

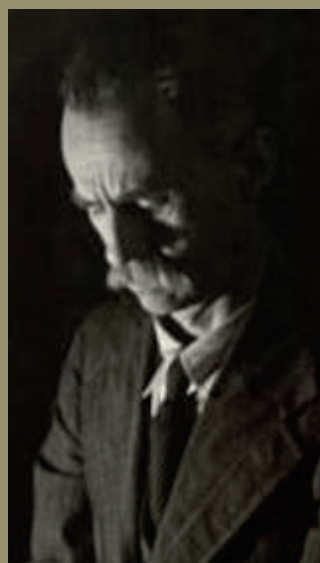


One of the greatest men of genius Poland
has ever brought forth was
Stanisław Leśniewski.

Jan Łukasiewicz

Based on my lifetime of experience,
I believe that Stanisław Leśniewski was
a man of genius: the only man of genius
who fate allowed me to encounter,
and once, that happened almost daily.

Tadeusz Kotarbiński



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Leśniewski (1912), from the author's collection.

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Jacek Jadacki ■ STANISŁAW LEŚNIEWSKI: GENIUS OF LOGIC



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epigram

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GENIUS OF LOGIC

Jacek Jadacki

STANISŁAW LEŚNIEWSKI: GENIUS OF LOGIC



Translated from the Polish
by Katarzyna Cullen

Epigram

THE LVOV-WARSZAW SCHOOL RESEARCH CENTER
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On the cover: Stanisław Leśniewski (1912)

On the front page: Stanisław Leśniewski (ca. 1915)

Both portraits come from the author's collection.

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Introduction

*One of the greatest men of genius Poland has ever
brought forth [was] Stanisław Leśniewski.
Jan Łukasiewicz [2013].*

*Based on my lifetime of experience, I believe that
[Stanisław Leśniewski] was a man of genius:
the only man of genius who fate allowed me to encounter,
and once, that happened almost daily.
Tadeusz Kotarbiński [1958].*

1

The opinions of Jan Łukasiewicz and Tadeusz Kotarbiński cited above leave no doubts: Stanisław Leśniewski was an exceptional phenomenon in Polish culture.

In 2015, I published his *Collected Works* [Leśniewski 2015]. It is time to present his life story and personality, hitherto known mostly from “the handful of memories” of a few people who came into contact with him, with Kotarbiński as the first.

I began preparations for this biographical book on Leśniewski in the 1990s; with varying degrees of intensity, the work has lasted until today. I managed to reach many of Leśniewski’s family members and his wife Zofia Leśniewska’s, as well as people close to the Leśniewskis, have conversations with them, and collect unique iconographic documentation.

I would like to mention at this point (in alphabetical order) the people who I owe the most gratitude. These are: Dr. Mieczysław Brykczyński (the grandson of Leśniewski’s uncle, Ludwik), Danuta

INTRODUCTION

Jabłońska (the granddaughter of Leśniewski's uncle, Euzebiusz), Krzysztof Leśniewski (uncle Euzebiusz's grandson), Stanisław Lewiński (uncle Ludwik's grandson), Barbara Szarejko (the granddaughter of Leśniewska's brother, Stefan Prewysz-Kwinto), and Professor Władysław Pożaryski (the grandson of Leśniewska's grandfather's brother-in-law, Adolf Prewysz-Kwinto).

I am greatly indebted to them for their help; I regret that two people from the list did not live to see this publication.

I wish to express special thanks to Ewa Malicka (the daughter of Leśniewski's half-brother, Czesław), without whom this book would never have come into being. I could say the same about the late Professor Henryk Hiż, one of three students of Leśniewski (the other two were Professor Jerzy Kreczmar and Professor Czesław Lejewski) who I had direct contact with and with whom I had long discussions about Leśniewski's work and the characterological type of "Russian" Pole (Hiż himself was born in St. Petersburg, called "Petrograd" at that time).

I would also like to thank: Dr. hab. Piotr Brykczyński (also related to the Leśniewskis) for his mediation in making contact with the abovementioned Dr. Mieczysław Brykczyński; Professor Czesław Głombik for sharing with me the information concerning Leśniewski's ties with Edmund Husserl; and finally, Professor Leszek Zasztowt, whose family was neighbors with the Prewysz-Kwintos, and who gave me an idea of the atmosphere in a Borderlands (*Kresy*) house, similar to the one where Leśniewski spent many of his youthful years.

2

The book consists of five chapters. The focal point of the first chapter, "Life story — personality — *milieu*", is the *calendarium*. Preceded by Leśniewski's short (and probably only surviving) autobiography, it constitutes the most comprehensive chronological compilation of the events of his life thus far; it is mostly based on reliable sources — and sometimes directly on the relevant documents. A short description

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of Leśniewski's personality has been made on the basis of remarks scattered in texts by various authors. The list of students is far from complete.

The chapter ends in an autobiography of Leśniewski's youngest half-brother, Czesław, reconstructed by me. One of the reasons it is included here is that he was his great brother's student for two years at the University of Warsaw. The autobiography is a compilation drawn up with the use of several versions of his autobiographies from the early 1950s.

3

Chapter two, "Official assessments", consists of requests and justifications attached to them, which concern the creation of the extraordinary chair for Leśniewski at the University of Warsaw and admitting him the title of ordinary professor. One of the opinions was probably expressed by Waław Sierpiński (or possibly Stefan Mazurkiewicz?), the other — definitely by Łukasiewicz. Apart from historical value, they also have factual value, as they provide a substantial and competent description of Leśniewski's work, presented by the greatest contemporary experts, who N.B. have not ceased to be experts up today.

4

In chapter three, "In the eyes of the environment", there are texts in chronological order by the people who were in direct contact with Leśniewski at various points of his life.

The environment his wife, Zofia (of the Prewysz-Kwinto family), came from, was probably the greatest influence on Leśniewski's personality, sensibility and imagination. As I mentioned, it was a landowning-borderland environment. The bloody turmoil of war and carnage, referred to by its perpetrators as "revolutions" — and before that, the Tsar's post-uprising repressions — almost completely

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eliminated this environment and the world of its values from Polish culture. It is no wonder then than Kotarbiński, a typical inhabitant of the central Poland, (wrongly!) identified Leśniewski's mentality as "the Russian soul".

An extraordinary document which opens the chapter, that is, a description of Leśniewski's wedding reception in Kimborciszki in 1913, sheds some light on the atmosphere of the Borderlands. This immediate description was written by Janina Jankowska-Oryźyna (1893–1986), a subsequent connoisseur and promoter of folk crafts and an author of many books in this field. She was the sister of a poet, Jerzy Jankowski (1887–1941). I published this text, the typescript of which Professor Pożaryski shared with me, in 2003 in *Magazyn Wileński* [Jankowska-Oryźyna 2003].

This is followed by information about Leśniewski from *Diary* by Eugeniusz Romer [1995] and *Diaries* by Kazimierz Twardowski [1997], as well as from abundant communications between Władysław Witwicki and Twardowski (Witwicki's first preserved letter is dated February 5th, 1902, and the last: September 24th, 1937). Witwicki's letters contain many (unflattering!) statements about Leśniewski; all of them date from 1919–1924 and shed interesting light on the characters of both leading representatives of the Lvov-Warsaw School.

The texts which follow are of particular value: a funeral oration by Stefan Mazurkiewicz and a commemorative article by Jan Ostrowski-Naumoff: the only obituary in the daily press which I was able to attain. Other texts of great value are mentions of Leśniewski in Łukasiewicz's *Memoir* [2013], as well as "A Handful of Memories" by Kotarbiński [1958b], published on the twentieth anniversary of Leśniewski's death. It is supplemented with a fragment of Kotarbiński's letter to Twardowski.

