

Imaginary Representations of the Technical Image

Escher Spaces in Science Fiction Works¹

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Abstract

Our study deals with the unique spatial structures of science fiction works. According to Scott Bukatman, the rhetoric of technological majesty in science fiction is one of the most defining experience transmission elements and mood regulation. The genre abounds in artificial infinity: giant spaceships, boundless outer space, hyperspace, planetary cities, galactic empires, and more. However, this shared and genre-specific vision can be supplemented by another type of spatial structure, as the infinite can be produced differently. We can approach this other route from the productions of M. C. Escher. The artist's most famous paintings, inspired by an article by mathematician Roger Penrose, are based on an apparent paradox: we start on a flight of stairs, uphill, always in the same direction, and after a few rounds, we reach the same level from which we had started. Douglas R. Hofstadter called this phenomenon a strange loop based on the circularity of thinking, the mathematical concept of pattern, and the dilemma of the visual representation of infinity. If one takes a look at the sci-fi spectrum, one can immediately see the prevalent use of Escher spaces or strange loops. In Christopher Nolan's film *Inception*, this visual organizing element is present on several levels: it is a defining figure of the plot, dramaturgy, but it can also be understood as an interpretive model encompassing the whole composition. Escher images are evident in the film industry, but a strange loop is often mentioned in sci-fi novels. Our study provides several examples of this phenomenon from the field of literature, from Sergei Lukyanenko's Watch Series through George B. Marvell's novel *Világok útvesztője [Maze of Worlds]* to Ted Chiang's novella *Story of Your Life*. Our intermedia analyses can contribute to the approach of image techniques and visual perspectives common in speculative fiction, of which the phenomenon in question may be one of the most widespread because it brings to the fore the point of intersection of the medial and the real as well as the possible and the real. Simultaneously, the recipient becomes aware of the fictitious world made up of laws and regularities different from ours from the point of view of paradoxical shapes. The technical image can define and control the imaginary representation in this sense.

Keywords: Escher space; Inception; Strange Loop; impossible objects; paradoxical shapes; simultaneous time

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Introduction

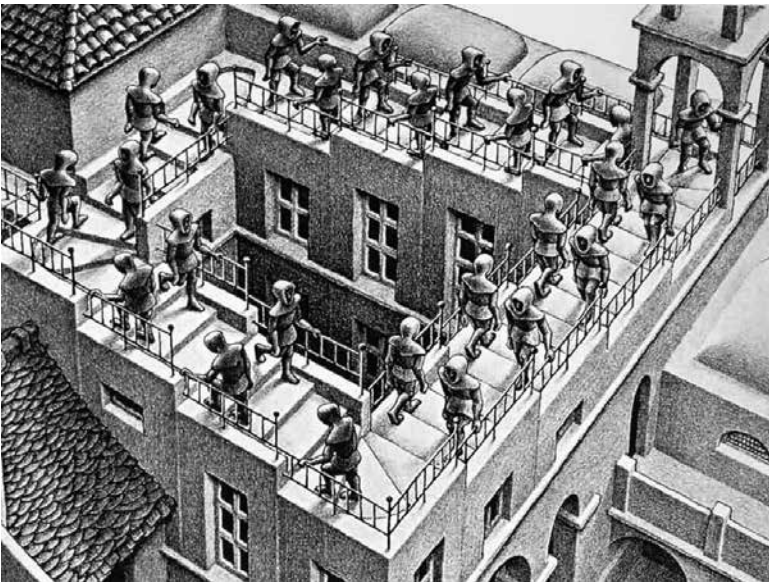
In science fiction, the rhetoric of technological sublime is one of the most defining elements of experience transmission and mood regulation. Scott Bukatman says science-fiction objects are majestically incomprehensible, as in the Isaac Asimov Foundation series of the city of Trantor, which covers an entire planet (thus being one of the limitless settlements of science fiction), or the spaceship in the opening scene of *Star Wars*, which is too big for our brains to accommodate. In Bukatman's conception, the science-fiction genre is directly and deeply connected to its majestic symbolic meaning. (Bukatman 2000)

