
Artículos

Irena Szumilewicz-Lachman. Against the time, despite borders

Irena Szumilewicz-Lachman. Contra el tiempo, más allá de los límites

TÁBANO

Ewa Szumilewicz¹

Brock University, Canadá

eszumilewicz@gmail.com

Tábano

no. 26, p. 37 - 49, 2025

Pontificia Universidad Católica Argentina Santa María de los Buenos Aires, Argentina

ISSN-E: 2591-572X

Periodicity: Semestral

revista_tabano@uca.edu.ar

Received: 14 July 2024

Accepted: 14 October 2024

DOI: <https://doi.org/10.46553/tab6846>

URL: <https://portal.amelica.org/ameli/journal/828/8285349004/>

Abstract: Irena Szumilewicz-Lachman dealt with the philosophy of science, philosophy of nature, methodology of natural science and history of science. She investigated conventionalism, mainly on the basis of the achievements of Henri Poincaré. Her comments and analysis on the nature of time, and more broadly the philosophy of cosmology, were original and innovative, as they focused on the directionality of the passage of time. To this end, Szumilewicz-Lachman emphasized the role of beauty and truth had, as well as good sense on the Socratic method, on the contemplation of time in itself. In other words, all scientific work and research relies on a moral and aesthetic responsibility, for beauty and truth are the foothold of all existence.

Keywords: Irena Szumilewicz-Lachman, Beauty, Truth, Poincaré, Cosmology.

Resumen: Irena Szumilewicz-Lachman se dedicó a la filosofía de la ciencia, la filosofía de la naturaleza, la metodología de las ciencias naturales y la historia de la ciencia. Investigó el convencionalismo, principalmente basándose en los logros de Henri Poincaré. Sus comentarios y análisis sobre la naturaleza del tiempo, y más ampliamente sobre la filosofía de la cosmología, fueron originales e innovadores, ya que se centraron en la direccionalidad del paso del tiempo. Para ello, Szumilewicz-Lachman destacó el papel que desempeñaban la belleza y la verdad, así como el buen sentido en el método socrático, en la contemplación del tiempo en sí mismo. En otras palabras, todo trabajo e investigación científica se fundamenta en una responsabilidad moral y estética, pues la belleza y la verdad son el fundamento de toda existencia.

Author notes

¹

Posthumanism Research Institute, Brock University, Canada.

Ewa Szumilewicz – PhD researcher in the Institute of Philosophy and Sociology of the Polish Academy of Sciences. She is the author of the book *On the paradox of cognition*, Peter Lang, 2021, and its Polish version *O paradoksie poznania* Scientific Publishing House Katedra, 2021. She has been writing articles mostly on French contemporary philosophy. She is the author of the poetical prose *W Nibyśłowach* (In Neverwords), 2020. Her research interests include French philosophy and philosophy of physics. She awarded numerous scientific scholarships, among others from the Polish Minister of Science.

Palabras clave: Irena Szumilewicz-Lachman, Belleza, Verdad, Poincaré, Cosmología.

1. Introduction

Irena Szumilewicz-Lachman was connected to the Lvov-Warsaw School by various ties. Firstly, at the London School of Economics, she lectured extensively on the achievements of the Lvov-Warsaw School and the superiority of its theoretical proposals over those of the Vienna Circle. Secondly, she translated works by Zygmunt Zawirski into English, accompanied by her extensive introduction. She also planned to publish a work on the contributions of Janina Kotarbińska (unfortunately, she did not manage to complete the planned publication). Thirdly, and most importantly, Irena Szumilewicz-Lachman was engaged in the philosophy of science, the favoured discipline of the representatives of the Lvov-Warsaw School, gaining significant achievements in this field. Furthermore, true to her membership of the Lvov-Warsaw School circle, her philosophical aspirations were based on a thorough education in the natural sciences: chemistry and physics.