The only text in this chapter which was not written by someone in close contact with Leśniewski is a belated (due to war) obituary by Daniela Gromska, one of Twardowski's students, well-informed about their colleagues' affairs.

5

A separate matter is the presence of texts by Leśniewski's three students from a later period in his life: Jerzy Śłupecki, Czesław Lejewski and Henryk Hiż, included in chapter three.

They all wrote about their master on more than one occasion.

Śłupecki (1904–1987) published two biographical notes about Leśniewski. Although they contain partially similar information, I decided to include both, since some details are depicted in a different light in them. Also, Lejewski (1913–2001) published two, much more extensive, biographical notes about Leśniewski, but they overlap to a large extent. Therefore, I am including one of them and have added a fragment which is significantly different in both versions.

The first of Hiż's (1917–2006) texts was in a way commissioned by me (I write about it in more detail in the introduction to this text). The second, although it partly overlaps with the first when it comes to information, is more extensive and contains many significant *addenda* to the first. This is why I decided to reprint both texts, as in the case of the biographical notes written by Śłupecki.

At the end of the chapter, I include short statements about Leśniewski found in the preserved legacy of one of his (*quasi*)mentors (Mścisław Wartenberg), colleagues (Kazimierz Ajdukiewicz, Leon Chwistek, Kazimierz Kuratowski, Czesław Znamierowski, and Roman Ingarden) or students (Bolesław Sobociński, Kazimierz Pasenkiewicz, and Józef M. Bocheński).

6

In the fourth chapter, "From the correspondence", I primarily reprint twenty letters written by Leśniewski to Twardowski, as well as a few letters from Twardowski to Leśniewski: all that has survived from the ravages of history and which is kept in the Archive of the Polish Philosophical Society in Warsaw.

These letters are valuable as a source of information, mostly for the sake of reconstruction of Leśniewski's biography, since all documents concerning him burned during World War II. They bring to light the complexity of Leśniewski's personality: they shed light on his amusing preferences, but also his inexplicable intellectual and emotional phobias, even approaching some kind of persecution mania at times;¹ they reveal a subtle deprecating humor which was so characteristic for him, as well as the peremptoriness of his unjust judgments of others; they attest that great regularity in some issues went hand in hand with severe carelessness in other matters.

They also constitute some value for reconstructing biographies of our other brilliant scholars. Among other things, they reveal Twardowski's attitude towards the sender of the letters: it had to be a very positive attitude since Leśniewski could take great liberties to make "lyrical" fun of his master, "St. Casimir", in his presence. In the background, there is also some tragic, albeit unclear, combination of circumstances casting a gloomy shadow on the relations between Tarski and Leśniewski, who, despite great admiration for his Ph.D. student's talent and theoretical results, felt more than personal reluctance towards him.

Still, apart from being of great value to biographers, the published letters are also valuable because they contain certain significant factual information concerning Leśniewski's work and philosophical views.

Apart from correspondence between Leśniewski and Twardowski, I include in this chapter a letter Leśniewski wrote to his brother Czesław and official letters in business matters as well as letters written by Leśniewski's wife, Zofia, to Kotarbiński. The last two groups of letters reveal how hard up the professor was during the interwar period and the tragic financial situation of the widow of the logical genius after World War II. This leads to the formulation of a thesis that the greatness of a state is a function of the way it treats its most eminent citizens.

¹ It is intriguing that similar symptoms appeared in J. Łukasiewicz by the end of his life.

7

Chapter five, “Work — the most important achievements”, is a discussion of the two main aspects of Leśniewski’s genius, written by myself.

8

In the Polish version of the book [Jadacki 2016], this chapter is followed by chapters “Genealogical tables” and “Illustrations”. In the last chapter, I placed all known portraits of Stanisław and Zofia Leśniewskis, as well as their ascendants and siblings, and group portraits of the Leśniewski and Prewysz-Kwinto families where Stanisław Leśniewski appears.

A series of photos from Leśniewski’s funeral in Powązki Cemetery in Warsaw is a shocking record. Thus, to refine the point I made in §6, the greatness of a country is measured with what kind of gravestones it builds for its finest citizens. A sad example of this is the gravestone of Twardowski, one of the most distinguished contributors to 20th century culture of Poland, in Łyczakowski Cemetery in Lvov: an iron cross with a metal plate

One’s identity is influenced by where one comes from and where one has lived. In the chapter “Places”, I included photographs of the places dearest to Leśniewski.

Particularly deserving of attention among the reproduced documents are the following three: an inscription for Twardowski on a copy of one of the earliest works by Leśniewski, the nomination for the title of professor signed by Józef Piłsudski, and a *curriculum vitae* written by Leśniewski himself.

I did not find any material memorabilia directly connected with Leśniewski, which is unsurprising, since his apartment burnt down in 1944, during the Warsaw Uprising. However, a few such souvenirs left by his wife were preserved, and I have included photographs of all of them.

Iconographic documentation is concluded with photographs of the Philosophers' Colonnade in the new Warsaw University Library.

There are sculptures of four prominent representatives of the Lvov-Warsaw School: Twardowski, Łukasiewicz, Tarski, and Leśniewski, by a distinguished Polish sculptor, Adam Myjak. I assisted in the creation of these sculptures: I prepared a justification for the choice of these particular individuals for the colonnade for the decision makers at the University of Warsaw, I provided photographic materials for the sculptor and I selected the quotations from their work which are presented on the columns.

The quotation from Leśniewski comes from *Foundations of the General Theory of Sets* and begins like this:

I admit freely that some of my theorems . . . could shock the “mathematical intuitions” of various more or less sensitive thinkers when contemplating the elegance of certain theoretical constructions, regardless of whether those constructions contribute in any degree whatsoever towards the scientific capturing of reality, or whether they merely serve to justify the dominant habits of our epoch, which distinguish themselves by a high degree of inertia. However, I cannot deny myself the pleasure of stating the fact [that I tried to write my work so that it would not concern exclusively some kind of “free creations” of various more or less Dedekindian creative souls; it follows hence], that I cared more about the fact that my theorems, while possessing as exact form as possible, would harmonize with the “common sense”. [Leśniewski 1916/1992.I: 130]

I attempted to minimize editorial corrections in texts which are not my own. Any omissions and interpolations are meticulously marked with the ellipsis:

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I also minimize footnotes where possible. If it is not otherwise stated, all footnotes are mine.

11

I may say, not without a certain degree of pride, that the present book is the most comprehensive compendium on the life and personality of Stanisław Leśniewski thus far.

However, I concede that some sources which I have not located may still be found.

Frankly speaking, I would be glad if this were the case.

The greater beam of light is shed on this extraordinary mind, the better.

Jacek Jadacki

Warsaw, on the centenary of taking over
the Chair of Philosophy of Mathematics
at the University of Warsaw
by Stanisław Leśniewski.

Chapter I

Life Story — Personality — *Milieu*

1 AUTOBIOGRAPHY AND CALENDARIUM

1.1 *Autobiography*

Stanisław Leśniewski, “Autobiografia” [*Autobiography*].
Stanisław Leśniewski, *Dzieła zebrane* [*Collected Works*]. Vol. II.
Warszawa 2015, Wydawnictwo Naukowe Semper, pp. 779-780.

