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**The Virtual Body in Science Fiction:
a Study on Phantomatics**

SUMMARY
OF THE PhD THESIS
IN THE FIELD OF PHILOLOGY – THEORY OF LITERATURE

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“The Virtual Body in Science Fiction: a Study on Phantomatics” is a PhD thesis of 219 standard pages and consists of an introduction, three chapters, a conclusion, a lexical addendum and a complete list of references (bibliography, cinematography and ludography).

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A physical copy of the text and all its materials can be found in the main building of Sofia University, floor 4, room 155.

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General Overview of the Dissertation

Thinking the phantomatic as body and the body as phantomatic – such is the intention behind the dissertation. Its main goal is to reconstruct Stanislaw Lem’s theoretic apparatus, to solve some of the more serious conceptual problems of the polish science fiction writer’s theory of the phantomatic and to delineate its particular limits. To that end the study relies on the theories of Pierre Levi and Roberto Diodato, which in turn are based on notions established by Deleuze and Merleau-Ponty. The purely technical aspects of the issue are examined through the works of Marie-Laure Ryan and Paul Addams; with their help the dissertation attempts to build up a clear conceptual framework which can then be merged with the models already developed by Lem. The literary material used to illustrate the scholarly claims presented in the dissertation is intended to extend the classification of Victor Yaznevich and to expand the critical sketches of Atanas Slavov by completing the list of science fiction works with some of the genre’s most recent discoveries.

The structure of the dissertation is comprised of an introduction, three chapters, conclusion, bibliography, filmography, ludography, and a dictionary appendix.

Introduction

The introduction summarises the first part of prof. Marcello Vitali-Rosati’s book “S’orienter dans le virtuel”, where the scholar of literature and digital culture traces the development of Aristotle’s concepts *dunamis* and *dunaton* and arrives at a certain disproportion between them. The lack of symmetry in the uses of the two concepts creates a tension in their Latin translations (*possibilis* and *virtualis*, respectively) and affects one of the key problems of philosophical thought on the possible, which has traditionally been presented as “possible in the previous” and “possible in the consequent”. Rosati’s text further extends its historical account by quoting Diderot and D’Alembert’s, where a similar contradiction is found in some definitions of mechanics and optics – two branches of physics that disagree on whether to conceive the virtual as *something more* or *something less* than the real. Thus virtuality is established to be a paradoxical construct which generates additional hybrid forms with the arrival of multitasking systems in the 1960s. Rosati’s analysis attempts to go beyond this time by adding brief notes on the science-fictional, but fails to fully grasp the genre, which allows

the present study to assume that science fiction is not based on concepts such as those employed by the sciences, but is instead a way of thinking through narrative and images, capable of offering an adequate interpretation of current tendencies. The dissertation simultaneously treats science fiction as both an object of study and a theoretical framework through which the relation between reality and fiction can be understood in a new way.

Chapter 1: Stanislaw Lem's Phantomology

The first chapter of the dissertation is based on the observation that the proliferation of discourse on virtuality has caused a Babylonian overabundance within the topic, thus erasing the boundaries of its meaning and admissible forms, which has led to an expansion of the traditional terminological framework beyond any admissible parameters, intertwining it with multiple different, even contradictory, philosophical and social currents. As a result, the relevant terminology no longer refers to anything specific and has become understandable without genuine understanding; in other words, it has itself become virtual. In order to overcome this obstacle, an attempt is made to focus on a reliable chronology, which is to delimit the lexical development of the phenomenon commonly known as "virtual reality".

The chapter attempts an overview of the concepts with which this science-fiction subtopic can be studied. This leads to a reappraisal of Stanislaw Lem, whose role in the subject matter is frequently overlooked. His thinking becomes foundational for the study. The model used in the dissertation is based on the theoretical articles of the Polish author and is applied to his own works, which requires additional corrections of the initial outline and sketches the way forward for phantomatics as a critical instrument.

1.1. A pocket calendar of virtual reality

This section mentions Ivan Sutherland ("The Ultimate Display", 1965) and Myron Kreuger, who introduces the term "artificial reality" in 1972, later publishing a book under the same title in 1983 (Yaznevich 2001: 45). Especially relevant in the discussion of the virtual is the figure of William Gibson, called a prophet and father of cyberpunk. His huge popularity is due mostly to the neologism "cyberspace", which he forges in "Burning Chrome" (1982) and further develops later, in 1984, in the novel "Neuromancer" (Jones 2016). Although the temporal limits of the idea are extended to include many more phenomena and figures, including the experimental theatre of Morton

Heilig (“Sensorama”), the aviatory simulations in 1944 (Yaznevich 2001: 45) and even the practice of reading itself (McCook 1993: 626 – 628), the true pioneer who talks about these familiar concepts within the lexicon of technical progress is the Polish science-fiction writer Stanislaw Lem. This occurs in his “Summa Technologiae”, published in 1964.

1.2. Stanislaw Lem and his “Summa Technologiae”

The marginal position of the “Summa” within the discourse on virtual reality is explained by the initially poor reception of the work, of which only 3000 copies were published, to receive a single (negative) review by the philosopher Leszek Kołakowski in the November 1964 issue of the journal *Twórczosc*. The book is entirely translated into English 49 years later, in 2013, when it is already widely popular on the territory of former USSR Countries and Germany. However, the development of technology at this point is tremendous and the social effects of this delay have been more than decisive for the destiny of phantomatics outside the Eastern bloc.

