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THE INFLUENCE OF BERGSON'S ENTROPIC AND NEGENTROPIC IDEAS ON POLISH PHILOSOPHY BEFORE THE SECOND WORLD WAR

INTRODUCTION

The concepts of energy and entropy were among the seminal ideas of 19th-century physics, which belonged to the field of thermodynamics, a new theory at the time concerning heat and energy transformations. Together with new theories about the evolution of the species and electromagnetic fields, they influenced the formation of a new way of perceiving humanity, the natural world, and the mechanisms that govern it. The concepts of evolution, energy, and physical field became, and continue to be, an inspiration for the social sciences, humanities, philosophical thought, and literary works (WHITEHEAD 1925, 99–104). The same happened to the concept of entropy that relates to the second law of thermodynamics. The original physical concept underwent various modifications as it penetrated various areas of culture, so we will use the broad term "entropic concepts" (or ideas) here to cover any concept or idea directly or indirectly inspired by the physical concept. In analogy to entropic ideas, we use here negentropic ideas, i.e. those related to processes opposite to entropic ones. Unlike entropic ideas, which

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are influenced by the physical theories, negentropic ideas first appeared in an intuitive form, and later were they named and formed negentropic concepts.[1] Thus, Bergson did not use directly the term "negentropy" (or a similar term), but negentropic intuitions and ideas were clearly present in his philosophy (KRAGH 2016, 190; KRAGH and WEININGER 1996, 122–23). For this reason, we refer here to negentropic ideas rather than, say, anti-entropic ones, to avoid false associations and misunderstandings, keeping in mind that the term was not directly used in the history described.

In recent years, studies of the cultural reception for the concept of energy and entropy have emerged,[2] but there is a particularly notable dearth of research on this topic in the Polish context. These concepts were originally based on 19th-century thermodynamics, and they have much cultural significance. The dissemination of these concepts of energy and entropy beyond the physics, in both literal and metaphorical forms, also influenced philosophical thinking. Early discussions of entropy were notably conducted by thinkers like Franz Brentano, Friedrich Engels, Friedrich Nietzsche, Charles Peirce, and Henri Bergson (NESWALD 2006; KRAGH 2016). Indeed, Bergson asserted in *L'évolution créatrice* that the second law of thermodynamics "is the most metaphysical of the laws of physics" (BERGSON 1907, 264; 1911, 256), thus attributing entropic concepts with a distinctive philosophical function. As expected, Bergson's contribution played a significant role in the early 20th century's advancement of entropic ideas. The relationship between Bergsonian philosophical concepts and thermodynamics has been the subject of numerous studies (ČAPEK 1971; GUNTER 1971, 1991; LACEY 1993; DIFRISCO 2015), but there has been scarce exploration of how Bergson's entropic and negentropic ideas impacted Polish philosophy.[3]

[1] This concept first appeared as "ectropy", introduced by Georg Hirth in 1900 and popularized by Felix Auerbach in 1910. Harry Overstreet introduced the term "extropy", the concept of "negative entropy" was then used by Erwin Schrödinger in his book *What is life?* (SCHRÖDINGER, 1944) to describe the core feature of the phenomenon of life. Finally, the modern name "negentropy"—as a shortened version—was introduced later by Léon Brillouin. In this paper we use the contemporary version to avoid misunderstanding (cf. KRAGH 2016, 190; KRAGH and WEININGER 1996, 122–23).

[2] Studies of the cultural dimensions of the idea of entropy are not so numerous. See NESWALD (2006, 2009), ZENCEY (1991), BRUSH (1978).

[3] It is worth noting that Stanisław Borzym, in his seminal work *Bergson a przemiany światopoglądowe w Polsce* [Bergson and worldview transformations in Poland] (BORZYM 1984), omitted almost all Bergsonian entropic themes, although he referred to all the thinkers we will cite in this study. After all, the worldview significance of entropic ideas can hardly be denied (NESWALD 2006). It is also difficult to analyze Bergson's philosophy, which was intended to

The question of entropic concepts seems particularly interesting from the perspective of Polish philosophy, which in the 19th and 20th centuries was typically open to inspiration from Western philosophy. Bergson's philosophy is also known to have strongly influenced Polish thinkers in the early decades of the 20th century. Stanisław Borzym even claimed that the reception of Bergsonism "in many respects provides an instructive **cross-section** of the [Polish] philosophical consciousness of the time" (BORZYM 1984, 18).[4] This raises questions about how Bergson's specific treatment of entropic issues influenced Polish philosophical thought and the role it played in shaping this consciousness. Finding answers to these questions is the main purpose of this article.

We begin with the historical background for the reception of Bergson's concepts. The most important moments in the development of thermodynamics and the concept of entropy in the field of physics will be outlined, followed by the broader influence of entropic ideas. We will then focus on an analysis of Bergson's ideas, which are mainly expressed in *L'évolution créatrice* (1907) (trans. *Creative Evolution*, 1911), and demonstrate Bergson's original contribution to the development of entropic themes. In what follows we will illustrate the reception process for Bergson's entropic ideas in Polish philosophy. In the concluding part we try to paint a tentative picture of how Bergson interacted in the field of interest and show why this was an important impulse for Polish philosophy to develop.

1. HISTORICAL BACKGROUND: ENTROPIC IDEAS IN THE CULTURE OF THE 19TH AND THE EARLY 20TH CENTURY

In the 1840s and 1860s, two laws pertaining to thermodynamics, the conservation of energy and energy dissipation were formulated. The law of conservation of energy (originally called the law of conservation of force) proposed in the 1840s by Julius R. Mayer and James P. Joule[5] states that in an isolated system, the amount of energy remains constant despite its changes. Soon after this law was formulated, it became the subject of spontaneous

complement modern science, without inscribing it in the process of reception and transformation of the scientific ideas of the time.

[4] All translations are by the authors, unless otherwise stated.

[5] The modern concept of energy was introduced in the 1850s by the Scottish physicists and engineers W. Thomson and W. J. M. Rankine.

philosophical and even theological interpretations. These interpretations would often contradict each other. For example, theistic scientists used the law of conservation of energy to argue for God's creation of the world. For atheistic materialists, this law was an argument for the non-existence of the Creator. Similar arguments have been put forward for and against the immortality of the human soul (KRAGH 2008, 26–29).