I was born on 28 March 1886 in Serpukhov in the Moscow Governorate, as a son of Izydor, a communications engineer, and Helena née Palczewska. In 1896, I started the first grade of primary school in Troitskosavsk (near Kyakhta and Maimacheng) in Siberia. After graduating Third Grade, I transferred to the Third Grade of an eight-grade philological gymnasium in Irkutsk. During the 1903/1904 schoolyear, I left school in Seventh Grade, and at the end of the schoolyear, I passed the final exam in this middle school as an extramural student. In the academic years: 1904/1905–1911/1912, I undertook university courses in Leipzig, Zürich, Heidelberg, St. Petersburg, Munich and Lvov. After passing the PhD exam in philosophy in 1912, and an

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additional one in mathematics at the Lvov University, I obtained a PhD in Philosophy. In the schoolyear of 1913/1914, I taught mathematics in Ms. Tegazzo-Chmielewska's boarding school for girls in Warsaw and Ms. Pawlicka's school in Klarysewo. In the years 1915–1918, I taught mathematics in Polish schools in Moscow. From June 1918, I was a clerk's assistant in the Department of Higher Education in the Ministry of Religious Affairs and Public Education (Poland) for about a year. At the same time, I taught logic in Ms. Jakubowska's, Ms. Kowalczykówna's, Ms. Platerówna's, and Ms. Sierpińska's schools, as well as in the Courses of the Catholic Association of Polish Women. Since 1 October 1919, I have held the position of Associate Professor in the philosophy of mathematics at the University of Warsaw.

Warsaw, 23 March 1935.

*Stanisław Leśniewski.*²

1.2 *Calendarium*

1886

On 28 March (16 March according to the old calendar), Stanisław Kazimierz Leśniewski is born in Serpukhov (south of Moscow), son of Izidor Wincenty Leśniewski (1863–1915), coat of arms Gryf, an engineer employed in the construction of the trans-Siberian railway, and Helena Palczewska. In the 19th century, huge textile mills opened in Serpukhov; their owner, Anna Marayeva, was an art collector whose collection constitutes the main part of the exposition at the Museum of History and Art in Serpukhov, which is housed in Marayeva's palace, built in 1896. ■ Leśniewski is christened in St. Stanislaus' Church in St. Petersburg. ■ After his mother's death, his father remarries in about 1890, marrying Łucja Katarzyna Kierbedź (1862–1950), Stanisław Kierbedź's niece. Apparently, his father's

² The autobiography includes a list of works published by 1932, written by hand on official letterhead of the University of Warsaw.

second wife contributed to spoiling relations between the son from the first marriage and the father. ■ Stanisław's half-siblings are: Witold (1892–1918), Wacława (1894–1916), Wanda (1896–1928), Wincenty (1899–1920), Olgierd (1901–1920), and Czesław (1903–1976). ■ His cousin was Helena Leśniewska (1898–1993), his uncle's daughter, known as Mother Pia of the Ursuline Sisters.

1896

He joins the Realschule in Troitskosavsk (presently, Kyakhta in Buryatia).

1899

He graduates from Fourth Grade and transfers to the Third Grade of the Irkutsk Classical Male Gymnasium, the oldest (founded in 1803) and the best 19th century middle school in Siberia.

1903

He leaves Seventh Grade of the Gymnasium.

1904

He obtains an extramural secondary school certificate from that same Gymnasium.

1904–1906

During his studies in Leipzig University (17 Oct 1904 – 30 Apr 1906), he enrolls in the following classes: first, inorganic chemistry (Beckmann), human anatomy (Spalteholz and Fick) and contemporary social-economic history (Lamprecht), then psychology (Wundt) and political economy (Bücher), and finally, the theory of knowledge (Volkelt). ■ In Leipzig, he lives respectively in Braustraße 3, Braustraße 4, and Albertstraße 16.³ ■ In the years

³ A. Betti's findings [2004].

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1905–1915, his father's family lives in Tsarskoye Selo near St. Petersburg, in 15 Cerkevnaya St., Apt 3. Tsarskoye Selo was the Tsars' residence near St. Petersburg. Since the mid-19th century (after building the rail line), the aristocracy and wealthy townspeople began to settle in the city around the residence, the most modern city in Russia at the time (electrification, sewage system, water supply system, *etc.*). Many Poles also settled there; their religious life focused around John the Baptist Church. ■ During one of his stays at his father's house, he meets Leon Petrażycki in St. Petersburg.

1906

He studies psychology at the University in Zurich (23 March — 16 Dec). He lives in Fehrenstraße 6/III (at Ms. Hugentobler-Friedli).

1907–1909

He spends the following two years studying at the University in Heidelberg.

1909/1910

He joins Ludwig-Maximilians-Universität in Munich, where he takes part in classes in the introduction to logic and the theory of knowledge (Cornelius and Pfänder) as well as the philosophy of mathematics (Geiger). ■ In Munich, he lives in Belgradstraße 33/II.⁴ ■ He reads Marty's book *Studies on the Foundation of General Grammar and the Philosophy of Language* [1908], which he intends to translate to Polish.

1910

He arrives in Lvov, where he takes part in Kazimierz Twardowski and Jan Łukasiewicz's lectures, among others. ■ He becomes a member of the Polish Psychological Society in Warsaw.

⁴ As above.

1911

He visits Paris.

1912

23 July — he obtains a PhD at the Lvov University, based on his dissertation entitled “A Contribution to the Analysis of Existential Sentences”; the PhD exam includes philosophy and mathematics as additional subjects; his examiners are Kazimierz Twardowski and Mściśław Wartenberg (in philosophy), and Józef Pużyna and Waław Sierpiński (in mathematics).⁵ ■ He receives a reward from the Philosophical Association of the University Reading Room in Lvov for the academic year of 1911/1912 for two lectures, “On the Principle of the Excluded Middle”. ■ He meets Łukasiewicz in person. ■ He aims to apply for a Docent position in Russia, and therefore, he prepares for the exams necessary for obtaining an MA in the Department of History at St. Petersburg University. He spends the winter of 1912/1913 with his future wife and mother-in-law in San Remo (Italy).

1913

He marries Zofia née Prewysz-Kwinto (1893–1958) who hailed from an old landowning family (supposedly of Spanish origin), Drya coat of arms, from Kimborciszki in Lithuania. The wedding takes place in the nearby church in Smółwy. A vivid description of the wedding party by Janina Jankowska-Orynżyna was preserved. ■ He travels across Europe (including Switzerland and Berlin); he also travels to St. Petersburg again, where he stays in Vladimirsky Prospekt, the place of the main Polish institutions in the capital of the Russian Empire are located.⁶ ■ In the second half of the year, he travels to Warsaw, where

⁵ Conceivably, Leśniewski was related to Sierpiński, whose wife, Anna Kazimiera (1888–1961), was of the Leśniewski family; her ancestral property was Poznańów near Witebsk. Unfortunately, I did not manage to confirm this hypothesis.

⁶ A. Betti’s findings [2004].

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he initially stays on 8 Nowowiejska street. ■ He teaches mathematics at boarding schools for girls owned by Sabina Tegazzo-Chmielewska in Warsaw and Wanda Pawlicka in the nearby Klarysew. ■ He becomes a member of the Polish Philosophical Association in Lvov. ■ He is a tutor in the Prewysz-Kwinto family in Kimborciszki and the nearby Lipniszki. He commutes to Kimborciszki in an express train; thanks to his father's connections, he is able to get off in Turmont, near Kimborciszki, although according to the schedule, the train should not stop until Dźwińsk; this inspired universal admiration.