1.3. First Steps into Phantomology

Stanislaw Lem’s vocabulary is much different from that of Western thinkers, which allows the scholar to apply it to differentiate specific uses of the virtual within science fiction. This requires, however, the careful study (and re-evaluation) of the sixth chapter of the “Summa”, which offers a sketch of “phantomology”, as the Polish writer calls it. Phantomology is a conceptual project divided into several branches: “Basics of Phantomology”, “The Phantomatic Machine”, “Peripheral and Central Phantomatics”, “The Limits of Phantomatics”, “Cerebromatics”, “Teletaxy and Phantoplication”, “Personality and Information”. The core of these branches is phantomatics, or the theory dealing with the creation of artificial environments, similar to ours to the point of irreognizability (Lem 2013: 191). Lem insists that this is different from the creation of inhabitable realities which are completely indistinguishable from standard reality but obey different laws; in the prior case we speak of illusion, in the latter, of authentic world-building (Lem 2013: 191). In other words, phantomatics is a branch of phantomology and is logically required by the unidirectional nature of art. A “phantomatic machine” is thus an apparatus capable of generating a specific kind of fiction which combines computer algorithm and non-machine imagination; a fiction which relies on maximal substantivation and involves the entire human body in a process of acting out.

The section further distinguishes between other kinds of phantomological instruments and the purely phantomatic ones. It touches on cerebromatic machines (ones that reconstruct the human

brain), teletaxic devices (which connect the individual to a particular segment of reality and/or another machine) and phantoplicational mergers (which combine the neuronal connections of two or more people).

1.4. The Unfortunate Mr. Smith and the Identity of Theory

After phantomology's branches have been established, they are generally defined as "variations of a narrative in which the human brain is connected to a certain number of 'information relays'" (Lem 2013: 219). The following section, titled "The Unfortunate Mr. Smith and the Identity of Theory", deals with the final science-fictional sphere that phantomology can encompass, namely the merging and transforming of consciousness, which would not obliterate the existence of the individual (Lem 2013: 219). This includes Stanislaw Lem's experiments with the fictional "Mr. Smith", which round up the notion of phantomology and transform it into a working paradigm.



1.5. A Requiem for a Hyponym

The paradigm however goes through historic changes, and phantomatics, having long stood as a hyponymic concept, incorporates a large number of phantomological motifs, reworking them into multiple literary works; it becomes a shadowy hegemon of science fiction. The influence of its topics is further increased by Howard Rheingold and Jaron Lanier at the end of the 20th century. This section traces the metamorphosis of phantomology and its fundamental change, and explains the rise of the phantomatic with its hypostases within the topic of the digitalization of the world.

1.6. "So What?" The Meaning of Phantomatics for Contemporary Literary Studies

After the dissertation has presented its theoretical framework and offered specific parameters

for its work, it faces the question about the need for restoring such a, some would say, outdated project.

To begin with, according to the dissertation, working with Lem's phantomology offers literary studies a privileged position in the transhumanism discourse. The task of creating and managing a virtual reality is not only a technical one, but also requires a critical viewpoint. By limiting the concept of VR and focusing on a particular aspect of it, namely phantomatics, the problem is cleared of its innumerable theoretical implications and can finally speak of itself specifically. This makes visible the fact that in science fiction virtuality is a more specific type of fictionality. Further, the suggested paradigm can also work as a genre delineator for science fiction, which produces a multitude of works that frequently spills over beyond the categories established so far.

A third benefit, which is also a goal for the rest of the chapter, is to go beyond a theoretical overview of Stanislaw Lem and to find manifestations of the concepts explored so far in his own literary work. Victor Yaznevich has attempted a similar undertaking, but his results present a mere sketch which requires serious expansion.

This expansion starts with thematic analyses of the novels "Solaris", "The Invincible" and "Return from the Stars".

1.7. A Step Back, or Return to the Stars: towards the Anti-eye and the Rethinking of the Paradigm

Certain terminological inconsistencies in Lem's literary corpus require a step back and a rethinking of the paradigm established earlier, which includes the addition of "proto-phantomatics". On an engineering level this refers to an external body attached to the eye's pupil to create an optically balanced system within it (Lem 2013: 192). Within this correlation, the natural eye functions as a receiver, and the artificial one – as a transmitter (Lem 2013: 192). The product can be described as a set of glasses, the wearer of which finds no noticeable difference in the external world, as the apparatus merely breaks the image received down into elements equal to the number of photoreceptors in the retina, and then stores the bits of information through use of a cable (Lem 2013: 192). Thus data is collected without any surgical intervention, and can be retransmitted back towards the brain (Lem 2013: 192). The entire process is not entirely comparable to the way microfilms work, as it is superior in degree.

The anti-eye is a conceptual solution which can connect the phantomatic with the teletaxic,

after it has been additionally enlarged by a third definition drawn not from Lem this time, but from the fabric of his fictional worlds, particularly his unusual application of the lexeme in “Return to the Stars”. The new meaning is fitted into the constellation of the previous ones and thus proto-phantomatics is used to assimilate holography into the topic of the study. A further addition is what William Gibson would later term “simstim technology”.

1.8. A Step Forward, or Return from the Stars: the Story of a Forgotten Phantomaton

After strengthening its definitions and testing the stability of its theoretical construct, the dissertation continues its analysis of Lem’s literary corpus. The section concludes the work on “Return to the Stars”.

1.9. Lem, Lem...

This section presents, analyses and compares the short stories “137 seconds”, “Altruisine”, “How the World Survived”, “Trurl’s Machine”, “Doctor Diagoras”, “Professor Zazul” and “Professor Corcoran”.

1.10. ...and Lem.

The final section of the first chapter studies in detail the richest manifestation of the ideas of phantomatics – the long short story “The Futurological Congress”, which combines fiction with chemistry and presents an entire spectrum of problems that suggests a new direction for simulation. Within the work (that is to say, from the meta-perspective of possible interpretations) this departure from computers is justified through an implicit change in the way technology is thought about. Humanity has decided to stop inventing ever newer machines which always have to deal with the obstacles presented by the laws of physics, and has turned to the perfect machine already furnished by nature, namely the organic body.

