherence – within limits – to techno-scientific veracity has been critical to the core of SF. This was termed “Hard Science Fiction” by P. Schuyler Miller (a not very well-known science fiction author and regular book reviewer for *Astounding Science-Fiction* and *Analog* for 24 years) in a November 1957 editorial while he was discussing the republication of Campbell’s *Islands of Space* [42]. With changes in society such as the 1950s view of “better life through chemicals” brought to an end by books like Rachel Carson’s *Silent Spring* [9], reactionary, less positivistic, and less optimistic “new wave” SF came about. This activity influenced the economic necessity of consolidation of SF with fantasy to create SF&F in the 1960s and made the term “hard” SF more important to those interested in the ‘hard science’ viewpoint.

The negotiation of what SF would be, however, had been a constant component of interactions between authors, editors, and fans. Gernsback often editorialized on the stories he published in his magazines as to their potential scientific veracity. He noted:

“In time to come, our authors will make a marked distinction between science fiction and science fact...By this term I mean science fiction in which there are so many scientific facts that the story, as far as the scientific part is concerned, is no longer fiction but becomes more or less a recounting of the fact” [43].

He took one of the fathers of SF, Jules Verne, to task in Verne’s “Off on a Comet” story:

“[T]he author here abandons his usual scrupulously scientific attitude and gives his fancy freer rein... Verne asks us to accept a situation which is in a sense self-contradictory...” [43].

John Wood Campbell, Jr. took the post of editor of *Astounding Science Fiction* in 1937 and would introduce in a serious way what C.S. Lewis would term “engineers’ stories”. Now the veracity not only would run to the science, but to the scientists and engineers that were creating the science and technology. He encouraged a number of authors, including Isaac Asimov and Robert Heinlein,

who had scientific or engineering backgrounds. In an interview in 1971 Asimov spoke of Campbell wanting realism, not that they "couldn't go out into the blue yonder" but that in the stories "scientists acted the way scientists do; that engineers acted the way engineers do; and in short that the scientific culture be represented accurately" [14].

The audience and authors may have evolved as well according to Asimov. There already existed a high percentage of technically oriented Americans reading and writing for the magazines. According to Everett F. Bleiler in *Science-Fiction: The Early Years*, almost half the writers had (or went into) technical, scientific, or medical backgrounds. Moreover, college education (93 of 510) and advanced degrees are in a higher percentage than the general American population of the time [3]. However, "While a subclass of mature readers persisted . . . this class diminished proportionately" [3]. Potentially as a reaction, in 1936 the market did change when *Wonder Stories* died and, the next year, when John W. Campbell Jr. took over *Astounding Stories*. He not only continued the attempt begun to add more scientific and technological accuracy but to raise the literary level as well. "[O]nly Raymond Z. Gullun, John Beynon Harris, Murray Leinster, Frank Belknap Long, C.L. Moore, Ross Rocklynne, Clifford Simak, E.E. Smith, and Jack Williamson continued as significant authors," continues Bleiler. Other writers continued with lesser effect and new authors sprang up such as Isaac Asimov, L. Sprague de Camp, Robert A. Heinlein, L. Ron Hubbard, Henry Kuttner, Fritz Leiber, Theodore Sturgeon, and A.E. Van Vogt [3]. The SF authors themselves argued for what SF would be. In an August 1951 letter to Truman Talley, Robert Heinlein writes, "I did not know that a Ray-Bradbury story was still under consideration. . . Ray is a prime example of the writer of pseudo-scientific fantasy. . . I have yet to read under his name any science fiction. He is ignorant of science, doesn't even know what the word means. . ." [20].

7. The Role of Predictions and a Conclusion

While Hard SF continues to play a role in SF, SF's adherence to realism and, thus, an adherence to accurate technical predictions, may or not be as critical to the traditional needs of storytelling such as theme, characterization, and plot. Futurology is a field fraught with difficulties. The accuracy of predictions by experts in their fields was found to be "at best weakly related to general technical expertise and unrelated to specific expertise" by George Wise in 1976 [44].

I would argue that predictive aspects of Leinster's "A Logic Named Joe" in describing our current networked society should be appreciated. However, its importance to our contemporary situation is more complex than technical accuracy. Thomas Haigh has noted, "Nothing tells us more about a society than its assumptions about its future" [18]. Indeed, the Leinster story tells us much of the society of 1946 post-war America, especially with regard to its assumptions of censorship. What stands in as the 'World Wide Web' of the story is far more restrictive concerning nudity, personal information, and potentially dangerous technical knowledge than the Web we know today – at least in most of the

Western World. However, it tells us as much about our current situation that it has been rediscovered and celebrated through the very mechanism that Leinster predicted – the world wide web. Moreover, I propose, that no matter how many technical predictions in SF go awry, the value is in the predicting itself. Author David Brin called them “thought experiments” where “tomorrow remains a popular playground” [7]. In many ways, they are like the thought experiments that engineers and scientists utilize everyday when imagining a future augmented by continued invention and discovery.

With further research, we will hope to discover more about how important a role SF plays in the communities where the future is created. How well does it conscript/retain and, in contrast, exclude membership to those communities? How big a part of the language is it in those communities? How much have the creations of those communities been shaped by it? In addition, does society depend on its assumptions? Perhaps, one might argue, democracy depends on it. In increasingly techno-scientific democracies like Finland and the U.S., a technically informed citizenship may thus depend, to some degree, on the literature of choice of the creators of that technology and science.

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