The second law of thermodynamics that we are more interested in was formulated following the work of the physicists William Thomson (later Lord Kelvin), Hermann von Helmholtz, and Rudolf Clausius. In 1865, Clausius introduced a new physical concept called entropy to measure the dissipation of energy in the processes of its transformation. These transformations, according to the second law of thermodynamics, are irreversible and temporal, like the "flow" of heat from a hotter body to a cooler one. In other words, it never works the other way. This new theory about heat and energy transformation led its authors to make some initial attempts at explaining the energy processes in the sun, the stars, and even the entire cosmos. These had some quite surprising consequences of a worldview nature.

In articles and readings by Thomson, Helmholtz (1854), and especially Clausius (1868), the idea of the so-called thermal death of the universe emerged (*ewige Ruhe, Wärmetod*). When the conclusions of thermodynamics are applied to the entire cosmos, it must inevitably move toward an end to energy transitions, with there being an eternal stasis in thermal equilibrium. Western intellectuals at that time accepted these scientific predictions as a kind of secular prophecy foretelling a cosmic apocalypse. The mood of such conclusions was thoroughly pessimistic, and this became particularly acute in the intellectual climate of the late 19th and the early 20th century (*fin de siècle*). The idea of entropy and the associated specter of the inevitable stagnation of the sun and the entire universe filled many with resignation and doubt.

By the end of the 19th century, the concepts of energy and entropy had become a kind of universal category, not just in scientific discourse but also in cultural discourse (GILLISPIE 1960; MYERS 1985; MUSSETT 2022). As mentioned earlier, the ideas formed on its basis were often of a metaphorical nature, although they retained some of the original connotations in altered cognitive perspectives, so they began to interact in the field of social and philosophical thought and even the sphere of literary creativity.

The concepts of energy and entropy have found a particularly useful and heuristically fruitful place in the social and economic sciences. In nine-

teenth-century industrial societies, these concepts were perfectly suited to modeling economic and even social processes. Modern researchers note that among other things, the idea of entropy influenced the emergence of certain economic concepts, such as the so-called neoclassical theory of Walras, Menger, and Jevons (MIROWSKI 1999; JAKIMOWICZ 2020). Social and economic thought based on the physical concepts of energy and entropy was developed by, among others, the biologist and sociologist Patrick Geddes, the physical chemist Wilhelm Ostwald, and the chemist and industrialist Ernest Solvay (MIROWSKI 1984, 812–13).[6]

Literary historians also point to the analogous influence of this idea on some of the works by authors like Charles Dickens, Joseph Conrad, and Herbert George Wells. In Conrad's novels *Heart of Darkness* (1899) and *The Secret Agent* (1907), the idea of "entropy is … the principle at work within the logic of industrial capitalism and imperial exploitation" (MACDUFFIE 2009, 90). In Wells' *Time Machine*, on the other hand, the novel's protagonist's fascination with time travel collides with the image of a cold, dead Earth in the distant future (GOLD 2010; TATTERSALL 2014).[7] With such a multi-disciplinary intellectual influence from the scientific concept of entropy, we could talk about a specific culture, or even cultures, of entropy.

2. ENTROPY AND NEGENTROPY IN BERGSON'S METAPHYSICS

Turning to the influence of the idea of entropy on philosophical thought, it is worth pausing to consider the already signaled reception of this idea in the intellectual legacy of Henri Bergson, especially given that this French thinker is widely, but not necessarily rightly, regarded as a critic of science and the so-called "scientific intellect." Bergson dealt with the physical concept of entropy twice: first in a short section of *L'évolution créatrice* (1907) and second in his 1909 address to the French Academy of Sciences, in which he discussed Émil Meyerson's book *L'Identité et Réalité* (BERGSON 1959) that had been published

[6] The forerunners of the use of thermodynamic concepts in social and economic theory in Polish culture were Zygmunt Heryng (1854–1931) and Leon Winiarski (1888–1927).

[7] Themes directly related to the idea of entropy also appeared in Polish literature (especially in the literary trend called Young Poland). In the fantasy novel *Stara Ziemia* (*The Old Earth*, 1911) by Jerzy Żuławski (1874–1915), the theme of the gradual death of civilization appears. In turn, in the short horror story *Dziwna stacja* (*The Strange Station*, 1922) by Stefan Grabiński (1887–1936)—an author sometimes called "the Polish Poe"—the fictional phenomenon of "partial entropy" leads to the mysterious disappearance of a passenger train.

the previous year. Since the second reference to entropy does not add anything new to the way it is treated in *L'évolution créatrice*, our attention focuses on the former work.

In the third chapter of his book, Bergson considered the relevance of the two laws of thermodynamics ("the principle of conservation and the principle of decrease of energy") to the "world order" he was discussing (BERGSON 1911, 254–56). (Note that he distinguished "such a world as our solar system" from the universe as "a collection of solar systems," recognizing that "they do not have the same metaphysical significance.") Bergson noted that while the second law of thermodynamics, particularly the concept of entropy, is quantitative mainly to enable its application, it could also be expressed in a qualitative form. Since this law indicates the irreversible direction of the course of events in the world, as expressed in the gradual loss of forces in the solar system, Bergson considered it "the most metaphysical of the laws of physics" (BERGSON 1911, 256). As he continued, he no longer wrote in quantitative terms about useful forces/energies but rather about the "capacity for change" (*la mutabilité*) in the world as a qualitative category.

Bergson then attempted to give two possible scenarios for the origin of the "capacity for transformation" in our solar system. The first assumed a scenario in which numerically infinite universes grant each other this ability in some infinite process, which resembles Svante Arrhenius' hypothesis of the self-sustaining universe (ARRHENIUS 1903) that was popular at the time. The second scenario, on the other hand, resembled the equally popular idea of eternal returns, which is characterized by alternating increases and decreases in "transformability." For the second scenario, Bergson referred to the theoretical conclusions given by Ludwig Boltzmann (1895, 1898) for a similar state of transformation of the universe. Without going into details about the Austrian physicist's argument and Bergson's largely controversial use of this argument (ČAPEK 1971, 394–95; DURÁN 2019),[8] it suffices to say that the French thinker considered the second scenario "absolutely impossible" (BERGSON 1911, 258).

