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## Speculations on the Emergence of a Cultural Practice

A shortlist of the most significant milestones in the history of computer and video games quickly reveals a powerful motif: without Science Fiction (hereafter, SF<sup>1</sup>) there would be no history of computer and video games. This is of course no small claim, given that the history in question culminates to the present time in a snapshot of an age in which, on a global scale, computer and video games are seriously challenging the established might of the film industry for entertainment revenue. To what extent, then, can we make this claim that SF – if such a beast could even be contained by a suitable definition – bears responsibility for the rise of the now near ubiquitous games industry? My aim here is, if not to answer this question definitively, to attempt to set up some parameters for mapping what we might call the *fields of influence*, which at key historical moments (or milestones) create the possibility for an individual act or product to achieve widespread or long-term cultural impact. In short, I simply want to make a case that the question itself has sufficient merit to warrant further sustained discussion and investigation.

Let us begin by compiling this shortlist of so-called “milestones.” Obviously, the list must begin at the beginning, with the first computer game. Few would dispute the claim that this epithet rightly belongs to *Spacewar!*, which was developed by a group of self-confessed “computer bums” (Graetz 78) at MIT starting in late 1961. *Tennis for Two* had previously been developed by Willy Higinbotham at Brookhaven National Laboratories, in 1958, but this game was not, strictly speaking, a computer game: its principal components were an oscilloscope and some push buttons, with an analogue computer to control the direction and pace of the signal in response to the user input. *Tennis for Two* was certainly an innovative use of electronics, but for this reason it is perhaps better classified as an “electronic game” (DeMaria and Wilson 10) rather than a computer game, for want of a central processing unit. In any case, Higinbotham’s game lacks milestone status since there is no evidence to suggest that any subsequent developments were directly influenced by it. The machine was a “one-off” (Kent 18) used to liven up the range of exhibits at Brookhaven, and it was dismantled in 1960.

The claims for *Spacewar!* are more substantial. The game was developed by Steve Russell and a team of hackers at MIT as a way of demonstrating the capabilities of the new PDP-1, with its Type 30 Precision CRT Display. Previously, computer output was only by way of punch cards or ticker tape, so requiring a qualified Operator to function (Graetz 78). The PDP-1, with its CRT monitor, represented the first real step on the path to the personal computer (PC). Being the game developed for what passes in the popular imagination as the first “real” computer, *Spacewar!* thus qualifies as the first computer game, by definition. Its influence was also far-reaching. For example, it was as a result of having played *Spacewar!* at the University of Utah that Nolan Bushnell became inspired to create *Computer Space* – a forerunner of the highly successful arcade and home video game *Asteroids* – in 1971, which marks the beginning of the arcade video game and also equipped Bushnell to launch Atari, the

first major maker of home video cartridge game systems (DeMaria and Wilson 16, 19).

Directly linked to this first milestone are thus a second – the emergence of games in a form suitable to locations like the pinball arcade – and a third – the development of a system capable of running multiple games directly through a home television set for well under the cost of a PC. Atari's cartridge systems were not the first games of this kind to hit the home front, of course. This honour belongs, by coincidence, to a tennis simulation *Pong*, sold by Al Alcorn for Atari through Sears & Roebuck in the 1975 Christmas catalogue<sup>ii</sup> (DeMaria and Wilson 26). Alcorn had previously worked for Bushnell on developing the *Pong* arcade console in late 1972. Bushnell's real interest lay in developing better varieties of his own *Computer Space – Space Race* was launched as a result in 1974 (Kent 68) – so Alcorn's project was never intended to be a major breadwinner (Kent 41-44). Yet win bread it did. Alcorn's *Pong* proved to be the game responsible for making both arcade games and home games systems profitable in the first instance for Atari.

While the domestic version initially sold well, it still posed no great threat to the arcade industry. The home version of *Pong* was affordable as a gift, but still more expensive than the twenty cents (or quarter in the United States) for which a player could enjoy any number of different arcade games that appeared on the market. The lack of any perceived threat meant that Atari's biggest competitor within the arcade market, Midway, did not even make a serious effort to develop a home version of its arcade games in competition with *Pong*. Yet Atari would never be capable of fully cornering the domestic market, as it was at this time that the PC began to make its way into homes. To appreciate the nature of this competition, we must take a brief glimpse into the development of the PC itself.

As was the case with *Spacewar!*, much of the early history of computer games involved the development of programs for expanding the capabilities of computer systems, well before there seemed any likelihood that computers could be made widely available for use in the home. During the 1960s, several chess simulations were developed on mainframe systems, culminating in the first recorded victory by a computer program over a human being in an official chess tournament in 1967 (DeMaria and Wilson 51). In 1970, the game of *Life* was developed by John Conway (DeMaria and Wilson 51). simulated the behaviour of cellular patterns according to the rules of life and extinction and variables in the arrangement of the cells.