From the aspect of vision technique this means that since the spectator sitting in the cinema witnesses the opening shot of *Star Wars: Episode IV – A New Hope* (directed by George Lucas), there is no point of reference within the scene. From this point of view the *Star Wars* series belongs to the variety of science fiction that abounds in artificial infinity: huge spaceships, boundless outer space, hyperspace, planetary cities, and galactic empires, combining huge snow fields and deserts with mechanized landscapes, and so on. All of this requires a system of extreme long shots (XLS) and wide-angle scenes (similar to westerns), yet the viewer's gaze can easily get lost in alien, monumental space. Close-ups (CU) of characters are therefore of great importance: on the one hand they counterpoint the infinite and on the other hand they can make the relationship to it reflected.

However, this usual and genre-specific perspective can be supplemented by another type of spatial structure, since the image of infinity can be produced in other ways. In the hugely successful film *Inception* (directed by Christopher Nolan) when Arthur (Joseph Gordon-Levitt) talks to Ariadne (Elliot Page) about the construction operation, he shows her a strange flight of stairs that turns into itself. Solutions of this nature (paradoxical constructions), he says, help to hide the boundaries of the dreamscape. The visual representations and operation principle of the staircase (as well as the cityscape folding onto itself) undoubtedly refer to M. C. Escher's lithographs (in the scene quoted, Arthur calls it the Escher staircase; no one draws attention to them during the action, but they can be seen at several points). The film can also be watched in a way that the action - the inception itself takes place in a strange setting that returns to itself. (After the collapse of the dream space, a sudden cut takes Cobb [Leonardo DiCaprio] and Saito [Ken Watanabe] from the Waiting Room to the cabin of the plane. Thus, for them, the fourth dream level is followed by a situation treated as reality questioning its identity. From this point of view the tilt of the totem is secondary, as the Escherization of the action also implants the very same idea in the viewer that Cobb has incepted in the subconscious of his late wife, Mal [Marion Cotillard]: "Your world is just a dream.")

The function of the Escher space in Nolan's film *Inception*

M. C. Escher's most famous paintings, inspired by a mathematician Roger Penrose's article in the February 1958 issue of the *British Journal of Psychology*, are based on an ostensible paradox. For example: we start up a flight of stairs, always in the same direction, and after a few rounds we reach the same level from which we had started (*Ascending and descending*). Or: we see a waterfall that drives a mill wheel, then the water continues to flow meandering and once again opens into the same waterfall that drives the mill wheel (*Waterfall*). This phenomenon is the so-called strange loop, which is based on the circular nature of thinking, the mathematical concept of pattern, and the dilemma of the visual representability of infinity.



Picture 1. M. C. Escher: *Ascending and descending* (Part of the Picture)

According to Douglas R. Hofstadter's fundamental book, the bible of computer culture *Gödel, Escher, Bach: an Eternal Golden Braid* "The »Strange Loop« phenomenon occurs whenever, by moving upwards (or downwards) through the levels of some hierarchical system, we unexpectedly find ourselves right back where we started." (Hofstadter 1999, 10) Viewed from here, a loop is a representation of an endless process in a finite way. "My belief is that the explanations of »emergent« phenomena in our brains – for instance, ideas, hopes, images, analogies, and finally consciousness and free will – are based on a kind of Strange Loop, an interaction between levels in which the top level reaches back down towards the bottom level and influences it, while at the same time being itself determined by the bottom level." (Hofstadter 1999, 709)

Awareness of this is sufficient to see through the main paradox of *Inception*. In the second half of the film, we follow the series of actions of Cobb's team. The

