

The Kraków School of Philosophy in Science: Profiting from Two Traditions

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Abstract: We set several aims for this paper: first, we wanted to attempt to show that from the perspective of historical and philosophical research, it is legitimate to accept the thesis for the existence of the Kraków School of Philosophy in Science, which was rooted in the activities of Michał Heller and Józef Życiński. We also wanted to make a comparative analysis of the basic specific determinants of the Lvov-Warsaw School (as a model for a philosophical school) and their correspondence in the Kraków School. Further, we wished to show how the Kraków School of Philosophy in Science is actually an adaptation of Kazimierz Twardowski's model, of course taking into account the differences between them. Finally, we wanted to illustrate the nature of the philosophy in the Kraków School and discuss the current efforts to develop it further.

Key words: Kraków School of Philosophy in Science, Lvov-Warsaw School, philosophy of science, philosophy in science, Polish philosophy, Michał Heller, Józef Życiński, Kazimierz Twardowski

1. Introduction

The development of a philosophy with close ties to the sciences has a long local tradition in Kraków,¹ one that culminated in Michał (Michael) Heller's *philosophy in science*.² This term describes a specific approach to the philosophy of science, one that assumes an interdisciplinary perspective, where the sciences play

¹ P. Polak, *Tradycja krakowskiej filozofii w nauce: między XIX a XXI wiekiem*, in: *40 lat filozofii w uczelni papieskiej w Krakowie*, ed. J. Jagiełło, Wydawnictwo Naukowe UPJPII, Kraków 2018, pp. 491–514.

² M. Heller, *Jak możliwa jest "filozofia w nauce"?*, "Studia Philosophiae Christianae" 1986, Vol. 22, No. 1, pp. 7–19; English version: M. Heller, *How Is Philosophy in Science Possible?*, "Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)" 2019, Vol. 66, pp. 231–249; M. Heller et al., *Jak filozofuje się w OBI?*, "Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)" 1999, Vol. 25, pp. 20–29.

a philosophically significant role, namely, by using philosophical assumptions to create explanations of reality and thereby contributing to the discussion around relevant philosophical problems.³

This philosophy had been practised in various forms for more than a century and a half in scientific-philosophical circles, but it was not until the late 1970s that a school of philosophy began to form on this basis. Its founder was Michał Heller, who together with Józef Życiński not only renewed this local tradition but also added a strong impetus for development. The peculiarities of these developed traditions have meant that it has not been referred to as a “philosophical school” yet,⁴ but a historical examination of the development of philosophy in Kraków reveals that we should start talking about the past, present, and future of the Kraków School of Philosophy in Science. Indeed, this sentiment manifests in the most recent studies of Kraków philosophy,⁵ and so a need has arisen to analyze the phenomenon that we call the Kraków School of Philosophy in Science. This article therefore represents an initial attempt to characterize this school,⁶ as well as to understand the specific nature of this phenomenon and explain why reflecting on this issue appears to be long overdue. We believe that explaining the peculiarities of the Kraków School of Philosophy in Science will become possible through a comparison with another specific philosophical school, namely the Lvov-Warsaw School.

³ The term “philosophy of science” has a wide scope of meaning in English, so “philosophy in science” is a specific research programme within the philosophy of science. For more about “philosophy in science,” see P. Polak, *Philosophy in Science: A Name with a Long Intellectual Tradition*, “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” 2019, Vol. 66, pp. 251–270.

⁴ Michał Heller and Bartosz Brożek have referred once to the “Kraków school,” but this term seems to be very imprecise, because it refers to “a group of philosophers, scientists, and theologians who belong to the milieu of the Copernicus Center for Interdisciplinary Studies.” B. Brożek, M. Heller, *Science and Religion in the Kraków School*, “Zygon” 2015, Vol. 50, No. 1, p. 194.

⁵ K. Trombik, *Koncepcje filozofii przyrody w Papieskiej Akademii Teologicznej w Krakowie w latach 1978–1993: studium historyczno-filozoficzne*, Wydawnictwo “scriptum,” Kraków 2021.

⁶ In general, when analyzing the phenomenon of the Kraków school, we account for the factors identified by Zbysław Muszyński in *Siedem cech głównych szkoły naukowej*, “Filozofia Nauki” 1995, Vol. 3, No. 1–2 (9–10), pp. 64–65. He distinguished a set of seven factors for describing the phenomenon of the school (without giving a hierarchy for their relative importance): “(I) genealogy, (II) time, (III) place, (IV) self-consciousness, (V) ideological core, (VI) methodological core, and (VII) journals, styles and worldviews.” Unless stated otherwise, all translations from Polish are our own.

2. Historical Background

Kraków is Poland's oldest centre of philosophy due to its university, which was established in 1364. However, the sources of the science-related tradition are much younger and can be attributed to the birth of the interdisciplinary circle called the Kraków Scientific Society (Towarzystwo Naukowe Krakowskie, est. 1815). Following some significant transformations, this society ultimately became the Polish Academy of Arts and Sciences (Polska Akademia Umiejętności), which exists to this day in Kraków.

The philosophical reflection carried out at the society's interdisciplinary meetings gradually developed throughout the 19th century.⁷ Up until the outbreak of World War II, this tradition significantly shaped the Kraków milieu, and according to the opinions of historians of philosophy, a separate school of philosophy did not form in Kraków in that period.⁸ Instead, there existed groups or circles of philosophizing naturalists.

The World War II period brought great loss to the entirety of Polish philosophy, and to make matters worse, Poland fell within the Soviet sphere of influence after the war and lost many aspects of its sovereignty.⁹ This also took its toll on philosophy, which had to contend with the forcibly imposed Marxist ideologization of science. This affected all areas of non-Marxist thought, although the persecution of philosophers from the Lvov-Warsaw School is the best-known exam-

⁷ The strong position of this local tradition can be associated with the enduring interdisciplinary scientific community, so even during the period of the widespread dominance of idealist philosophy, its influence in Kraków proved to be very short-lived. For more on this topic, see P. Polak, *Między koniecznością a utopią. Józefa Kremera koncepcja filozofii przyrody w kontekście szybko rozwijającej się nauki*, in: *Genus vitae. Księga pamiątkowa dedykowana Panu Profesorowi Marianowi Józefowi Wnukowi*, eds. S. Janeczek, Z. Wróblewski, A. Starościc, Wydawnictwo KUL, Lublin 2019, pp. 257–269.