In 1971, the first computer simulation of a board game was developed by Peter Langton (DeMaria and Wilson 51). Langton had played the game *Empire*, in which civilizations compete for resources, land, and military dominance using tokens on a scale map. By the mid-1970s, the game of *Empire* was widely played by computer geeks using mainframes on college campuses across America. The big development, which I shall call the fourth milestone on our shortlist, came in 1972 when William Crowther developed *Adventure*, in order to combine his experiences exploring caves and his penchant for the fantasy role-playing game *Dungeons and Dragons* with his career as a programmer (Adams). Crowther was also directly involved in the early history of the internet, which at that time was a network of mainframes on college campuses and defence contractors in America. His adventure game was one of the first programs made widely available on the fledgling internet (DeMaria and Wilson 51).

*Adventure* was a text-based game in which players were given a description of their location and they could control their "actions" using simple commands such as "Get Knife." Having endured a messy divorce, Crowther admits to having developed

the game as a way of improving his relationship with his children; he wanted to make a game for the computer “that would not be intimidating to non-computer people, and that was one of the reasons why I made it so that the player directs the game with natural language input ... My kids thought it was a lot of fun” (qtd. Adams). Just as *Spacewar!* had inspired a generation of hackers – later industry gurus – in the 1960s, *Adventure* was massively popular among the computing fraternity in the 1970s. At the time that many hackers were playing *Adventure* at college, they would also have been building computers at home using hobby kits, which became commercially available after 1975. By 1977, they were able to buy fully integrated home computer systems such as the Apple II, Commodore PET and TRS-80. The home computing revolution had begun.

*Adventure* represents a milestone because it spawned countless numbers of copies of games designed specifically for the PC. It was the first text-adventure game, which was a form of game only suitable for the PC and its keyboard, set apart from the push-button mode of operation of arcade and video game consoles. It also introduced a less obvious yet, I will argue, even more significant feature of games for the PC: fantastic interactive narratives. When Don Woods later expanded *Adventure* with Crowther’s blessing, it was in order to increase the apparent fantasy elements, using many of the features of the fantasy worlds created by J.R.R. Tolkien in *The Hobbit* and *The Lord of the Rings* (Adams). Woods introduced trolls, elves, and mountains of fire. Other major PC games from the late 1970s and early 1980s repeated the fantasy element, even as they moved more toward full graphics and text input became less important – *Akalabeth*, *The Hobbit*, *Rogue*, and *Zork*, for example, represent major contributions to a history of PC games development.

Indeed, *Rogue* even surpasses *Adventure* in the eyes of many users because it was the first game to use random adventure generation: the maze of twisty passageways confronting the player is different every time the game is played. *Rogue* was also an entirely graphical game, so it presented itself more like a video game than a game for the PC (with a combination of keys used instead of a push-button console). So popular was the game after its release in 1980 that the term “roguelike” remains in use to this day as a viable substitute for the more standard CPRG (computer role-playing game) label for computer games based on any fantasy role-playing game (*Dungeons and Dragons* has many descendants of its own). Yet one of the game’s creators, Glenn Wichman, states that the main impetus for the development of *Rogue* was a love of *Adventure* and a fan’s desire to improve on what was perceived as the more limiting features of Crowther’s classic game, such as lack of graphics, repetitive game play, and arbitrary text parsing (qtd. Parish). Perhaps we might include *Rogue* as a fifth milestone, then, but before we get ahead of ourselves, there is the small matter of *Space Invaders* to contend with.

I have already noted that Atari was the first major player in the home video games system. *Pong* had been its first success, but this game was challenged in the market by the introduction of the Fairchild Video Entertainment System in 1976. For about one quarter of the price of the Commodore PET, and for less than double the price of the *Pong* home game unit, the Fairchild VES was launched with a 4-in-1 game cartridge (including *Tic-Tac-Toe*, *Shooting Gallery*, *Doodle*, and an expanded sequel, *Quadra-Doodle*). As the cheaper product, *Pong* still enjoyed some success throughout 1976, and several alternative versions were marketed, but the arrival of a cartridge system sounded the death knell for the game that had forged the pathway for video games in the home. Fairchild’s VES ultimately failed to make a major dent in the market, but only because Atari responded to its newest rival by immediately developing the Atari

Video Computer System (later Atari 2600), which became a huge commercial success (De Maria and Wilson 29-38).

Ironically, an indirect key to the success of the Atari 2600 was the worldwide hit arcade game *Space Invaders*, released in Japan by the Taito Corporation in 1977, and sweeping America in late 1978. It is easy to underestimate the cultural phenomenon of *Space Invaders*, but it is worth noting that so much money was poured into the machines in Japan in its first year of operation that the Japanese mint was forced to triple production of the 100-yen piece to meet the coinage crisis (Kent 118). In the States, the game became an overnight sensation, and many businesses discovered that the machine usually paid for itself within a month, turning over large profits instantly. When Atari bought the license to reproduce *Space Invaders* for VCS in 1979, sales of the game system soared, making it the best selling home entertainment item in 1980, and many consumers bought the Atari just so they could play *Space Invaders* (Kent 190) – the game had been so popular and addictive that, for many players, buying the VCS represented a way of saving hundreds of dollars worth of coins!

