

# If Leibniz Wrote SF... On the Multiplicity of Worlds and Science Fiction

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The idea of parallel worlds, one of the flagship concepts of SF, can take various forms in practice. The notion that other worlds exist in addition to our empirically experienced reality can be encountered in many diverse mythologies (for example the Nine Realms of Norse mythology), and the fables of various nations are full of stories about lands of marvels. Sometimes people link science fiction to the fable (that was Roger Caillois's understanding, for example), so that we can grasp the concepts of this type that appear in SF as a kind of reworkings of archaic imaginings.

At the same time we might also say that the efflorescence of science fiction is connected with the turbulent changes caused by the development of science and technology over the last several centuries. These changes force us to look in a new way at the question of parallel

worlds, as does the presence of the subject in contemporary physics (such as various continuations of Hugh Everett's interpretation of quantum mechanics) and logic (as in David Lewis's concept of possible world, which traces back to Leibniz's *Theodicy*). According to physicist David Deutsch, the existence of a multiverse has even been confirmed experientially (by the phenomenon of elementary particle interference).<sup>1</sup> References to certain theories often appear in science fiction. On the other hand, SF writers allow themselves far-reaching liberties (similarly, historical novels often deviate significantly from the actual realities of the epochs they portray). Furthermore, science fiction generally belongs to popular culture and thus places an accent on action and fantastic adventure settings, which is not favorable to a heavy scientific load. Other issues arise as well. How should SF's flirtation with fable or fairytale motifs and fantasy literature be treated? And how do other traditional SF topoi relate to the idea of the multiverse? For example, time travel can lead to the creation of an alternate history. Another parallel world that exists alongside empirical reality is the space created by computers. Sometimes various conceptualizations are effectively mixed together and virtual reality becomes an area wherein the absolute can be made manifest (as in the anime work *Serial Experiments Lain*). Thus the concept of parallel worlds can take on the most varied forms. We find works that are strongly rooted in actual science as well as others in which the "fiction" in science fiction dominates.

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<sup>1</sup> D. Deutsch, *The Fabric of Reality*, New York 1997.

## **Time Travel – Travel Between Worlds**

I will begin with the connections between concepts of parallel worlds and that of time travel, which constitutes one of SF's most frequently explored themes. The three works I have chosen are Jarosław Grzędowicz's short story "Zegarmistrz i łowca motyli," the anime work *Toki wo kakeru shōjo* (The Girl Who Leapt Through Time) and the film *Butterfly Effect*. In all of these works, we find a similar starting point– the possibility of going back into the past, which leads to the burgeoning of divergent versions of history, different worlds.

How does science look at the idea of a time machine? Physics grants the possibility of traveling into the future (the phenomenon of time dilatation during a journey at a speed approaching the speed of light), and into the past as well. Theoretical speculation about time-space tunnels, also defined as forms of the Einstein–Rosen bridge (to which name I will return below), which, according to some theories, exist inside black holes, have developed into considerations about the possibility of creating a time machine; Kip Thorne's concept, which demands enormous amounts of negative energy (occurring in the observable universe only in trace amounts) and exotic matter (at this point still a hypothesis), is one example. Such a machine would enable its users to go no further back in time than the moment of its construction (which can explain why we have not yet been visited by travellers from the future). And since time travel is theoretically possible, we must consider the related paradoxes of what will happen if a traveler goes back to the past

and kills his father before the latter meets the traveller's mother? The solution lies in the concept of parallel worlds:

*A [...] way to resolve the time paradox is if the river of time smoothly forks into two rivers, or branches, forming two distinct universes. In other words, if you were to go back in time and shoot your parents before you were born, you would have killed people who are genetically the same as your parents in an alternate universe, one in which you will never be born. But your parents in your original universe will be unaffected.<sup>2</sup>*

Both films and Grzędowicz's story take liberties with science while hooking their narratives on to physics. Going back in time leads to the creation of an alternate world. All three of these works develop this idea in different ways, which makes them particularly rewarding objects of comparison.