first level is reality, the cabin of the plane from where the team starts off and infiltrates Fischer's subconscious mind. The second level is the cabin of the minibus, in which Yusuf (the dreamer of this level) stays awake, the others fall asleep again. The third level is the interior of the hotel, where Arthur generates and manages the dream; the rest of the team, however, does not stop here, falling asleep again. The fourth level is the winter fortress, the siege of which is dreamt of and therefore commanded by Eames, and where the Cobb squad has hid the chamber in which they want to carry out the inception. However, Mal's projection intervenes, shooting Fischer, who falls into the Limbo (a kind of waiting room). Saito sacrifices himself and gets there too. Cobb and Ariadne follow the two businessmen to the most dangerous place, from which there might not be a way back. After Ariadne shoots Mal and Cobb stays in the Limbo to find Saito, Ariadne wakes up Fischer with a 'kick', taking him back to the upper level; the idea is implanted, and then, at every dream level, we see the sleeping members of the team as they are waking up (or already being awake). Except of Cobb and Saito, who meet in the Limbo, the latter reaches for the gun and then, after a dialogue between them, we end up in the cabin of the plane with a sudden cut. (The sudden cut, the *in medias res*, however, is also a feature of dream zones, and death is identical to awakening.) Cobb and Saito also wake up, the mission is accomplished successfully, and Cobb is back home with his children as planned. In the final scene of the film, Cobb spins the totem that serves to distinguish dreams from reality: if it tilts, we are in reality, if not, we are in the dream world. The last cut follows: we do not see what happens to the totem. The film ends.

However, the interpretation only begins here, thanks to the perception of the Escher space, as this open ending doubles the course of the plot. The viewer seems to be able to make a decision, and surprisingly, arguments can be listed for both versions. Did the extractor and his team complete the mission and then get back to reality? Or, according to the "your world is just a dream" idea (which destroyed Mal), are Cobb and his companions actually still in a dream world? This duality can be resolved by jumping to the next level of reasoning. If it is indeed the Escher space that marks the boundaries of the dreamscape, then the film can also be viewed that the whole construction forms a Strange Loop. That is, the level of the plane from which we took off and where we arrived is the point where the hierarchical system returns to itself and this self-turning back structure of space becomes perceptible again. If this is the case, then the question is whether there is an invisible additional level besides the visible Strange Loop that is not visible from our point of view, but dissolves the paradox. And who can be the dreamer at this perpetual level?

Hofstadter explains the dissolution of the paradox based, among other things, on Escher's painting *Drawing Hands*. (Which, by the way, also flashes up in Peter Greenaway's *The Draughtsman's Contract*.) "Here, a left hand (LH) draws a right hand (RH), while at the same time, RH draws LH. Once again, levels which ordinarily are seen as hierarchical—that which draws, and that which is drawn—turn back on each other, creating a Tangled Hierarchy. [...] behind it all lurks the undrawn but drawing hand of M. C. Escher, creator of both LH and RH. Escher is outside of the

two-hand space [...]. One could further Escherize the Escher picture, by taking a photograph of a hand drawing it. And so on.” (Hofstadter 1999, 689) Based on this, it is also possible to continue playing with the structure of *Inception*, as the dreamer of the airport lounge – according to the concept – is awake during the action. Who can be that person? Nolan, the screenwriter, as Hofstadter refers to the case of the hand-drawing artist? Christopher Nolan’s concept is ingenious from this point of view, because with this solution he not only ingrains in the viewer’s mind that perhaps “your world is just a dream,” but also confronts them with the notion that it only seems so from a certain position. However, we do not necessarily have to stabilize any of the meanings, for it may easily be that what is essential is *indecision* itself. This duplication thus follows from the divergence of the materiality of the medium and the mediated act. When the loop system of the Escher space becomes perceptible, and this opens the world of the work to the viewer, uncertainty arises because we see both systems, but to do so we must perceive the story and the materiality of the relay system at the same time.