⁸ M. Heller, J. Mączka, *Krakowska filozofia przyrody w okresie międzywojennym*, in: *Krakowska filozofia przyrody w okresie międzywojennym*, Vol. 1, ed. M. Heller, J. Mączka, P. Polak, M. Szczecińska-Polak, OBI-Biblos, Kraków–Tarnów 2007, pp. 5–40.

⁹ P. Madajczyk, *The Policy of the USSR and the III Reich towards the Polish Elites during the Second World War*, "Studia nad Totalitaryzmami i Wiekiem XX – Totalitarian and 20th Century Studies" 2017, Vol. 1, pp. 202–217; D. Schenk, *The Genocidal Extermination of the Polish Intelligentsia*, "Studia nad Totalitaryzmami i Wiekiem XX – Totalitarian and 20th Century Studies" 2017, Vol. 1, pp. 240–253; J. Kojkoł, *Polskie spory filozoficzne w latach 1945–1949*, "Zeszyty Naukowe Akademii Marynarki Wojennej" 2009, Vol. 4 (179), pp. 101–144.

ple today.¹⁰ Under these circumstances, any clear meaning for the local tradition in Kraków was lost, although it secretly persisted in scientific circles, cultivating a specific “intellectual climate.”

Bishop Karol Wojtyła, who initiated meetings of scientists and philosophers in the 1970s, contributed greatly to reviving the importance of interdisciplinary discussion and this tradition.¹¹ These meetings turned into regular interdisciplinary seminars chaired by Michał Heller together with the slightly younger Józef Życiński.

Heller and Życiński built upon the local tradition, which was called an “intellectual climate,”¹² and coined the modern conception of the philosophy of science, which was aimed at transcending the limitations of both the then-declining positivist philosophies and the still-active neo-Thomist philosophy of nature.¹³ In this historical context, the concept of “philosophy in science” was formulated by Heller.¹⁴ The Kraków School of Philosophy in Science was also born in the same

¹⁰ R. Kuliniak, M. Pandura, Ł. Ratajczak, *Filozofia po ciemnej stronie mocy: krucjaty marksistów i komunistów polskich przeciwko Lwowskiej Szkole Filozoficznej Kazimierza Twardowskiego. Cz. 1: Lata 1945–1951*, Wydawnictwo Marek Derewiecki, Kęty 2018; R. Kuliniak, M. Pandura, Ł. Ratajczak, *Filozofia po ciemnej stronie mocy: krucjaty marksistów i komunistów polskich przeciwko Lwowskiej Szkole Filozoficznej Kazimierza Twardowskiego. Cz. 2: Problem reformy szkolnictwa wyższego w świetle partyjnej ofensywy ideologicznej*, Wydawnictwo Marek Derewiecki, Kęty 2019; see also critical remarks: J. Woleński, *Uwagi o książce o krucjatach marksistów przeciwko Lwowskiej Szkole Filozoficznej*, “Przegląd Filozoficzny. Nowa Seria” 2022, Vol. 131, No. 1 (121), pp. 107–125; for a general overview of this period in Polish philosophy, see J. Woleński, *Philosophy inside Communism: The Case of Poland*, “Studies in Soviet Thought” 1992, Vol. 43, No. 2, pp. 93–100.

¹¹ K. Trombik, *The Origin and Development of the Center for Interdisciplinary Studies: A Historical Outline by 1993*, “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” 2019, Vol. 66, pp. 271–295.

¹² M. Heller, J. Mączka, *Początki filozofii przyrody w Ośrodku Badań Interdyscyplinarnych w Krakowie*, “Roczniki Filozoficzne” 2006, Vol. 54, No. 2, pp. 49–62.

¹³ Anna Lemańska, in her review of Heller’s book, gives interesting objections to Heller’s attitude towards scholasticism and neo-scholasticism and concerning the omission of neo-scholastic philosophers. See A. Lemańska, *Michał Heller*, Nowa fizyka i nowa teologia, Tarnów 1992, ss. 151, “Studia Philosophiae Christianae” 1993, Vol. 29, No. 1, pp. 198–200.

¹⁴ Życiński’s philosophy, like Heller’s, was part of the trend towards a Christian-inspired renewal of philosophy. He shared many areas of interest with Heller, such as science–religion relations, interdisciplinary research, philosophy of mathematics, philosophy of physics, and methodology of sciences. The peculiarity of Życiński’s philosophy was due to a broader approach than Heller’s and to the inspiration of 20th-century British and American philosophy. See J. Życiński, *Język i metoda*, Znak, Kraków 1983; J. Życiński, *Teizm i filozofia analityczna*, Społeczny Instytut Wydawniczy „ZNAK,” Kraków 1985; J. Życiński, *Bóg Abrahama i Whiteheada*, Biblos, Tarnów 1992. Many of Życiński’s views testify to this philosopher’s openness to metaphysics; on the

context. The birth of this new school was not quickly recognized, however, not least because of Heller's own distance to the neo-Thomist conception of a philosophy and the Lublin conception of a philosophical school¹⁵ but also because the nascent school was unique in many respects. The problematic nature of this school and its ties with the existing interdisciplinary milieu meant that its members rarely referred directly to the concept of a school. Nevertheless, many characteristics of a philosophical school were evident in it, such as various metaphysical concepts and claims that were rather unique in Polish philosophy. We will attempt to elaborate on these peculiarities in the following sections.