*The Butterfly Effect* does not even make much effort at offering a scientific explanation; changes to the past take place through the paranormal abilities of the main protagonist, Even Treborn. He is capable of briefly embodying his past self and changing the course of events. The title, which refers directly to the butterfly effect of chaos theory, should be noted here. In the anime work *The Girl Who Leapt Through Time* an ordinary schoolgirl, Makoto Konno, one day finds a strange nut and experiences unusual visions, after which she chances to discover a way of

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<sup>2</sup> M. Kaku, *Parallel Worlds : A Journey Through Creation, Higher Dimensions, and the Future of the Cosmos*, New York 2005, pp. 144-145.

returning to the past. In the end, however, a quasi-scientific explanation does appear: one of the heroine's friends is in fact a visitor from the distant future, where humanity has mastered the ability to travel through time, and the machine that makes it possible is precisely that nut. In Grzędowicz's story we find the greatest amount of care given to preserving a foundation of science (though in comparison to some works to which I will return later, the theoretical skeleton of "Zegarmistrza i łowcy motyli" is quite rickety). In the year 2037, the European Temporal Administration has succeeded in sending a human being into the past. This experiment relies on quantum mechanics and thermonuclear energy. According to Grzędowicza's conceptualization, time is like a string, and time travellers (or temponauts) journey as pure information along temporal lines. Nevertheless, this leads to certain disturbances. When something changes in the past, the change does not result in a bifurcation of the timeline, but rather the new world begins to absorb the old. As one of the characters puts it: At this moment our history goes back to somewhere around 17 October 1946 [...] *A day earlier, the sun rises over a completely different world. A world which is devouring ours at the rate of two days to one and is accelerating.*<sup>3</sup> The two universes in Grzędowicz's story are alternate but not parallel, since the new one overlaps with the other world, ours.<sup>4</sup>

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<sup>3</sup> J. Grzędowicz, "Zegarmistrz i łowca motyli," in *Tempus fugit*, Lublin 2006, p. 17.

<sup>4</sup> We find a similar idea of the old world's absorption by the new in Jorge Luis Borges's short story "Tlön, Uqbar, Orbis tertius," where a fictional world created by a group of fanstasts, Tlön, becomes so popular that it begins to replace our Earth, but in the story the alternative reality is not a world as understood in physics terms but rather an unusually powerful literary fiction.

Grzędowicz's vision is vast in its scope: in the new history of the world, Rome never fell and Venice is Protestant (the Hussites were victorious in the Battle of White Mountain); the two world wars did not take place. Interesting historiosophical and ethical questions are referenced. The main protagonist, Meier, is a participant in a plan to arrest the devouring of the old world. His group's mission involves engendering changes at key moments in history for the purpose of reversing the chaos caused by earlier temponaut expeditions (here Grzędowicz invokes the phenomenon of the butterfly effect). Meier, however, falls in love with the world he is supposed to destroy. For that reason, he begins to sabotage the activities of the group sent from the future.

What, in such a situation, happens to ethics? Meier commits a new type of treason, betraying his own reality, which he seeks to wreck. He does this, however, in the name of defending the people and values of the new world. His opponents, the commandoes who have been sent from *our* future, commit crimes without the faintest scruple, since, in the first place, they are defending their own universe, and in the second, they do not consider the inhabitants of the second reality to be ethical subjects: "There is nothing to mourn for, after all they were never really alive. It's an anomaly of time"<sup>5</sup> (this approach also sheds new light on the paradox cited above relating to the patricide committed by the temponaut). At the end of the story, in something like a *deus ex machina*, there appears an envoy

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<sup>5</sup> J. Grzędowicz, "Zegarmistrz i łowca motyli," pp. 66.