In connection with one of the chapters of Szilvia Deisler’s book *Puzzle-hatás* [The Puzzle Effect], a fruitful debate could be initiated regarding the approach to *Inception*. The author keeps the possibility in play that *the entire story* can be accessed through the *memory* of Saito (Watanabe), which is justified by the discrepancy between the opening and one of the last scenes, and since the memory is unstable, the real life (or rather reality) is already shaken. We think, however, that the story of the film is not necessarily Saito’s memory or dream, as it is neither Cobb’s (DiCaprio) nor the others’, but their alternation. (The characters are connected in the dreamscapes, the action takes place in Fischer’s mind, and Mal emerges from Cobb’s unconscious at every level until the man makes peace with her death and lets go of her. It is essentially the same as his remorse, because with the inception, the infectious thought, he caused Mal’s death in part.) The non-identical repetition of the starting scene does not rule this out, rather, it may be about seeing the scene from a different perspective. It might be important that even though the Strange Loop is a hierarchical system, that is, we get to one level through another, one of the levels can be absolutely real. After the collapse of the dream space, Saito and Cobb cannot go back, for them, after the Limbo, the cabin of the plane follows, where the loop returns to itself. The Escher space serves to mark the boundaries of a dream according to fiction, so it can also be one of the dream levels, but we do not have to assume that it is connected to Saito’s memory.

Thus, the initial scene can also be understood immanently: Saito is familiar with Cobb from another dream because he has spent decades in that dream space since their separation, and thus, he refers to another dream level. If the film bounces in this way between the dream spaces and the level believed to be real by the viewer, then, on the one hand, the final shot hits bigger. On the other hand, the inception also extends to the audience, as the film successfully implements that particular sentence in the viewer’s mind. And this can certainly be extricated from Saito’s consciousness. If, on the other hand, we connect (relate to one another) the scenes in which Cobb spins the totem, we find that at the levels that can be treated the same as the plane cabin level, it tumbled once, then again it did

not. When, during the team building Ariadne realizes that something is wrong with Cobb's mind, they return to reality, Cobb flustered, runs out to the other room. He spins the totem which then tilts to its side. However, when Yusuf shows the opium cave-like nightclub where delinquents go to dream, Cobb spins the totem in the bathroom, sees the flashing image of Mal (representing his consciousness), but being distracted, picks up the totem, and we do not see it falls down or not. Just as we do not see the totem fall down at the very end of the film. 2:1 in favour of the dream? Or could it be more about the question being limited to whether Cobb has really returned and the viewer's level no longer matters? Here, too, we run into the figure of indecision which, it seems, can be interpreted by involving Escher space according to its characteristics described above, thus then the paradox can be resolved, or at least made visible.

Escher spaces in literary texts

The application of Escher images in the film industry is evident (from Greenaway's production of *The Draughtsman's Contract* through *The Lord of the Rings* to *Night at the Museum 3*), let us now look at one or two *literary* examples of the figure in question. In Dan Simmons's space opera *Hyperion* (and its sequels), loops of this kind are mentioned several times in interpreting poetry and intelligence. In Diana Wynne Jones's fantasy novel *Deep Secret*, the hotel serving as the scene of the plot operates as if it had been designed by Escher. But we can also mention Charles Stross's posthuman sci-fi, *Accelerando*, in which the cylinders orbiting planets without the Sun, home to the remnant colonies of mankind, are also reminiscent of Escher's space. (Some examples of alternative canons without claiming completeness; Escher references are also found in the works below: Adrian Barnes: *Nod*, Kim Stanley Robinson: *Aurora*, Kim Stanley Robinson: *2312*, Neil Gaiman – Michael Reaves: *InterWorld*, Neil Gaiman – Michael Reaves – Mallory Reaves: *The Silver Dream*, Neil Gaiman: *American Gods*, Lev Grossman: *The Magicians* etc.)

Naturally, works belonging to other canons could also be mentioned in good numbers, one of the most amazing being probably Mark Z. Danielewski's novel *House of Leaves*. (If we also include works whose beginnings and endings are the same – that is, they form a textual loop – we should refer to Milorad Pavić's short story *Akseanosilas*, of which the title and the last word are the same, in this way, reading the title will be equivalent to murder.) In Danielewski's work, the labyrinth that appears at fiction level in the House of Navidson also makes the text itself a labyrinth; the direction and structure of the text takes on the movement of the person wandering in the maze and the shape of the maze itself, thus handing over its primary function to something else. In this intricate work, then, we move in different directions (forward, backward, right, left, up and down), in the same hope as the characters trapped in the maze of the house: that we might figure the way out of it. The story, however, can only continue to create itself while destroying itself, that is, the way out of the maze at the level of the diegesis becomes possible only by

removing the medium carrying it, producing a closed hierarchical system returning to itself, where the levels are constantly creating and destroying one another, i.e. making it virtually impossible to actually get out (cf. Deisler).

