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STANISŁAW LEM'S VISIONS OF A TECHNOLOGICAL FUTURE: TOWARD PHILOSOPHY IN TECHNOLOGY

ABSTRACT

Stanisław Lem is mostly known as a sci-fi writer and not widely perceived as a visionary of the cyber age, despite the fact that he foresaw the future of information technology better than most scientific experts. Indeed, his visions of future information-based societies have proved to be remarkably accurate. Lem's stories fuse together elements of fantasy, philosophy, and science, but what we can really learn from them is the nature of humanity, technology, and philosophy, as well as the values of technological prophecies. Moreover, Lem gave birth to, without naming it as such, the concept of philosophy in technology, which is a perspective on technology and philosophy that explores the deep implicit philosophical foundations of technology and humanity.

Keywords: Stanisław Lem, visions of technology, technological future, philosophy of technology, philosophy in technology.

INTRODUCTION

Stanisław Lem's technological visions have proved to be astonishingly accurate (see Krzanowski, Polak, 2021). Lem is regarded primarily as a sci-fi writer and even a philosopher by some, but only a few regard him as a visionary for technological societies. Surprisingly, though, Lem's technological visions hold the key to his philosophy and sci-fi work, so we will not focus on Lem's philosophy qua philosophy or question what kind of philosopher or writer he was.[1] We will focus instead on Lem's technological prophecies and explore why they so closely portray many aspects of contemporary technology and what they can tell us about Lem's philosophy. We do not agree with the opinion that the success of his visions was a sort of self-fulfilling prophecy due to Lem's pessimism about humanity and technology, an attitude that runs contrary to the myopic views that are prevalent among technology gu-

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[1] The philosophy in Lem works is reflected in Filip Kobiela and Jakub Gomułka's (2021) collection of essays.

rus and enthusiasts. We believe the source of Lem's success lies somewhere much deeper than just in his pessimism.

The key to the effectiveness of Lem's vision is his method, which is a combination of technological pre-scientism and *Gedankenexperiment*, and how it was guided by an understanding of the philosophical foundations of humanity and society. Throughout Lem's stories a deep philosophical current runs mostly implicitly, hidden from the casual reader. We refer to this philosophical current as *philosophy in technology*.

Futuristic visions are not just indifferent conceptions of the future—they justify technological development, shape societies, trigger wars and destruction, and shape our dreams and political realities. What is more, technological visionaries play an important role in our culture, such as Raymond Kurzweil and his vision of the technological singularity or Lowelock and his vision of the *Novacene*.[2] Indeed, these visions drive our lives. If we still doubt whether visions really matter, we need only to point out how Karl Marx's vision of society was futurism (for his time) *par excellence*, and we all know now the effect this vision had. The fact is that many, if not most, visions of the future, both positive and negative, simply did not come true.[3] It is therefore surprising that Lem's technological prophecies—which predicted the Internet, ubiquitous information networks, robotics, AI, superintelligence, and synthetic poetry—were conceived at a time when the peak of technological achievement were calculating machines based on electron tubes, yet they have been mostly realized now or at least been demonstrated to be technologically feasible.

TECHNOLOGICAL PROPHECIES

Visualizing future technologies is big business and big politics (Barbrook, 2007),[4] although this is a bit surprising because predictions of the future in general and specifically for technology are usually wrong (e.g., Pogue, 2012; Pestov, 2017; Larkin, 2018; Bush, 2021).[5] The creators of futuristic visions exert great influence on the direction of politics, the development of societies, and the path of technological progress (e.g., The Rockefeller Foundation, 2010). Their visions justify the need for technological development by promising to make humanity happy or scaring people with new dangers that will only be surmountable with new technology. (Often these threats derive

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[2] Lowelock's *Gaia* and *Novacene* concepts can be traced back to Giordano Bruno's writings (Martinez, 2020). Lowelock is lucky to live in safer times.

[3] Still, some prophesies may come true so we need to watch out for them (e.g., Bastiani, 2019.