3. Kazimierz Twardowski's Model of a Philosophical School

The unique character of the philosophical school that formed around Michał Heller and Józef Życiński suggests that it is worth comparing it with another more widely known modern philosophical school, namely, the Lvov-Warsaw School. Such a comparison would not be arbitrary, because Heller has repeatedly mentioned that in his scientific and organizational activities he was inspired by the model of Kazimierz Twardowski. (These remarks were shared by Heller

other hand, Życiński's distance from thinking in neo-Thomist categories is evident (see, e.g., the concept of the field of rationality, evolutionary emergentism, panentheism). It is worth noting that from the 1990s onward, Życiński's influence on the school became weaker and weaker due to his pastoral duties as a bishop. Despite this, the concepts undertaken by Życiński are still being developed in the Kraków milieu, especially by his former students, such as Zbigniew Liana and Jacek Rodzeń (see, e.g., Z. Liana, *Nauka jako racjonalna doxa. Józefa Życińskiego koncepcja nauki i filozofii nauki – poza internalizmem i eksternalizmem*, "Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)" 2019, Vol. 66, pp. 147–199; Z. Liana, *Józefa Życińskiego koncepcja racjonalizmu umiarkowanego: epistemologiczna i doxologiczna funkcja podmiotowego commitment*, "Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)" 2020, Vol. 68, pp. 117–184).

¹⁵ "At the end of [my studies at] the Catholic University of Lublin, I was definitely a non-Thomist, and [...] probably even more radical than today." M. Heller et al., *Wierzę, żeby rozumieć: w osobistej rozmowie o życiowych wyborach*, Wydawnictwo Znak, Kraków 2016, p. 162. Such a negative attitude towards neo-Thomism (described by Heller as a "rebellion," *ibid.*, p. 74) stemmed from the following diagnosis: "[H]ere is the essence of the matter: not only does Thomism not fit into the sciences, but no one will be convinced by Thomism. It is just the opposite" (*ibid.*, pp. 126–127).

during a seminar attended by one of this paper's author's, Paweł Polak).¹⁶ We posit that such a comparison represents the most convenient way to analyze the Kraków School of Philosophy in Science.

The Lvov-Warsaw School (LWS), as well as its philosophy, has been the subject of many studies since the mid-1980s,¹⁷ and so its concepts have been ana-

¹⁶ For interesting remarks by M. Heller and J. Mączka on the relationship of Kraków philosophy to the LWS, see M. Heller, J. Mączka, *Początki filozofii przyrody w Ośrodku Badań Interdyscyplinarnych w Krakowie*, op. cit. It is worth noting that in this article they do not use the term "school," but speak instead of the "Kraków centre," while noting the key role of internal influences within this "centre." In particular, they emphasize the role of friendship as a cohesive factor in this group: "friendships, although they do not leave traces in any archive, are the most durable element of all initiatives"; on the interests of the Kraków Circle (a branch of the LWS) and the philosophical parallels, see M. Heller et al., *Jak filozofuje się w OBI?*, op. cit.

¹⁷ Z. Jordan, *The Development of Mathematical Logic and of Logical Positivism in Poland between the Two Wars*, Oxford University Press, Oxford 1945; H. Skolimowski, *Polish Analytical Philosophy: A Survey and Comparison with British Analytical Philosophy*, Routledge & Kegan Paul, The Humanities Press, London–New York 1967; J. Woleński, *Filozoficzna szkoła lwowsko-warszawska*, Państwowe Wydawnictwo Naukowe, Warszawa 1985; J. Woleński, *Filozofia szkoły lwowsko-warszawskiej*, Uniwersytet Wrocławski, Wrocław 1986; J.J. Jadacki, *Semiotyka szkoły lwowsko-warszawskiej: główne pojęcia*, Ossolineum, Wrocław 1987; J. Woleński, *Logic and Philosophy in the Lvov-Warsaw School*, Kluwer Academic Publishers, Dordrecht 1989; K. Szaniawski, *The Vienna Circle and the Lvov-Warsaw School*, Kluwer Academic Publishers, Dordrecht 1989; R. Poli, F. Coniglione, J. Woleński, eds., *Polish Scientific Philosophy: The Lvov-Warsaw School*, Rodopi, Amsterdam, Atlanta, GA, 1993; J.J. Jadacki, *The Conceptual System of the Lvov-Warsaw School*, "Axiomathes" 1996, Vol. 7, No. 3, pp. 325–333; J.J. Jadacki, *Warsaw: The Rise and Decline of Modern Scientific Philosophy in the Capital City of Poland*, in: *In itinere: European Cities and the Birth of Modern Scientific Philosophy*, ed. R. Poli, Rodopi, Amsterdam–Atlanta, GA, 1997, pp. 145–160; J. Woleński, *Szkoła Lwowsko-Warszawska w polemikach*, Wydawnictwo Naukowe Scholar, Warszawa 1997; K. Kijania-Placek, J. Woleński, eds., *The Lvov-Warsaw School and Contemporary Philosophy*, Kluwer Academic Publishers, Dordrecht 1998; J.J. Jadacki, *From the Viewpoint of the Lvov-Warsaw School*, Rodopi, Amsterdam–New York 2003; J.J. Jadacki, J. Pańniczek, eds., *The Lvov-Warsaw School: The New Generation*, Rodopi, Amsterdam–New York 2006; J.J. Jadacki, *Polish Analytical Philosophy: Studies on Its Heritage: With the Appendix Containing the Bibliography of Polish Logic from the Second Half of the 14th Century to the First Half of the 20th Century*, Wydawnictwo Naukowe Semper, Warszawa 2009; R. Murawski, *Philosophy of Mathematics in the Lvov-Warsaw School*, in: *The Golden Age of Polish Philosophy*, eds. S. Lapointe, J. Woleński, M. Marion, W. Miskiewicz, Springer, Dordrecht 2009, pp. 121–130, https://doi.org/10.1007/978-90-481-2401-5_9; S.B. Ivanik, *Filozofowie ukraińscy w Szkole Lwowsko-Warszawskiej*, Wydawnictwo Naukowe Semper, Warszawa 2014; A. Chybińska et al., eds., *Tradition of the Lvov-Warsaw School: Ideas and Continuations*, Brill-Rodopi, Leiden–Boston, MA, 2016; A. Brożek, A. Chybińska, eds., *Fenomen szkoły lwowsko-warszawskiej*, Wydawnictwo Academicum, Lublin 2016; A. Brożek, F. Stadler, J. Woleński, eds., *The Significance of the Lvov-Warsaw School in the European Culture*, Springer International Publishing, Cham 2017, <https://doi.org/10.1007/978-3-319-52869-4>; Á. Garrido, U. Wybraniec-Skardowska, eds., *The Lvov-Warsaw School: Past and Present*, Springer International Publishing AG, Cham