Predictably, *Space Invaders* infiltrated all three major game platforms. After its initial success in the arcade console, it became a smash hit in the home video games system for Atari, and it was not long after that unofficial versions were popping up for PC across the globe. In the process, PC users were introduced to another standard key command: space bar means shoot – the first thing all good first-person shooter players would come to learn in the ensuing decades. On all three platforms, too, the rush of *Space Invaders* clones appeared in quick succession: *Galaxian*, *Galaga*, *Gyruss* and so on. A new word came into the vocabulary of the young arcade goer – “spacies” – to mark the generational step away from the games enjoyed by our parents: “pinnies” (or pinball machines). Even non-space oriented games were obliged to signify some form of kinship with this new phenomenon. *Breakout* – a *Pong* variant in which one paddle is replaced by an obstacle in the form of a brick wall – had been in existence in many forms prior to the emergence of *Space Invaders*, but when Atari released *Super Breakout* in the wake of *Space Invaders*, the game’s program instructions included a back story in which the paddle is compared to a spaceship and the rectangular bricks are described as a “mysterious force field” which the ship must conquer with its ball attack weapon (Wolf 103).

After *Space Invaders*, our history could go one of two ways. We could identify a sudden proliferation of milestones, tracking games development through the first first-person shooter game, the first animated or 3-D game, the rise of multi-player games, the emergence of the God game, the strategy game, and the SIM phenomenon, the introduction of free motion video, *Dragon’s Lair*, *Doom*, *Duke Nukem*, and a myriad of other firsts. Alternatively, we could argue that after *Space Invaders*, the rest, as they say, has been history, an inevitable rise of the machines via the entertainment industry. For the sake of argument here, I will take this latter approach, on the basis that the success of *Space Invaders* made all of these subsequent firsts possible, in the first instance. Yet the shortlist of milestones does not begin with *Space Invaders*, as if this one game represented some privileged Ur-text of the video and computer games industry. Rather, I suggest that the milestones that preceded *Space Invaders* paved the way for its success, and rendered viable the rise of the industry on three fronts: urban commercial spaces (via the arcade) and in the domestic front in both the family room (games consoles) and private rooms (PC).

Let us then review these milestones and recall the claim with which we began the present investigation: that this shortlist reveals the importance of SF to the history of video and computer games. These milestones, once more, are in chronological order:

1. *Spacewar!* (1961): the first computer game;
2. *Computer Space* (1971): the first arcade console, a *Spacewar!* clone;
3. *Adventure* (1972): the first text-adventure and CPRG for PC;
4. *Pong* (1975): the first successfully marketed home console game;
5. *Space Invaders* (1977): space invaders (or games) conquer the globe.

There is in this list an obvious leaning toward SF content. The only exception is, of course, *Pong*, although we noted above that the success of this game was something of a miscalculation: its maker's master had planned for *Pong* to fail and for his own *Space Race* to be the next big thing. *Pong*, then, stands here as an elegant reminder of the limits of any grand theory. Instead of five-for-five, we must content ourselves with a "leaning" rather than a direct and perfect correlation, which is just as well, for we are loathe to universalise when it comes to mapping historical connections or – my stated goal here – fields of influence. Our focus must remain on historical contingency rather than universal principle.

To make this point, in what follows, I shall focus mainly on the first milestone on our list. Space prohibits me from doing much more, although some consideration will be given to the long-term implications for much of the history I will be describing, as it extends to some of these other milestones. As I stated at the outset, the goal here is to argue for the merit of further discussion and investigation. So, let us cast our gaze once more to *Spacewar!*, that game developed by a team of hackers in 1961 to show off to potential buyers the computational capabilities of the PDP-1, a landmark in the history of the PC. In the more detailed account provided by one of Russell's team, in hindsight some twenty years after the event, J. Martin Graetz suggests the choice of a space war scenario was more than mere happenstance:

It's Kimball Kinnison's fault. And Dick Seaton's. Without the Gray Lensman and the *Skylark of Space* there would be nothing to write about. So most of the blame falls on E. E. Smith ... If Doc Smith had been content designing doughnuts ... the world might yet be free of *Spacewar!* (Graetz 78).

Who are these people? Kinnison and Seaton are characters in novels by Edward Elmer "Doc" Smith. According to Graetz, the MIT team responsible for *Spacewar!* were fans of *The Skylark of Space* and the *Lensman Series*, and *Spacewar!* was quite literally the result of their desire to see Smith's novels represented on the big screen. Lacking the resources to produce a big screen version, they did the best with the materials at their disposal: the CRT display version.

The very first demonstration programs used on the PDP-1 were a bouncing ball, a maze, a pattern generator (called HAX) and Tic-Tac-Toe, which had been developed for the prior TX-0 computer. To the hackers at MIT, these simple programs certainly failed to utilise the full potential of either the PDP-1 or its CRT display. Moreover, the thought of a computer user being enthralled by nothing more than a bouncing ball was beyond the pale for these SF fans. As Graetz notes, the team agreed that a worthwhile demonstration program should ideally challenge both machine and operator: "in short, it should be a game" (78). Immersed in the worlds of Doc Smith, Russell and Graetz imagined only one game worth creating: *Spacewar!*.