4 With the internet, we have had a flood of futurists. They are all safe in their jobs because the future they talk about is well past their life spans (e.g., "Top 50…" 2022). Of course, sheer numbers do not translate into quality or (in this case) accuracy.

[5] The history of AI and its failures is an almost canonical example of failure to predict technology's course (Smith, 2019).

from an earlier technology.) Technological prophets tell us that the new technology will always be better than the preceding one, and anyone arguing against this view is denounced as a Luddite.

But scientists have begun to wake up to the dangers of artifices. Stuart J. Russell (2019, p. 101) asked what will happen when

> "… in principle everyone could have at their disposal an entire organization composed of software agents and physical robots, capable of designing and building bridges, improving crop yields, cooking dinner, running elections, or doing whatever else needs doing […] VR may turn into the medium of choice for literary and artistic expression."

Lem was providing responses to these questions 60 years ago.[6] Lem's visions differ from those of typical sci-fi stories or the prophecies of technological experts who are unfettered by moral, ethical, or rational concerns. His critical perspective for uncontrolled technological progress is expressed through a skeptical approach to common assumptions about technology and technological visions rather than pessimistic doubt. Lem exposes myths and naïve interpretations of science and technology that feed unbounded technological optimism and opportunism, and he shows that common claims about technological progress—such as new technology always being better, always solving problems not creating them, always being controlled, and usually being beneficial—should be revised.

Many of his prophecies are served within funny, fable-like stories, but under closer scrutiny, Lem's funny stories are not so humorous, because technology does not bring us eternal bliss or a new enlightenment.[7] Lem's stories, at their philosophical layer, are precisely sketched, hardcore philosophical arguments.

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[6] Researchers recently voiced strong concerns about the benefits of uncontrolled AI development: "Stephen Hawking, Elon Musk, Steve Wozniak, Bill Gates, and many other big names in science and technology have recently expressed concern in the media and via open letters about the risks posed by AI, joined by many leading AI researchers." Available at https://futureoflife.org/background/benefits-risks-of-artificial-intelligence/. For more discussion about AI's benefits and threats, see, for example, the wider Future of Life Institute website linked above, as well as the discussion from 2018 Artificial Intelligence and the Future of Humans, which is available at https://www.pewresearch.org/internet/2018/12/10/artificial-intelligence-and-the-future-of-humans/. The main point to make here is that what "Stephen Hawking, Elon Musk, Steve Wozniak, Bill Gates, and many other big names in science and technology" are saying now, Lem said some 60 years ago.

[7] A complete list of Stanisław Lem's books and their editions can be found in "Editions" (2022). Lem's Polish bibliography can be found in (Bednarek-Michalska, 2006).

LEM'S VISIONS

One cannot possibly analyze all Lem's *oeuvre* in a single article, so out of necessity, we focus on three works in which Lem perfected his art of prophecy, namely *Summa Technologiae* (1964), *Fables for Robots* [Bajki robotów], and *Cyberiad* [Cyberiada] (1965). Looking at *Cyberiad* (Lem, 1965), we see that almost every one of Lem's stories presents a situation that plays the role of a thought experiment (i.e., *Gedankenexperiment*). A thought experiment is one where the thinker uses conceptual rather than actual experimentations to study ideas and conceptual problems, and this is Lem's workshop.

Lem uses sci-fi conventions to consider problems that are far removed from the current state of science and technology, both at the time of writing and even now. The problems were freely chosen by Lem but not at random, because they serve to explore specific issues pertaining to the relationship between man and technology. Above all, Lem explores possible worlds and searches for answers to the questions of human existence, the existence of God, the universe, and our position among the species, and the answers are often pessimistic. Through thought experiments, Lem tries to show deeper truths about the possibilities of technological development and the place of humanity in a mechanized world. In this sense, philosophical considerations were used to serve the technology.