lyzed many times. In the context of this work, we will therefore only recall the most important issues. The best guide for this is the precursor monograph by Jan Woleński,¹⁸ in which he analyzed the LWS in terms of the various criteria used in the historiography of philosophical schools.

Woleński stressed that the LWS was distinguished by the fact that it did not require members to share the same metaphilosophical and philosophical assumptions, nor did it require them to focus on any selected philosophical theme. All this indicates that the LWS philosophy was very diverse, and it is difficult to find common elements. It could be said that LWS members were united more by methodological issues, such as a common aspiration for clarity and precision in philosophy. The second most important factor determining this school was the question of its intellectual genealogy. It originated from the circle of Twardowski's direct disciples, or the circles of his disciples' disciples, and this provided the basis of self-identification, which was one of the most important elements of the school's identity. Twardowski's school was also distinguished by its philosophers' high level of professionalism, and the requirement to train philosophers in both philosophy and one additional discipline is particularly noteworthy.¹⁹

Typically, when we attempt to analyze the phenomenon of a certain philosophical school, we first pay attention to the existing relationships among its members. When analyzing the structural relations, the LWS appears to be a typical school, because its internal relations are based mainly on the master–disciple relationship and centralized, with them converging on the personality

2018; A. Drabarek, J. Woleński, M.M. Radzki, *Interdisciplinary Investigations into the Lvov-Warsaw School*, Palgrave Macmillan, Cham 2019; A. Brożek, *Analiza i konstrukcja: o metodach badania pojęć w Szkole Lwowsko-Warszawskiej*, Copernicus Center Press, Kraków 2020; A. Brożek et al., *Antyirracjonalizm. Metody filozoficzne w Szkole Lwowsko-Warszawskiej*, Wydawnictwo Naukowe Semper, Warszawa 2020; A. Brożek et al., *Anti-Irrationalism: Philosophical Methods in the Lvov-Warsaw School*, Wydawnictwo Naukowe Semper, Warszawa 2020; J.J. Jadacki, ed., *Rozum i wola: Kazimierz Twardowski i jego wpływ na kształt kultury polskiej XX wieku*, Wydawnictwo Academicum, Lublin 2021, <https://doi.org/10.52097/acapress.9788395354977>; A. Brożek, J.J. Jadacki, eds., *At the Sources of the Twentieth-Century Analytical Movement: Kazimierz Twardowski and His Position in European Philosophy*, Brill, Leiden–Boston, MA, 2022; J. Woleński, *Lvov-Warsaw School*, in: *The Stanford Encyclopedia of Philosophy* (Summer 2022), ed. E.N. Zalta, <https://plato.stanford.edu/archives/sum2022/entries/lvov-warsaw/> (substantive revision published on 30.09.2019).

¹⁸ J. Woleński, *Filozoficzna szkoła lwowsko-warszawska*, op. cit.

¹⁹ K. Twardowski, *On Scientific Preparation for Philosophy*, in: *On Prejudices, Judgments, and Other Topics in Philosophy*, eds. A. Brożek, J.J. Jadacki, transl. A. Chybińska, Rodopi, Amsterdam–New York 2014, pp. 57–59.

of Twardowski. Of course, such a picture of the LWS is an oversimplification, because, over time, fellow-to-fellow relationships, as is rather typical in a philosophical circle,²⁰ began to manifest, mostly between Twardowski's students. As we have already mentioned, the basis for identity was being aware of belonging to a group, so the typical activities of a philosophical circle were treated as secondary. However, on closer inspection of the LWS model, the boundaries between school-typical and circle-typical activities are sometimes blurred, and identity issues are decisive and determine any interpretation. Now, let us immediately highlight that this identity issue would become the main source of distinction for the Kraków School of Philosophy in Science.

We posit that when analyzing a philosophical school, attention should be paid *not just to internal relations* but also the intentional shaping of the *environment with which the school interacts*. This claim is based on the biological metaphor of a living organism. If a philosophical school has certain aspects that are analogous to a living organism – and after all, we use biological terms like “birth,” “development,” and “dying” when referring to them – then it may be beneficial to consider them as being akin to a living organism in these respects. Thus, while we need to analyze the internal relations, it is equally important to consider the relations the school had with the surrounding environment in which it existed. In this context, the environment refers to all the informational relationships and influences the school was engaged with. For the sake of clarity, we will call this environment the *extended circle of influences*.²¹ We coined this name based on the metaphor of a “circle” to illustrate how the influences of a philosophical school's ideas can be thought of as three concentric circles. At the centre of all these circles is the master, the next circle comprises his or her students (i.e., the school itself is the primary circle of influence), while the outermost circle represents the school's environment (see Fig. 1). We refer to the outer circle as “extended” to indicate that while most influences will be internal to the school, the school also needs to disseminate its ideas and engage with other thinkers and groups, and so it will remain open to discussion and avoid turning into a closed sect. Thus, the existence of an extended circle of influence is crucial to establishing a philosophical school rather than a cult.

²⁰ This model of fellow-to-fellow relationships is perhaps most clearly seen in the example of the Vienna Circle. We are grateful to Anna Brożek for this distinction between the school (master-disciple relations) and the philosophy circle (fellow-to-fellow).

²¹ The school itself is the primary circle of influence.