This approach opens up new perspectives for the present study, allowing it to consider the possibility of putting the image of the body at the center, as *axis mundi*, from which to begin a genuine renewal of theoretic work about the virtual. Such a renewal will depend on all that has been drawn thus far from Lem, but will also revitalize, adapt and update this material, in order to better fit it to contemporary tendencies and use it as an instrument to analyse multiple other works of science

fiction.

Chapter 2: Fundamental Problems of the Phantomatic Machine

The second chapter of the dissertation is devoted to the phantomatic machine and its integral problems, many of which turn out to be connected to the human body. Lem himself, being highly critical of his own texts, has noted several serious difficulties for the creation of the kind of two-directional illusion that, according to him, is the final product of the activity of the phantomatic machine. That is why the dissertation attempts to look at these difficulties, discuss them, extend them further, and then suggest solutions for them where possible. As the topic is explicitly connected to the development of technological progress, the dissertation suggests the differentiation between three generations of phantomatic devices, each of which operates through a different dominant medium, thus arranging the different problematic spheres and offering an additional classification for works of science fiction based on the type of phantomaton around which they build their narratives.

2.1. First Catalogue of Phantomatic Errors: Based on Lem's Statements

The section lists the problems noted by Lem himself, and then extends the list with additional ones not touched upon by the Polish writer. It is suggested that perhaps the most obvious obstacle for a theoretician of the phantomatic is a purely biological one, relating to the effect of a phantomatic machine on a flesh-and-blood body.

Lem considers that the kind of generator of opaque simulations he imagines in the pages of the "Summa Technologiae" can exist only as an external addendum to our physiology, as a foreign periphery of our organic anatomy. This addendum would work through the exteriority of our sensations – it would depend on our senses, seen as "external", that is, engaged with the production of optic, tactile, olfactory and auditory impressions. The fine mechanism of our "internal" corporeality remains inaccessible to any technological invasion; the machine, whatever its instrumental arsenal and available ruses, cannot manage the proprioceptors present in each muscle and most of the tissues of the analogue base. Thanks to the information transmitted by proprioceptors to the brain we are able to know the position of our limbs without touching or looking at them; we are aware if our arms and legs are stretched out or bent, whether they are taxed or not, etc. (Lem 2001: 52). This data is processed by the brain along with the additional activity of the organ of balance placed in our internal ear. The latter includes three arcs filled with liquid, corresponding to

the three dimensions of actual space, as well as multiple chalky bodies called statoliths, composed of calcium salts, which are pushed by gravity towards tiny fine hairs (Lem 2001:52). Through the movements of these lumps and the pressure they create we are aware of our head's position, as well as acceleration and cessation of movement (Lem 2001:52). The examples offered by Lem for this sensation concern plane travel or riding an elevator (Lem 2001:52), but anyone could think of more wide-ranging and less specific cases. However, the effect of the impulses (or irritants) influencing the organ of balance is indeed specific, as their stimulation affects each individual differently. A particular person could for instance experience motion ("sea") sickness, as happened even to a trained soviet cosmonaut German Titov, who spent a full day flying in orbit – although this example occurred in an entirely different context (Lem 2001:52).

Making the above tangle even more complex, the Bulgarian science fiction scholar Atanas Slavov has published a text ("The Virtual Johnny from the 13th Floor of the Matrix"), in which the chain of biological arguments against the possibilities of a phantomatic machine is further extended. According to Slavov, the dream of directly plugging into the nervous system is untenable, as the coding and decoding of the internal bioelectric languages of both systems has not yet been solved (Slavov 2001: 77). All actual devices are limited to translating the "languages" used at the surface of the human body, which is why the interface suit, including glasses, headphone helmets and gloves, is intended to turn flesh into a contact surface for the phantomaton (Slavov 2001: 77). Another, no less important task for the full set of specialized equipment is to supply the correct synchronization of the body; servomotors and pneumatic devices need to limit human movements within specific boundaries in order to synchronize them with the behaviour of objects in virtual space (Slavov 2001: 77-78). The option of simply putting a device on one's head and being transported to a different world with computer-generated sights and sounds is thus presented as unrealistic and is perhaps correctly dismissed by Slavov's text.

However, this metaphoric representation of the body as a cybernetic black box, that is, viewing the corpus as a system composed of input point, modulation and output point, is perhaps too arbitrary a solution to a very sophisticated complex of relations – an attempt to find certainty within a very uncertain field of possibilities. The possibility of disregarding the internal does show how easily this distinction can be blurred. "The Futurological Congress" does precisely this, by demonstrating how chemistry's resources can be employed to accomplish phantomatic goals. In this extraordinary scenario even proprioceptors cannot be a reliable indicator of what is happening to our bodies, although their assurance does not require quite such a symbiotic extreme in order to fail. Medicine does provide cases in which a person continues to feel pain in a missing limb, and more severe

psychological illnesses can distort the entire feeling of the human body, reducing it to two-dimensionality. In such cases the organ of balance becomes almost as helpless as the eye does under the activated visor in science fiction narratives. That is why interface suits are burdened with a third task; in addition to transforming the surface into a conductor, as well as limiting freedom of movement, they place an accent on the anthropomorphism of phantomised users. The body itself, thought of only as body, perceived as body rather than a digital map or analogue interface; the body taken as *the* absolute casts even further doubt on the distinction between internal and external. If we follow this line of philosophical reasoning to its conclusion (assuming that such a conclusion can be found within the labyrinth of our way of existing) it would turn out that Lem's original argument, along with the following ones by Slavov, are problematic. They are based on ontological premises that can be exploded as soon as a certain binary opposition becomes blurred. Considering all of this, we should rather speak of spheres where internal and external are indistinguishable; of the skin and the event-on-the-skin as problems of digitalization, of transferring signals as a particular case, (yet another) reduction of the body.