Among similar solutions Sergei Lukyanenko's *Watch Series* stands out, as the strange loop becomes one of the most important tropes in the work. The Others' special abilities (inter alia) is immersion in the so-called Twilight (Gloom); what is more, even magic power relations can be classified according to how many levels the watchmen can enter in the special space. The novels constantly suggest that the Twilight consists of several levels, but only a few can reach the lower levels. When Gorodetsky reaches the sixth level of the Twilight at the end of the fourth book, following that his daughter takes him to the next, it turns out that the Twilight is actually endless because "we all live in the seventh layer of the Gloom". That is, in a strange loop... (In the fifth volume of the series, *New Watch*, there is a dialogue that confirms what has just been said. This is how one of the characters in the novel makes a statement about the phenomenon in question: Each layer of the Gloom is more and more different from our world, however, it is possible to return to our world from the sixth layer, which is thus no other than the seventh layer of the Gloom.)

George B. Marwell's philosophical thriller *Világok útvesztője* (Labyrinthus Mundi) was published a few years ago. The cover of the eye-catching book features several shapes that play an important role in the story (e.g. a labyrinth-like texture, a picture referring to time, a capital letter I, the caption Labyrinthus Mundi), and the cover's folded flap shows a detail of Escher's *Ascending and descending*. (The same detail was shown above.) Not by accident. In the novel, during the investigation into the mysterious murders, investigators are confronted with a world structure, several details of which outline Escher spaces. The first specific reference alludes to the following analogy: "In the three-dimensional space that can be described by Euclidean geometry, a line rising incessantly cannot return to its own starting point; so the artist had to deceive the viewer and outwit the laws of Euclidean space in order to depict the strange loop. However, the abbot of the monastery seemed to have just hinted that *this staircase did exist*, and was nothing more than the library itself..."

The phenomenon investigators stumble upon is referred to in the monastery as the steps of Satan; the expert on symbols, Dr. Larkin, interprets it as a prototype of labyrinths that virtualizes space and replaces reality. The narrator refers to Escher six times, the characters in the story actually experience the operation of the strange loop, and at the end of the story, Larkin puts it this way: "M. C. Escher's self-returning stairs are nothing but the time we have experienced." He says so based on the fact that time goes into nothingness in both directions (past and future), we all end our lives where we started. From this perspective, we are in a strange loop whose starting point and end point seem to coincide: for you are dust, and to dust you shall return. This is true in itself, but it is through Escher space that the work pushes off in the direction of speculation (e.g. in the characters' opinion, sensations, imagination, will, etc. modify the physical world).

Finally, an amazing example relating to time and thinking. Ted Chiang's book *Stories of Your Life and Others* is considered one of the most important collections of short stories in science fiction. Greg Bear says "You won't know SF if you don't read Ted Chiang." However, science fiction is definitely worth knowing... Therefore, following a little context-building, we will deal with the title short story on xenolinguistics in a nutshell. (An excellent film adaptation of the story by Eric Heisserer, titled *Arrival* and directed by Denis Villeneuve, was released in 2016.)

Science distinguishes many and more directions (or arrows) of time. Some of them are as follows: the expansion of the universe marks the *cosmological arrow of time*; the more disordered segments of the world determine the *thermodynamic arrow of time*; the aging of living beings represents the *evolutionary direction of time*; the difference between the past and the future determines the experiential direction of time; the direction of light propagation – also from the past to the future – means the *electromagnetic direction of time*; the propagation of electric charges is related to the *gravitational wave-type direction of time*. We can also distinguish *psychological, causal, particle physics, quantum, and radiative* arrows of time). (At the same time, strictly speaking, time is a relationship concept that results from an increase in entropy.)