from the mysterious Watchmaker, who essentially concedes that Meier is right, but also eliminates him as an intruder from an alien world. The problem of historiosophy does not feature in either of the two films discussed here, however, though their point of departure is similar to that of Grzędowicz's story. The alternate worlds created during those journeys in fact serve to illustrate two interrelated theses: firstly, a minor change in the past can cause unimaginable consequences in the present (the butterfly effect once again). Secondly, that unimaginability means that the ability to go back in time in no way gives us control over our lives. Interventions in the past create still greater problems, the worlds thus summoned into being are worse than the previously existing one, and the gift turns out to be a curse. In this sense the films are similar, which is why it is interesting to compare the different developments of the problem in both works. *Butterfly Effect* uses the conventions of the thriller. The action plays out in a psychiatric hospital and a diner; the hero changes the past in order to get out of prison. *The Girl Who Leapt Through Time* is, on the other hand, a film for teenagers, of the genre called "crumbs of life" in Japan. The heroine changes the past in order to solve problems she is having at school or avoid a difficult conversation with her boyfriend. Thus the combination, similar in underlying concept, of the ideas of parallel worlds and time travel, is executed in very dissimilar ways in both films, though the films share both that idea and the peculiar bittersweet flavour of their endings. Mokoto and Even break free from the loop of evil worlds (a concession to the convention of the happy ending,

though the director's cut of *Butterfly Effect* goes in a different direction), but must pay for doing so with the loss of their powers and of romantic happiness (popular films must always have a romantic plotline of some sort).

Thus we find that even power over the past does not enable problems to be solved, and even the most ambitious plans turn out to be merely the movements of pawns on the Watchmaker's chessboard. Generally speaking, the three works discussed above can be interpreted as expressions of disbelief in the ability of human beings to engage in effective action (in opposition to, for example, the descriptions, typical in classical SF, of the conquest of space). Moving further down this path would appear to suggest that the contemporary period of economic crises inclines people toward humility, a phenomenon reflected in SF as well.

### **Alternate Universes and Alternate Histories**

The historiosophical layer sketched out in Grzędowicz's story presents one of the most intriguing areas of possibilities to emerge from the use of the idea of parallel worlds in SF. The dynamism evident in the creation of alternate histories of Earth can be astonishing. In Robert Sawyer's cycle *The Neanderthal Parallax*, humanity makes contact with a reality in which the Neanderthal became the dominant species instead of *Homo sapiens*. In Lance Parkin's novel *Warlords of Utopia* a world in which Rome never fell is at war with another in which the Nazis won the Second World War.

A more modest but very expressive vision is that of Philip K. Dick's novel *The Man in the High Castle*. Who among us has not wondered what history would look like if victory in the Second World War had gone to the Axis Powers? This is the subject of Dick's book. In it, the eastern part of the former USA is ruled by Germany, the western part by Japan. However, a book called *The Grasshopper Lies Heavy*, by Hawthorne Abendsen, circulates throughout America, describing the world in which Hitler lost. Yet it is not a work about the history we know, but about a reality in which there was no Yalta Conference and only the British and American armies took Berlin. Translator Lech Jęczynek notes that "[i]n the novel, three planes of reality intersect: the world that is real for the book's characters, the world of Abendsen's book, and our world, existing in the reader's consciousness and appearing only briefly in the novel, in Mr. Tagomi's feverish vision."<sup>6</sup>

The characters in *The Man in the High Castle* do not want to believe that they are living in a delusion and that the world described in Abendsen's book is in fact more real—and indeed, we behave in similar fashion as we read Dick's novel. This is in fact one of the constantly recurring motifs in Dick's work. In *Eye in the Sky* characters begin to shift, as a result of an accelerator failure, between alternate worlds that are a projection of their fantasies about reality. In *The Three Stigmatas of Palmer Eldritch* we observe a rivalry for supremacy between the empirical world and a reality created by extraterrestrial drugs. *The Man in*

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6 L. Jęczynek, "Posłowie tłumacza," in Dick P. K., *Człowiek z Wysokiego Zamku*, trans. Jęczynek, Poznań 2006, p. 281.