On the other hand, if our matter presents a serious problem which the available hardware has yet to cope with, then our consciousness presents a separate obstacle for the machine, because it tests its semantic capabilities, or rather its ability to (re)produce plausible personalities so as not to undermine the illusion of actual conversation. The phantomised user ends up in a situation in which it is practically unavoidable to play out a simplified version of a Turing test. This claim is further supported by certain examples given by Lem.

Apart from the technical specifics, but also as a reasonably expected requirement for them, stands the question of the potential financial cost of a phantomatic undertaking. How much would it cost to design such a machine and what would be the price of its products? The kinds of programs that Lem imagines are based on the phenomenon of moving pictures, which makes Lino Aldani's "Onirofilm" a good illustration of the cases in which such technology can become available in our world. However, it has by now found other manifestations, such as the internet and videogames, which are points of phantomatic rendition. Key here is the development of media.

2.2. Tracing the Net: Tangled Up among the Cables of History. Types of Phantomata

Put quite simply, the development of media produces characteristic models, types of phantomata, which are different from each other but preserve the conceptual unity that is so admirable in science fiction. Listing them can not only serve as a secondary categorial framework to

function in synchrony with the larger one offered in the previous chapter of the study, but can also “fix” certain anachronisms, inform us of particular bugs and register the nuances between the ways different versions of the machine work. However, this listing cannot solve the more universal theoretical problems that phantomatics is faced with; it cannot answer the arguments already suggested by Lem against its categorical possibility, or even complete the overview of such arguments that has been undertaken above, which is why it will only serve as a temporary, particular, empirical reworking of the whole, before we return to the more general aspects of the phantomatic. To make things easier, the types of phantomata are distinguished and denoted according to the media which most obviously facilitate their work. They are defined as cinematic-television (classical), network (transitional) and ludic. A more detailed exposition of each type is accompanied by exemplary works, but the current section pays particular attention to the first type, as it most closely fulfils Stanislaw Lem’s requirements.

The classic phantomaton is the type presented in the “*Summa technologiae*”. It appears at the beginning of the 60s and is especially popular up to the beginning of the 90s, right before the “virtual craze” erupts in the West. In Bulgaria the fictional construction of classical phantomata continues to this day – an example would be the recently successful novel by Nicholas Dimitrov (“*Dealer of Realities*”). Characteristic of narratives that work with classical phantomata is a nearly invisible transition from protophantomatic to phantomatic; this makes such narratives highly solipsistic; they are limited to the character who struggles against the machine-produced fiction all by themselves. The form of the classic phantomaton is extremely undefined, ambiguous and mutable. It can be a tablet or a satellite signal, an electric box, a special band to receive the sense perceptions of an artificial dummy, a chip, or anything else dependent on a computer as mediator. However, the illusions produced by this machine, which are based on the methods of moviemaking, or in some more specific cases (such as that of Lubomir Nikolov) are made possible by television, remain (practically) solipsistic, with a low level of transitivity, which allows them to work in two directions and to cause (often as a result of an error or bug) an analogy with holography or simstim (that is to say, with the protophantomaton, P0).

The blurring of lines between worlds generated through machine communication, that is to say, the connection of devices (which is what internet communication basically is), makes possible the network (or transitional) type of phantomaton, P2. It becomes popular in the 90s with cult series like Sergei Lukyanenko’s “*Labyrinth of Reflections*” and Tad Williams’ “*Otherland*”, as well as singular masterpieces like Neal Stephenson’s “*Snow Crash*”. Network phantomata are socially directed, although they have different degrees of social applicability. They introduce methods of

organizing digital space, that is to say, the totality achieved through connecting cyberpoints, the masking and revealing of oneself and the other, the entering of the foreigner and the departure from the already familiar. Since a key principle of their work is the blurring of boundaries, network phantomata tend to invade other genres as well, to enter into adjacent media such as computer games, without realizing that this will end their brief period of pure dominance.

The third (and so far last) generation of phantomata, the newest and most current model, P3, structures its narratives not only based on networks, which have been colonized by this type, but on motifs from the general appearance of the gaming interface which has ended up being a mass phenomenon. Video games have become the main legislator for this type of literature; they provide its narratives with a set of rules and conventions, they shape its characters through the transformation of role stereotypes, they even attempt to create their own genres such as litRPG and GameLit. Put another way, the theoretical problems introduced by this type of phantomata into the general discourse of phantomatics have much more to do with worldbuilding and modelling – things that the dissertation addresses, comments on and illustrates later on.

2.1. The Problem of Phantomatic Space, or How to Think about the Cyberpoint

What differentiates the second generation of phantomata from their predecessors, as well as their successors, is undoubtedly the extension and distribution of digital space; the combining of that particular multiplicity of meanings, values and affects which can be put together in science fiction (Frow 2006: 85-86, Rieder 2017: 56) or, in this case, in the subgenre of phantomatic fiction. Here once again we have fictional speculation based on previous typologies, which can and should be considered in its dialogue with other forms of speculation from the same field (Rieder 2017: 26) so that the analogies can maintain their instrumental reliability as a tool for study. However it is important to remember that the discourse of this speculation, oriented as it is around worries about the future and reminiscing about the past, is generative both in terms of our initial attitude towards the present, as well as the popular understanding of technical progress and its consequences. Put another way, the very object of phantomatic fiction, which is often non-time itself coupled with its characteristic non-space, naturalizes certain expectations and transforms them into a dubious supposition of knowledge which nullifies the distance from the text and creates a danger of activating inappropriate modes of reading.