Irena Szumilewicz-Lachman dealt with the philosophy of science, the philosophy of nature, the methodology of natural science and the history of science. She investigated conventionalism, mainly based on the achievements of Henri Poincaré. Her comments on the nature of time, and more broadly on the philosophy of cosmology, were original and innovative. She contained them in her work on the direction of the arrow of time. I will elaborate on these concepts later. Additionally, Szumilewicz-Lachman emphasized the role of the category of beauty and truth as well as good sense in the Socratic manner, while clarifying the category: she strongly stressed the issue of the moral responsibility of a scientist. Meanwhile, the category of beauty was close to the philosopher in her private life and accompanied her until her death in 2002.

In my paper, I will attempt to sketch a figure not only of a scientist but of a woman, of a mother, of a Gulag prisoner who - against the passage of time and despite borders, was striving for beauty and truth, both in life and in philosophy.

2. Philosopher's Profile

My grandmother, Irena Szumilewicz-Lachman, was born in Zambrow on December 20, 1912. In the abbreviated birth certificate (No. 355/68), she is listed under the name Tenienbaum Ita, her parents being Tenienbaum Chaim Benjamin and Zelda Regernsberg, both of Jewish origin. In 1930, she completed high school, with Leopold Infeld, a close associate of Albert Einstein, as her physics teacher. In 1932, she enrolled in the Chemical Faculty of the University of Warsaw. In September 1938, she graduated from the university with a Master's degree in chemistry, signed by Jan Łukasiewicz.

During World War II, she was expelled and sent to Lvov. After the death of her first husband Józef Krigier (the father of Benedykt Szumilewicz), who was tortured and murdered by the Soviet secret police agency (the NKVD) in a Soviet prison, Irena Szumilewicz was deported to Kazakhstan with her newborn son. Her practical knowledge of chemistry, particularly soap production, saved her during the deportation to the Gulag.

She then married Leon Szumilewicz and lived with him in Gdańsk. The result of this marriage was her second son, Jerzy Szumilewicz (currently George Summers).

In 1959, at the University of Warsaw, she defended her doctoral thesis *The Theory of the Thermal Death of the Universe*, which was later published by PWN. Irena Szumilewicz was 47 when she became a Doctor of Philosophy. Five years later, Irena Szumilewicz obtained her habilitation at the same university based on the book *On the Direction of the Flow of Time*.

She was a lecturer in Gdańsk, first at the Medical Academy and later at the Higher Pedagogical School, where she became an associate professor and head of the Department of Philosophy. In the infamous year of 1968, she was dismissed from the university. Later, she remained unemployed, earning a living by tutoring in mathematics. After a few years, she found employment at the Institute of Philosophy and Sociology of the Polish Academy of Sciences, where she became head of the Independent Laboratory for Methodological Problems of Physical Sciences.

In 1979, she moved to London permanently. It is worth noting that she was 67 when she made a desperate and brave move to find serenity, happiness, love and relief abroad. There, she married her third husband, Professor Feliks Lachman.

Her marriage to Feliks Lachman was her happiest one: simply the good one. Feliks and Grandma were not only devoted to each other but were also very good friends. As they both were Shoah survivors, they shared that trauma and cared about each other. I also remember from our private correspondence that Grandma underlined the value of true friendship as a rare and beautiful gift, and one often underestimated.

Prof. Irena Szumilewicz-Lachman became a Research Associate at the London School of Economics in the Department of Philosophy, Logic, and Scientific Method (a department established by Karl Popper). Shortly after arriving in London, she became a professor at the Polish University Abroad (PUNO), where she dedicated herself to researching and promoting Polish philosophy until the end of her life.

As I hope you can see, during her life the notion of time was present not only theoretically. She was the living example of it, and was also my personal inspiration to believe that it is never too late for dreams, no matter what obstacles exist; it is never too late for philosophy, for love, for dreams about a good place to live in.

Irena Szumilewicz's body of work includes four books and over forty scientific papers, as well as numerous lectures at international conferences.

