KARLHEINZ STEINMÜLLER

THE USES AND ABUSES OF SCIENCE FICTION

Science fiction is one of the most successful and perhaps most influential contemporary literary genres and surely one of the cultural factors which shape our images of science, technology and – last not least – the future. As an integral part of post-modern culture, science fiction has penetrated all fields of the media landscape: fiction, comic books, movies, even plays and musicals. Science fiction themes and images surface sometimes quite unexpectedly in everyday life, in TV commercials and video clips, not to speak of computer games. Internet enthusiasts use science fiction jargon and imagery to depict their "cyberspace" visions. A generation ago, the race to the moon was at least partly initiated by the dreams of early science fiction writers and readers. For the public, technology is science fiction come true. For many scientists and engineers science fiction provides the imagery of their visions.

Naturally, SF has been subject of many studies, but it still defies an easy definition. Ever since the term SF came into use during the 1930 there have been attempts to bring all its different currents and subgenres into one formula.[1] For our present aim it may suffice to follow Moskowitz, who defined science fiction as a

> ... branch of fantasy identifiable by the fact that it eases the "willing suspense of disbelief" on the part of its readers by utilizing an atmosphere of scientific credibility for its imaginative speculations in physical science, space, time, social science, and philosophy.[2]

SF therefore relies on science even when it is contradicting, ignoring or negating some specific laws of science or principles of technological feasibility.

"WHAT IF..." -- SCIENCE FICTION AS THOUGHT EXPERIMENT

The general principle of imaginative speculation in SF has often been characterized by the phrase "What if ..." What if machines could be made more intelligent than men? What if a plastic-eating microbe escapes from a laboratory? What if the internal combustion machine had never been invented? What if Lee had won the battle of Gettysburg? What if interstellar space travel or time travel were feasible? Sometimes the question is "How could ..." How could a sustainable economy based mainly on solar energy work? How could I survive in a global ecological disaster? How could we inform our distant descendants, perhaps living in a new medieval age, of the hazards of nuclear waste deposits?

Following these questions, SF can be understood as a kind of thought experiment similar to thought experiments in science. The experimenter – the writer – begins with an

---

[1] Comp. e.g. the entry on "Definitions of SF" in Clute, J./Nicholls,P. (eds.): *The Encyclopedia of Science Fiction*, London 1993

[2] Moskowitz, S.: *Explorers of the Infinite. Shapers of Science Fiction*, Westport/Conn. 1974, p. 11.

hypothesis and sets up initial conditions. Following the inherent logics of these conditions (i. e. the plot) he derives some results, perhaps surprising ones, as in pointed short stories with twisted or double twisted endings. Use of imagination is as central to the fictional thought experiment as to the scientific one, with the difference that the imagination of a writer is not controlled by scientific, methodological constraints, but by aesthetic, narrative principles. Characteristically, the writer does not look for the most plausible outcome of the experiment but for the most striking, most dramatic one. Perhaps the most profound reason why so many scientists[3] feel attracted by science fiction, is that – beyond the methodological restrictions (enforced by social conventions!) of science – SF opens up vast opportunities for a playful manipulation of scientific concepts, for speculations on alternative laws of space and time, on more than two genders or on changed sexual roles, on machine self-reproduction and last but not least on cunningly devised political and sociological models. For a concerned scientist like Leo Szilard, SF was even a means to elaborate and promulgate models of mutual nuclear deterrence (*The Voice of the Dolphins and Other Stories*, coll. 1961).

In some ways, SF is a quasi-scientific and, like science itself, a collective enterprise. Like scientists, SF writers take notice of their colleagues' work and results; they borrow the fundamental concepts from previous generations of writers. They elaborate on and transform these concepts, apply and test them in new situations, and add new ideas. They regularly share even the technical terms introduced by others, to which the readers are accustomed and which are mostly coined to resemble true scientific terms. Thus, SF has its own topical lineages and traditions and undergoes – like science – phases of accumulative growth (for example during the pulp era) and of deep paradigm shifts, like during the 1960ies when environmental concerns transformed its overall image of the future.

Of course, most science fiction is superficial adventure and its cognitive content may be questioned. But any piece of fiction, which wants to qualify as science fiction, has to introduce at least one deviation from our common empirical world (called “the novum” in SF theory), and to work under the conditions imposed by that deviation. Even the dullest space opera is based on more or less elaborated assumptions on space flight and draws its “legitimation”, its “willing suspense of disbelief” from science, which will, perhaps one day, make these inspiring dreams of interstellar battleships and the annihilation of whole planets come true.