Understanding this allows us to theoretically distinguish different categories which can encompass the literary expositions of two radically different types of phantomaticisation of space,

which the study refers to as open and closed phantomaticity, or virtual reality and cyberreality. The two have in common a relation to phantomata of the second generation, to “network” machines, and at the same time mark the poles of a potential matrix within which can be situated literary manifestations of phantomatic worldbuilding within the entire class. The opposition thus elucidated can also be illustrated with literary examples which work with the second generation of phantomatic machines; this particular study takes the novels “False Mirrors” by Sergei Lukyanenko and Victor Pelevin’s postmodern experiment “The Helmet of Horror”, which shows the specifics of transition between the classic phantomaton and the newest generation of science fiction. The comparison of the two texts is based on propositions derived from the works of Marie Laure-Ryan and Paul Adams, namely from the book *Narrative as Virtual Reality* and the article *Network Topologies and Virtual Place*. The results thus derived should illustrate two things: the possible disruption of a concept within the same generation of phantomatic devices and the different approaches that can be taken when segmenting a theory that finds itself realized in many fictional works across time.

2.2. The Problem of Phantomatic Time, or How to Think about the Cybersecond

If the question of virtual topology can be reduced to asking about the access to a cyberpoint (or exit from it), the question of the passage of time in a phantomatic environment is much more complex than it looks, because forcibly dividing the two essential components – time and space – is a necessary, but quite unnatural decision according to current scientific theories. The traces of time can be found in the two models suggested by Lukyanenko and Pelevin; that is, in the works that rely on alternativity. Such alternativity, which is seen as a key characteristic of the virtual, cannot and certainly should not be thought of as quite different from the actual; as ideally other and negational towards its material component. The two realities – the phantomatic and the actual – cannot be fully equated, but also cannot be fully opposed because of their fragile connection, the body, which is projected and segmented on different levels, split between the digital and the organic.

Like other resources, in the virtual world time also seems to be imported; it is characteristic of the body and introduced with the latter’s appearance. This is already evident on the level of everyday practice, in which cybernetic denudation goes along with our online activities.

However, looking more carefully at some of the most common models in science fiction, we quickly find a certain stagnation at the heart of the phantomatic, a totality of its status quo which is interrupted by local occurrences. This totality in phantomatic fiction is a kind of unchanging nothingness, which is altered only by the decisions of liminal elements, of acting parties. Their activity measures the

existing time of the phantomatic; their analogue bodies (or metaphorically speaking, their biological clock) are necessary as the only functional measure of digital time, which possesses an infinite virtuality but a very limited and self-contained actuality. This motif can be found in multiple works, and the study demonstrates it by once again referring to the urbanistic fiction of Sergei Lukyanenko, in his *Deeptown*, the capital of avatar, which is mostly immobile and almost entirely dependant on external (or hardware) influences.

In Pelevin's "Helmet of Horror", the contrasting work already sampled by the study in connection with the organizing of space, we find something quite different. The bodies there, although cybernetic, are internal to the system itself; they are not regular, that is to say organic-digital, but are instead permanent, that is to say digital. This feature allows the novel to carry out experiments which initially appear far more progressive than Lukyanenko's. The users in this world are entirely replaced by algorithms which carry out dialogue among themselves without being aware of their fictionality, and the idea of a restart, of beginning anew, introduces a different temporal model, akin to mythological time rather than historic time. We therefore find, opposite to the *line* of the earlier model, its *circular* antithesis.

The question is: are these two models really opposed, or do they work in synthesis? It would appear that virtuality – at least in its phantomatic hypostasis – can undergo different spatio-temporal realisations; it can be entirely dependent on an already existing reality, or entirely autonomous. This binary structure however is extremely imperfect and allows for multiple in-between versions, which literary studies can use to extend some key arguments on the topology of the virtual, such as Rosati's argument that leads to this simple, but important conclusion: virtual time is real time, and cyberspace is real space (Rozati 2013: 104-105). This however is not sufficient. By analysing literary works we find that virtuality as a phantomatic process enters into contradictory hierarchical relations; it is both virtuality leading to actuality and virtuality following from actuality. Its work is increased by its characteristic dynamism, which allows it to "escape the kind of identification which would make [the virtual] a singular and determined function" (Rozati 2013: 61). In a way that reminds of a Moebius strip, deterritorialization itself creates virtual space, it sketches out a new territory, which is however a clear mutation of already familiar forms; a distorted imitation of an imitation framed by the theoretical conditionality of the two models which, in addition to being static points of orientation amid the sea of virtuality, can enter into a certain dialectic, a particular kind of combining which allows them to flow into something third in terms of how time can be conceived. In more specific terms, they can form a spiral by blending the circle and the line.

Phantomatic time is therefore controllable; the cybersecond is divisible and can function in

different ways. On the one hand, phantomatic fiction is still attached to a minimal materiality, stemming from the organic body and the technological hardware. On the other hand, certain spaces within it can intentionally be designed to be cyclical, or to follow certain narratives. This poses an entirely new problem, which works as a loose part within the phantomatic machine's activity – the problem of disproportion between actual experience and the transfer of simulated experience, which is extremely important for phantomatics as a whole, but especially relevant politically and pedagogically in the context of the third generation of phantomata (P3).

2.3. Crumbs of pixels: a reflection on the non-reciprocal data of the virtual

In this section the problem of the disproportionality of experience is analysed mainly through scenes from Sergei Lukanyenko's "Labyrinth of Reflections", Segel and Miller's "Otherworld" and Vivian Velde's "Heir Apparent". The conclusion arrived at is that the void within the phantomatic is a highly generative void. This presents the problem of non-reciprocity of the data in an entirely new light, as it changes the way discrepancies can be thought about, leading to two possible scenarios for science fiction in trying to understand this dilemma.