Three main currents dominated Irena Szumilewicz's research: the issue of the moral responsibility of the scholar, including an attempt to reflect on the archetype of the scholar (see Szumilewicz-Lachman, 2000, pp. 227-232; see also Szumilewicz-Lachman, 1998); the issue of the flow of time (see Szumilewicz-Lachman, 1964), more precisely the direction of the arrow of time; and the history of science (including the profiles of Henri Poincaré and Zygmunt Zawirski).¹

3. The issue of the moral responsibility of a scholar – an attempt to reflect on the archetype of the scholar

Reflecting on the work of a scholar and the mission of the scholar, Professor Szumilewicz often invoked the examples of Socrates, Nicolaus Copernicus, and Henri Poincaré. Irena Szumilewicz clarifies the approach of Socrates, who inseparably links knowledge with virtue, adding that possessing knowledge of a person's moral stance is indeed a necessary condition, but not a sufficient one. What is needed is to provide future scholars, as well as society as a whole, with knowledge about morality (compare Szumilewicz-Lachman, 2000, p. 232).

Henri Poincaré is an example of a scholar who fits in the Socratic tradition. Poincaré believed that the goal of knowledge is to understand beauty, goodness, and truth, while pragmatic motives are of secondary importance.

A scholar does not study nature because it is useful; they study it because it brings them pleasure, and it brings them pleasure because nature is beautiful. If it were not beautiful, it would not be worth knowing, and life would not be worth living. I am not talking here, of course, about the beauty perceived by our senses, the beauty of material properties and appearances; not that I disdain it, may God forbid, but it has nothing to do with science. I am talking about that inner beauty, flowing from the harmonious order of parts, perceptible to the pure mind (Poincaré, 1911, p. 242)

Truth, on the other hand, constitutes the ultimate goal, and a scholar should have the courage to proclaim it unconditionally. Here, Professor Irena Szumilewicz advocates: "When I speak of truth, there is no doubt that I am referring to moral truth, not just scientific truth. To find both, one must strive to free oneself completely from prejudices and passions; one must achieve absolute honesty" (Szumilewicz-Lachman, 2000, p. 229).²

The pragmatic value of the results of scholars' research is only a consequential factor (and not a constitutive one). On the other hand, Irena Szumilewicz does not devalue the pragmatic worth of research work as a factor that could influence, and often does influence, the development of society or civilization; however, she warns against the threats that the outcomes of scientific research may pose. The professor cites Michal Atiyah, an eminent scholar involved in the fight against the proliferation of nuclear weapons, listing the following reasons:³

1. The argument about the moral responsibility of a scholar: the scholar is responsible for the consequences of their creative activity;
2. The scholar, better than a politician, understands technical problems and, therefore, bears a greater responsibility;
3. The scholar can provide assistance and technical guidance in solving problems that arise with discoveries;
4. The scholar should warn of future dangers that may arise in connection with today's discoveries;
5. Scholars form an international brotherhood beyond natural borders, and therefore, they are in a favourable position to assess the interests of humanity globally;
6. Finally, there is a need to prevent widespread aversion to science. The self-interest of scholars requires them to be fully engaged in public discussions and not to be seen as "enemies of the people" (Szumilewicz-Lachman, 2000, p. 231)

This list is the quintessence of how a moral scholar should behave. There is little to add here, at most, to articulate how important the moral responsibility of the scholar is. Hence, future scholars should be given a thorough foundation in moral issues. Here, Irena Szumilewicz proposes an innovative solution.