Bergson ultimately distanced himself from Boltzmann's partial solution of the problem due to the mechanistic conclusions of the kinetic-molecular theory. He considered the problem of a diminishing transformation capacity as unsolvable on scientific grounds due to the limitations of the "scientific intellect." At the same time, Bergson expressed the need to seek an adequate solution to this problem in the sphere of metaphysical narrative, and we could call this "a philosophy of sci-

[8] Bergson completely ignored the physical consequences of Boltzmann's statistical formulation of the second law of thermodynamics.

entific gaps." He argues there are two important processes in the world: the first is manifested in a diminishing capacity for transformation, while the second is the creative process "by which this thing *makes itself* is directed in a contrary way to that of physical processes, and that it is therefore, by its very definition, immaterial. The vision we have of the material world is that of a weight which falls" (BERGSON 1911, 258–59). Bergson called this latter process *élan vital*, or vital impulse.[9] However, for the French philosopher, entropy in physical terms remained the law of resistance for deterministic matter, but not the law of indeterministic *élan vital* (DURÁN 2016). In his commentary, Milič Čapek (1971, 394) wrote that Bergson's creative evolution could be contrasted ideologically with Herbert Spencer's vision of mechanistic evolution that dominated the minds of the second half of the 19th century.[10]

From the perspective of Bergson's metaphysics of nature, living organisms occupy an intermediate position between the tendencies of the dynamics of matter and the dynamics of *élan vital*. This *élan vital* is characterized as a cosmic force that precedes the emergence of living organisms through evolution, and it is able to survive the end of organic life in the universe. If even much of the activity of *élan vital* is unable to stop matter orienting toward decay, the goal of creative evolution, according to Bergson, is to at least inhibit, although not stop, this entropic tendency: "All our analyses show us, in life, an effort to remount the incline that matter descends." Thus, life "is like an effort to raise the weight which falls. True, it succeeds only in retarding the fall" (BERGSON 1911, 260). Bergson's core idea clearly refers to negentropic ideas (cf. e.g., KRAGH 2016, 190; KRAGH and WEININGER 1996, 122–23) and popularizes them in philosophy.

Thus, for Bergson, both the material dimension of the world and the activity of the *élan vital* factor have their end, which is determined by the classically understood second law of thermodynamics. It was an interesting statement, based on reflection on the second law of thermodynamics and the concept of entropy, not much appreciated by contemporary commentators of *L'évolution créatrice* (usually in studies Bergson's attitude to physics is limited to his discussion with Albert Einstein on the theory of relativity). On the other hand, it should be noted that the French thinker did not take into account in his works the conclusions of the statistical interpretation of the second law of thermodynamics. If he had gone in this

[9] Translation according to SKARGA (1982).

[10] Spencer was a key thinker in Bergson's concepts of evolution, time, and ultimately his own interpretation of entropy. For Bergson, Spencer's mechanical evolution takes place in Newtonian mechanical time. To go beyond this simplistic vision of evolution, Bergson, drawing on impulses from the life sciences, developed the concept of becoming, duration (*durée*), and creative evolution "driven" by the *élan vital* factor (cf. ČAPEK 1971, 394; WASZKINEL 1986, 93).

direction, his philosophical cosmology could have become more optimistic (i.e., the inevitability of the death of the world would have been excluded) and, consequently, his main idea of introducing elan vital would have become less evident.

The above discussion certainly does not exhaust the question of Bergson's role in the development of entropic and negentropic ideas, and this should be a task for a separate detailed study. Our discussion is intended to help us understand Bergson's position, which have influenced Polish philosophers in relation to the reception of entropic and negentropic ideas. We now deal with the issue of the reception of these ideas in the following sections.

3. THE RECEPTION OF BERGSON'S NEGENTROPIC IDEAS AMONG CRITICS OF THE PESSIMISTIC WORLDVIEW INSPIRED BY SCIENCE

Bergson's metaphysical vision of a constantly and unpredictably changing reality challenged the worldview derived from the scientific concept of entropy. For Polish philosophers, however, admiration for the originality and novelty of Bergson's philosophy obscured many of the significant changes that this philosophy brought to the culture of entropy.[11] The most important issue that initially influenced Polish thinkers was the polemic against the pessimistic visions of reality that had been inspired by entropic ideas.

This was the case, for example, with Maria Grossek-Korycka (1868–1926), who followed in Bergson's footsteps in her polemic against Nietzschean pessimism, although she subsequently made significant reinterpretations. She posited that in addition to Bergson's progressive evolution, an opposing, retrograde evolution degenerates and dissipates the products of the former (GROSSEK-KORYCKA 1914). The reality is then the result of the constant action and attrition of these two tendencies (cf. BORZYM 2003, 251). The idea of entropy has been treated even more explicitly than with Bergson as a fundamental metaphysical factor, such that it can even be reminiscent of the Manichean image of evil and good. Unfortunately, we are not aware of any instances where Grossek-Korycka's interpretation gained any adherents.

[11] The problem of an uncritical approach to Bergson's philosophy was unfortunately quite popular. This is evidenced by the words of Bronisław Biegeleisen in his review of J. W. Dawid's publication (see below): "Mr. Dawid's engaging dissertation, although it does not exhaust the subject, has the merit of counteracting the uncritical 'Bergsonism' that seemed to nestle in some layers of our intelligentsia" (BIEGELEISEN 1913a, 31b).

The reception of Bergson's philosophical criticism took a somewhat different form, however. The position of Henryk Romanowski, an exceptional Catholic philosopher, is the most interesting here. Although he frequently criticized Bergson, he shared Bergson's criticism of determinism based on his assertion of the hypotheticity (i.e., lack of proof) of the principle of conservation of energy, as well as his view that it needed to be supplemented with postulated non-mechanical causes (ROMANOWSKI 1929, 94–95). In reality, Romanowski wanted to neutralize the pessimistic worldview that was derived from science.

The issue of contradictions in Bergson's philosophy was critically analyzed by Zygmunt Mysłakowski (1890–1971), with him noting that Bergson's philosophy is based on a kind of dialectic designed to reconcile contradictions, but on analyzing it, he points to paradoxes hidden within it that are difficult to accept but which Bergson overcame thanks to "a kind of intellectual magic" (MYSŁAKOWSKI 1923, 326–28). Mysłakowski showed several levels at which Bergson's contradictions between tendencies to organize and disorganize reality appeared (e.g., MYSŁAKOWSKI 1923, 357), which are a vague analogy of the problem of contradicting the modern ideas of entropy and negentropy that interest us. In light of the earlier criticism of dialectics, the significance of Bergson's entropic ideas was mostly negatively evaluated.