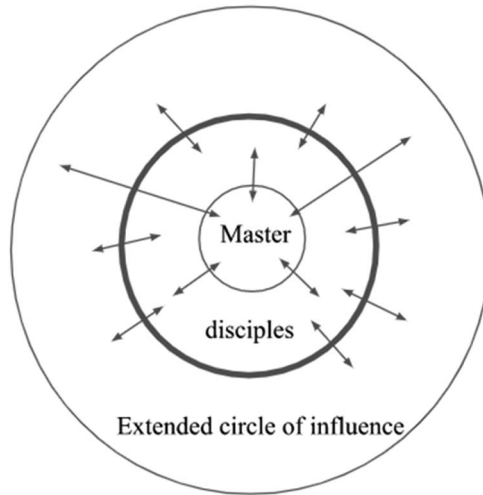


Figure 1. Concentric circles representing the influences of a philosophical school

A question now arises: what was the extended circle of influence for the LWS? Originally, the Polish Philosophical Society that was established by Twardowski was intended to function as an extended circle of influence. Over time, the circle expanded to include many other groups, becoming strongly international in the 1930s, including with connections to the well-known Vienna Circle.

Equipped with these tools for analysis, we can now take a closer look at the similarities and differences between the LWS and the Kraków school.

4. The Kraków Adaptation of Twardowski's School Model: Similarities and Differences

The Kraków School of Philosophy in Science resembles in some respects the LWS model of a philosophical school. Of course, the circumstances of its foundation and the conditions of its operation, as well as the people involved, are completely different, so we certainly cannot speak directly about the model's application here. We therefore believe it is better to use the word "adaptation" to describe

the Kraków school's relationship to the LWS. Indeed, Heller himself admitted in private conversations that while he was inspired by Twardowski's school, it was impossible to translate old solutions to a completely different situation.²²

Now, let us first examine the similarities linking these two schools of interest. For ease of reference, the basic determining factors for the philosophical schools are summarized in Table 1.

Table 1. A comparison of the basic features of the LWS and the Kraków School of Philosophy in Science

FACTORS	Kraków School of Philosophy in Science	LWS
"GENETICAL" (masters)	M. Heller, J. Życiński	K. Twardowski
GEOGRAPHICAL	Kraków	At first Lvov, then Lvov and Warsaw
PERIOD	Exists since the late 1970s (still active)	Existed since the end of the 19th century/beginning of 20th century (there is some controversy over times when the school was active)
SUBSTANTIVE	Various interests but a common set of metaphilosophical and methodological views (i.e., how philosophy should be practised); philosophy focuses on science and its philosophical significance	Various interests but a common set of metaphilosophical and methodological views (i.e., how philosophy should be practised); a broad concept of philosophy that is potentially open to all problems
SENSE OF BELONGING TO A SCHOOL	Rather strong, but it originally did not form an identity due to strong ties with the extended circle of influence	Very strong, and it formed an identity

On analyzing the way philosophy was practised in the two schools more closely, we can discern a number of important similarities, although these are

²² M. Heller, J. Mączka, *Początki filozofii przyrody w Ośrodku Badań Interdyscyplinarnych w Krakowie*, op. cit.

obviously not exactly identical. Firstly, we need to stress that in both cases the absence of a common core of shared philosophical ideas is distinctive. Indeed, pluralism and inclusiveness are not typical characteristics of classical philosophical schools, but here they play an important role. Of course, we should stress that pluralism was limited in both cases, but every kind of philosophy was accepted. Surprisingly, we discover that the LWS and the Kraków school shared a negative attitude towards the neo-scholastic model of philosophy and its model for a philosophical school (the reasons for this attitude, however, were different). This issue – as well as the pursuit of strict philosophy, which in Heller’s case was even based on an “exegesis” of the mathematical structures of scientific theories²³ – naturally brought these schools closer together. This was especially evident during the 1970s when the Kraków school was founded. At that time, Polish philosophy could not freely develop due to the limitations of the communist regime and the narrow range of potential “allies.” The methodical similarities between the LWS and the Kraków school should also be considered carefully. On the one hand, the proponents of both schools accept the need for clarity and transparency, but Heller in fact redefined this aspect. For Heller, the clarity of philosophical considerations in philosophy in science was based on the clarity of the mathematical structure of scientific theories.²⁴ Clarity and precision in the philosophy of physics are possible because a philosopher can describe the properties of the extremely precise mathematical structures used in physical theories. Of course, such descriptions will necessarily be poorer and less precise than the mathematical structures themselves.²⁵ However, Heller did not dare to abandon natural language as the vehicle and “fabric” of philosophy. After all, in physics a similar strategy is in use – natural language is employed to explain mathemati-

²³ Exegesis of the mathematical structure of a given physical theory, according to Heller, is a kind of philosophical comment or interpretation of a physical theory. “A comment could so closely follow the mathematical structure of a physical theory that any its ‘perturbation’ would result into inconsistencies or contradictions with the theory’s formalism” (M. Heller, *What Does It Mean “To Exist” in Physics?*, “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” 2018, Vol. 65, p. 14). With this approach, it is possible to achieve maximum accuracy and clarity in the philosophy of physics, although it is important to be aware that not all philosophers agree with this extreme approach.

²⁴ See, e.g., M. Heller, *Science as Philosophy*, in: M. Heller, *Philosophy in Science*, Springer, Berlin–Heidelberg 2011, pp. 129–151, https://doi.org/10.1007/978-3-642-17705-7_12.

²⁵ We know that the language of mathematics can efficiently describe properties that cannot be exhaustively and strictly described in natural language – a perfect example is quantum mechanics.

cal structures, and statements can always be made more precise by referring them to the mathematical structures of the theory. This clarification is possible because nature is mathematical and our explanatory structures can be “in resonance” with the real, infinitely complex natural structures despite being evidently simpler than them.²⁶

When looking at the scientific ethos and set of values in both cases, we see strong inspirations and intentional similarities.²⁷ It is worth noting, though, that sharing such ethos and the abovementioned metaphilosophical assumptions were the reason why the problem of “proper interpretation of the Master” did not emerge in either school. This is interesting because both philosophical schools profited from the inspiring influence of their masters (i.e., Twardowski or Heller).