The moral issues should be at the center of society's interest. [...] Furthermore, it would be advisable to introduce ethics as a mandatory subject on all faculties. By ethics, I mean not just narrowly understood professional ethics but ethics in a broad sense, as the study of values and their significance for society. I believe that something like the Hippocratic Oath should be introduced for those granted the right to practice professions such as physicist, chemist, geneticist, etc. Such an oath would have a superior value compared to all future commitments. I believe that anyone who decides to become a scholar in the future should, in their own conscience, take an oath corresponding to the old Roman principle, which we paraphrase: Let the well-being of humanity be the highest law! *Salus Humanitati suprema Lex Esto!* (Szumilewicz-Lachman, 2000, p. 232)

In the context of the moral responsibility of a scholar, it is worth mentioning the deep friendship that connected my grandmother and her husband, Feliks Lachman, with Józef Rotblat, a Nobel Peace Prize laureate for his efforts to promote nuclear disarmament. I will quote a statement from an interview Professor Rotblat gave me on the day after his receipt of the Nobel Prize: *'Those who cannot remember the past are condemned to repeat it'* – (George Santayana). This was a saying that I also heard from my grandmother. Irena Szumilewicz, although not formally a part of the Twardowski School, fully identified with this intellectual formation.

4. The issue of the passage of time/the arrow of time

The second fundamental issue my grandmother devoted herself to is the problem of the passage of time. This problem is so broad that Irena Szumilewicz deliberately narrows her intellectual research to reflections on the passage of time (the flow of time) understood as the arrow of time. In turn, she analyzes the arrow of time in three aspects – representing an attempt to resolve the following problems:

1. Is the structure of the world isotropic or anisotropic? [Irena Szumilewicz adopts an anisotropic structure of the world]
2. What are the objective properties underlying the anisotropy of the world?
3. What conditions the human, subjective sense that time flows in a specific direction?

The researcher considers features such as locality, universality, and causality. She concludes that there are no physical grounds for assuming that the world has local or universal properties. It is also inappropriate to speak of time in the full category of causality; time is only a result of specific relationships between phenomena. Irena Szumilewicz examines the passage of time within three main theories: causal, entropic, and based on Friedman's three cosmological models, with a focus on the distribution of the arrow of time only within the expanding universe model. The philosopher argues that causal theories provide the basis for explaining the passage of time.

They are legitimate when causality is understood only as a function of order, without reversal. The second law of thermodynamics allows for a nomological sanctioning of the anisotropy of time. The analysis of entropic theories may serve as a basis for determining the direction of the arrow of time only on a local scale; that is, only on the scale of our universe. When contemporaneously analyzing the issue of entropy, one should not forget that the concept of entropy is appropriate only when systems in thermodynamic equilibrium are being analyzed. Examining the universe at the moment of its origin —whether from the perspective of the Big Bang or the Big Bounce— it is difficult to postulate conditions that would fulfil the second law of thermodynamics.

The new approach of non-equilibrium thermodynamics⁴ weakens the power of entropy as a reliable tool for analyzing cosmological issues. Non-equilibrium systems —such as the universe— possess fascinating properties that do not align with the classical assertion that nature inevitably tends toward chaos. One example of research challenging the extrapolation of entropy rules to the scale of the universe is the study of self-organizing systems.

Another phenomenon that alters one's perspective on the issue of entropy is the Bénard effect, which describes how regularities and symmetries characterize systems in a state of thermodynamic imbalance. This phenomenon illustrates how, in systems in a state of imbalance, orderliness can transition into chaos and vice versa:

Self-organization refers to the process of the spontaneous formation of spatial, temporal, and spatiotemporal structures or functions within a system composed of several or many components. This phenomenon occurs in physics, chemistry, and biology in open systems that are far from thermal equilibrium. Interestingly, the phenomenon of self-organization also appears in fields far removed from physics, biology, and chemistry, such as economics, sociology, medical sciences, and engineering (Szydłowski et al., 2011, p. 2)

Also, deliberations on specific cosmological models require determining whether time constitutes an open or closed continuum. Prof. Szumilewicz advocates for an open time continuum. According to Prof. Szumilewicz, the topology of time, compared to the topology of space, is impoverished since time possesses only one dimension. Therefore, there are only two possible ways to conceptualize time: as a straight line or as a circle. In contemporary terms, such a situation may not necessarily hold true when considering modern physical hypotheses, such as the theory of superstrings, which operates with multiple dimensions. In such an approach (string theory), time can be analyzed as a multidimensional object.