The most interesting and original position, however, is that of the chemist Wacław Mutermilch (1870–1940). In his work "Twórcze czynniki ewolucyi" (The creative factors of evolution) , he polemicized firstly against the pessimism of the entropic view of the world, according to which "the determinism of the unbreakable laws of nature and the spectre of eternal death as the final result of all fights, struggles, strivings, sufferings, and aspirations—these are the only dogmas that the priests of science allow us to believe in" (MUTERMILCH 1913, 123). Mutermilch believed that Bergson's negentropic ideas were a step in the right direction, one toward overcoming the fatalism of the scientific worldview. However, he criticized Bergson for his vitalist concept of *élan vital*, which he felt was an obvious simplification of the problem that did not correspond to the observed history of the development of life (MUTERMILCH 1913, 126–27). Admittedly, Mutermilch's interpretation of *élan vital*, which manifests as a *deus ex machina* in world history, is problematic, but it shows that Bergson was criticized from the point of view of spiritualist philosophy, which also used arguments from science. Mutermilch's concept is therefore an attempt to develop and transcend Bergson's negentropic ideas within the spirit of spiritualism, and he also emphasizes the role of creative factors in nature even if he interprets them differently. It should be noted that this Polish thinker often referred to biology and chemistry, and interest-

ingly, he was able to conceptually criticize the concept of the heat death of the universe on this basis, because he showed that there are forms of energy in nature that do not have to be transformed into heat energy. Although Mutermilch's explanation was ultimately flawed, it moved in the right direction for analyzing the issue of the heat death of the universe. Bergson thus played an inspirational role, although Mutermilch emphasized that he did not want to be associated with the "fashion" that was Bergsonism.

Bergson's philosophy also played an interesting role in the neo-romantic transformation of the idea of entropy by another chemist named Bohdan Szyszkowski (1873–1931). This Polish scientist was active in the thriving scientific community of Kiev's Polish minority before the Bolshevik Revolution. Szyszkowski first became interested in the concept of entropy in physics, as evidenced in his Russian-language scientific papers (SZYSZKOWSKI 1909a; 1909b). In the conclusion of his article on entropy, he wrote:

> The law of entropy, both in physics and in life, limiting the power of the strong, gives the weak an opportunity to fight for existence. The most remarkable thing about it is that it is too narrowly interpreted, as an evil genius (злой гений) of nature, as an inseparable companion and parasite of energy; the basis of the most pessimistic philosophy, while in reality, it is the most humane law of inanimate of inanimate nature, as if given to it as proof of its tender care and concern for the highest good to be distributed as widely and evenly as possible. (SZYSZKOWSKI 1909a, 33)

Szyszkowski directly polemicized against the pessimistic worldview interpretation of the idea of entropy. He instead tried to see it from a humanistic perspective, such that entropy became a tool for fighting the Nietzschean worldview (i.e., the value of being stronger), which was supported by Darwin's vision of a universal, fierce struggle for existence. Szyszkowski's interpretation also seems to have been developed for Christian apologetics, yet the argument was never deployed for this purpose, probably because of Kiev's remoteness from other centers of Polish culture. Perhaps the fact that Szyszkowski was neither neoscholastic nor closely associated with that philosophy also played a role. However, the convergences with the Christian vision were not accidental, because they stemmed from a specific reception context, namely the philosophy of Bergson and the earlier romantic concept of material-spiritual evolution put forward by the eminent Polish poet Juliusz Słowacki (1809–1849) (cf. KLEINER 1927, 275). Szyszkowski saw clearly the contradiction between the idea of entropy being associated with "dead matter" and the idea of development and organization that is associated

with the "realm of the spirit." By introducing dualism and limiting the scope of entropy, Szyszkowski tried to neutralize this problem (SZYSZKOWSKI 1917). He fought simultaneously against materialism, Darwinism, and Nietzscheanism. A little later on, he explicitly admitted that while his solution was original, having stemmed from an independent reflection on science, it was later deepened by Bergson's philosophy, which he had become acquainted with during the First World War (SZYSZKOWSKI 1921, 35). Later on, he became acquainted with the romantic philosophy of Słowacki, which together with Bergson's philosophy, became the basis for a secondary, metaphysical, neo-romantic interpretation. This case is special because Szyszkowski himself encountered the contradiction between physical entropy and the growth of biological organization during his scientific work, and Bergson's philosophy (esp. negentropic ideas) only inspired him to modify his worldview, which had previously gone in the typical direction for intellectuals of that time. Ultimately, however, under the influence of the reception of Słowacki's romantic vision, entropic and negentropic ideas were interpreted in the spirit of a dualistic materialist-spiritualist vision while at the same time inheriting the features of Bergson's vitalism. Nevertheless, the whole thing was never elaborated in detail, as pointed out by his contemporaries (see CHRZANOWSKI 1923, 741).

It is worth mentioning that Stanisław Borzym emphasized that "placing Bergson in the stream of romantic thought had many supporters in Poland" (BORZYM 2003, 247), with these being mainly writers. Thus, a strong emphasis on negentropic ideas that were influenced by his scientific activity is what distinguishes Szyszkowski's position.

4. RECEPTION OF BERGSON'S ENTROPIC IDEAS IN POLISH SCIENCE-RELATED PHILOSOPHY

From a slightly different perspective, science-inspired philosophy also tried to understand the contradiction between the entropic tendencies of energy dissipation in nature and the processes of organizational growth. An interesting representative was Jan Władysław Dawid (1859–1914), a psychologist and pedagogue associated with the circles of Warsaw positivism. In a lecture on Bergson's philosophy presented in Lwów (now Lviv, Ukraine) in 1913, he emphasized that *élan vital* is the source of energy that realizes negentropic tendencies in reality: "the intuition of becoming, of movement, gives momentum and energy to life" (DAWID 1914, 17). The blade of criticism, however, ignored the apparent conflict

between world images and fell instead on the nature of this philosophy as a product of an era of change and competition. In the Warsaw positivism circle, entropy clearly did not enter into the set of basic ideas that constituted this philosophical current.