1914

He stays in Kimborciszki (until summer 1915). ■ After the outbreak of World War I, he leaves for Moscow.

1915–1918

He teaches mathematics (algebra) in gymnasia of the Polish Committee in Moscow: Władysław Giżycki's coeducational school and Anna Jakubowska's school for girls.⁷ One of his students in Giżycki's Gymnasium was the later poet, Konstanty Ildefons Gałczyński. As another student of Giżycki's Gymnasium recalled, in the "Lion's" classes (as Leśniewski was called by his students), there was total anarchy: "Everybody could do what they wanted" [Hoppe 1961: 49]. ■ He lectures in Higher Scientific Courses for Teachers in Moscow.⁸ ■ He becomes a member of Polish Teachers Association⁹ and the Polish Scientific Association in Moscow;¹⁰ he belongs to the Association's Mathematical Section, the president of which was Waław Sierpiński [Świętoławska-Żółkiewska 1988: 108-109]. ■ He

⁷ The 1st Polish Gymnasium was established by her on behalf of the Central Civic Committee. According to E. Romer, he was a teacher at E.A. Rontaler's gymnasium in Warsaw in 1915. Cf. [Romer 1995.I: 211].

⁸ They operated in the years 1916–1918.

⁹ The Polish Teachers Association operated in the years 1906–1919.

¹⁰ The Polish Scientific Association was founded on 14 November 1915; it operated until 1918.

participates in the works of the Moscow Mathematical Association, which he praises for having in its headquarters the best blackboard known to him, as it encircles the whole room. ■ He makes the acquaintance of Wojciech Świątosławski, a chemist, later a politician. ■ He receives exclusive rights to translate Edmund Husserl's *Logical Investigations* [1900–1901] into Polish¹¹ (this translation never came to pass).

1918

On 13 April, he participates in a heated discussion on Wojciech Świątosławski's paper, "The Present Situation of Polish Education in Moscow" [Świątosławska-Żółkiewska 1988: 117]. ■ At the end of May or the beginning of June, he leaves Moscow, together with his wife, and comes to Warsaw.¹² ■ In Warsaw, he initially lives on 24 Piękna Street. ■ He becomes a member of the Warsaw Philosophical Institute. ■ From 11 June 1918 to 3 July 1919, he is a clerk's assistant in the Department of Higher Education at the Ministry of Religious Affairs and Public Education. ■ He teaches logic in Warsaw in schools for girls owned by Anna Jakubowska, Jadwiga Kowalczykówna, Cecylia Plater-Zyberkówna [Palczewska & Krasnowolska (eds.) 1987: 486], and Zofia Stryjeńska, as well as in

¹¹ A. Rosenblum, E. Husserl's student, mentions it.

¹² The following fragment from "Scientific Autobiography" by W. Świątosławski gives us an idea of what this journey looked like: "[After the Bolshevik uprising], whoever could, began to flee [from Moscow] through Orsza-Mińsk. Those leaving were mostly German and Austrian citizens, and those who could pretend to be so. Next, Polish repatriates moved. . . . At the beginning of May, or perhaps already in April, I raised the issue of sending a deputation from the Education Department to Minister Ponikowski. . . . The Committee [that is, the Polish Committee of Assistance to Victims of War] concurred with me, although one must admit that at the time, the word "deputation" was overused and these deputies usually wanted to cross the border of German occupation and thus get into their homeland. . . . On 25 May [19]18, we left for Poland, got through the border in Orsza, having bribed Bolshevik and German guards, heavily demoralized at that time, and on 7 June we arrived in Warsaw". Cf. [Świątosławski 1985: 530-532]. It is possible that Leśniewski traveled on the same train.

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courses in the Catholic Association of Polish Women. ■ 7 September — The Philosophical Department of the University of Warsaw hires him as a “substitute” teacher to have classes in the philosophy of mathematics (2 hours of lectures and 2 hours of classes a week). ■ 14 December — he presents two papers: “Foundations of the General Theory of Sets” and “The Critique of the Logical Principle of Excluded Middle” as the basis for his habilitation dissertation at the Lvov University.

1919

8 March — Twardowski sends him a letter with a message that the Commission of the Philosophical Department at the Lvov University composed of Marcin Ernst (dean), Waław Sierpiński (reviewer), Mścisław Wartenberg, and Kazimierz Twardowski — with Wartenberg’s objections — suggests transferring the habilitation to the University of Warsaw, since both the interested party and the reviewer are in Warsaw. In the end, the habilitation does not come about. ■ 30 June — The Department of Philosophy at the University of Warsaw adopts a resolution to appoint him *primo et unico loco* to the newly created Department of Philosophy of Mathematics. ■ 13 August — he is appointed associate professor of philosophy of mathematics at the University of Warsaw, starting from 1 October. ■ 1 October — he becomes an associate professor of the philosophy of mathematics at the University of Warsaw.¹³ ■ One of the first participants in his classes in basic mathematics is Alfred Tarski.

1919–1921

During the Polish-Russian war, he works in the Military Office as a decoder of soviet telegrams for the Bureau of Ciphers of the General Staff of Polish Army.

¹³ Trivia fact: Leśniewski’s salary in 1934 was 882.08 zł a month (net).

1920

20 March — he receives from the Ministry of Religious Affairs and Public Education a one-time cost-of-living allowance. ■ 20 July — as the press reports, together with Łukasiewicz and Tadeusz Kotarbiński, he reports being “at the Commander-in-Chief’s disposal with the request to allocate him . . . to active military service at the front”.¹⁴ ■ Leśniewski’s half-brother, Olgierd, dies in the Polish-Russian war. ■ Together with Łukasiewicz, he becomes a member of the Editorial Committee of the magazine *Fundamenta Mathematicae* (both resign from membership in the Editorial Committee in early 1928). ■ In December, he stays in Zakopane with his wife for health reasons.

1921

He is a member of the jury for *Przegląd Filozoficzny* in a competition for a dissertation on general subjects. There was only one entry (“The Issue of General Subjects in Philosophy and an Attempt to Resolve It”); the jury did not award it with the prize.

1922

He moves into an apartment in the Professors House in 12 Brzozowa street (apt. 8). His neighbors are, among others, the Kotarbińskis (apt. 15), the Łukasiewicz (apt. 17), and the Witwickis (apt. 20), all of them being Twardowski’s former students.

1923

He leaves for Zakopane with his wife in the summer. ■ He obtains a sabbatical for the academic year of 1923/1924.

1924

21 March — the advancement of his only PhD student, Alfred Tarski, takes place, based on the paper “On the Primitive Term of Logistics”;

¹⁴ Cf. [“W obronie Rzeczypospolitej” 1920]. The latter information was not confirmed.

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the reviewers were Łukasiewicz and Sierpiński. ■ He travels for a few months in France and Italy, where he meets Witwicki. In Paris, he works at the National Library, and in Rome, he works at the Royal Library.

1925

Based on his paper, “On Finite Sets” [Tarski 1924], Tarski obtains *veniam legendi* on the philosophy of mathematics.

1925–1927

Czesław, “beloved brother” (who later becomes an economist), is among his students.

1927

He takes part in the Second Polish Philosophical Congress (23–28 September), where he gives three lectures on his systems.

1928/1929

In the second trimester, he obtains a sabbatical.

1929

30 April — he is a witness at the wedding of Jan Łukasiewicz and Regina Barwińska in the St. Alexander Church in Warsaw, representing the groom. ■ He spends the summer in Piwniczna, near Nowy Sącz.