The more interesting examples of science fiction follow the line of real thought experiments and asks questions which could challenge science too. Take for example the possibility of duplicating persons, be it by means of a Wiener transmitter or by some other way of recording and reconstructing the physical (and/or informational) structure of a person.[4] Could we have more than one copy of a person? What would become of the individual self? What does this mean for the philosophical notion of personality? What are the juridical consequences? Among others, Stanislaw Lem has tackled questions like these. In his novel *Solaris* (1961), all human efforts to communicate with an intelligent ocean on a distant planet fail, perhaps due to a lack within our scientific reference system. The ocean

---

[3] Some SF stories by famous scientists – Otto Frisch, George Gamov, Fred Hoyle, Leo Szilard, Norbert Wiener ... – have been collected in the anthologies *Great Science Fiction by Scientists* and *The Expert Dreamers* (both 1962).

[4] In Star Trek language: by “beaming” one person simultaneously to two places. – To my knowledge this idea was first elaborated by Norbert Wiener. Recently artificial intelligence researches and robotics scientists like Ray Kurzweil speculate on means of recording the information content of the human brain – as a way to software-based immortality in changing bodies.

itself sends 'messengers' to the observing station: simulacra of dead persons taken from the memories of the observers. The epistemological riddle turns into personal tragedy.

Science fiction, used in this way, can prompt what Darko Suvin calls “cognitive estrangement”: fantastic imagining in the service of knowledge, not as vehicle for escapism.[5] However, one should not mix up cognitive value with prediction. The principal question “What if...” does not aim at forecasts, but implications of a presupposed novum. SF, from that point of view, comes close to a kind of fictional technology assessment.[6] Or, as Fred Pohl put it: “A good science fiction story should be able to predict not the automobile but the traffic jam.”[7]

SCIENCE AND SCIENCE FICTION: AN IRKSOME RELATION

Science fiction is controversial. It has been blamed for different, even opposing sins: propagating an elitist, technocratic, even authoritarian world view, giving a distorted picture of science, idealizing or caricaturing it, transgressing the borders between science and pseudo-science. It has been hailed as the only kind of literature which really matches an era of science and technology, and it has been scolded for its irrational belief in science. As early as 1953 Philip Wylie asked: “Does science fiction owe anything to the exalted standards of science itself? In short, does science fiction augment or aberrate human sanity in this age?”[8] – Science fiction as a pro-science enterprise and science fiction as a contra-science enterprise ...

Of course, all that is true. SF has committed all the sins it has been blamed for, and it has deserved all the praise given to it. As a literary genre with some thousands of first editions per year there is a multitude of novels or stories that corroborate each of these claims.

SF writers use science in many ways, as foreground, background, context or subject of their stories. According to Lambourne et al., one should differentiate six different roles, which science can play in SF:[9] Science may provide the information necessary to describe a real, but relatively unfamiliar, environment. Similarly an imaginary environment may be constructed as consistent as possible with established facts and principles. Thus the ecology of the planet Dune from Frank Herbert's novel of that name (1965) or the seasons on Brian Aldiss' *Helliconia* (1982-85) are designed with the utmost scientific care.

The writer may also use a piece of scientific information as the basis for a puzzle which frequently follows the structure of detective stories. Take Larry Niven's story *Neutron Star* (1966) in which two scientists investigating a neutron star in a fly-by mission are

---

[5] Suvin, D.: *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre*, London and New Haven 1979.

[6] It should be noted that SF constructs future scenarios in a way similar to futurology.

[7] Quoted from Lambourne, R./Shallis, M./Shortland, M.: *Close Encounters? Science and Science Fiction*, Bristol und New York 1990, p. 27.

[8] Wylie, Philip: “Science Fiction and Sanity in an Age of Crisis”, in: Bretnor, R. (ed.): *Modern Science Fiction. Its Meaning and Its Future*, New York 1953, p. 230.

[9] Lambourne et al. 1990, pp. 39-48

found crushed to a bloody pulp. The hero discovers that this frightful accident is due to the enormous tidal forces of the star even within the dimensions of a spaceship.[10]

Very commonly science is utilized to justify the existence of devices or processes. As an example, Michael Crichton's novel *Jurassic Park* (1990) – and consequently the movie – are based on genetic engineering. Crichton does even more. He uses the scientific process itself as a credible scientific setting to his novel *The Andromeda Strain* (1969, filmed 1971), where scientists analyse with extreme bio-hazard precautions harmful extra-terrestrial spores. His more recent bestselling novel *Prey* (2002) about the hazards of nanotechnology is much weaker in this respect. Nearly all SF uses science at least peripherally, to justify a device or process, or to provide a generally "scientific" background.