Things were a little different in Galicia, which is a part of Poland that belonged to Austria at the time. A specific form of philosophy developed here that we now call "philosophy in science" (POLAK 2019). Bergson's philosophy was of particular interest to the Lwów-based engineer and philosopher Bronisław Biegeleisen (1881–1963). Indeed, he was the most important critic of Bergsonism from the perspective of using philosophical argumentation based on the sciences, and in his criticism, he also addressed the entropy problem. Biegeleisen (1909b, 1909a) pointed out that one of Bergson's goals was to create a philosophy that was complementary to science (i.e., biology). Biegeleisen aptly noted that under this task lay the problem of the contradiction between degradative (entropy) and developmental (organization) tendencies (called here negentropic ideas). He claimed that Bergson was aware of this contradiction between these two ideas and recognized the inadequacy of scientific methods for addressing this problem, so the explanation should lay in the metaphysical concept of *élan vital*. Biegeleisen correctly recognized that Bergson's strategy was a kind of metaphysics-of-the-gaps,[12] so future developments in science that accommodated the opposing visions would eliminate Bergsonian metaphysics (for more on this, see BIEGELEISEN 1911, 103–5). History has conceded Biegeleisen's point, because at the end of the 20th century, thanks to the study of thermodynamic systems far from equilibrium, this apparent contradiction was overcome. Bergson's cosmology, however, was by then long consigned to history.

At the same time, another philosophical issue came to the fore, one that linked entropy to the concept of time, as Wilhelm Ostwald had previously done.[13] This

[12] We use this phrase analogously to the well-known God-of-the-gaps argument, in which gaps in scientific knowledge are filled by appealing to God (RATZSCH and KOPERSKI 2023, sec. 2.2.3). In this case, we have a similar situation in that instead of trying to explain gaps in knowledge with the help of science, we appeal to *a priori* metaphysical concepts. These concepts play the same role as the idea of God in the God-of-the-gaps argument. It is worth analyzing whether Bergson's metaphysics-of-the-gaps type of argumentation is not a case of Bergson's specific conception of God, as suggested by Leszek Kołakowski's interpretation (KOŁAKOWSKI 2008, 75–80). According to this line, Bergsonian argumentation would be a case of implicit God-of-the-gaps argumentation.

[13] Although the issue of time is central to Bergson's metaphysics, the author of *Évolution créatrice* did not link it to his interpretation of the second law of thermodynamics. As is known, Bergson was a critic of the understanding of time limited to its scientific approach. He saw the

discussion was initiated unexpectedly. The original and controversial Polish philosopher Stanisław Brzozowski (1878–1911) based his work *Idee* (Ideas) (1910) on Bergson's ideas as they were interpreted by Georges Sorel (1847–1922). Biegeleisen criticized this work and tried to show that Bergson's, and at the same time Brzozowski's, main assumption that the description of reality requires an anti-intellectual intuition was unfounded (BIEGELEISEN 1911, 79–80; 1913b, 67–68). This was premised on the kind of metaphysics-of-the-gaps that Bielgeleisen attacked. He pointed out that contemporary science offered some hope for resolving some of the problems that Bergson considered beyond the limits of the intellect. For example, Biegeleisen cited Ostwald's concept of dissipative time. This refers to the internal time of transformations in systems in which entropy increases. Biegeleisen pointed out that science was able to grasp some intuitions that for Bergson seemed completely outside the scope of intellectual grasp. Brzozowski disagreed with Biegeleisen's criticism but did not engage in a public polemic. Brzozowski merely noted in his diary that both astronomical time and dissipative time are just different ways of looking at *durée*, so according to him, Bergson's metaphysical concept is still necessary, so this approach need not be corrected (BRZOZOWSKI 2007, 181–84). Biegeleisen used entropic ideas to criticize the momentum building among the irrationalist trend.

Things were different for Biegeleisen's colleague Zygmunt Zawirski, however. This representative of the Lvov–Warsaw School was closest to the Kraków style of philosophy in science (POLAK 2016). He quickly became one of the best Polish specialists on the concept of time, effectively incorporating entropic concepts of time into the circulation of philosophy in science and significantly expanding its circle of inspiration beyond Bergson (e.g., Ludwig Weber, Louis Couturat, Georges Batault, Alfred Fouillé).

Zawirski appreciated Bergson's contribution to developing the philosophy of time. In his outstanding treatise *L'évolution de la notion du temps*, which was awarded the Rigano Prize, he wrote about Bergson's contribution as follows: "Bergson's theory is undoubtedly the most interesting philosophical theory of time after Kant" (ZAWIRSKI 1936, 115). Although Zawirski greatly appreciated Bergson's contribution to the development of the philosophy of time, he was nevertheless critical of Bergson's ideas themselves. Zawirski first analyzed the problem of the irreversibility of time in a treatise on the concept of the eternal return of worlds (ZAWIRSKI 1927). He analyzed the problem in detail, citing Bergson's views in the context of the question of entropy. He showed that Bergson's intui-

importance of time/duration (*durée*), incomprehensible to the scientific intellect, in the dynamics of becoming and creativity driven by *élan vital* (ČAPEK 1971, 234–37;WASZKINEL 1986, 168–72).

tion that physical processes must "unravel" and dissolve from a state of maximum concentration had no justification that was grounded in physics, since Helmholtz had already pointed out other theoretical possibilities based on classical physics (ZAWIRSKI 1927, 61). Bergson's position here illustrates the unreliability of colloquial intuitions about the natural world. Zawirski suggested that recent scientific advances were discovering new possibilities. Influenced by his reflections on Einstein's theory of relativity, Zawirski criticized the use of colloquial, commonsense intuitions in science as early as the early 1920s (POLAK 2012, 314). He was therefore strongly convinced that the science of the time was discovering possibilities for interpreting entropy that philosophers like Bergson had not even dreamed of. Characteristically, in *L'évolution de la notion du temps*, he analyzed in detail the influence of new thermodynamic concepts on considerations about the irreversibility of time (ZAWIRSKI 1936; for an English translation of the part about irreversibility see, SZUMILEWICZ-LACHMAN 1994, 157:361–68). Nevertheless, he no longer mentioned Bergson's contribution because it no longer seemed interesting from the perspective of modern science, and although Bergson was often referred to in relation to the philosophy of time, his entropic concepts were no longer of interest to Polish philosophers.

Similarly, the subject of the incompatibility between the physical idea of entropy and biological tendencies of organization had already received sporadic attention in the period following the First World War. At that time, the view about the apparent contradiction between the law of universal increase of entropy in the world and its decrease in living organisms was generally accepted. It was enough to consider the fact that even the classical formulation of entropy allowed it to increase in a distinct, non-isolated area, albeit at the expense of the global entropy of the entire isolated system. An interesting case at hand is the Krakow physicist, psychologist, and philosopher Władysław Heinrich, who while questioning the relevance of Smoluchowski's works on statistical physics was able to explain based on classical theory that the contradiction was a misunderstanding (HEINRICH 1924, 273).