1931

According to Walter Auerbach, Rudolf Carnap “includes Leśniewski’s and Tarski’s works in the program of his classes”. He spends the summer in Zakopane, together with Tadeusz Kotarbiński, among others.

1932

He spends the summer in Zakopane, together with Władysław Witwicki's wife, among others. He hikes to Morskie Oko through Zawrat and Świstówka.

1933

In May, Willard van Orman Quine takes part in his classes. He spends his summer in Zakopane, where he rents a cabin in Gubałówka (as usual). He hikes to Kopa Magury together with Waław Pożaryski.

1934

He spends the summer in Wisła-Głębcze, in the company of the Kotarbińskis, among others. ■ 12 January — he is selected for the 5th salary group, starting from 1 February.

1935

He spends the summer in Zakopane. ■ 27 September — he receives the nomination to full professor from the President of Poland. ■ He obtains a sabbatical for the 1935/1936 academic year.

1936

5 March — he leaves (without his wife) for a two-month-long trip around Europe; he sees Vienna, Dresden, Leipzig, Munich, Nuremberg, and other cities. ■ He spends the summer months (May to September) in Kimborciszki. ■ 27 September — he receives the position of full professor at the University of Warsaw.

1938

14 March — he receives a passport to go to Belgium, France and Germany. ■ In the spring he presents his lectures on Frege at the University of Münster, invited by a German logician, Heinrich

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Scholz. ■ 21 December — he takes part at a party at Łukasiewicz's apartment, to celebrate obtaining by Łukasiewicz a *honoris causa* PhD degree of the University of Münster. Among others, Scholz is also present.

1939

He becomes the Deputy Dean of the Mathematical-Natural Faculty at the University of Warsaw. ■ 13 May — he dies in Warsaw of thyroid cancer, right after an unsuccessful surgery at St. Joseph's Hospital (at the corner of Emilia Plater St. and Hoża St.). He is buried in the Old Powązki Cemetery. The grave (quarter 339, row 5, grave 5) has a common tombstone with Ewa z Koskowskich Miłoszowa Kotarbińska (1858–1939), the philosopher's mother, and Kazimierz Kotarbiński (1919–1938), her son. ■ All of his numerous manuscripts are handed over by his wife to Bolesław Sobociński.

1940–1942

Mieczysław Choynowski, one of the participants in Leśniewski's lectures, assembles notes of Leśniewski's students (among others, his own, Billich's, Drewnowski's, Hiż's, Kreczmar's, Lejewski's, Mostowski's, and Sobociński's) and makes exact copies of them.

1944

During the Warsaw Uprising, Leśniewski's apartment was bombed and all of his manuscripts burned. A similar fate befell part of the copies of the notes made by Choynowski. Some of Leśniewski's manuscripts were partly recreated by Sobociński and published in [Sobociński 1949–1950], [Sobociński 1954] and in [Sobociński 1956b]. The surviving part of Choynowski's notes was published in English by Srzednicki and Stachniak [Srzednicki & Stachniak (eds.) 1988].

2 PERSONALITY

Leśniewski had a low voice. He was broad-shouldered; suffered from an overactive thyroid and was already obese in his twenties. He was a chain smoker, coffee lover, and an avid consumer of chocolate. (He would say jokingly, “mereology was born out of chocolate”.) He usually worked in a café, and at home, there was always a huge jug of coffee standing in front of him, which he drank in great quantities. His portrait, painted by Władysław Witwicki, hung in his study over his favorite armchair (a photograph documenting this fact was preserved). He kept the great genealogical table of the Leśniewski family.

He combined pedantry with... laziness.

He was very talkative and had “a tendency to lead endless discussions” [Kotarbiński 1958b: 295].

Having gained extensive experience as a gymnasium teacher, he complained about the level of high school education. Sierpiński stressed his outstanding pedagogical talent: “His explanations are clear and accessible; he introduces the students to rigorous scientific reasoning” [Sierpiński 1919: 50]. “He lectured with pleasure and the greatest ease”, Kotarbiński confirms [Kotarbiński 1958b: 302]. There is an anecdote that he lectured so clearly that Quine, who listened to several of Leśniewski’s lectures in Warsaw, was able to understand them, although... he could not speak Polish at all. During his university lectures, he was always cracking jokes. He said of Łukasiewicz’s many-valued logic that it is unacceptable, but... he regrets not having come up with it himself. He had his private, playful logical terminology, which he used with relish in his lectures (*e.g.*, he called the dependent variable “objątko” [hugging]). Leśniewski’s friend and contemporary, Kotarbiński, said of Leśniewski once that “he was the only man of genius who fate allowed ... [him] to encounter and stay in almost daily contact with” [Kotarbiński 1958b: 307]. Łukasiewicz wrote of him:

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Professor Leśniewski has an outstandingly creative mind. The fact that he created three great deduction theories, which had not existed in this form before his time, is the best proof of it. . . .

What is rare and extremely characteristic of him, is that Professor Leśniewski combines great creative skill with an exceedingly precise, rigorous, sharp, and critical mind. One may be certain there are no mistakes in his deductive reasoning. [Łukasiewicz 1934: 39]

He was a relentless critic. Łukasiewicz wrote: "His critical remarks are usually crushing, *e.g.*, his remarks concerning the theory of deduction in *Principia* [Whitehead & Russell 1910–1913]". Czesław Znamierowski, who encountered Leśniewski in Leipzig, recalled years later:

After every lecture of the contemporary celebrities, he demonstrated to them in a few questions and remarks how vague and ambiguous the authors' arguments were. [Znamierowski 1967: 36]

This bothered Wartenberg, who wrote to Twardowski about Leśniewski in harsh words:

He is a juggler and a conjurer, who turns everything he touches upside down with his devious dialectics, which he perceives as his original streak and teases others with it.¹⁵

Leon Chwistek was very critical towards Leśniewski. Also, Twardowski himself had certain objections to the criticism practiced by Leśniewski. He wrote:

Those, who act according to Leśniewski's formula, very arbitrarily demand analysis where it is convenient for them. However, when someone demands it from them where it is not convenient, they refer to "intuition". Yet, [when] an opponent in a discussion also wishes to refer to «intuition»

¹⁵ Cf. in this volume, p. 229.

at some point, they respond: “We do not understand that which, according to you, is intuitively given”. [Twardowski 1997.II: 149]

He was a man of extremes. Kotarbiński described it in the following way:

It was either extreme “yes” or extreme “no”, aversion to half measures, loathing of pettiness, affinity to sudden passion, violent changes, radical breaking of friendly terms, passionate antipathy towards insincere feelings, adherence to principles and a lack of tolerance for exceptions. [Kotarbiński 1958b: 295]

This was reflected in his political views. They evolved from extreme leftist (he was supposedly a member of the Social Democracy of the Kingdom of Poland and Lithuania during his stay in Moscow), to socialist tinged with Piłsudski’s views (since the Polish-Russian war) and far right (during The Sanation).

He was considered anti-Semite in some circles. According to one of his students, Henryk Hiż, if he was anti-Semitic, then he was a “late” one (that is, he became one by the end of his life), and not a “doctrinal” one, but rather an “emotional” and “selective” one. He treated some people of Jewish descent with great aversion, but some, for instance Alfred Tarski, who was not, N.B., an easy person to collaborate with, he valued greatly.

He was called “Staś-the-professor” in the family on his father’s side, to distinguish him from his cousin, a son of his uncle, Staś-the-captain (1897–1966), who was a sailor. A favorite dish in the home of Staś-the-professor’s parents was the Lithuanian *pierogi* (a dumpling stuffed with fresh cabbage stewed with onion and hard-boiled eggs).