The story of *How the World Was Saved* from *Cyberiad* teaches us that complex technology always has some unforeseen consequences that may have disastrous, irreversible effects. *Trurl's Machine* conveys the warning that General AI or super-intelligent systems will have their own logic and goals, and we may be inadvertent victims of their designs. *The First Sally (A) or Trurl's Electronic Bard*, meanwhile, represents a critique of synthetic art, because art is an expression of a deeply human experience based on spirituality and values, so any form of synthetic art will inevitably be empty and vacuous. *The Mischief of King Balerion*, meanwhile, carries the warning that any attempt to emulate the human mind through whole-brain emulation (WBE) will in all probability wreak havoc through society, something that is never mentioned by WBE research teams. *The Sixth Sally* or *How Trurl and Klapaucius Created a Demon of the Second Kind to Defeat the Pirate Pugg* warns clearly about the unlimited flow of unfiltered information, with it resulting in mental stupor rather than the enlightenment that the prophets of the Information Highway have promised.

Lem's stories obviously refer to concepts from early computer science,[8] but he mostly avoids academic and technical jargon by molding his writings

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[8] Lem seems to follow Alan Turing's ideas, who, disregarding the embryonic state of computer technology, was able to consider such general issues as the intelligence of machines. Norbert Wiener and his idea of cybernetics was another source of influence for Lem. In fact, cybernetics serves as a fundamental theory for interpreting technology in *Summa Technologiae*.

into the sci-fi genre. Indeed, staying too close to technology would render his writings obsolete, but by distancing himself from it, his writings gained prophetic power. Such an approach is known in the history of science, such as Kepler's fantastic story in *Somnium* (Kepler 1634; 1967) about a hypothetical journey to the Moon. This fantastic stylization helped Kepler to convey the first results of lunar astronomy without antagonizing the scientific and religious establishments of his time. The same is true, *ceteris paribus*, of Lem's philosophical reflections, although Lem obviously did not face persecution but rather just the ignorance and envy of his contemporaries.

It is easy for a trained eye to spot Lem's numerous references to classical philosophical discussions and problems.[9] By placing technology under the light of classical philosophical debate, Lem shows how philosophical reflection can illuminate technology. Lem's style of philosophizing was far from academic, but his writings have a clearly philosophical overtone and bring interesting philosophical reflections. Maybe *Summa Technologiae* is closer to the classical philosophical treatise, as the title suggests,[10] with its formal structure and some linguistic conventions, but the work also contains elements of humor and references to sci-fi conventions. Lem evidently aimed to contribute to the discussion of classical philosophical problems without getting too involved in the mostly fruitless (in his eyes) academic debates.[11] It is from this perspective that we should look at Lem's philosophical meditations.

Lem clearly avoided getting involved in academic discussions, and he probably noticed the lack of openness and limited horizons in his peers, just like Kepler did! He probably considered most academic discussions to be infertile, a view repeatedly expressed in his literature and interviews. Lem held technocrats and people infatuated by technological gimmicks in low esteem. He even disparaged most sci-fi writers by regarding them as mere story tellers.

One may say that Lem hid behind his fantasies. In retrospect, it could be said that Lem's procedure proved successful because his literary form deceived the critics while bringing him fame. On the downside, however, Lem's philosophical reflection has only become appreciated after many years, while his sci-fi work was embraced with little delay.

In his fantastic stories, Lem deliberately forces the reader to stretch the limits of technological imagination. Today, when a large part of Lem's ideas clearly reference our modern reality, it is easy to appreciate his methods. Lem's philosophical perspective enabled him to somehow prepare for an

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[9] The title *Summa Technologiae* refers to Aquinas's famous *Summa Theologiae*.

[10] Lem was evidently interested in philosophy and took part in some philosophical discussions among the philosopher–scientist milieu of Kraków, because he delivered the paper "*Summa Technologiae po 16 latach*" [*Summa Technologiae* after 16 Years] in the first series of seminars (Życiński, 1978).

[11] For example, Lem expressed a disdain for the linguistic turn in English philosophy.

unknown future. As a result, Lem's philosophical reflections remain relevant and a source of inspiration for successive generations of readers (and hopefully technologists). It seems that there is no better method than Lem's if we want to remain rational when challenging technological progress.