*the High Castle* and Dick's work in general lead us to wonder, as the characters do, what we are really experiencing. And this gives rise to the question of when, if ever, we can talk of truth and reality.

The second important question involves the sketching out of various scenarios of how history could have developed. In *The Man in the High Castle* the shape of the world is not only the result of the war, but also caused by the effects of certain developments in the postwar reality. The victorious Third Reich develops an ambitious space program, but suffers from a lack of consumer goods. The Germanic national character is presented as one whose dominant trait, idealism, requires that people concentrate only on lofty goals, putting aside for their sake both everyday life and ethics (a German artist who arrives in San Francisco in the novel takes his stadium for a space station, since he cannot understand that such a huge structure could be built for mere entertainment). The Japanese have conquered the US militarily, but treat American products and mass culture as works of art, though at the same time they look at Americans with condescension. This opens up the question: to what extent does the attraction of American pop culture derive from the political might of the US? Other factors in the development of the narrative situation are revealed in the world of Abendsen's book (for example, the beneficial role of television). In Dick there is no butterfly effect, but rather gradual molding of reality by definite historical currents. That is why the concept of parallel worlds has such an enriching effect on

our thinking about history, by allowing us to imagine the relative nature of how history was formed.

### **Variations on the Theme of Earth – Entertainment Version**

The depiction in Dick's novel of the problem of various historical flows in alternative worlds directs our attention to the problem of how parallel realities are constructed. In the case of *The Man in the High Castle*, as well as many other works, the creation of parallel worlds takes place in such a way that one or several developmental tendencies are selected and a thought experiment is conducted on that basis, modifying our Earth in terms of the predictable effects of certain changes. Sometimes such speculations are very ambitious. Let us imagine a reality of two-dimensional beings– Edwin Abbott's *Flatland* is built on such an idea. How would the world look if the physics of Aristotle corresponded smoothly to its empirical realities, and his pupil Alexander the Great had lived and ruled to a ripe old age?– is the question posed by Jacek Dukaj in *Inne pieśni*. My purpose here, however, is less to engage with elaborate intellectual brainteasers than to consider the function of the phenomenon I have described within popular culture. An exemplary model of such an approach is the American series *Sliders*, released in Poland under the title *Piąty wymiar* (The Fifth Dimension).

Quinn Malory, a physics student, builds a laboratory in the basement of his house, where he experiments with what is known as the Einstein–Podolski bridge. He manages to cre-

ate a clock that allows him to travel between worlds. After accidentally erasing the coordinates of Earth, he is doomed to a life of wandering, accompanied by his friends, to various other versions of the planet. The series's creators enjoy playing around with sociological and historical realia. Consecutive places represent various fundamentally simple modifications to existing reality. What would happen if America were still a British colony? Such a world is created using references to stereotypical notions about the English (a certain conservatism, a phlegmatic nature), at the same time using popular myths (Robin Hood battled with an evil sheriff). The episode "Eggheads," on the other hand, presents an over-intellectualized Earth. Hip-hop artists rap about literature,<sup>7</sup> and the American national sport is "Mind-game" (in which complicated manoeuvres involve reciting the answers to questions about scientific achievements).

What role do the characters' leaps through parallel worlds play in the series? It seems that they serve primarily to provide an interesting setting for the action. Considerations of possible sociological or cultural results of those modifications are usually just broadly sketched (each episode lasts about forty minutes, and a respectable serial must contain some action-adventure elements), but the fact that the characters get entangled in the problems of a different world each time is excellent for maintaining tension. It should also be mentioned that later seasons of *Sliders*, though they did not abandon the motif of

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<sup>7</sup> In fact we are not too far removed from such a world, since we have MC Hawking and a rap has been composed on the topic of the Large Hadron Collider (it can be watched at: <http://www.youtube.com/watch?gl=PL&hl=pl&v=j50ZssEojtM>; accessed 16.07.2017).

wandering between worlds, came significantly closer to following action film conventions and focused on a single guiding narrative line— humanity's war against the Kromag race, originating on an alternate Earth.