Leśniewski’s marriage was successful, even though they did not have children; he was a womanizer, and some of those closest to him believed his wife to be “dull”. Leśniewski himself addressed her as “wifey”, and she called him “Stasio”. They treated each other with utmost care and affection. He dedicated *Foundations of the General Theory of Sets* [Leśniewski 1916] to his wife. The Leśniewskis were music lovers. They

spent their summer holidays in the Tatra Mountains. They loved them and knew them well, especially the Western Tatras, although they only walked the paths and never climbed. They usually rented a mountain hut on Gubałówka in Zakopane; they also went to Piwniczna and Wisła-Głębcze.

3 WRITINGS, PAPERS AND CLASSES

3.1 Writings

- 1911a Głos w dyskusji nad odczytem Ignacego Halperna “Metafizyka, dzieje jej nazwy, pojęć, prądów” [The Voice in the Discussion Concerning Ignacy Halpern’s Lecture “Metaphysics, the History of Its Name, Concepts and Trends”], *Ruch Filozoficzny* vol. I, No. 1, p. 13b. Cf. [Leśniewski 2015.II: 773].
- 1911b Problemat istnienia w oświeceniu norm gramatycznych [The Problem of Existence in the Light of Grammar Norms], *Ruch Filozoficzny* vol. I, No. 6, pp. 133a-b. Cf. [Leśniewski 2015.II: 767-768].
- 1911c Przyczynek do analizy zdań egzystencjalnych [A Contribution to the Analysis of Existential Propositions], *Przegląd Filozoficzny* vol. XIV, No. 3, pp. 329-345. The same in: *Filozofia Nauki* vol. II (1994), No. 1, pp. 117-134. Cf. [Leśniewski 2015.I: 15-31]. English translation: [Leśniewski 1992.I: 1-19].
- 1911d Zagadnienie przedmiotów sprzecznych a teoria języka [The Problem of Contradictory Objects and the Theory of Language]. *Ruch Filozoficzny* vol. I, No. 10, p. 222a-b. Cf. [Leśniewski 2015. II: 769].
- 1912 Próba dowodu ontologicznej zasady sprzeczności [An Attempt at a Proof of the Ontological Principle of Contradiction], *Przegląd Filozoficzny* vol. XV, No. 2, pp. 202-226. The same in: *Filozofia*

Nauki vol. II (1994), No. 2, pp. 117-147. Cf. [Leśniewski 2015.I: 32-56]. English translation: [Leśniewski 1992.I: 20-46].

1912–1917

Listy Stanisława Leśniewskiego do Kazimierza Twardowskiego [Letters of Stanisław Leśniewski to Kazimierz Twardowski]. [Leśniewski 1992.II: 781-801]

1913a Czy prawda jest tylko wieczna czy też i wieczna i odwieczna? [Is All Truth Only True Eternally or Is It Also True Without a Beginning?] *Nowe Tory* vol. VIII, No. 10, pp. 493-528. The same in: *Filozofia Nauki* vol. VIII (2000), No. 2, pp. 135-156. Cf. [Leśniewski 2015.I: 147-182]. English translation: [Leśniewski 1992.I: 86-114].

1913b Krytyka logicznej zasady wyłączonego środka [The Critique of the Logical Principle of Excluded Middle], *Przegląd Filozoficzny* vol. XVI, No. 2-3, pp. 315-352. The same in: *Filozofia Nauki* vol. VIII (2000), No. 1, pp. 137-169. Cf. [Leśniewski 2015.I: 183-222]. English translation: [Leśniewski 1992.I: 47-85].

1913c *Логические рассуждения* [Logical Considerations]. Petersburg 1913, Smolinski, pp. IV, 88. Cf. [Leśniewski 2015.I: 57-146].

1913d Problemat tworzenia prawdy [The Problem of Creating Truth], *Ruch Filozoficzny* vol. III, No. 5, p. 125b. Cf. [Leśniewski 2015.I: 183-222].

1914a Czy klasa klas nie podporządkowanych sobie jest podporządkowana sobie [Is the Class of Classes not Subordinated to Themselves, Subordinated to Itself], *Przegląd Filozoficzny* vol. XVII, No. I, pp. 63-75. Cf. [Leśniewski 2015.I: 223-235]. English translation: [Leśniewski 1992.I: 115-128].

1914b O pewnej własności wszystkich klas (autoreferat) [On Certain Property of All Classes (summary)], *Ruch Filozoficzny* vol. IV, No. 3, pp. 79b-80a. Cf. [Leśniewski 2015.II: 770-772].

1914c Przyczynek do krytyki teorii mnogości (autoreferat) [A Contribution to the Critique of the Set Theory (Summary)], *Ruch*

- Filozoficzny* vol. IV, No. 6, p. 161b. Cf. [Leśniewski 2015.II: 771-772].
- 1914d Teoria mnogości na “podstawach filozoficznych” B. Bornsteina [B. Bornstein’s Set Theory on “Philosophical Foundations”], *Przegląd Filozoficzny* vol. XVII, No. 4, pp. 488-507. The same as “O podstawach filozoficznych teorii mnogości” [On the Philosophical Foundations of the Set Theory] in: *Filozofia Nauki* vol. VI (1998), No. 2, pp. 123-139. Cf. [Leśniewski 2015.I: 236-255].
- 1916 *Podstawy ogólnej teorii mnogości* [Foundations of the General Theory of Sets]. I. Prace Polskiego Koła Naukowego w Moskwie. Sekcja Matematyczno-Przyrodnicza. No. 2. Moskwa 1916, Druk. A.P. Popławskiego, pp: 42. The same in: *Filozofia Nauki*, vol. VI (1998), No. 3-4, pp. 173-208. Cf. [Leśniewski 2015.I: 256-294]. English translation: [Leśniewski 1992.I: 129-173].
- 1919–1936
Listy Stanisława Leśniewskiego do Ministerstwa Wyznań Religijnych i Oświecenia Publicznego [Letters of Stanisław Leśniewski to the Ministry of Religious Affairs and Public Education]. [Leśniewski 2015.II: 805-813]
- 1920 Głos w dyskusji nad odczytem T. Kotarbińskiego „Czy wydziały filozoficzne uniwersytetów mają być wydziałami nauczycielskimi?” [The Voice in the Discussion Concerning T. Kotarbiński’s Lecture “Should the Philosophy Faculties of Universities be Tutorial Faculties?”], *Nauka Polska* vol. III, p. 51. Cf. [Leśniewski 2015.II: 774].
- 1924 Głos w dyskusji nad odczytem T. Kotarbińskiego „Prawdziwość i fałszywość definicji” [The Voice in the Discussion Concerning T. Kotarbiński’s Lecture “Truthfulness and Falsehood of Definitions”], *Przegląd Filozoficzny* vol. XXVII, No. 3-4, p. 264. Cf. [Leśniewski 2015.II: 775].
- 1925 Głos w dyskusji nad odczytem J. Łukasiewicza „O pewnym sposobie pojmowania teorii dedukcji” [The Voice in the