It is worth noting that Heller, having modelled himself on Twardowski’s activities, also organized a *privatissimum* (a private seminar) in the 2000s.²⁸ As a rule, invitations were supposed to be limited to selected doctoral students and young philosophers, but some other philosophers and scholars were also invited. Interestingly, this way of working was continued by the next generation of the school.

When evaluating the differences between the LWS and the Kraków School of Philosophy in Science, we need to highlight the incomparable historical contexts in which the schools developed, as well as the markedly different aims of these schools. First, Twardowski built his school from scratch because no strong local traditions existed in Lvov in the 1890s. Conversely, Heller drew strongly on local tradition while also being somehow, even unconsciously, bound by it (the most obvious evidence of the influence of local traditions is the role played by the concept of interdisciplinary research).

²⁶ M. Heller, *Czy świat jest matematyczny?*, in: *Filozofia i wszechświat: wybór pism*, TAIWPN Universitas, Kraków 2006, pp. 48–57; M. Heller, *The Field of Rationality and Category Theory*, in: *Mathematical Structures of the Universe*, eds. M. Eckstein, M. Heller, S.J. Szybka, Copernicus Center Press, Kraków 2014, pp. 441–457; for a deeper analysis of this topic, see W.P. Grygiel, *A Critical Analysis of the Philosophical Motivations and Development of the Concept of the Field of Rationality as a Representation of the Fundamental Ontology of the Physical Reality*, “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” 2022, Vol. 72, pp. 87–108.

²⁷ Interesting remarks about these issues in the Kraków school can be found in M. Heller, *Jak być uczonym*, ed. M. Szczerbińska-Polak, Znak, Kraków 2009.

²⁸ The name *privatissimum* was taken from the Austrian educational model, which was a basis for the Polish model of universities in the early 20th century and still belongs to the intellectual traditions of the Kraków centre.

The biggest difference between Twardowski's and Heller's metaphilosophical concepts concerns the object and role of philosophy. Heller's concept of philosophy is very limited compared to Twardowski's concept of open philosophy. Given Heller's exclusive focus on philosophy in the context of the sciences, his philosophy is strongly related to the sciences. For Twardowski, meanwhile, his adopted solution emphasized the autonomy of philosophy in relation to the sciences, which would be unacceptable for Heller, because for him, the boundaries between philosophy and science were blurred, and science itself played a philosophically important role. After all, the very name "philosophy in science" indicates there are close ties between science and philosophical reflection. We also need to mention that Heller's, and similarly Życiński's, philosophy served a double purpose: to analyze the problems of science while also building a dialogue between science and theology.²⁹

5. The Special Role of the Extended Circle of Influence in the Kraków School

In order to understand the phenomenon of the Kraków School of Philosophy in Science, we need to take a closer look at the significant role played by its extended circle of influence. This was originally represented by the Interdisciplinary Seminars, which were chaired by Michał Heller from the 1970s, and later by a separate institution that became the Center for Interdisciplinary Research (Ośrodek Badań Interdyscyplinarnych) at the Pontifical Academy of Theology in Kraków.³⁰ This Centre was formally established by Michał Heller and Józef Życiński at the academy's Faculty of Philosophy, but it had some autonomy from the very be-

²⁹ P. Polak, J. Rodzeń, *The Science-Religion Relationship in the Academic Debate in Poland, 1945–1998*, "European Journal of Science and Theology" 2021, Vol. 17, No. 6, pp. 11–14; for the case of Heller's reception of relativity theory, see P. Polak, J. Rodzeń, *The Theory of Relativity and Theology: The Neo-Thomist Science–Theology Separation vs. Michael Heller's Path to Dialogue*, "Theology and Science", <https://doi.org/10.1080/14746700.2022.2155917>; see also W.M. Macek, *Teologia nauki*, in: *Oblicza racjonalności: wokół myśli Michała Hellera*, eds. B. Brożek et al., Copernicus Center Press, Konsorcjum Akademickie Wydawnictwo, Kraków 2011, pp. 204–206.

³⁰ R. Janusz, *The Center for Interdisciplinary Studies in Cracow*, "Forum Philosophicum" 2006, Vol. 11, pp. 269–274; K.Trombik, *The Origin and Development of the Center for Interdisciplinary Studies*, op. cit.

ginning.³¹ The role that the centre played is particularly important, because the centre's activities were strongly linked to the school's formation process. Michał Heller and his close collaborator Janusz Mączka described it as follows:

From the very beginning of the Center for Interdisciplinary Studies (OBI) in Kraków [...], those associated with it had two goals: (1) to develop a contemporary philosophy of nature, that is, by referring to the dynamically developing natural sciences, and provide modern man with a useful tool for understanding the world and himself in this world; and (2) to give students and those within the circle of influence of the OBI a philosophical and natural science education that meets modern needs, that is, being on the one hand rooted in the great philosophical tradition of the West and on the other hand open to the challenges brought by scientific and civilization progress.³²

Alumni of Heller's school were dominant in the centre, thus forming its core, but some other Kraków scholars also attended the Center,³³ and so the school

³¹ The 1997 regulations of the Center indicate in Article II that "OBI [i.e. Center for Interdisciplinary Research] is a scientific and research unit, with some elements of autonomy, but organizationally functioning at the Faculty of Philosophy of the Pontifical Academy of Theology in Kraków" (OBI jest jednostką naukowo-badawczą, posiadającą pewne elementy autonomii, lecz organizacyjnie funkcjonującą na Wydziale Filozoficznym Papieskiej Akademii Teologicznej w Krakowie). *Regulamin Ośrodka Badań Interdyscyplinarnych przy Wydziale Filozoficznym PAT w Krakowie*, 26.05.1997, Archiwum Wydziału Filozoficznego UPJPII w Krakowie, Regulaminy PAT nr 37, pp. 1–2.