In the memory of one of the key participants in this milestone, the ties that bind the creation of the game to the novels which inspired it thus seems somewhat like a case of serendipity akin to the alignment of the planets: we were at MIT, the PDP-1

was at MIT, we were reading Doc Smith, so it was inevitable that Doc Smith would wind up on the PDP-1. Yet we must consider to what extent Graetz is too close to the picture he seeks to paint. Unravelling this picture, the cultural historian will want to supplant serendipity with contingency, as I suggested earlier. There are some aspects of the story that we must first see as containing a high degree of inevitability in the history of the development of computer games. Imagine, for example, that Graetz and his colleagues were not at MIT. It does not matter, as somebody else would have been at MIT. The TX-0 and its replacement, the PDP-1, were developed at MIT. We shall take this as given, and not surmise an alternative history of computer games without the invention of the computer. Yet let us ask what the history of computer games may have been like if Graetz and Russell, or whoever else might have chanced to be given the task of developing a demonstration program for the PDP-1, were *not* reading Doc Smith?

Can we imagine such a scenario? What if, for example, Graetz and Russell – or whoever else in this alternative history has taken their roles – were avid readers of the collected works of William Shakespeare? Instead of *Spacewar!*, the first game might then have been *Forsooth!*, which would undoubtedly have inspired Nolan Bushnell to seek to market the arcade console game *Computer Bard* a decade later. If this seems a bit far-fetched to the reader, then the reader is being generous: the idea is absurd, just as I suggest any scenario at which we arrive is absurd if we base it on a supposition of what else the MIT hackers might have been reading if not the space adventures of Doc Smith. Note that in the history of *Spacewar!*, as it is recounted by Graetz, we get the impression that the decision to make the demonstration program a game came before the decision to make this game a computerised version of a Smith space adventure. It is very easy then to plot the alternative history of computer games with a turning point based on alternative reading habits of the hackers mapped out as an after-effect of the decision to make the program a game. Yet Graetz has already also mentioned that the hackers had long been toying with the idea of developing the screen version of their favourite Doc Smith novels. What I want to argue here is that the decision to make the PDP-1 demonstration program a game was, so to speak, *influenced* by having read SF novels and watched SF films.

At least to this extent, then, we could agree with Graetz's own assessment about the important role played by the novels of Doc Smith and argue further that without SF in general there would be no *Spacewar!*. First, let us look more closely at the role of the Doc Smith novels. In Graetz's own account, Smith was a "cereal chemist who wrote with the grace and refinement of a pneumatic drill" (78). This assessment is not a particularly generous one, to say the least, but it seems that it does match scholarly critical opinion. In Neil Barron's *Anatomy of Wonder: A Critical Guide to Science Fiction*, the assessments of *The Skylark of Space* and the *Lensman Series* are rather similar: the former is described as the "archetypal pulp space opera" in which "the writing is stilted and the plot absurd, but the adventure has a naive exuberance that remains appealing to younger readers" (80); the latter novels are described in more generous terms as the "greatest of the early golden age space opera" but description of the plot is a mere outline, replete with hyperbole, that "on the greatest of battlefields, employing the most violent weapons, the lensmen fight the most ferocious of all wars" (176).

Armed with these assessments, it is tempting to find some measure of mirth in the observation that these novels were simple fare, "appealing to younger readers", and to complete a caricature of the hackers as children at heart. Certainly this picture accords with the stereotype of the computer geek or the games developer held in the popular

imagination today. Yet I am reluctant to so easily slot these seminal game developers into the stereotype, for we should recognise in their habitudes and habits a degree of originality: they do not fit the type; they invented it. Rather than stereotypical, then, we might call them proto-typical. Nevertheless, the point remains that the type these hackers originated was that bordering on the savant, technically gifted but with the maturity or sophistication – but also the wide-eyed wonder and optimism – of a child. This capacity for wonderment is, I suggest, the key here.

Doc Smith himself represents, in the SF literary corpus of the twentieth century, a pin-up figure for the kind of personality we are describing. Brian Aldiss explains that it was Edward Smith, Ph.D, “who started science fiction off on the trillion year spree which is now an integral part of its image” (209). Smith was himself a scientist, albeit a specialist in doughnut mixes, but a scientist nonetheless. This fact alone gives to his work a small dose of credibility, but what sets Smith’s work apart is a brand of “super-science” it introduced into the mix of 1920s SF writing, built on what Aldiss calls “the infinite extension of technology for its own sake, the glamorous disease of giantism” (209). Without Smith, Aldiss suggests, there may have been no SF revival during the 1930s. What made Smith so appealing to a legion of fans, and what brought together the potentially incommensurable strains of SF writing at the time, was ultimately this fact that even the educated man of science himself “clearly enjoyed spinning out this doughnut mix of galactic action” (211).