- Discussion Concerning J. Łukasiewicz's Lecture "On a Certain Way of Understanding the Theory of Deduction"], *Przegląd Filozoficzny* vol. XXVIII, No. 1-2, pp. 135-136. Cf. [Leśniewski 2015.II: 775-776].
- 1926 List Stanisława Leśniewskiego do brata — Czesława Leśniewskiego [Letter of Stanisław Leśniewski to his Brother, Czesław Leśniewskiego]. [Leśniewski 2015.II: 803-805]
- 1927–1931 O podstawach matematyki [On the Foundations of Mathematics]. *Przegląd Filozoficzny* vol. XXX (1927), No. 2-3, pp. 164-206; vol. XXXI (1928), No. 3, pp. 261-291; vol. XXXII (1929), No. 1-2, pp. 60-101; vol. XXXIII (1930), No. 1-2, pp. 77-105; vol. XXXIV (1931), No. 2-3, pp. 142-170. Cf. [Leśniewski 2015.I: 295-468]. English translation: [Leśniewski 1992.I: 174-382].
- 1928 O podstawach teorii klas. O podstawach ontologii. O podstawach logistyki [On the Foundations of Class Theory. On the Foundations of Ontology. On the Foundations of Logistics]. *Przegląd Filozoficzny* vol. XXXI, No. 1-2, pp. 160-161.
- 1929a Über Funktionen, deren Felder Gruppen mit Rücksicht auf diese Funktionen sind [On Functions Whose Fields, with Respect to These Functions, are Groups], *Fundamenta Mathematicae* vol. XIII, pp. 319-332. Cf. [Leśniewski 2015.II: 475-488]. English translation: [Leśniewski 1992.II: 383-398].
- 1929b Grundzüge eines neuen System der Grundlagen der Mathematik. Einleitung und §§1-11 [Fundamentals of a New System of the Foundations of Mathematics. Introduction and §§1-11], *Fundamenta Mathematicae* vol. XIV (1929), pp. 1-81. Cf. [Leśniewski 2015.II: 489-569]. English translation: [Leśniewski 1992.II: 410-492].
- 1929c Über Funktionen, deren Felder Abelsche Gruppen in bezug auf diese Funktionen sind [On Functions Whose Fields, with Respect to These Functions, are Abelian Groups], *Fundamenta*

- Mathematicae* vol. XIV, pp. 242-251. Cf. [Leśniewski 2015.II: 714-723]. English translation: [Leśniewski 1992.II: 399-409].
- 1930 Über die Grundlagen der Ontologie [On the Foundations of Ontology], *Sprawozdania z posiedzeń Towarzystwa Naukowego Warszawskiego*. Wydział III, vol. XXIII (1930), pp. 111-132. Cf. [Leśniewski 2015.II: 724-745]. English translation: [Leśniewski 1992.II: 606-628].
- 1931 Über Definitionen in der sogenannten Theorie der Deduktion [On Definitions in the So-Called Theory of Deduction], *Sprawozdania z posiedzeń Towarzystwa Naukowego Warszawskiego*, Wydział III, vol. XXIV, pp. 289-309. Cf. [Leśniewski 2015.II: 746-766]. Polish version as: O definicjach w tak zwanej teorii dedukcji [On Definitions in the So-Called Theory of Deduction], *Filozofia Nauki* vol. IX (2001), No. 3, pp. 165-179. English translation: [Leśniewski 1992.II: 629-648].
- 1934 Głos w dyskusji nad odczytem J. Łukasiewicza „Z dziejów metody naukowej” [The Voice in the Discussion Concerning J. Łukasiewicz’s Lecture “From the History of the Scientific Method”], *Nauka Polska* vol. XIX, p. 407. Cf. [Leśniewski 2015.II: 776-777].
- 1935 Autobiografia [Autobiography]. Cf. [Leśniewski 2015.II: 779-780].
- 1938a Einleitende Bemerkungen zur Fortsetzung meiner Mitteilung u. d. T. „Grundzüge eines neuen System der Grundlagen der Mathematik” [Introductory Remarks to the Continuation of My Article “Grundzüge einse neuen System der Grundlagen der mathematic”]. *Collectanea Logica* vol. I, pp. 1-60. Cf. [Leśniewski 2015.II: 570-629]. English translation: [Leśniewski 1992.I: 649-710].
- 1938b Grundzüge eines neuen System der Grundlagen der Mathematik. §12 [Fundamentals of a New System of the Foundations of Mathematics §12]. *Collectanea Logica* vol. I (1938), pp. 61-144. Cf. [Leśniewski 2015.II: 630-713]. English translation: [Leśniewski 492-605].

- 1939 Głos w dyskusji nad odczytem J. Łukasiewicza “Geneza logiki trójwartościowej” [The Voice in the Discussion Concerning J. Łukasiewicz’s Lecture “The Genesis of Three-Valued Logic”], *Nauka Polska* vol. XXIV, pp. 218-220. The same in: *Filozofia Nauki* vol. II (1994), No. 3-4: 235-237. Cf. [Leśniewski 2015.II: 777-778].
- 1992 *Collected Works*. Vols. I-II. Dordrecht — Warszawa, Kluwer Academic Publishers — PWN.
- 2015 *Pisma zebrane [Collected Works]*. Vols. I-II. Warszawa, Wydawnictwo Naukowe Semper.

3.2 *Papers and contributions to discussions*

- 28.XI.1910 — The voice in the discussion concerning Ignacy Halpern’s lecture “Metaphysics, the history of its name, concepts and trends” (Polish Psychological Society, Warszawa — hereinafter referred to as: PPS).
- 12.V.1911 — Paper “The problem of existence in the norms of grammar norms” (PPS).
- 23.X.1911 — Paper “The problem of contradictory objects and the theory of language” (PPS).
- 1911/1912 — Two papers “On the logical principles of excluded middle” (Philosophy Circle of the Academic Reading Room in Lvov).
- 25.IV.1913 — Lecture “The problem of creating truth” (PPS).
- XI/XII.1913 — Six public papers “Paradoxes of logic and mathematics: 1. The principle of contradiction in contemporary logic; 2. Paradoxes of logic and mathematics; 3. Solution on the paradoxes of (a) Meinong, (b) Nelson and Grelling; 4. Solution of the Berry paradox; 5. Solution of the Russell paradox; 6. Solution of the Epimenides paradox” (PPS).
- 26.I.1914 — Paper “On certain property of all classes (summary)” (PPS).
- 11.V.1914 — Paper “A contribution to the critique of the set theory (Summary)” (PPS).

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- 16/21.IV.1915 — Paper “A Contribution to the Critique of the Set Theory” (PPS).
- 3.III.1916 — Lecture “Problem of the Set Theory System Free from Contradictions” (Polish Science Club, Moscow — hereinafter referred to as: PSC)
- 19.IV.1916 — Lecture “Вопрос о аксиоматизации и фундаментальных определениях в теории множеств” [The Question of Axiomatization and Fundamental Definitions in the Set Theory] (Moscow Mathematical Association).
- 26.IX.1916 — Paper of W. Weryho’s Memory (PSC).
- 24.XII.1917 — Paper “Antinomy of Formal Sciences and Language” (PSC).
- 1918 — Papers “Relativism and Absolutism”, “Theory of Cognition or Metaphysics” and “On the Road to New Logic” (Polish Circle for Scientific Self-Help, Moscow). ■ Paper „Philosophical Foundations of Marxism” (Polish Democratic Club, Moscow). ■ The voice in the discussion concerning W. Świątosławski’s paper “Current Situation of Polish Education in Moscow” and on J. Grabowski’s paper “Participation of Teachers in the College of Education of the Department of Culture and Education at the Polish Commissariat”. ■ Co-report (to T. Kotarbiński’s paper) concerning Z. Kobjzyński’s work “On the Principle of Relativity in Symbolic Logic” (Warsaw Institute of Philosophy — hereinafter referred to as: WIPh).
- 9.VI.1918 — Paper “On a Certain Theorem of the Theory of Relations” (WIPh).¹⁶
- 28.VI.1918–25.VI.1919 — Comments to the first chapter of *Principia mathematica* by Whitehead and Russell (WIPh).
- 7.IV.1920 — The voice in the discussion concerning J. Łukasiewicz’s paper “Should the Philosophy Faculties of Universities be Tutorial Faculties?” (1st Congress of the Club of Science Studies of the J. Mianowski Fund in Warsaw — hereinafter referred to as: CSS —

¹⁶ According to Twardowski (*cf.* below, his letter to Czeżowski), Leśniewski’s paper concerned antinomies and “a general method to solve them”.

devoted to the issues of organizing and developping the Polish science).