Some of the examples quoted are "hard", or "hard core", SF. In contrast to "soft" SF, this subgenre tries to follow as closely as possible the established facts of hard, natural science and technology. Writers of this kind of SF, like Jules Verne, look for plausible extrapolations; they stick as far as possible to scientific accuracy which implies that they do not use scientific concepts and technical devices as metaphors (as it characteristically happens in "new wave" SF). In contrast, writers like Herbert G. Wells transgress the established principles of science and speculate about the far implications of scientific and technological progress for society, culture, and man. Ironically, Jules Verne was highly shocked when he looked through Wells' novel *First Men in the Moon* (1901):

> "We do not proceed in the same manner. It occurs to me that his stories do not repose on very scientific bases. No, there is no *rapport* between his work and mine. I make use of physics. He invents. I go to the moon in a cannon-ball, discharged from a cannon. Here there is no invention. He goes to Mars [sic!] in an airship, which he constructs of a metal which does away with the law of gravitation. *Ça, c'est très joli*," cried Monsieur Verne in an animated way, "but show me this metal. Let him produce it."[11]

Writers of "hard" SF like Crichton, Stephen Baxter or David Brin often incorporate realistic pieces of science shop talk into their novels. Unfortunately, some "hard" SF tends to get infected by the "techno-syndrome": card-board scientists mumbling polysyllabic neologisms involved in the technical solution of purely technical problems.

Not uncommonly, science is used only verbally: to provide the atmosphere of credibility, necessary for Moskowitz's "willing suspense of disbelief". Even worse, SF tends to mix up real and fake science. Some writers propagated (from conviction or only for the sake of the plot, it does not matter) "hollow Earth" theories, Velikovsky's cosmogony, Hubbart's dianetics or popular UFO lore.[12] Thus they gave pseudoscientific concepts, like telepathy or giant mutants, the decorum of science – undistinguishable in the minds of readers not scientifically trained. Furthermore, SF has sometimes willingly or unwillingly depicted science as a new magic, which solves in due time all problems and which works

---

[10] At that time, neutron stars were still a theoretical concepts, the first astronomical observations were made in 1967.

[11] Interview with Jules Verne in *T.P.'s Weekly*, October 9, 1903, quotation according to Parrinder, P. (ed.): *H. G. Wells. The Critical Heritage*, London Boston 1972, p. 101f.

[12] SF writer L. Ron Hubbart became famous as the founder of an authoritarian pseudo-religious organization "Scientology", whose teachings are concocted from different SF motives (superman, thought control...).

without any negative side effects. Especially during its "golden age" in the 1940ies and early 1950ies, SF gave rise to expectations of a wonderful world of to-morrow which real science could never fulfil. But, one can argue, SF only borrowed its verbal and visual rhetoric from science and took for granted what many scientists, engineers, and politicians promised of the coming age of affluence.[13]

Naturally, most readers know that time travel is impossible, that space flight faster than light is not feasible, but a slight doubt, an inextinguishable expectation of the big scientific breakthrough (proclaimed by SF) remains. There are, alas, fields where the demarcation line between the possible and the impossible is not as distinct as in basic physical questions. Think of the uploading of a human personality on a kind of hard disk, think of cryonics, cyborgization and similar means of technical immortality ... Perhaps, science fiction has the strongest impact on the public conception of future scientific achievements and future hazards in these fields.

FRANKENSTEIN, EINSTEIN AND THE SCIENTIST IN SCIENCE FICTION

Science fiction cannot be expected to give a realistic image of science and scientists. For the ordinary reader, tedious lab work, nightly calculations, boring committee meetings, the frustrating fight for funding, even problems with inappropriate equipment are of little interest. Readers expect and writers prefer the eccentric researcher, the extraordinary experiment, the spectacular discovery, the shocking application. The image of the scientist in SF is full of misconceptions and stereotypes. Geniuses and mad scientists displace less colourful and characteristic types. Crackpots and eggheads abound. Glamorizing and demonizing science, SF also glamorizes and demonizes the scientist.