CONCLUSIONS

In Poland, the entropic ideas of Henri Bergson played an important role in catalyzing discussion and interest in the subject of time. Bergson's negentropic ideas strengthened the critical trend for the pessimistic visions inspired by entropy (e.g., the heat death of the universe), so they also played an important role in changing

the worldview. The reception of Bergson's entropic and negentropic ideas therefore played an inspiring role in the development of Polish philosophy.

On the other hand, Bergson's ideas did not attract any direct followers. Polish philosophers approached them critically, in a specific intellectual fashion, and creatively, so they were inspired by the new insights but developed the intuitions in their own way. In principle, the influence turned out to be relatively small, with even those with resurgent vitalist and spiritualist tendencies (e.g., Mutermilch) going their own way while criticizing Bergson.

This research into the influence of Bergson's entropic ideas on Polish philosophy also enables us to see the thread of neo-romantic interpretations of science from the second and third decades of the 20th century, something that has been overlooked in historiography (Szyszkowski, Mutermilch). This area requires further systematic research, however. A separate issue that has not yet been explored by literary scholars and philosophers of literature is the reception of Bergson's entropic ideas in Polish literary production prior to the outbreak of the Second World War.

Bergson's entropic ideas were received in a characteristic period when, on the one hand, a specific form of reflection on the sciences (philosophy in science) was gaining momentum in Poland, and this rejected the idea of imposing *a priori* concepts on science. The 1920s also became a period for receiving modern thermodynamic ideas that were inspired by the work of the eminent Polish physicist Marian Smoluchowski and also previously by Władysław Natanson. Bergson's example demonstrates the unreliability of using colloquial intuitions to analyze nature, a criticism that was reinforced by similar conclusions resulting from the reception of relativity theory. The French thinker became a paradigmatic example of using an outdated philosophical approach to science, so his entropic and negentropic ideas lost their impact and were forgotten, unlike his other ideas.

REFERENCES

ARRHENIUS, Svante August. 1903. *Lehrbuch der kosmischen Physik*. Leipzig: Verlag von S. Hirzel.

BERGSON, Henri. 1907. *L'évolution créatrice*. Paris: Alcan. https://gallica.bnf.fr/ark:/12148/bpt6k991406s.

BERGSON, Henri. 1911. *Creative Evolution*. Translated by Arthur Mitchell. London: Macmillan. http://archive.org/details/creativeevolutio00berg_1.

BERGSON, Henri. 1959. *Ecrits et paroles.* 2nd vol. Edited by Rose-Marie Mossé-Bastide. Bibliothèque de philosophie contemporaine. Paris: Presses Universitaires de France.

BIEGELEISEN, Bronisław. 1909a. "Filozofia Bergsona [Cz. 2]." *Krytyka* 4:93–108.

BIEGELEISEN, Bronisław. 1909b. "Filozofia Bergsona [Cz. 1]." *Krytyka* 4:8–19.

BIEGELEISEN, Bronisław. 1911. "Idee Brzozowskiego." *Widnokręgi* 2 (3, 4–5):75–80, 98–105.

BIEGELEISEN, Bronisław. 1913a. "Dawid J. Wł. O Intuicyi w Filozofii Bergsona. Odbitka z 'Krytyki'. Kraków 1911. Skład Gł. Gebethner i Sp. Str. 19." *Ruch Filozoficzny* 3 (2): 31a–31b.

BIEGELEISEN, Bronisław. 1913b. "Uśmiechy Sfinksa." *Sfinks*, 7:46–75.

BOLTZMANN, Ludwig. 1895. "On Certain Questions of the Theory of Gases." *Nature* 51 (1322): 413–15. https://doi.org/10.1038/051413b0.

BOLTZMANN, Ludwig. 1898. *Vorlesungen Über Gastheorie.* Vol. 2. Leipzig: Barth.

BORZYM, Stanisław. 1984. *Bergson a przemiany światopoglądowe w Polsce*. Wrocław: Zakład Narodowy im. Ossolińskich.

BORZYM, Stanisław. 2003. "Bergsonizm literacki." In *Przeszłość dla przyszłości: z dziejów myśli polskiej*, 241–52. Warszawa: IFiS PAN.

BRUSH, Stephen G. 1978. *The Temperature of History: Phases of Science and Culture in the Nineteenth Century*. Studies in the History of Science 4. New York: Franklin.

BRZOZOWSKI, Stanisław. 1910. *Idee: wstęp do filozofii dojrzałości dziejowej*. Lwów: Księgarnia Polska B. Połonieckiego. https://polona.pl/item/idee-wstep-do-filozofii-dojrzalosci-dziejowej,MTEwMTUxNzQ.

BRZOZOWSKI, Stanisław. 2007. *Pamiętnik*. Biblioteka Narodowa 311. Edited by Maciej Urbanowski. Wrocław: Zakład Narodowy Imienia Ossolińskich.

ČAPEK, Milič. 1971. *Bergson and Modern Physics*. Boston Studies in the Philosophy of Science 7. Edited by Robert S. Cohen and Marx W. Wartofsky. Dordrecht: D. Reidel Publishing Company.

CHRZANOWSKI, Ignacy. 1923. "Krittiky a referaty: Historia literatury polskiej." *Slavia: časopis pro slovanskou filologii* 2:739–60. https://ceskadigitalniknihovna.cz/periodical/uuid:34789fd2-518b-11e1-1589-001143e3f55c.

DAWID, Jan Władysław. 1914. *O filozofji Bergsona: odczyt miany we Lwowie d. 9 marca 1913 r. w sali Muzeum Przemysłu*. Warszawa: Skł. gł. w księgarni E. Wendego i S-ki. https://rcin.org.pl/dlibra/doccontent?id=16232.

DIFRISCO, James. 2015. "*Élan Vital* Revisited: Bergson and the Thermodynamic Paradigm: Bergson and the Thermodynamic Paradigm." *The Southern Journal of Philosophy* 53 (1): 54–73. https://doi.org/10.1111/sjp.12096.

DURÁN, Ronald. 2016. "Vida y materia: Bergson y la termodinámica clásica." *Veritas* 34:75–91. http://doi.org/10.4067/S0718-92732016000100004.

DURÁN, Ronald. 2019. "Filosofía y ciencia: críticas al uso que hace Bergson del argumento de Boltzmann contra la reversibilidad del universo." *Filosofia Unisinos* 20 (3): 228–37. https://doi.org/10.4013/fsu.2019.203.01.

GILLISPIE, Charles Coulston. 1960. *The Edge of Objectivity: An Essay in the History of Scientific Ideas*. Princeton: Princeton University Press.