Although the proposal of closed time loops seems improbable, in the light of the laws of physics, such a state cannot be ruled out. Attempts to describe time as a cyclical entity were made even in ancient times. Both Heraclitus and Parmenides, despite their radically different perspectives, denied a fixed direction of time flow. Heraclitus believed that reality is constantly changing, while Parmenides maintained that the world is an immovable being.

Plato, on the other hand, believed that time possesses attributes akin to mathematical entities. In addition to these attributes, time, in the philosopher's view, corresponded to circular motion: these images of time imitated eternity by moving in circular motion according to mathematical principles:

Thus God shaped the world into a circle, in the form of a sphere, which extends equally far in every direction from the center to the edges. It is the most perfect shape of all, entirely similar to itself everywhere. He believed that such a uniform shape is incomparably more beautiful than a non-uniform one (Plato, ca. 360 B.C.E./1999, p. 682)

And also,

Thus time was created together with the world, so that being born together, they might also cease together if ever the end of the world and time comes. It was created in the image of eternity, to be as similar to it as possible. The archetype lasts for all eternity, and time lasts until the end - encompassing the past, present, and future. Thus, according to the thought and intention of God regarding the creation of time, for time to exist, the sun, the moon, and five other stars, known as planets, were created to mark and guard the numbers of time. God made their bodies and placed them on the orbits through which the circular motion of the other world proceeds. There are seven of these bodies and seven of their paths. The moon travels on the orbit closest to the Earth, the sun on the second, above the Earth. The morning star and the so-called sacred star of Hermes travel on orbits with the same speed as the sun but received an opposite velocity. Therefore, they overtake each other and are overtaken, just as the sun and the star of Hermes, and the morning star" (Plato, ca. 360 B.C.E./1999, pp. 687-688)

Friedrich Nietzsche formulated the theory of eternal recurrence, which describes cycles and the repetition of the history of the universe. A similar standpoint in more recent times was represented by Svante Arrhenius, Abel Rey, and Zygmunt Zawirski (compare Szumilewicz-Lachman, 1964, p. 88). Closed time loops are logically possible. Moreover, they do not contradict the laws of physics.

In 1949, the Austrian-born American mathematician Kurt Gödel created a space-time model that assumes closed time loops. This model is consistent with the equations of GTR. Gödel postulated that spacetime rotates around the axis of inertia. According to Professor I. Szumilewicz, Gödel's model is homogeneous in space and static. In this model, the existence of a three-dimensional space perpendicular to the world lines of matter is not considered.

In the spacetime model, the properties of time also undergo changes. The world lines of each fundamental particle are open. In the observer's experiments, no epoch repeats itself.

However, there can exist other, closed *time-like* lines. With closed *time-like* lines, there is no basis for conducting an analysis of the arrow of time. According to Professor I. Szumilewicz, an inhabitant of Gödel's universe could traverse such a *time-like* line to their own past. Contemporary versions of spacetime with *time-like* lines have been confirmed as a valid hypothetical possibility, see for example the work of Rosa and Letelier *Stability of closed timelike curves in the Gödel universe* (Rosa & Letelier, 2007).

Our world, it is true, can hardly be represented by the particular kind of rotating solutions referred to above. [...] There exist however also expanding rotating solutions. In such universes an absolute time also might fail to exist, and it is not impossible that our world is a universe of this kind. The mere compatibility with the laws of nature of worlds in which there is no distinguished absolute time, and, therefore, no objective lapse of time can exist, throws some light on the meaning of time also in those worlds in which an absolute time can be defined. (Gödel, 1976, p. 457)

Albert Einstein did not find any logical inconsistency in Gödel's model, although he was far from uncritically accepting that theory:

The work of Kurt Gödel constitutes, in my opinion, a significant contribution to the general theory of relativity, especially in the analysis of the concept of time. The problem in question troubled me already during the formulation of the general theory of relativity, and I was unable to comprehend it. [...]