The series, precisely because of its entertainment function, appears to perfectly mirror certain stereotypes associated with the culture of the United States. The worlds where political systems other than American-style democracy have triumphed are generally presented as worse (the world of the British is merely slightly backward technologically, while the world of the Soviets is a repellent place). The characters themselves, however, sometimes seem to bring to life the ethos of the pioneers of the Wild West as they explore terra incognita, and there are sometimes signs of encroaching freedoms and democracy. *Sliders* thus manifests an important trait of popular culture—the constant reproduction, though not always directly verbalized, of stereotypes and ideology.

So what is the series's take on science? A student making a breakthrough in physics while conducting an experiment in his basement? In an era of long-range accelerators, built over the years for enormous sums (the Large Hadron Collider at CERN is 27 kilometres long, was created by 60 countries working together and cost billions of euros), such an image elicits mirth (there is a distinct evocation here of the stereotype of the loner genius). Furthermore, in the series, Quinn's machine is based on the theory of the Einstein-Podolski bridge. That also represents a playful

use of scientific achievement, since, as I mentioned above, the theory of time-space tunnels involves the concept of a bridge, but it is the Einstein–Rosen bridge. Borys Podolsky was a physicist who collaborated with Einstein, but his name appears in the so-called Einstein–Podolski–Rosen paradox. *Sliders* is just playing at being scientific, but precisely for that reason the series perfectly represents the entertainment strain of SF. Here, an intriguing issue develops: what if “hard” SF, following the development of science more closely, is no longer even possible? The image of the world that emerges from the discoveries of researchers nowadays contradicts common sense, and the growth of knowledge in all areas renders impossible its mastery not only by ordinary people, but even by specialists. If the culture is adopting that way of thinking, it may become hard to create literature or films that reference scientific discoveries and are simultaneously accessible to audiences. Science fiction does not necessarily have to become popular mass entertainment, it may become an area of philosophical or theological speculation, for example, but it is definitely becoming less science and more fiction.

### **Variations on the Theme of Earth – Serious Version**

So far in these reflections I have described works that take a fairly free approach to physics hypotheses about the existence of parallel worlds. For this last section, in contrast, I will discuss a novel deeply immersed in scientific knowledge—I have in mind Neal Stephenson’s *Anathem*. A great honor was conferred on this book when it was reviewed in the prestigious science magazine *Nature*.

Stephenson's novels, most of which have been published in Poland, show a visionary imagination that draws on the accomplishments of past authors (for example the world of nanotechnology presented in *The Diamond Age* grew out of Stephenson's intensive study of China, the Victorian era, the tradition of the *Bildungsroman*, and the thought of Alan Turing; *Snow Crash*, a thought-provoking vision of virtual reality, makes use not only of the attainments of IT, but also anarchistic thought and Sumerian mythology). The case of *Anathem* is no different. In the acknowledgements, located at his website, Stephenson offers a long list of philosophers, physicists and mathematicians.<sup>8</sup>

The action takes place in a parallel world called Arbre, whose history has many points in common with that of Earth. Stephenson's concept involves a proliferating variation on Platonism which also uses parts of quantum mechanics. Successive parallel worlds are reflections of each other; the closer they get to the source reality of pure intellectual entities, the clearer become ideational divisions (in the course of the action it becomes known that Arbree constitutes the model for a world called Fthos, which is in turn the model for Earth). The scientific foundation of *Anathem* is made manifest chiefly in the specific way in which the action develops. Most of the characters are *avouts* (a word that refers to a scholar-theorist who lives according to strict monastic rules— after some events which partially correspond to the historical earthly catastrophes

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<sup>8</sup> N. Stephenson, *Anathem*, <http://www.nealstephenson.com/anathem/acknow.htm> (24.10.2009).