The first scenario places it entirely within the magical and can therefore not work as a serious argument within the realm of empirical possibility; the second one is yet another conceptual obstacle for the way a phantomatic machine functions. In the prior case, as illustrated by "Heir Apparent", the machine completes the memory of the user and furnishes him with everything necessary, bypassing the individual cypher of memory, the informational capacity of his organic body, as well as the entire series of legal, ethical and moral dilemmas related to remodelling the human subject. In the latter case phantomatic fiction copies material reality "to the letter", changes none of its rules, and thus not only removes the main reason a user would visit it, but also denies the very possibility to realise that it's an illusion; it therefore undermines the ontological distinction of simulation itself. Lem has thought on this in the final argument against creating such devices found in the "Summa".

2.4. Phantomatics: A Daydream, or a Dream within a Dream?

Before concluding that it may seem possible and indeed probable to X that X is in a phantomatic world, but never absolutely certain (Lem 2013: 202), the "Summa Technologiae" asks whether phantomatic fiction can be identical to material reality and whether the phantomatized subject caught in its machinations could escape the trap of the illusions

presented to them. Here we find the most undeniably paranoid episode of the book, connected to an entire series of thought experiments intended to show our cognitive incapability to determine whether we are already victims of a cartesian demon armed with futuristic technology. Lem's reasoning goes as follows: although a machine can affect its victims only by utilizing its peripheral devices, that is to say through the body's exterior, it would not be dumb enough to be fooled by the user. It would for example be possible to imagine someone squatting a thousand times in order to test whether they will break a sweat, that is, they could check the reality of their corporeality through physical intensification. The phantomatic world could render such a feat quite possible without leading to any exhaustion (Lem 2013: 200-201). But we can also imagine that the phantomaton is designed to be more sophisticated; the machine can guess what the trickster is trying to do and stimulates certain nerves in order to "tire" them or cause muscle fatigue through them (Lem 2013: 200-201). And this is only one possible scenario to avoid the embarrassing situation. Another would be more extreme but no less probable – the phantomaton could simply increase the emission of carbon dioxide in the room or capsule where the subject is situated, speeding up their heartrate in order to achieve the expected sweating (Lem 2013: 201). Such a thing cannot even be categorised as a simulation, because the forced reaction is as natural as that final truth marker, the organic body itself. The user would then be left only with "strategic games" that rely on the individual cypher of their personal memories in order to guarantee any plausibility (Lem 2013: 201). That could allow them to recall something that no one else would – such as what particular kind of alcohol he has stored in a used Coke bottle. The test would then be relatively simple – the phantomatized subject would only need to go into the kitchen, unscrew the cap, smell the contents with a respectable amount of scepticism and then carefully raise the bottle to their lips. Of course the machine could and probably would rely on a "tactical manoeuvre" (Lem 2013: 201), which is to provoke a reaction to new data. In the above scenario this data could be actualised in the person of the angry parent who bursts into the room and renders it impossible for the experimenter to test such unspecified variables quite so thoroughly ever again. Or, turning to Lem's own similarly ironic example, the actualization can take the form of the experimenter's wife who, seeing him triumph over a drawer which for the first time didn't stick, informs him condescendingly that a repairman has fixed it earlier that day (Lem 2013: 201-202). Both examples lead to the conclusion that within phantomatic fiction we are alone and everything that we would entrust to our nearest and dearest could serve the enemy who surrounds us everywhere (Lem 2013: 202).

A solution to the problem can still be proposed, but it would require a suspension of the distrust that the Polish writer has towards psychoanalysis.

Here the section offers a psychoanalytic solution to the ontological problem of “truth” by recalling a famous example from “The Interpretation of Dreams” and its lacanian reading. This however once again poses the question of the distinctions between dreams, hallucinations and phantomaticisation. The latter is different from similar phenomena because of the exterior control that the machine has over the worlds being generated.

Chapter 3: Phantomatics: Body and World

After the first chapter has suggested using Stanislaw Lem’s phantomological model as a paradigm for the study of fiction and has traced its generation within the work of the Polish writer, and the second chapter has faced the most serious obstacles to manifesting phantomatics in reality, the third and final chapter admits the high improbability that a person alive today could ever witness the creation, distribution, and indeed possible serialization of phantomatic machines. Such devices however have been functioning within science fiction for decades and they all seem attached to an initial condition which grounds them. Articulating this condition in the context of the present study allows for the creation of a critical optics built upon what has been accomplished so far, which make possible the generation of a final interpretative matrix to connect the phantomatic body and the phantomatic world within a sophisticated interpretative construct.

3.1. The Phantomatic Body

This section focuses on one particular element – the body – in order to understand it as the basis for virtuality, which manifests itself as something far more specific than what we are used to calling an “avatar”. Here both terms are discussed in detail, using Roberto Diodato’s book “Aesthetics of the Virtual” in order to determine the basic characteristics of the image-body [corpo-immagine]. This image-body, or this phantomatic body is characterised as dynamic and interactive; as a multimedial instrument, an interface of a complex stratified multimedial environment which, depending on its depth, can be richer or poorer. It is stressed that this environment is part of the body and the body is part of the environment; the two are inseparable, because they are similarly composed of informational matter.

3.2. The Phantomatic World

For a phantomatic body to exist there must be a phantomatic environment for it to interact with. And as the prior maintains so many things from the structure of the more general virtual, the world generated by the phantomatic machine can be looked at through models that have already been developed. One such attempt, by Pierre Lévi, is based on the medieval trivium and postulates grammar, dialectic and rhetoric as levels of virtualization; they are used and explain alongside concepts like **amplitude, depth, speed, range** and **control**. These five allow for the “measuring” of a virtual environment, but the way in which Diodato utilizes them fails to take into account the most characteristic feature of virtuality itself – the multiplication of functions, to be discussed in the following section.