If we approach the problem of time from scientific aspect, Einstein's theory of relativity, Hawking's bestseller *A Brief History of Time*, John Gribbin's work *The Birth of Time*, Sean Carroll's writing about ultimate theory of time *From eternity to here*, Lee Smolin's book *Time Reborn* and Carlo Rovelli's monograph *L'ordine del tempo* [The Order of Time] could identify the domain within which we can move. If, on the other hand, we were to try to explore the relationship between art and time, the work of a lifetime would not be enough. This is because the processes that unfold over time affect almost every branch of art and medium, from rhythm to moving images. Not to mention the works that make time itself a theme (from Cage, Dali to Pink Floyd and time-traveling sci-fi to Proust).

Ted Chiang's great novella *Story of Your Life* runs on two threads: linguist Louise Banks talks about the great event of her life, the deciphering of the communication system of an alien civilization, and, addressing the subject and the object, she flashes details from her daughter's life story. To simplify it a bit, the first line goes in chronological order, the other story goes backwards, from death to birth. On the way, the exploration of foreign language and writing is associated with some key phenomena and a special concept of time. The examples: Escher, Borges, Fermat. (The former models the writing pattern of aliens, the heptapods; their signs "formed a grid pattern evoking Escher". Starting from this triangulation point, a serious scholarly paper could be written about the theme centres of the short story. Here we only flash a moment in the medium where the primary function of language is not communication, but the facilitation of thinking.)

The language of strangers is performative, their perception of time is parallel, so they know in advance what is going to be said in a conversation. Accordingly, Chiang's text also turns back into itself, forming medial loops while doing what it is talking about. Just as the ending of the short story contains its ending, so can be comprehensible the way of thinking that views life story not along a linear code but

simultaneously in time (because Louise's brain is re-wired by the foreign intellect). From this point of view, the above list can be supplemented by the *performative* direction of time, which is therefore suitable for talking about a time whose medium is the language that produces the Escher/Borges pattern.

"For the heptapods, all language was performative. Instead of using the language to inform, they used language to actualize. Sure, heptapods already knew what would be said in any conversation; but in order for their knowledge to be true, the conversation would have to take place." (Chiang 2016, 138) The short story works accordingly: Banks narrates the life story in the language of the strangers, creating it in advance as a performative act. However, as a result of her knowledge of xenolinguistics, Louise foresees the future, the death of her daughter, and could change it – she does not get together with her daughter's father – yet she does not do so. On the other hand, the xenolinguistic code re-wires her brain, making Louise remember the future, so she cannot even change it. (This Escherizing moment will also be one of *Arrival's* central dramaturgical and visual organizing figures.)

The Boundaries of Escher Space

As can be seen, Escher space is a recurring figure in contemporary literature. However, it also has a feature that can destroy the apprehension of text autonomy. When writing collides with Escher space, reading immediately moves in the direction of visual imaging (an intermediate loop is created). We see Escher space more than we understand it. This is a good example of a flashing image facing the limits of our thinking. Although the master anno stated that he feels closer to mathematicians than to artists, the strange loop shows exactly what logically cannot always be fully conceivable (even if the paradox seems solvable by involving a next level, for example, the hands drawing each other are drawn by a third hand, the artist's). As the eye sees, but the mind cannot grasp the infinite that changes from two-dimensional to three-dimensional.

The reason for this is not infinity itself (for example, we can move in one direction indefinitely even on a sphere), but the plus dimension of the hierarchical system, as a result of which the plane has the properties of the curved space. The Escher space brings to the fore the collision point of the possible and the real – perhaps which is why it is popular with pop culture and literature as well. (The system returns to itself the way it should not return.) Therefore, a possible world with strange loops would be fundamentally different from the world we think is ours.

Summing up from the intermedia point of view, we can say that among the imaging techniques and visual perspectives common in speculative fiction, the phenomenon in question may be one of the most widespread because it brings the collision point of *the medial and the real, the possible and the real* to the fore, while the recipient becomes aware of the fact that, from the point of view of paradoxical shapes, the fictitious world is made up of regularities different from ours. The tech-

nical image can define and control the imaginary representation in this sense. The Escher space truly marks the boundaries of our world, while confronting us with the disruption of these boundaries by fiction through the very same figure.

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