³² "Od samego początku istnienia Ośrodka Badań Interdyscyplinarnych (OBI) w Krakowie [...] osobom z nim związanym przyświecały dwa cele: (1) rozwijać współczesną filozofię przyrody, tzn. nawiązując do dynamicznie rozwijających się nauk przyrodniczych, zapewnić współczesnemu człowiekowi użyteczne narzędzie rozumienia świata i siebie samego w tym świecie; (2) dać studentom oraz osobom pozostającym w kręgu oddziaływań OBI wykształcenie filozoficzno-przyrodnicze na miarę współczesnych potrzeb, tzn. z jednej strony zakorzenione w wielkiej tradycji filozoficznej Zachodu, a z drugiej strony otwarte na wyzwania, jakie niesie postępowanie naukowe i cywilizacyjny." M. Heller, J. Mączka, *Początki filozofii przyrody w Ośrodku Badań Interdyscyplinarnych w Krakowie*, op. cit., p. 49.

³³ The 1997 regulations, Article IX, par. 1: "Ordinary members of OBI [Center for Interdisciplinary Research] can be both employees and students of PAT [Pontifical Academy of Theology] in Kraków, as well as all persons engaged in research or activities of an interdisciplinary nature, also outside the Academy, expressing a willingness to cooperate closely" (Członkami zwyczajnymi OBI mogą być zarówno pracownicy jak i studenci PAT w Krakowie oraz wszystkie osoby zajmujące się badaniami czy działalnością o charakterze interdyscyplinarnym, także poza Akademią, wyrażający gotowość ścisłej współpracy). *Regulamin Ośrodka Badań Interdyscyplinarnych*, op. cit., p. 4.

naturally evolved into a philosophy circle.³⁴ The group was therefore linked both by master–student and peer-to-peer relationships, with Heller deliberately striving to cultivate the latter by introducing a friendly, informal atmosphere and encouraging collaboration among subgroups for selected topics.³⁵ Heller therefore played the role of both mentor and animator of the circle’s activities. In fact, the school and the centre were mutually supportive of each other’s goals, although there are admittedly problems when trying to analyze this symbiotic relationship. Nevertheless, it is worth noting that for Heller, the logical clarity of organizational structures came second to finding opportunities for fruitfully using bootstrapping strategies to help progress both the school and the centre.

Today, the Center for Interdisciplinary Research’s role has since been assumed by two institutions: the Copernicus Center for Interdisciplinary Research, which was established in 2008 based on the Center for Interdisciplinary Research,³⁶ and the Commission for the Philosophy of Science at the Polish Academy of Arts and Sciences. The latter was founded in 2012 by Michał Heller by merging the existing “Fides et Ratio” Commission and the Commission for the Philosophy of Natural Sciences. It acts as a forum for the exchange of ideas and discussions, continuing the traditions of the Center for Interdisciplinary Research and providing an important venue for the school’s members to collaborate.

³⁴ In this way, Heller, initially together with Życiński, played the authority role for the school and the environment, with him performing the three most important functions identified by Goćkowski – namely, master/teacher, educator (*wychowawca*), and manager/leader. See J. Goćkowski, *Funkcje autorytetów w społeczeństwie nauki*, “Teksty: Teoria Literatury, Krytyka, Interpretacja” 1977, Vol. 1 (31), pp. 37–38. However, Heller, like Twardowski, clearly avoided playing the role of an ideologue because this would be incompatible with the accepted concept of philosophy.

³⁵ The importance of developing peer-to-peer rather than master–student relationships was emphasized, e.g., by Kazimierz Kuratowski, a prominent mathematician and member of the Warsaw School of Mathematics. He also emphasized the crucial nature of peer-to-peer relationships for developing a scientific school: “The sooner that teacher and pupil become partners in their work, the greater are the prospects for the school’s successful development.” I. Stasiewicz-Jasiukowa et al., eds., *The Founders of Polish Schools and Scientific Models Write about Their Works*, Ossolineum, The Polish Academy of Sciences Press, Wrocław 1989, p. 10; I. Stasiewicz-Jasiukowa, *Rozmowy i refleksje o polskich szkołach i modelach naukowych*, “Kwartalnik Historii Nauki i Techniki” 1988, Vol. 33, No. 3, p. 771.

³⁶ The foundation of the Copernicus Center for Interdisciplinary Studies was possible due to Heller being awarded the Templeton Prize in 2008; for more on this topic, see a special issue of “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” – Vol. 43 (2008), <https://zfn.edu.pl/index.php/zfn/issue/view/18>.

The journal “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” (ISSN 0867-8286) also played a significant role in shaping the school, as well as the centre. Indeed, it was the forum in which the concept of *philosophy in science* was developed, such that even in the first issues, the English title “Philosophy in Science” was used alongside the Polish title “Zagadnienia Filozoficzne w Nauce.” From the very beginning, the journal also served as a medium for publishing other works by members of the school, starting with an article written by Krzysztof Turek,³⁷ a physicist who was the first doctor of philosophy to be promoted by Heller at the Pontifical Academy of Theology.

Unlike Twardowski’s school, in the Kraków school, the boundaries between it, the centre (and its descendants), and the *privatissimum* were fluid. The informality and the avoidance of a rigid organizational framework also makes it difficult to describe and analyze this phenomenon. Indeed, meetings were often held in cafes, and Heller founded the café-bookstore De Revolutionibus, or DeRevo for short, especially for this purpose. This again highlights how the style of the Kraków school is close to that of the pre-World War II Lvov school of mathematics, and again, this similarity is not accidental.