The *Skylark of Space* had originally appeared in print in *Amazing Stories* in 1928, and its sequels appeared in the next few years. The series was reprinted from 1947, setting up renewed interest in Smith’s work and paving the way for a legion of new fans for the *Lensman Series*, appearing from 1948 to 1954 (Barron 176). Smith’s popularity in the earlier portion of this sequence makes him a dominant figure in the period defined by Lester del Rey as “the Age of Wonder” (qtd. Mellor 25). This Age of Wonder is often dated from 1926 to 1937, during which time, due to the efforts of Hugo Gernsback in the first instance, the SF magazine experienced its first boom in the United States. The renewal of interest in Smith’s work takes place during a timeframe which spans the end and beginning of the next two of del Rey’s so-called “ages” of SF: a “Golden Age” from 1938 to 1949, and an “Age of Acceptance” spanning from 1950 to 1961 (qtd. Mellor 26). The renewed interest in Smith’s work during this time suggests that these subsequent ages were not without their sense of wonder as well.

Indeed, I would like to argue that a sense of wonderment is a characteristic of the SF genre, regardless of the age in which it is written. Critiquing del Rey’s summaries of the historical ages of SF, Adrian Mellor points out that they are defined not merely in terms of what characterises SF as a literary form; rather, they are informed by the shape of the SF sub-cultures in America throughout the twentieth century, with only the last of del Rey’s phases taking into account trends in SF in Europe and Britain as an expansion of the genre beyond the shores of the New World (26). It may be pertinent, then, to proffer a more general definition of the characteristics of SF *as a genre*, seemingly against the compartmentalised historical account offered by del Rey. Yet I am loath to suggest such a definition without deferring once more to one of the principle tenets on which the present investigations have been based: *always historicise*.<sup>iii</sup> The point is that I do not wish to propose a definition of SF that fails to account for its emergence and evolution within specific historical contexts of its own. That being said, however, it is inevitable that in devising a history of the emergence of a genre, we will continually refer to an agreed set of more or less standard or generic features.

Even Aldiss, in developing the finest account that I have read of the origins of SF, devotes much of the first six chapters of *Trillion Year Spree* to making arguments for which pre-1900 literary texts fit a definition of SF and which ones do not, although the latter are mentioned in many instances by virtue of their influence in their time. To cut a long story short, the earliest text indubitably fitting a working definition of SF is Mary Shelley's gothic masterpiece *Frankenstein* (1818). Yet if this text represents the birth of SF, it does not emerge as if by autogenesis. Aldiss identifies some antecedent texts – Daniel Defoe's visionary fantasy *The Consolidator* (1705), the scientific works of Erasmus Darwin, the whole gothic era and the work of romantics like Percy Bysshe Shelley himself, for example – and several contemporary contexts including the rise of industry, a new social politics centred on the inalienable rights of individuals, and, of course, the new science of electricity (28-37).

According to Aldiss, *Frankenstein* represents the birth of SF principally because it is the first novel of the new scientific age to present a fictional treatment of science in action, and to speculate on the wages of science: Shelley “dramatizes the difference between the old age and the new, between an age when things went by rote and one where everything was suddenly called into question” (40). The core of the novel is a now familiar staple of SF narratives – the experiment gone wrong – but its innovation lies in the nature of the experiment. This was no mere fantasy masquerading under the guise of science as had been the case with Defoe's machine for travelling to the moon. Instead, Shelley developed the idea of using electricity to animate lifeless human flesh from experiments already documented by Luigi Galvani in the previous century. The fiction in *Frankenstein* proceeds via speculation, taking existing science and playing a “what-if” gambit as the catalyst for a departure from reality. Yet since it is grounded in existing science, the speculation remains wrapped up in realism: the narrative's “what-if” question seems entirely plausible. Those onlookers who have seen with wide-eyed wonder the lifeless legs of a frog suddenly spring to life, jumping around aimlessly on a slab will find it no great stretch of the imagination to share in Shelley's wonder at the possibility of animating lifeless tissue culled from the bodies of dead humans.

With *Frankenstein* as a convenient reference point, we can pinpoint one of the key features of all SF writing and, more recently, film making: there must be science, real science, at the core of the narrative. The science may be pure (biology, chemistry, or physics, for example) or social (anthropology, history, or psychology, for example), but it must be based on existing knowledge. Even the high romance of science fantasy like Doc Smith's battlefields in space relies in some degree on the assumption that we can conceivably recognise in the early rocket science of the 1920s and 1930s a primal ancestor of the skylark of space – this is what Aldiss describes with his comment on “infinite extension of technology for its own sake” (209), which I cited above. Shelley does not extend the technology that far toward infinity, although I do not know of any documented example of an attempt to replicate Frankenstein's experiments among the “real” scientific community. Yet the experiment is merely the beginning. After breath is restored to the monster's once breathless form, the narrative is based more on issues from the social sciences, speculating about the inhumanity of humans confronted with the unnatural. As Aldiss notes, once the experiment is out of the way and the “what-if” question has been answered, Frankenstein becomes a pursuit and retribution narrative showing marked similarities to her father William Godwin's brooding pre-Romantic social fable *Caleb Williams* (41).