3.3. Doubling the Doubled: Rereading Diodato and Lévi

Everything said thus far leads to the conclusion that the phantomatic body and the phantomatic world are two very similar phenomena – an indivisible whole which phantomatic fiction is based on. The world is that which makes the work of the body meaningful, and the body is that which creates the world through the activity of a specific device from the first, second or third generation. The factors of this world, its dimensions, can be dimensions of the avatar itself, conceived of not merely as a static image, but as an active unit; as a part of the virtual. But the virtual can never be reduced to one thing, because in its virtuality it multiplies itself (Rozati 2013: 61). Thus the optics of reading it need to be doubled in order to achieve any degree of comprehensiveness.

At the level of grammar two syntagmatic procedures are distinguished, which need to be taken into consideration: the merging of ones and zeroes (of binary code) necessary for the building of an avatar, and the merging of natural and artificial, organic and synthetic, necessary for the composition of the user. The prior offers description, the latter offers action; like a Moebius strip the two transform the “heavy” or the hard aspects of the cyborg into a “soft” and discrete functional operator (Diodato 2005: 7).

At the level of dialectic the reader will always have to deal with a double reference, according to which the phantomatic body will interact with other phantomatic bodies surrounding it and will at the same time interact with at least one organic body hidden in the background. The phantomatic body thus would refer simultaneously to an “externality” and an “internality” without supplying its operator with non-contradictory information about which side the operator is on. Thus dialectic will

always be accompanied by a not fully articulated sensation of difference, of distance, more or less strongly felt, which can be described as the feeling that “this” reality is not quite “my” reality (Diodato 2005: 4).

At the level of rhetoric (or meaning) things look quite depressing: while the operator is enjoying and participating in the masquerade of the phantomatic, their real life is frozen and remains in the background; it is devoid of development, and therefore also of any future. Time needs to be distributed between the two worlds, but the priorities and values of the two worlds never fully overlap. The character then is composed of at least two sides, according to dialectic: a phantomatic mask and a physical person which the mask usually doesn't quite fit. What happens then however, rhetoric goes on to add, is more important than anything else, because there must necessarily be a preference, a choice needs to be made; one must participate in what happens somewhere. The directions available are many, but their trajectories never coincide.

The values we can use to calculate certain aspects of the phantomatic world could be mirrored. The amplitude, so far related to the number of senses stimulated, would open up new horizons for the user; the phantomatic body would now have its own sensorium different from its organic correlate. The particular amplitude also implies a particular depth in spite of the improbability of such a fantasy.

Speed, range and control are split in the following way: Speed ceases to be perceived as assimilation of input from the mediated environment. It would be far more accurate from now on to speak of not one, but multiple speeds, as well as a reverse assimilation characteristic of them, that is to say, we should assume the existence of multiple phantomatic worlds with different models that are gradually assimilated by a large and rather clumsy reality. The range then, would regard both the freedom of the avatar and the limitations of its correlate, while the control, related to the system's ability to adapt and answer to the preestablished expectations, would be transported onto the social, legal and economic structures that put pressure on the new spaces and themselves receive pressure from them.

3.4. Levels of Conflict within Phantomatic Fiction

The idea of thinking virtualization by dividing it in accordance with the medieval trivium contains a greater potential than Lévi could have anticipated. In the context of his own research this construct is able to highlight certain effects such as the Moebius inversion and interpret them as resulting from the dynamic of two diads (the possible and the real, and the virtual and the actual).

Thus the phenomenon studied has ceased to speak of its own effects and has revealed its own appearance in relation to other processes by creating new paradigms. This can be the criterion for the adequacy of the theory being tested: it does the same thing to itself that it describes as happening to its object, that is to say, it multiplies itself, or more accurately still: it makes itself virtual by connecting non-independent units, separate effects, into general processes (grammar), relating them to the outside world (dialectic) and creating a new one from that (rhetoric). This is in agreement with phantomatics, which illustrates all of this through its science fictional narratives; it is the part of the virtual describing that which describes, utilizing its resources to the greatest degree.

If we have to explain what all this means, we can simply say that grammar, dialectic and rhetoric are not only levels of virtualization, but also levels of conflict in literary science fiction; they are categories, levels of meaning which can house the entire richness of phantomatic narratives.

3.1.1. The Grammar of the Phantomatic

Any further activity by the phantomatic machine relies on the construction of a dynamic image – a fictional image which must be defined and dynamized so as to imitate its object as much as possible (Tavinor 2020: 11). The phantomatic object “therefore bears the function of the original in a non-actual way”, it is isomorphic to that “which it depicts or exemplifies, allowing for an interaction that is usually achievable through something that actually exists (Tavinor 2020: 11). This comparison however becomes accessible only at a later stage of the phantomatization process which, in order to achieve such analogies, must first construct its world on the syntagmatic axis, that is to say, to speak it using a limited total of symbols. These are the ones and zeroes or, as has already been stated, this is the code, the enigmatic speech. However, the presence of speech also presupposes the presence of certain rules – laws which regulate the connection of elements into recognizable wholes. What is more, speech, at least for some, is a temptation, an invitation towards the sort of people enchanted by finding and deciphering patterns within language.

This section looks at the figure of the hacker as found in Lukyanenko and Gibson and then moves on to the problem of the computing error, using for further illustration an analysis on works from the world of “The Matrix”, scenes from “Sword Art Online” and the novel “Otherworld”.

3.1.2. Dialectic of the phantomatic

When we speak of at least two worlds present in narratives about phantomatic machines, as

frequently happens in the genre, we are dealing with a conflict between them, which we could call a conflict of autonomy or, if we stay with a more naïve interpretation of the virtual, a conflict of truth, as the two worlds are never considered equally real. This approach is often intentionally adopted by the author, as it allows them to critically analyse their own work. We are told that by giving up a starting point, we risk losing ourselves in the bad infinity of unmotivated reiteration. That is why regardless of the degree to which this is explicit, physical worlds are always present in phantomatic fiction; they are the other, the (often unreachable) outside which grounds the balloon of illusions to the solidity of something familiar, even as that something is denied or ignored.