LEM AND PHILOSOPHY IN TECHNOLOGY

In his stories, Lem not only develops typical reflections on technology (i.e., the philosophy of technology or PoT). Indeed, the literary style of his work allows him to engage in a meta-philosophical discourse that goes beyond the boundaries of philosophical reflections on technology. Lem's meta-philosophical ideas are best seen in his reflections on artificial intelligence (AI). It is well recognized that in designing advanced AI systems—including technologies that are now discussed in this context, such as social robotics, machine ethics, superintelligence, and trans-humanity—we face deep philosophical problems about the nature of the human mind, the nature of intelligence, problems of ethics and morality, and issues with trust, fairness, truth, freedom, and personhood, to name but a few. We are becoming slowly aware that AI systems are not just engineering constructs but rather things that present us with philosophical problems *par excellence* (e.g, Smith, 2019; Wooldridge, 2021). We only now realize that AI-based technological solutions can only be realized once their philosophical foundations are recognized. This is the take-home lesson, or at least one of them, from Lem's stories.

The recognition of the tight bond between technology, specifically AI and informatics, and philosophy can be found in many of Lem's stories (see *Altruizyne* [Altruizyna] and *In Hot Pursuit of Happiness* [Kobyszcze] in *The Cyberiad*) (see also Stoff, 2005). Lem uses his philosophical acumen to forewarn engineers against wasting time trying to solve philosophical problems with technology, because this should work the other way around. In the 1960s, it was very hard to believe that philosophical problems should be treated as constraints on engineering solutions, but now such claims are more obvious and well recognized.

Lem's philosophical insights were visionary precursors to today's philosophically "saturated" technology, so we would class it as *philosophy in technology*.[12] We need to distinguish philosophy *in* technology from the philosophy *of* technology as being a reflection on the philosophical grounds of technology rather than the interpretation of technology as phenomenon from the perspective of metaphysics, ontology, ethics, and methodology, which are the classical dimensions of philosophical lore (e.g., Mitcham,

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[12] By analogy, we have a concept of *philosophy in science* formulated by Michael Heller (Heller, 2019; see also Polak, 2019).

1994; Dusek, 2006; Olsen et al., 2009; Verkerk et al. 2016; Franssen et al. 2018).[13]

The name "philosophy in technology" indicates that we are focusing on a philosophy that is not about something (as would be indicated by the preposition "of") but rather internal to something (as indicated by the preposition "in"). In our case, this "something" is technology. The cultivation of technology, like any other conscious human activity, is not possible without adopting specific philosophical premises or attitudes, even if they remain unspoken. Such premises are mostly adopted implicitly, usually by virtue of tradition or by the nature of the task. They are rarely explicitly explicated, yet they play a key foundational role in any particular domain of knowledge or practical activity.

Good engineers are, in some way, philosophers, even if they do not realize it, but their philosophies are frequently uncritical, naïve, and incoherent or idiosyncratic. We should not ask an engineer to resolve ethical problems, yet unfortunately we do. Likewise, we would not ask a philosopher to design a computer chip, and fortunately we do not. Despite this asymmetry, philosophers would benefit by talking to engineers, and engineers would benefit by talking to philosophers. We therefore need a bridge for engineers and philosophers to talk to each other. Maybe Lem is this bridge?

We could say that Lem was one of the first to notice the importance of *philosophy in technology*, a point that is not well recognized by Lem scholars. Lem was not interested in making his views more explicit. He maybe thought that it was all there for anyone to see if they want to. Today, when the development of technology has made Lem's ideas more understandable, it seems appropriate to draw the attention of philosophers and engineers to philosophy in technology. Without insights into technology from philosophers, engineers may be chasing the shadows in Plato's cave (see, for example, the history of AI), and philosophical reflections without a close connection to practice will be of little use in illuminating and solving the problems of the modern, technological world.