GOLD, Barri J. 2010. *ThermoPoetics: Energy in Victorian Literature and Science*. Cambridge, MA–London: The MIT Press.

GROSSEK-KORYCKA, Maria. 1914. *Medytacye.* Vol. 1, *Synteza współczesności*. Kraków: G. Gebethner i Spółka. https://polona.pl/item/medytacye-t-1-2,MTExMzQ5Njk.

GUNTER, Pete A. Y. 1971. "Bergson's Theory of Matter and Modern Cosmology." *Journal of the History of Ideas* 32 (4): 525–42. https://doi.org/10.2307/2708975.

GUNTER, Pete A. Y. 1991. "Bergson and Non-Linear Non-Equilibrium Thermodynamics: An Application of Method." *Revue Internationale de Philosophie* 45 (2): 108–21. https://www.jstor.org/stable/23949499.

HEINRICH, Władysław. 1924. "O Zagadnieniach Podstawowych Filozofji." *Kwartalnik Filozoficzny* 2:269–302.

HIEBERT, Erwin. 1962. *Historical Roots of the Principle of Conservation of Energy*. Madison, WI: State Historical Society of Wisconsin Press.

JAKIMOWICZ, Aleksander. 2020. "The Role of Entropy in the Development of Economics." *Entropy* 22 (4): 452. https://doi.org/10.3390/e22040452.

KLEINER, Juliusz. 1927. *Juljusz Słowacki: dzieje twórczości.* Vol. 4/2, *Poeta mistyk*. Warszawa [etc.]: Gebethner i Wolff; Łazarski, Wł.

KOŁAKOWSKI, Leszek. 2008. *Bergson*. 2nd ed. Kraków: Wydawnictwo Znak.

KRAGH, Helge. 2008. *Entropic Creation: Religious Contexts of Thermodynamics and Cosmology*. London: Routledge.

KRAGH, Helge, and Stephen J. WEININGER. 1996. "Sooner Silence than Confusion: The Tortuous Entry of Entropy into Chemistry." *Historical Studies in the Physical and Biological Sciences* 27 (1): 91–130. https://doi.org/10.2307/27757770.

LACEY, A. R. 1993. *Bergson (The Arguments of the Philosophers)*. London: Routledge.

MACDUFFIE, Allen. 2009. "Joseph Conrad's Geographies of Energy." *ELH* 76:75–98. https://doi.org/10.1353/elh.0.0030.

MIROWSKI, Philip. 1988. "Energy and Energetics in Economic Theory." *Journal of Economic Issues* 22:811–30.

MIROWSKI, Philip. 1999. *More Heat Than Light: Economics as Social Physics: Physics as Nature's Economics*. Historical Perspectives on Modern Economics. Cambridge: Cambridge University Press.

MUSSETT, Shannon M. 2022. *Entropic Philosophy: Chaos, Breakdown, and Creation*. Lanham: Rowman & Littlefield Publishers.

MUTERMILCH, Wacław. 1913. "Twórcze Czynniki Ewolucyi." *Przegląd Narodowy* 9 (2–3): 122–45, 232–53.

MYERS, Greg. 1985. "Nineteenth-Century Popularizations of Thermodynamics and the Rhetoric of Social Prophecy." *Victorian Studies* 29 (1): 35–66. https://www.jstor.org/stable/3827565.

MYSŁAKOWSKI, Zygmunt. 1923. "Intuicjonizm Bergsona." *Kwartalnik Filozoficzny* 2 (1): 59–90, 212–44, 303–68.

NESWALD, Elizabeth. 2006. *Thermodynamik als kultureller Kampfplatz: zur Faszinationsgeschichte der Entropie, 1850-1915*. Berliner Kulturwissenschaft 2. Freiburg im Breisgau: Rombach.

NESWALD, Elizabeth. 2009. "Ansätze zu einer Kulturgeschichte der Entropie." *Non Fiktion. Das Arsenal der anderen Gattungen* 4 (2): 21–32. https://www.hsozkult.de/journal/id/z6ann-104381?title=non-fiktion-4-2009-2.

POLAK, Paweł. 2012. *"Byłem Pana przeciwnikiem [profesorze Einstein]…": relatywistyczna rewolucja naukowa z perspektywy środowiska naukowo-filozoficznego przedwojennego Lwowa*. Kraków: Copernicus Center Press.

POLAK, Paweł. 2016. "Philosophy in Science – A Case Study of the Reception of the Special and the General Theory of Relativity in Kraków and Lwów before 1925." *Studia Historiae Scientiarum* 15:245–73. http://doi.org/10.4467/23921749SHS.16.010.6153.

POLAK, Paweł. 2019. "Philosophy in Science: A Name with a Long Intellectual Tradition." *Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)*, no. 66 (July): 251–70. https://zfn.edu.pl/index.php/zfn/article/view/472.

RATZSCH, Del, and Jeffrey KOPERSKI. 2023. "Teleological Arguments for God's Existence." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta and Uri Nodelman (Summer Edition). Stanford, CA: Stanford University. https://plato.stanford.edu/archives/sum2023/entries/teleological-arguments.

ROMANOWSKI, Henryk. 1929. *Nowa filozofja: studjum o bergsonizmie*. Towarzystwo Wiedzy Chrześcijańskiej 4. Lublin: Towarzystwo Wiedzy Chrześcijańskiej.

SCHRÖDINGER, Erwin. 1944. *What Is Life? The Physical Aspect of the Living Cell*. Cambridge: Cambridge University Press.

SKARGA, Barbara. 1982. *Czas i Trwanie: Studia o Bergsonie*. Warszawa: Państwowe Wydawnictwo Naukowe.

SZUMILEWICZ-LACHMAN, Irena. 1994. *Zygmunt Zawirski: His Life and Work*. Edited by Robert S. Cohen. Boston Studies in the Philosophy of Science 157. Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-011-0768-6.

SZYSZKOWSKI, Bohdan A. 1909a. "Novyy vzglyad na vtoroy zakon termodinamiki." *Fizičeskoe Obozrěnie* 10 (1): 31–33.

SZYSZKOWSKI, Bohdan A. 1909b. *Energiya i entropiya*. Kiyev: Tip. Imp. un-ta Sv. Vladimira Akts. O-va pech. i izd. dela N.T. Korchak-Novitskogo.

SZYSZKOWSKI, Bohdan A. 1917. "Entropja." *Wiadomości Bibljograficzne*, no. 2, 63.