of the 20th century, scientists have been kept in isolation on Arbre to prevent the further development of destructive technologies), including the narrator, a young adept. As they encounter unusual events, they attempt to understand them, relying on their knowledge. The text therefore fills up with discussions. One frequently discussed topic is the concept of parallel worlds— theories from quantum physics are invoked, as are various interpretations of Plato's philosophy. Does the book not thereby become over-intellectualized and boring? Such accusations have been voiced, but I believe that Stephenson's intellectual games represent a worthy attempt, and the discussions are easier to digest in that the narrator is a novice (so that he, too, must listen to explanations). Furthermore, by means of the action's submersion in scientific and philosophical speculation, the novel revitalizes old SF conventions, since deep intellectual underpinnings allow a series of interesting details to be brought in. Thus the action of the novel also becomes more colorful (for example, an important role is played by the question of the different atomic structures in various universes, which means that the characters are unable to eat food from a universe not their own). In addition, the reader, following the characters' discussions, must put himself in the role of an intellectual detective and identify the equivalents of figures and concepts from earthly history. The action, after all, takes place in a parallel world and the characters' language as well as their intellectual tradition remain related to ours but also differ significantly. For example, on Arbre the figure corresponding to Plato was named Protas, and the language of

religion and science is called Orth (Stephenson introduces many neologisms in situations where he claims there is no exact earthly equivalent).

Thus in *Anathem* parallel worlds constitute the central element of the the action and problematic of the work. The effective combination of Plato and quantum theory with the concept of a series of worlds bringing to fulfillment the stream of ideas can also, however, be read as a kind of accusation. This is how Jacek Dukaj formulated his objections: “Revealing a variety of emanations of the same ideas, visible in our world also, Stephenson imposed upon himself very powerful limitations, fettering his imagination. Nothing here can be genuinely other or original– for the author would thereby be violating the basic premise of his book. Even its characters speak towards the end of having a sense of something banal. Because we change the names, but if we take away from *Anathem* its repetition of what Tatarkiewicz did – what remains? This main can’t-miss idea, a few minor gadgets, humor and ironic commentary on contemporary life, a few effective scenes... Enough for a good book, but – is it enough for a Neal Stephenson book?”<sup>9</sup> I nevertheless find that the novel holds up well in spite of everything, if nothing else through the careful accumulation of detail mentioned above. And perhaps most importantly, it constitutes an answer to the question outlined above about the future of “hard” SF – like Stephenson’s earlier texts, in fact, or like the works of Dukaj himself.

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<sup>9</sup> J. Dukaj, “Cień nerda w jaskini Platona,” *Czas Fantastyki* 1/2009, available online at: <http://ksiazki.wp.pl/felietony/id,38610,felieton.html> (24.10.2009).

## **Boundaries of Infinity**

Michio Kaku, in discussing the famous paradox of Schrödinger's cat and the equalization of the wave function, explains the hypothesis of the multiverse as follows: "Wave functions never collapse, they just continue to evolve, forever splitting into other wave functions, in a never-ending tree, with each branch representing an entire universe."<sup>10</sup> According to this conceptualization, there exists an infinite number of universes. In comparison with this richness, the inventiveness of science fiction authors is less spectacular, though the SF library also contains many interesting visions. The few works described in the present essay obviously represent merely the tip of the iceberg, but even that segment allows us to state that science fiction is a protean creation, and this applies not only to the branch that deals with parallel worlds. One subject, one concept can take on the most varied forms. On the other hand, at the same time, this seemingly unbridled creativity of SF turns out not only to depend on genre schemata and conventions, but also to be simply limited by our own Earth, its languages and cultures. Even great experimenters, desiring to show something Other, use modifications of what is familiar. Such a statement is by no means necessarily an indictment of science fiction, and may even be transformed into an apologia for it—because in the end we find that fantastic worlds can tell us a whole lot about our own world here and now, if we only dare to visit them.

**Translated by Timothy Williams**

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<sup>10</sup> M. Kaku, *Parallel Worlds...*, p. 168.