As we have noted, *Frankenstein*'s opening “what-if” gambit – the experiment gone wrong – has come to be a familiar staple among SF narratives. Shelley's most



direct descendants certainly repeated the dose: Robert Louis Stevenson's *The Strange Case of Dr Jekyll and Mr Hyde* (1886), for example, involves the creation of a monster as a result of a failed experiment in chemically separating the good from the bad portion of the human psyche (foreshadowing the science of eugenics, perhaps?), and many of the novels of H.G. Wells – *The Time Machine* (1895), *The Island of Dr Moreau* (1896), and *The Invisible Man* (1897), for example – focus on a scientist who fails to foresee the consequences for himself and for society at large of experimenting with startling new technologies. Aldiss notes that this formula is repeated later, “more sensationally, in *Amazing Stories* and elsewhere” during the revival in SF in America (39). The point to be made here is that, for better or worse, where there is science there must also be a scientist. The early SF novels of Shelley, Stevenson, and Wells are symptomatic of a time in which the new science was capable of inspiring wonder but also of inducing fear, so the scientists in these novels are doomed to fail monstrously.

In what del Rey called the Age of Wonder, the fear of new technologies subsided and what remained for the SF writer was wonder, simple, joyous, and optimistic. The scientist became a champion of progress, the gatekeeper of the new technology, who held the future potential of our civilization within skilled hands. Graetz recalls with fondness what for him and his colleagues were the most appealing characteristics of Kinnison and Seaton:

In a pinch, which is where they usually were, our heroes could be counted on to come up with a complete scientific theory, invent the technology to implement it, build the tools to implement the technology, and produce the (usually) weapons to blow away the baddies, all while being chased in their spaceship hither and thither through the trackless wastes of the galaxy. (78)

With this we can begin to appreciate the lure of SF – particularly of the Doc Smith variety – for the prototypical computer geek. In SF, a man of science is cast as the central character, a protagonist who makes things happen, a latter day Prometheus in a masculine power trip. Even if the SF narrative predicts the downfall of the scientist, it generally lauds the effort to push science through new boundaries. Furthermore, the fictional component of the SF narrative proceeds by way of the same model of inquiry that a scientist adopts in order to strive to extend scientific knowledge. Without asking “what-if” the scientist could never progress beyond the existing boundaries of science. Science fiction is thus never far removed from science fact.

Having arrived satisfactorily at this point, however, I am reminded that what yet remains undiscussed is the influence of SF on the MIT hackers' decision to make the first PDP-1 demonstration program a game. The point has not been forgotten; it was merely held in abeyance. Indeed, even to the point that we have been able to argue for the lure of SF for the prototypical computer geeks at MIT, our history of SF remains as yet incomplete. We have not yet accounted for the 33 years from the publication of *The Skylark of Space* to that moment when, according to Gaertz, both he and Russell shouted in unison, “SPACEWAR!”, as the answer to their problem of what to do with the PDP-1 (78). It is worth noting, by way of illustration of how times and SF authors change, that only three years after *Spacewar!* brought his romantic image of battles in space to virtual realisation, Doc Smith published a late, fourth novel in the *Skylark of Space* series, in which the protagonist “single-handedly destroys an entire galaxy of fifty thousand million suns, plus an undisclosed number of inhabited planets” (Aldiss 209). Smith's earlier joyous revelry in the infinite extension of technology gives way

in 1965 to callous bloodlust and a timely reminder of the inevitable failure of a theory of Mutual Assured Destruction: if, like a lensman or a skylark, an individual acquires the capacity for mass destruction, then this power is bound to be exercised.

What I am suggesting here is that we must consider the events at MIT in 1961 not only in terms of the SF influence on which they draw directly – an influence that dates from an earlier age in the history of SF – but also in terms of significant influences *in 1961*. The reader may well have observed that this landmark year in the history of the development of computer games coincides with the transition point between two ages in del Rey’s SF history: the Age of Acceptance ends, and the Age of Rebellion begins, in the year that *Spacewar!* appeared. According to del Rey, the Age of Acceptance is characterised by the “transformation in the status of SF writers from pulp hobbyists to professional authors between boards” (Mellor 26). This transformation came about as a result of a number of pressures from within the SF industry, but it was also assisted by a number of important historical factors. It is significant that the period in question (1949-1961) covers the decade associated with the Cold War, McCarthyism, and the early milestones in the Space Race. In a brilliant analysis of the role of SF during the “long 1950s”, M. Keith Booker explains that under the shadow of the mushroom cloud there developed an increasing sense, at least among the proponents of SF themselves, of the social relevance of texts that explored in imaginative ways the possible political and social ramifications of an atomic age and a “monolithic and monotonic growth in the penetration of capitalist, Fordist-Taylorist organization into virtually every aspect of American society” (5).