Mr. Gödel found such a cosmological solution to the gravitational equations. It would be interesting to consider whether they can be rejected for physical reasons (Einstein, 1999, p. 190)

In the view of some theorists, Gödel's discovery of a cosmological model with closed *time-like* curves may lead to contradictions. As an example, consider the following situation: imagine a person who travels back to their own past and, before their birth, kills their own mother. The concept of solutions to Einstein's equations with closed *time-like* curves is not internally contradictory. To describe the process of human life, the theory of gravitational field alone is insufficient. Michał Heller believes that when it becomes possible to create a mathematical theory that describes the conditions necessary to explain life, it will impose additional conditions on the theory of gravity, automatically excluding closed *time-like* curves (Heller, 2002, p. 46). He also speculates that the sought conditions for the existence of a global time are simultaneously necessary conditions for the emergence of human life.

In 1964, when Irena Szumilewicz's book *O kierunku upływu czasu* (*On the Direction of the Flow of Time*) was published, the philosopher intentionally narrowed discussions regarding specific cosmological models to the consideration of whether time constitutes an open or closed time continuum, which remains a fascinating issue. Today, with the rapid development of contemporary cosmology and its modern hypotheses, an entirely new spectrum of philosophical considerations on the nature of time and space opens up. For instance, the concept of a cyclic universe is intriguing, serving as a scenario for the development of the universe.

The scenarios envisioning the possible development of the universe, which assume cyclicity and thus go beyond the initial singularity, depict the universe as temporally infinite. In such scenarios, the actual infinity is realized and, as suggested by Professor Marek Szydlowski, it becomes a genuine attribute of the universe.

Exploring the concept of the cosmological arrow of time in such universes becomes a captivating philosophical journey, as time would appear significantly different during the contraction phase of the universe (the arrow of time flowing from the future to the past) compared to the expansion phase (the arrow of time flowing from the past to the future).

It has been exactly 60 years since *On the Direction of the Flow of Time* was published and the main thesis of the book is still valid: namely that there are no physical grounds for assuming that the world has local or universal properties and that it is also inappropriate to speak of time in the full category of causality as time is only a result of specific relationships between phenomena.

5. Conclusion

Irena Szumilewicz engaged in the philosophy of science, the philosophy of nature, the methodology of natural sciences, and the history of science. She explored conventionalism, primarily based on the contributions of Henri Poincaré. Her comments, analyses, and insights on the nature of time and the broader philosophy of cosmology, as presented in the work *O kierunku upływu czasu* (*On the Direction of the Flow of Time*), were extraordinarily original and innovative. She strongly emphasized the role of the categories of beauty, truth, and goodness, understood in a Socratic manner, while simultaneously refining those categories. The researcher placed particular emphasis on the issue of the moral responsibility of the scholar. In her private life, the category of beauty was close to her philosophy. My grandmother dressed beautifully, took care of the beauty of her surroundings and home, and until the very end of her long life (she lived to be 89 years old), she wore high heels.