This section deals with the conflict between the organic body and its digital double by tracing the motif of danger and death in phantomatic narratives, as well as the relation between worlds.

3.1.3. Rhetoric of the phantomatic

Pierre Lévi defines rhetoric of the virtual as “the emergence of autonomous worlds and creation of an interrelation of signs, things, and beings independently of any reference to a preexisting "reality" or any notion of utility” (Levy 1998: 171). „Through rhetorical operations virtualization results in the sudden appearance of new ideas and forms, the composition and recomposition of those ideas, the discovery of original "figures," the growth of "memory" machines, the development of systems of action“ (Levy 1998: 171). In other words, rhetoric no longer refers to substitution, correspondence and the rhizomatic processes of doubling, which are characteristic of dialectic within Lévi’s terminology (Levy 1998:171), nor is it focused on the segmentation of virtual elements, their sequences and duality (Levy 1998: 171). It does not pose embarrassing questions to the machine’s code, it is not as concerned with disrupting the generated fiction, because it deals with the very meaning of the phantomatic, quite apart from any pragmatic potential. The level of rhetoric is thus the level at which both the writer and the scholar of science fiction must turn inward and ask themselves directly “why”; why was all of this necessary? The study seeks answers in “Otherworld”, “The Matrix”, “Peripheral Bodies” and elsewhere.

Conclusion, Or memory and future of phantomatic science fiction

In its very end, the thesis examines the conclusions that could be derived from Stanislaw Lem’s conceptual frame, as well as the courses further research can take. It states that the Polish

writer's legacy is ambivalent since it is torn between the spotlight of his renown as a science fiction author and the shadow cast out from the West on his early theoretical works. This in no way means Lem is forgotten but quite the opposite. In the past few years there has been a distinct return to his texts, which in different parts gravitate towards "Summa Technologiae". The intersection between science, philosophy and fiction is quite evident in Lem's work from the 1960s and 70s, as can be seen in the first chapter of the thesis, and yet it proceeds to pulsate in the veins of the entirety of his fiction which carries out the function of an illustration to his theoretical publications.

What was written by Lem proves to be insufficient however. The Polish science fiction author formulates the problem and leaves it to wander the world similarly to Frankenstein's monster which has to emancipate itself from the cover of its alienation. Unlike Mary Shelley's fictional constructor though, Lem does not shy away from his creation and returns to it through the course of his career to reshape and improve it, thus helping it to integrate into society without any particular success.

The problems raised by this complicated project outlive the Polish writer and deepen, as shown in the second chapter. They transform into a foundation of a paradigm that multiplies the phantomat and separates it into generations. Every generation is characterized with either higher or lower degree of distinctness and its boundaries are interpreted in its own way. The motion between those boundaries ranges over practical solipsism, network communication and finally, video games. It is at this point that literature, cinema, animation, internet culture and ludology meet. A motif that links them together in a thematic core is introduced and it also provides new patterns and models, drawn out of the platforms it concerns. Also, something else occurs – local science fiction output interconnects with the global one and thereby the differences between local variations are outlined – a problem that deserves its own research, although it can be summarized with the statement that older generations of phantomats are not necessarily replaced by newer, but somehow manage to adapt to contemporary tendencies as shown in novels such as "Dealer of Realities" and collections in the vein of "Virt".

What all phantomats have in common – Lem's phantomatics and the phantomatics of the current research – is the human body, the entry point with which the generation of phantomatic fiction begins. Its technological transformation is simultaneously the task and the impetus of the genre, which converts it into its means and pledge in forthcoming pursuits. In other words, the body is both a challenge and an implicit pledge to the narrative. The body is identical to the machine's produce because the machine is its produce. Therefore, all products of phantomatic fiction touch upon it; their grammar is its genetics, their dialectics is its distance, and their rhetoric is an escape, an attempt to separate flesh from information. In a sense, the body is the principle that generates and restricts; it is

the paradoxical combination of the beginning and the end, the point of intersection of fact and fiction.

Whether this thesis' formulated notion of phantomatics endures as a model of reflection about virtual reality, depends solely on the body's sustainability, the thesis concludes.

Contributions of the dissertation

1. The dissertation completes and corrects the work started by Marcello Vitali Rosati, providing a new entry in the topic of the virtual in literary theory. The text addresses and solves the existing contradictions by suggesting a new vocabulary of terms, which takes on the function of some of the now obsolete definitions.
2. The work attempts the rehabilitation of phantomology – a marginalized theoretical project with the potential to supply critics with tools that can be applied over a wide variety of science fiction works. With this the name of Stanislaw Lem falls into the trajectory of current discourse surrounding virtual worlds and his literary heritage has an opportunity to be explored and analysed again.
3. The thesis solves some of the problems with the hypothetical realization of the phantomatic project and establishes its framework by listing cases which modern science still cannot solve.
4. The paper separates a new sub-genre – phantomatic fiction, which includes works about computer simulation. The sub-genre itself is further differentiated by a new categorical grid, extracted from the essence of the works itself. They are organized based on the concept of the machine generations of the phantomatic devices, invented and developed within the framework of the current work.
5. The thesis builds upon the studies of Pierre Levi and Roberto Diodato to synthesise a new interpretative matrix which can help define the various degrees of conflict in phantomatic fiction.
6. The dissertation puts forward a new take on the human body as a device for generating and containing virtual worlds and follows its realization in the sphere of science fiction literature.
7. Over the course of this work an understanding of the virtual as its own kind of fiction is developed. This prompts the study towards interdisciplinary solutions and the pursuit of new ties between literature, cinema, computer games, and television.

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