6. Perspectives on the Development of Philosophy within the Kraków School of Philosophy in Science

Philosophy at the Kraków school is closely tied to science, but we found a diverse range of interests among its members, such as the more traditional philosophy of nature (e.g., problem of the rationality of the world), the philosophy of physics and cosmology (e.g., unification of physics by using formalism of the noncommutative geometries, philosophical issues in quantum mechanics), the philosophy of mathematics (e.g., study of category theory and its consequences for foundations of mathematics), logic and the philosophy of logic (e.g., categorical logic, studies of logics involved in theology), the methodology of sciences (e.g., impact of digital technologies on the methodology of sciences), the history of science (e.g., reception of new physical theories, such as Einstein’s special and general relativity), the science–religion relation (e.g., theology of science), and selected is-

³⁷ K. Turek, *Filozoficzne aspekty pojęcia informacji*, “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” 1978, Vol. 1, pp. 32–41.

sues of the philosophy of the mind (e.g., research on the origins of mathematical thinking). If we wanted to single out a “universal” problem the school sought to address, it would probably be the problem of a mathematical nature.

Specific to the Kraków school were studies of the scientific challenges for Christianity, especially for philosophy developed under the influence of Roman Catholic theology, as well as science–religion studies.³⁸ In this context, Heller started a project related to the *theology of science*.³⁹ Nowadays, existing fields of research, such as the philosophy of physics (Wojciech Grygiel, Łukasz Mściślawski, Andrzej Koleżyński, et al.), are continued within the school. Directly linking to the traditions of the LWS is the ongoing research about the Kraków Circle, a branch of the LWS that was formed in the 1930s by, among others, Józef Bocheński and Jan Salamucha, who used modern logical tools in theology and became the forerunners of analytical Thomism. Today, the most important subject for consideration is the role of logic in theology.⁴⁰

Among the new threads that have emerged as extensions of previous research areas that can be indicated, we could, for example, refer to:

- studies about transforming the methodology of sciences in the age of digitalization;
- adaptations of the concept of philosophy in science to research in the area of the philosophy of technology (i.e., philosophy in technology);

³⁸ F. Krauze, *Jedna prawda, dwie księgi: nauki przyrodnicze a teologia w Ośrodku Badań Interdyscyplinarnych Papieskiej Akademii Teologicznej w Krakowie*, Wydawnictwo WAM, Kraków 2008; T. Obolevitch, *Problem relacji pomiędzy nauką i wiarą w OBI*, “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” 2012, Vol. 50, pp. 75–84; T. Obolevitch, *The Relationship between Science and Religion in the Copernicus Centre in Krakow* (Michael Heller, Józef Życiński and Others), “European Journal of Science and Theology” 2015, Vol. 11, No. 4, pp. 1–11; B. Brożek, M. Heller, *Science and Religion in the Kraków School*, op. cit.; P. Polak, J. Rodzeń, *The Science-Religion Relationship in the Academic Debate in Poland*, op. cit.; P. Polak, J. Rodzeń, *The Theory of Relativity and Theology*, op. cit.

³⁹ M. Heller, *The New Physics and a New Theology*, Vatican Observatory, Vatican City 1996; for the analysis and development of the concept, see W.M. Macek, *Teologia nauki według księdza Michała Hellera*, Wydawnictwo Uniwersytetu Kardynała Stefana Wyszyńskiego, Warszawa 2010; J. Mączka, P. Urbańczyk, eds., *Teologia nauki*, Copernicus Center Press, Kraków 2015; see also M. Oleksowicz, *Do We Need a Theology of Science? / ¿Necesitamos una teología de la ciencia?*, “CAURIENSIA. Revista anual de Ciencias Eclesiásticas” 2020, Vol. 15, pp. 755–770; M. Oleksowicz, *Teologia della scienza. Lo status quaestionis e possibili sviluppi ulteriori*, “Aisthema, International Journal” 2019, Vol. 6, No. 1, pp. 203–227.

⁴⁰ See, e.g., A. Olszewski, *Negation in the Language of Theology – Some Issues*, “Philosophical Problems in Science (Zagadnienia Filozoficzne w Nauce)” 2018, Vol. 65, pp. 87–107.

- historical-philosophical research, with the main emphasis currently being on studying Kraków's philosophy in the context of science from the beginnings of the 19th century; and
- the history of science–faith relations in post-war Poland.

This all shows that the school is still alive and developing Heller's concepts, despite Heller, as professor emeritus, currently playing less and less of a direct role in shaping the school's subsequent generation.

7. Conclusions

The Kraków School of Philosophy in Science can be regarded as a successful adaptation of the Lvov-Warsaw School model, thus demonstrating how the open and flexible concept of a school created by Twardowski could continue to contribute to philosophical development. The many peculiarities of the Kraków school derive from strong local traditions, and this case shows that a philosophical school is still needed for philosophical development, because it supports the building of long-term research programmes. The cases of the Lvov-Warsaw School and the Kraków school also demonstrate how schools need not be rooted in a set of theses that must be shared by all members. Instead, sharing fundamental methodological assumptions and focusing on similar areas of interest is sufficient for achieving the typical goals of such schools, so members can jointly undertake long-term research programmes.

The two discussed schools also demonstrate that personal ties are crucial, even if they are hard for historians of philosophy to identify and analyze. This suggests that some aspects of sociology may be relevant to discussions of philosophical schools.⁴¹ The geographical location of a school, which is generally a key historiographical criterion for describing and analyzing a school, is also worth briefly mentioning. With modern telecommunications technologies, collaborative meetings can now be held online, and so a modern school can also operate through a network of virtual ties (e.g., Łukasz Mściślawski at the Wrocław University of Science and Technology, Jacek Rodzeń at Kielce University). With such remote collaboration, geographical location will become less important

⁴¹ See, e.g., the interesting remarks in J. Goćkowski, *Funkcje autorytetów w społeczeństwie nauki*, op. cit.

for a school, with it approaching Derek de Solla Price's idea of the invisible college.⁴² Nevertheless, the Kraków school still makes strong use of local traditions and personal ties, and being so embedded in a traditional context and bound by friendship prevents, for now, a complete virtualization for this school of philosophy.

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⁴² See, e.g., D.J. De Solla Price, D. Beaver, *Collaboration in an Invisible College*, "American Psychologist" 1966, Vol. 21, No. 11, pp. 1011–1018.

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