Booker observes that SF remained, throughout the long 1950s, very much on the verge of acceptance. In intellectual circles on both the Left and the Right, there was a renewed scepticism of “popular” culture, and yet the genre remained surprisingly less than popular in a broader sense, producing none of the decade’s highest selling novels nor any of the biggest box office successes (1-2). Nevertheless, Booker maintains that the era did bear witness to a renaissance in socially relevant SF, although on the Left this often involved an increasing level of obscurantism (the threat of the McCarthyist witch hunts was ever present for the producer of popular fiction):

some of the best science fiction of the 1950s was produced by left-leaning writers who found Aesopian potential in setting their political commentary in other times or other galaxies, thus allowing them more freedom than they could possibly have to comment on political conditions in America. This phenomenon helps to explain the marginality of science fiction to 1950s literature. (3)

On the other side of the political divide, right-leaning writers like Robert Heinlein enjoyed *carte blanche* to produce anti-Soviet propaganda. Novels such as *The Puppet Masters* (1951) and *Starship Troopers* (1959) show Heinlein whipping up anti-alien sentiment: “the only good alien is a dead alien” (Booker 51). In *The Puppet Masters*, the menace was all the more horrifying for the fact that it was “impossible to tell Us from Them—one of the ultimate nightmares of the 1950s” (Booker 51). A similar paranoia was evident in a number of 1950s SF films such as *The Thing From Another World* (1951), *It Came From Outer Space* (1953), and *Invasion of the Body Snatchers* (1956), and the Victorian fear of the alien menace was revived in the film version of H.G. Wells’s *War of the Worlds* (1953). What the right-leaning and left-leaning SF texts have in common is the fact that they are all identifiably SF texts, and where they depict aliens, inevitably, it is in the form of bugs, pods, or slimy non-descript “things” that are unmistakably Other.

Amidst the alienating gloom of Cold War SF, with its constant reminder of likely apocalypse, there also emerged a new theme: the dangers of the computer (Seed 119). In several notable examples from this era, the possibility that wars might be placed in the hands of computers is given alarmist treatment: Kurt Vonnegut's short computer story, "EPICAC" (1950), tells of a machine that tires of serving only to plan for war; Ward Moore predicts in "Flying Dutchman" (1951) that responsibility for launching nuclear war will be taken out of the hands of human operatives and computerised; Bernard Wolfe's *Limbo* (1952) foreshadows a potential for nuclear holocaust as the result of centralising all managerial functions in the hands of the computer; Walter Miller's "Dumb Waiter" (1952) imagines a computer failing to end defence counter-measures long after the holocaust; and the list continues long into the 1950s (Seed 119-26). Other dystopian SF narratives of the time consider the computerisation of human social functions as the beginning of the end for the human race, detailing a very real fear that computers might not merely destroy "us"; they may supplant us (Seed 119).

After the excesses of the Age of Wonder, then, this Age of Acceptance ushered in a return of the element of fear into SF narratives in film and literature, as SF writers sought to be taken seriously by the critics and the community at large. For those who worked on emerging technologies, the representations of their work in contemporary SF would undoubtedly have seemed like the worst kind of negative reinforcement. It is *against* this negative image of computer technology in contemporary SF, I suggest, that the creation of the first computer game is motivated. Any number of programs for performing "managerial functions" could have been devised in order to demonstrate the full potential of the PDP-1, but such programs would merely reinforce an existing negative image of the uses to which computers will be put in a dystopian future. Yet the PDP-1 was seen by its makers as a machine that would take the computer out of the laboratory and into the hands of ordinary people, the transition from Operators to users. As such, the PDP-1 could not be presented as a foreboding instrument of the world of "work"; the alternative was to present it in the context of the world of play.

With this in mind, we may wonder then if the decision to develop a game with the word "war" in its name – a game in which players try to destroy each other's spacecraft – was altogether very wise. Surely, the user whose fears about the new technology are allayed by virtue of the fact that it is presented as a leisure tool will find that a related set of fears about global warfare is acutely exacerbated by the game's content? In the world of games, I suggest, the opposite applies. Some of the most successful board games of the previous thirty years had seemed uncomfortably close to subject matter that might well have been considered taboo in some circles due to recent history. *Monopoly*, for example, was released by Parker Brothers in 1935, while memories of the Wall Street Crash of 1929 and its effects on the global economy would still have been painfully real for many. The game's success is unparalleled among board games. Two major games were released in 1959 – *Risk* and *Diplomacy* – both of which were concerned with the threat of large-scale war: in *Risk* the goal is global domination through the exercise of military might; in *Diplomacy* the goal is to avert a potentially mutually destructive conflagration while still gaining an advantage over an opponent. These games have also gone on to become classics.

To understand why this is the case, we can briefly refer to theories about the social function of games. Johna Huizinga's widely accepted analysis of game playing points to the importance of boundaries and rules in games, as a form of guaranteeing that "an absolute and peculiar order" can be called into account (10). In playing the game, the participants agree to abide by the rules, meaning they agree to limit their actions only

to those accepted within the game parameters, but within these parameters they are also assured of a degree of control over the outcomes of the event. For this reason, a game with a direct analogy to an event in the real world involves, for the participants, an opportunity to exert control over these events but also an assurance that the event itself will not exceed the boundaries of the game: *control and containment*. Huizinga suggests that the structures and rules of game play need not mirror those of the world of not-play, but Gregory Bateson notes that these structures and rules do reflect a set of ideas about how the world of not-play *should* be structured (188-90).