SZYSZKOWSKI, Bohdan A. 1921. "Słowacki i Bergson. Ewolucja ducha." *Nowy Przegląd Literatury i Sztuki* 1 (1–3): 35–68.

TATTERSALL, Mason. 2014. "Thermal Degeneration: Thermodynamics and the Heat-Death of the Universe in Victorian Science, Philosophy, and Culture." In *Decadence, Degeneration, and the End: Studies in the European Fin de Siècle*, edited by Marja Härmänmaa and Christopher Nissen, 17–34. New York: Palgrave Macmillan.

WASZKINEL, Romuald. 1986. *Geneza pozytywnej metafizyki Bergsona*. Lublin: Towarzystwo Naukowe KUL.

WHITEHEAD, Alfred North. 1925. *Science and the Modern World*. Lowell Lectures. Cambridge: Cambridge University Press.

ZAWIRSKI, Zygmunt. 1927. *Wieczne powroty światów. Badania historyczno-krytyczne nad doktryną "wiecznego powrotu."* Kraków: Druk. Uniw. Jagiellońskiego.

ZAWIRSKI, Zygmunt. 1936. *L'évolution de la notion du temps*. Kraków: Polska Akademia Umiejętności.

ZENCEY, Eric. 1991. "Some Brief Speculations on the Popularity of Entropy as Metaphor." *Metaphor and Symbolic Activity* 6 (1): 47–56. https://doi.org/10.1207/s15327868ms0601_3.

THE INFLUENCE OF BERGSON'S ENTROPIC AND NEGENTROPIC IDEAS ON POLISH PHILOSOPHY BEFORE THE SECOND WORLD WAR

Summary

The second law of thermodynamics and the concept of entropy became one of the most important scientific ideas to influence Western culture in the 19th century. Pessimistic conclusions, such as the concept of the heat death of the universe and the specter of the inevitable decay of everything, inspired philosophical reflection at the *fin de siècle*. The philosophy of Henri Bergson played a key role in overcoming this pessimistic attitude. In his famous work *L'évolution créatrice* (1907), he proposed a bold metaphysical vision for the completion of science through a vision of creative evolution driven by the metaphysical factor of *élan vital* in opposition to destructive (entropic) factors. Bergson's philosophy appealed specifically to negentropic ideas, so it made an important contribution to the worldview debate of the time. The influence of Bergson's thought on Polish philosophy has been studied many times, including from a worldview perspective, but no one has yet analyzed the impact of his entropic and negentropic ideas. With research into the cultural significance of these ideas developing today, such research would be particularly relevant. This paper therefore aims to fill this significant research gap and present an initial analysis of the influence of Bergson's specific entropic and negentropic ideas on Polish thinkers prior to the outbreak of World War II. This paper begins with presenting the historical background for the influence of entropic ideas on Western thought at the turn of the 20th century. Bergson's philosophical entropic and negentropic ideas are then analyzed. By outlining the background to their reception like this, it becomes possible to illustrate the reception process in Polish philosophy in the next two parts. First, we focus on a group of philosophers who challenged the pessimistic consequences of the established scientific view of the world, while the following part shows the reactions to Bergson's ideas by philosophers associated with science. Finally, some general conclusions are drawn about Bergson's influence and the reasons for his failure. Some little-known connections between neo-romanticism and the reflection on entropic ideas are also highlighted.

Keywords: Henri Bergson; *élan vital*; creative evolution; entropic ideas; heat death of the universe; pessimism; *fin de siècle* philosophy; scientific worldview; neo-romanticism

WPŁYW IDEI ENTROPICZNYCH I NEGENTROPICZNYCH BERGSONA NA FILOZOFIĘ POLSKĄ PRZED DRUGĄ WOJNĄ ŚWIATOWĄ

Streszczenie

Druga zasada termodynamiki i koncepcja entropii stały się jednymi z najważniejszych idei naukowych, które wywarły wpływ na kulturę Zachodu w XIX wieku. Pesymistyczne wnioski, takie jak koncepcja śmierci cieplnej wszechświata oraz widmo nieuniknionego rozkładu wszystkiego, inspirowały filozoficzną refleksję *fin de siècle*'u. Filozofia Henriego Bergsona odegrała kluczową rolę w przezwyciężeniu tej pesymistycznej postawy. W swoim słynnym dziele *L'évolution créatrice* (1907) francuski myśliciel zaproponował odważną metafizyczną wizję uzupełnienia nauki poprzez koncepcję ewolucji twórczej, napędzanej metafizycznym czynnikiem *élan vital*, w opozycji do czynników destrukcyjnych (entropicznych). Filozofia Bergsona odwoływała się szczególnie do idei negentropicznych, w związku z czym wniosła istotny wkład do ówczesnej debaty światopoglądowej. Wpływ myśli Bergsona na polską filozofię badano wielokrotnie, także z perspektywy światopoglądowej, jednak nikt dotychczas nie analizował wpływu jego idei entropicznych i negentropicznych. Ponie-

waż obecnie rozwijają się badania nad kulturowym znaczeniem tych idei, szczególnie istotne mogą się okazać takie prace nad twórczością Bergsona i jej recepcją. Celem niniejszego artykułu jest wypełnienie tej istotnej luki badawczej i przedstawienie wstępnej analizy wpływu specyficznych idei entropicznych i negentropicznych Bergsona na polskich myślicieli przed wybuchem drugiej wojny światowej. Artykuł rozpoczyna się od przedstawienia tła historycznego wpływu idei entropicznych na myśl zachodnią przełomu XIX i XX wieku. Następnie analizowane są filozoficzne idee entropiczne i negentropiczne Bergsona. Nakreślając w ten sposób tło ich recepcji, możliwe staje się w dwóch kolejnych częściach zobrazowanie procesu recepcji tych idei w filozofii polskiej. W pierwszej kolejności skupiamy się na grupie filozofów, którzy kwestionowali pesymistyczne konsekwencje utrwalonego naukowego poglądu na świat. W dalszej części przedstawiono reakcje filozofów związanych z nauką na idee Bergsona. Na koniec wyciągnięto pewne ogólne wnioski na temat wpływu Bergsona i przyczyn jego niepowodzenia. Podkreślono także mało znane powiązania neoromantyzmu z refleksją nad ideami entropicznymi.

Słowa kluczowe: Henri Bergson; *élan vital*; ewolucja twórcza; idee entropiczne; śmierć cieplna wszechświata; pesymizm; filozofia *fin de siècle*; światopogląd naukowy; neo-romantyzm