This image of the scientist reveals a double origin: the savant (searching wisdom in old scriptures) and the sorcerer (commanding magic, white and black). Quite commonly, SF stories are plotted along the lines of Goethe's *The Sorcerer's Apprentice* who is unable to control the forces he has called forth. Within SF, this kind of plot goes back to Goethe's contemporary, the young Mary Shelley, whose novel *Frankenstein, or The Modern Prometheus* (1818) became the inspiration of a whole subgenre of SF/horror movies – and of stories on genetic engineering.

Victor Frankenstein, M. D., personified the aspirations and the hubris of science, challenging the "natural order" of things. The scientist in the role of a demiurge, imitating the act of creation, that image fits well into the conflicts between science and religion in the nineteenth century and it fits well into the strained relation between science and ethics in the late twentieth and early twenty-first century.

Frankenstein, perhaps the paradigm of the mad scientist, was copied many times, e. g. in Fritz Lang's movie *Metropolis* (1926), where a scientist with the looks of a cliché alchemist creates a robot in the likeness of a beautiful woman. But never, not even during the pulp era of the early twentieth century, did vicious crackpot scientists outnumber their sane colleagues. The "professor" in SF, savant and wizard in one person, was to explain the intricate wonders of science to the laymen heroes and readers. He was the man of fundamental science, the theoretician and researcher, as well as the man of applied science, the

[13] The optimistic image of a future "atomic age" was equally shared by many scientists, politicians, the broader public and even futures researchers like Herman Kahn. SF writer and futurologist Arthur C. Clarke once even stipulated that a sufficiently advanced science could not be distinguished from magic (*Profiles of the Future*, 1962).

inventor. He always had a useful new gadget at hand; or he quickly invented it during a crisis. Dr. Zarkov from the *Flash Gordon* comics (from 1934 onwards) is a case in point.

Contradicting the sociology of real science, fictional conventions helped the isolated scientific hero to survive the beginnings of Big Science, even the Manhattan project. Only rarely did writers mould their protagonists after the thousands of scientists involved in the construction of the atomic bomb. Albert Einstein, the outstanding visionary mind (at that time already rather secluded from the scientific community), remained their model; and he embodied the social responsibility of science. Perhaps the best example for this high regard of a scientist's social role and integrity is given in the movie *The Day the Earth Stood Still* (1951). Here, an extraterrestrial emissary tries to contact the leading figures of the world to warn them about the cosmic law of peace or destruction. Unsurprisingly there is no politician to receive the message – only a physicist, working alone on his home blackboard, summons his fellow scientists from all over the world to listen to the messenger.

Since the late fifties scientists have been less commonly represented in SF. This may be due to a decline of the professional status and the social significance of scientists. In a study of scientists in SF, Patrick Parrinder argues that a change in writers' careers may be an additional reason. Whereas in the "golden age" SF writers were characteristically science graduates, the more recent generation has (with exceptions) received little or no scientific education.[14] One could debate whether this was effected by the growing reputation of SF as literature.

Today scientists are frequently represented as a faceless force, as anonymous as scientific-technological progress by itself. Parrinder concludes, that the heroes of cyberpunk SF in the eighties and nineties – starting with William Gibson's paradigmatic novel *Neuromancer* (1984) – are not researchers producing knowledge, but persons who control information: computer scientists and hackers who make sure that knowledge remains unregulated and potent.

SCIENCE FICTION AT THE BEGINNING OF A NEW CENTURY

At the beginning of the new century science fiction resembles a large supermarket, offering anybody what he or she wants. Space operas for "trekkers", BattleTech for weapon junkies, "hard" and "soft" SF, cyperpunk for computer kids, alternative time-stream novels for nostalgic adults, feminist futures and macho ones, all kinds of mixtures with horror and heroic fantasy, high-tech nightmares and high-tech utopias – with a distinct preponderance of dystopian (or at least ambiguous) anticipations, not to count all sort of mixed-media and franchising products like game worlds, TV adaptations, novelizations of movies, graphic novels, SF role plays ...

The more science fiction evolves and diversifies, the more it splits up into subgenres with their own peculiarities and traditions. Perhaps SF as such has already become extinct – a cultural dinosaur species from an age believing in science. It's only promotional labels on books and movies which still give it a resemblance of life.

---

[14] Parrinder, Patrick: "Scientists in Science Fiction: Enlightenment and After", in: Garnett, R./Ellis, R. J. (eds.): *Science Fiction Roots and Branches. Contemporary Critical Approaches*, Houndsmill and London 1990, p. 62-64