I do not wish to suggest that Graetz and Russell must have been familiar with the scholarly work on game playing. Their decision to program a game for the PDP-1 is motivated more as a reaction against the SF representation of computer technology, as I have stated above. Nevertheless, the theory of game playing does explain why the concept of *Spacewar!* was appealing to both its developers and its earliest users. The Cold War had reached crisis point at the beginning of the 1960s with the situation in Cuba – while the missile crisis did not escalate until late 1962, diplomatic ties were already severed by Eisenhower in early 1961 – Russian testing of the hydrogen bomb, and the crash of a B-52 bomber carrying nuclear weapons in North Carolina, among a host of incidents. Games of war, like *Risk* and *Diplomacy*, would have been one tool for controlling and containing the sense in which the apocalypse was nigh. In 1961, Kennedy also sought to divert the public’s attention in some degree by announcing that the United States would seek to achieve the prime target of the Space Race by putting a man on the moon before the end of the decade. The calculation was designed to focus Cold War tension away from terrestrial devastation and redirect the attentions of the public to outer space. *Spacewar!* spoke directly to such public concerns, but by way of reference to a fiction of excess and wonderment, a formula established by Doc Smith in 1928.

With this, then, I should conclude the current investigation. More remains to be said, though, and this exercise has been merely intended to get the ball rolling – or, perhaps, we should use a more apposite metaphor and say, get the rockets firing. The task hereafter must be to determine whether the events, texts and contexts that come together in the historical milestone of the development of the first computer game are also present in some residual form in the subsequent milestones in this history. We may wonder, indeed, whether Nolan Bushnell was touched by the SF theme when he decided to invest in developing Computer Space, or whether his motives were more market driven than those of Graetz and Russell. Nevertheless, I think there is merit in the suggestion that the development of *Adventure* and its descendants was influenced heavily by some parts of the history we have traced here. Without the success of *The Hobbit* or the advent of the fantasy role-playing game *Dungeons and Dragons*, there would have been no *Adventure*. Without *Adventure* there would have been no *Hobbit* or *Rogue*, nor all the subsequent roguelikes, in the world of the computer game. This history of the CPRG is dependent in the first instance, then, on a history of SF in the twentieth century if we put stock in a comment made by Samuel R. Delaney in an article on the relation between SF and Fantasy: “The Tolkein craze could not have occurred without the stability of the SF editorial complex” (69).

There must also be some consideration given to the role of a new breed of SF film, with the phenomenal success of *Star Wars* in 1977. Without *Star Wars*, would *Space Invaders* have been such a hit in the United States? Of course, we cannot consider the history of *Space Invaders* without shifting our attention to the Japanese context, with some thought required to the Toho film complex which gave us the *Godzilla* films – incidentally, another of the body of SF texts that Graetz and Russell loved, which may

prompt us to expand our initial map of the fields of influence behind *Spacewar!* and consider a Sino-American history of video and computer games that connects in the first instance in 1961 and then again with *Space Invaders*. Tasks such as this shall be instructive not only on the topic of games development, but on the ways in which the global economy functions through localised economies, given expression in pockets of cultural practice – such as the development of *Spacewar!* and its initial reception through the hacker network on college campuses across America – which grow into burgeoning capitalist megaliths like the current video and computer game industry.

**Laurie Johnson**

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<sup>i</sup> In using the standard abbreviation, I am attaching to this term the multivalence identified by Brian W. Aldiss in the introduction to *Trillion Year Spree*:

Throughout the book ... we allow only the abbreviation "SF". That down-market appellation "sci-fi", sometimes heard on the lips of the would-be trendy in the media and elsewhere, is purposely avoided. We bow to the fact that much of what passes for science fiction these days is nearer fantasy. SF can, after all, be imagined to stand for science fantasy, as it can for speculative fiction (for those who are attached to that term). (20)

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<sup>ii</sup> DeMaria and Wilson's history refers more generally to "electronic games" so they give this honour to the Magnavox Odyssey developed by Ralph Baer and released in 1972. As DeMaria and Wilson point out, the Odyssey "did not use integrated circuits, but rather consisted of 40 transistors and 40 diodes. The plug-in cartridges did not contain any electronics, but were used as jumpers to determine which of the electronics systems would be used for a set of games" (18). Based on this definition, it is possible to argue that the Odyssey is even further removed from the computer game than Higinbotham's *Tennis for Two*. My thoughts are that the Odyssey represents more of an oddity than a milestone, being more akin to board games with electronic components (like *Battleship*) than to Russell's *Spacewar!* and its descendants.

<sup>iii</sup> This is the rallying cry introduced by Fredric Jamieson at the beginning of *The Political Unconscious: Narrative as a Socially Symbolic Act*, which I repeat here as a way of situating my own project within a specific academic tradition of cultural and literary historicism.