CONCLUSIONS

The fascinating development of technology over the past 60 years has placed Lem's visions of technological societies in a unique light. Their predictive prowess has earned Lem a special place among the visionaries of technology. His visions were created in the 1960s, and even if they need to be disentangled from their literary embalmment, they are more far-reaching

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[13] Many philosophers have looked at technology, but their views about technologies were amusing at best or pointless or irrelevant (e.g., Mitcham, 1994; Dusek, 2006; Olsen et al., 2009; Verkerk et al., 2016; Franssen et al., 2018).

than the visions of our contemporary celebrity visionaries, such as Elon Musk, Bill Gates, Ray Kurzweil, and Steven Hawking (e.g., Howard, 2015).

Indeed, Lem's visions of the benefits and dangers of AI and cyber-societies are much more specific than any warnings from our own technology gurus and most philosophers of technology. All that our technocrats foresee is constant progress and boundless benefits. To really explore what may be coming, and what new technologies may bring to us, we need the mind to be unhinged like Lem's. What is coming, based on Lem's visions, may not be an AI-driven nirvana like in the dreams of Kurzweil (2015), Schwab (2016), and Bastiani (2019).

Lem was not trying to build a philosophical system or even some kind of eclectic philosophy. To use an analogy, the phrase "philosophical issues in science" was used for the first time by Władysław Tatarkiewicz (1950) and later by Michał Heller (1978) and Józef Życiński, as well as their followers. Lem's philosophical mediations are more about philosophical issues in technology, as well as philosophical issues in science sometimes,[14] rather than the philosophical issues of technology,[15] so we class Lem's philosophical approach to technology as *philosophy in technology*.

Several thoughts come to us from Lem's stories. Lessons from the future that we need to learn now to avoid such a future include:

(1) Deterministic technical systems always fail in some unpredictable way.

(2) We do not understand the technology we create, and we cannot foresee all its consequences.

(3) We never know what we give up in return for technological convenience.

(4) We never know what human capacities are critical to retain (i.e., we do not know what makes us essentially what we are).

(5) Synthetic art, music, or poetry is not telling us anything about us, and it does not fulfill the role that our art, music, and poetry occupies.

(6) A society controlled by AI will not be a human society. We do not know what it will be, but we do know what it will not be.

"The acceleration of the rate of scientific and technological development has already become so clear that you do not have to be a specialist to notice it." This was written almost 60 years ago by Lem in *Summa Technologiae* (1964). We are currently experiencing an extremely rapid development of

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[14] Similarities between Heller's and Życiński's early approaches to philosophy as philosophical problems in science and Lem's approach may partly explain why Lem presented his reflections in the circle of Heller and Życiński (see Życiński, 1978).

[15] Philosophy *in* technology asks questions about philosophy that are internal to technology. In other words, it is about the deep philosophical underpinnings of technology, with philosophical assumptions usually being implicit and unarticulated, hidden from practitioners of technology, yet these assumptions determine the horizon of technological activities.

technology. Indeed, it surrounds us from everywhere, and most of our activities are now related to the use of technical artifacts. The Covid-19 pandemic and lockdowns have accelerated these processes further by pushing many aspects of social life into cyberspace. In using various forms of electronic communication, online meetings, information transfer and exchange, and so on, we witness rapid changes to our social fabric, workplace relations, social structures, systems of governance, education, and commerce. The list is endless. Not so long ago, such changes seemed difficult to imagine, but this was not so for Lem. On seeing our information- (aka cyber-) societies and the challenges we face with this technology, Lem would say, "I told you so."

In such a context, questions about the direction of future technologies take on a unique significance. Our civilization has become dependent on technical artifacts to an unprecedented degree, and the pace of change is so great that reflection on the anthropological effects of these processes is definitely needed. What is more, we, as always, play the avoidance game. For example, our experts propose emigrating to Mars (Stockton, 2016; Jorgenson, 2018), as if this would address our problems here on Earth. Unsurprisingly, we would meet ourselves and our technology again on Mars, just as Lem's heroes did during their cosmic travels.

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