References

- Einstein, A. (1999). *Pisma filozoficzne* [Philosophical writings]. PAN
- Gödel, K. U. R. T. (1976). Static Interpretation of Space-Time: With Einstein's Comment on it. In M. Capek (Ed.), *The Concepts of Space and Time: Their Structure and Their Development* (pp. 455-461). Springer Netherlands. https://doi.org/10.1007/978-94-010-1727-5_69
- Heller, M. (2002) *Początek jest wszędzie* [The beginning is everywhere]. Prószyński i S-ka.
- Plato. (1999). *Dialogues, Volume II: Timaeus* (W. Witwicki, Trans.). Antyk. (Original work published ca. 360 B.C.E.)
- Reguera, D., Rubi, J. M., & Vilar, J. M. G. (2005). The mesoscopic dynamics of thermodynamic systems. *The Journal of Physical Chemistry B*, 109(46), 21502-21515. <https://doi.org/10.1021/jp052904i>
- Poincaré, H. (1911). *Nauka i metoda* [Science and method]. J. Mortowicza.
- Rosa, V. M., & Letelier, P. S. (2007). Stability of closed timelike curves in the Gödel universe. *General Relativity and Gravitation*, 39, 1419-1435. <https://doi.org/10.1007/s10714-007-0464-9>
- Szumilewicz-Lachman, I. (1964). *O kierunku upływu czasu* [On the Direction of the Flow of Time]. PWN.
- Szumilewicz-Lachman, I. (1978). *Poincaré*. Wiedza Powszechna.
- Szumilewicz-Lachman, I (1994). *Zygmunt Zawirski: His Life and Work. With selected Writings on Time, Logic and The Methodology of Science* (F. Lachman, Trans., R. S. Cohen, Ed.). Kluwer Academic Publisher.
- Szumilewicz-Lachman, I. (1998). Joseph Rotblat: the moral responsibility of a scientist. *Dialogue and Universalism: toward synergy of civilizations*, 8(9), pp. 27-36.
- Szumilewicz-Lachman, I. (2000). Czy nauka straciła swoją niewinność [Has science lost its innocence?]. In E. Piotrowska, M. Szczepniak, & J. Wiśniewski (Eds.), *Pisma Filozoficzne: Vol. LXXV, Między Przyrodoznawstwem, Matematyką a Humanistyką*. Wydawnictwo Naukowe Instytutu Filozofii.
- Szydłowski, M., Herec, M., & Tambor, P. (2011). Samoorganizujący się Wszechświat w różnych skalach – miejsce, gdzie nauka spotyka się z filozofią [Self-organizing Universe on different scales – where science meets philosophy]. In E. Roszał (Ed.), *Transfer idei. Od ewolucji w biologii do ewolucji w astronomii i kosmologii*. Wydawnictwo KUL.

NOTES

- 1 This can be seen in Szumilewicz-Lachman, 1978; and Szumilewicz-Lachman, 1994.
- 2 As pointed out by Poincaré, mathematics is the queen of sciences, revealing to scholars the eternal harmony and order of both the human mind and the world: "On one hand, mathematical science must reflect upon itself, and this is useful because reflecting upon itself means for it to reflect upon the human mind that created it, especially since it is among all its creations the one for which it drew the least from the outside. This accounts for the usefulness of certain mathematical speculations, such as those whose subjects are postulates, unconventional geometries, and strangely shaped functions. The more these speculations diverge from the most common concepts, and hence from nature and applications, the better they show us what the human mind can achieve when it increasingly distances itself from the tyranny of the external world, and thus the better they allow us to understand it in itself" (Poincaré, 1911, pp. 21-22).

3 See Szumilewicz-Lachman, 2000, p. 231.

4 See for example Reguera et al., 2005.

AmeliCA

Available in:

<https://portal.amelica.org/ameli/ameli/journal/828/8285349004/8285349004.pdf>

How to cite

Complete issue

More information about this article

Journal's webpage in portal.amelica.org

AmeliCA

Open Science for Common Good

Ewa Szumilewicz

Irena Szumilewicz-Lachman. Against the time, despite borders

Irena Szumilewicz-Lachman. Contra el tiempo, más allá de los límites

Tabano

no. 26, p. 37 - 49, 2025

Pontificia Universidad Católica Argentina Santa María de los Buenos Aires, Argentina

revista_tabano@uca.edu.ar

ISSN-E: 2591-572X

DOI: <https://doi.org/10.46553/tab6846>



CC BY-NC-SA 4.0 LEGAL CODE

Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International.