- 10.I.1921 — Paper “On Foundations of Ontology” (PPS).
- 7.III.1921 — Paper “On the Degrees of Grammatical Functions” (WIPh).
- 10–13.V.1923 — The voices in the discussion concerning K. Ajdukiewicz’s paper “On the Application of the Criterion of Truth”, L. Chwistek’s “The Principles of the Pure Type Theory” and “The Application of the Constructive Method to the Theory of Knowledge” and R. Ingarden’s “Whether and How Can the Objectivity of the External Perception Be Demonstrated?” (1st Polish Philosophical Congress, Lvov).
- 12.XI.1923 — The voice concerning T. Kotarbiński’s paper “Truthfulness and Falsehood of Definitions” (PPh).
- 8.XII.1924 — The voice in the discussion concerning J. Łukasiewicz’s paper “On a Certain Way of Understanding the Theory of Deduction” (PPS).
- 23–28.IX.1927 — Papers “On the Foundations of the Theory of Classes”, “On the Foundations of Ontology” and “On the Foundations of Logistics” (2nd Polish Philosophical Congress, Warsaw).
- 18.II.1928 — The voice in the discussion concerning J. Łukasiewicz’s paper “On Definitions in the Theory of Deduction” (Warsaw Philosophical Society).
- 22.III.1930 — Paper “On Foundations of Ontology” (Warsaw Scientific Society).
- 11.III.1933 — The voice in the discussion concerning J. Łukasiewicz’s paper “From the History of the Scientific Method (CSS).
- 26.I.1938 — The voice in the discussion concerning J. Łukasiewicz’s paper “The Genesis of Three-Valued Logic” (CSS).

3.3 *Classes*

1919/1920

- Foundations of the theory of classes. Notes from a lecture concerning the theory of classes (from an unidentified academic

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year), made by Bolesław Sobociński and Jerzy Kreczmar, were published in English translation in [Srzednicki & Stachniak (eds.) 1988: 60-125].

- On Cantor's set theory.
- On the foundations of mathematics.

1920/1921

- Axiomatic foundations of mathematics.
- Foundations of arithmetic.
- On Cantor's set theory.
- On Zermelo's *Untersuchungen über die Grundlagen der Mengenlehre*.

1921/1922

- Foundations of arithmetic.
- Foundations of logistics.
- Foundations of three-dimensional Euclidean geometry in light of the new theory of classes.

1922/1923

- Foundations of arithmetic.
- Foundations of logistics.
- Foundations of three-dimensional Euclidean geometry in light of the new class theory.

1923/1924

- Foundations of logistics.
- Foundations of three-dimensional Euclidean geometry in the light of new class theory.

1924/1925

- Foundations of logistics.

1925/1926

- Foundations of logistics.
- Foundations of ontology. Notes from this lecture made by Jan Franciszek Drewnowski have been preserved (Catholic University of Lublin, Department of Logic).

1926/1927

- Axiom systems for group theory.
- Foundations of logistics.
- Foundations of ontology.
- Theoretical arithmetic.

1927/1928

- Axiom systems for group theory.
- Introduction to mathematics.

1928/1929

- Axiom systems for group theory.
- The problem of the primitive terms in the foundations of arithmetic. Notes from this lecture, made by Bolesław Sobociński, were published in English translation in [Srzednicki & Stachniak (eds.) 1988: 129-152].

1929/1930

- Directives of logistics and ontology.
- Elementary outline of ontology. Notes from this lecture were published in English translation in [Srzednicki & Stachniak (eds.) 1988: 30-58].

1930/1931

- An outline of elementary ontology.
- Chosen topics concerning the axiom systems of geometry.
- Directives of logistics and ontology.
- On the foundations of mathematics.
- On the foundations of the so-called theory of deduction.

1931/1932

- An outline of elementary ontology.
- Foundations of mathematics.
- Selected problems in foundations of logistics.

1932/1933

- Chosen topics concerning the axiom systems of geometry.

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- From the foundations of protothetic. Notes from this lecture, made by Mieczysław Choynowski, were published in English translation in [Szednicki & Stachniak (eds.) 1988: 4-28].

1933/1934

- Arithmetic of real numbers.
- Inductive definitions. Notes from this lecture were published in English translation in [Szednicki & Stachniak (eds.) 1988: 152-170].
- Foundations of protoethics.

1934/1935

- Antinomies of deductive sciences.
- Fundamental problems of mathematical logic.

1935/1936

- Foundations of sentential calculus.
- Main theorems in protoethics.
- Mereology.
- On many-valued systems of sentential calculus.

1936/1937

- Antinomies of semantics.
- Introduction to deductive sciences.
- On the foundations of mathematics.
- On the so-called many-valued logics.
- Sentential calculus.

1937/1938

- Antinomies of semantics.
- On the foundations of mathematics.
- Basic publications in the so-called many-valued logic.
- Traditional "formal logic" and traditional "set theory" on the grounds of ontology.

1938/1939

- An outline of ontology.
- An outline of protoethics.

- Axiom system of mereology.
- Philosophy of mathematics.

4 STUDENTS

Here is a list of people who were confirmed to have attended Leśniewski's lectures or classes. Dates of birth and death are the brackets. The period of attending classes (sometimes only approximate) follows the colon.

Jerzy Kazimierz Billich (1901–1933): 1927–1933
 Jerachmiel Bryman (1908–1944): 1928–1932
 Mieczysław Choynowski (1909–2001): 1932–1937
 Jan Drewnowski (1896–1978): 1921–1927
 Henryk Hiż (1917–2006): 1937–1939
 Janina Hosiasson-Lindenbaumowa (1899–1942): 1920–1925?
 Witold Andrzej Jabłoński (1901–1957): 1919–1923
 Stanisław Jaśkowski (1906–1965): 1927–1931
 Zygmunt Kobrzyński (1893–1944): 1919–1930
 Jerzy Michał Dionizy Kreczmar (1902–1985): 1922–1925
 Zbigniew Jan Kruszewski (1900–1925): 1920–1923; M.A.'s degree under the supervision of Leśniewski, based on the work *Ontology without Axioms* (1925)
 Czesław Lejewski (1913–2001): 1937–1939
 Czesław Leśniewski (1903–1976): 1925–1927
 Adolf Lindenbaum (1904–1944): 1922–1925
 Andrzej Stanisław Mostowski (1913–1975): 1934/1935
 Stanisław Muttermich (1912–1944): 1937–1939
 Kazimierz Olszewski (1894–?): 1920/1921
 Kazimierz Pasenkiewicz (1897–1995): 1921–1924, 1931–1933?
 Władysław Pożaryski (1910–2008): 1929–1934
 Mojżesz Presburger (1904–1943): 1923–1930

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Wacław Sadowski (1910–1983): 1938–1939?

Jan Salamucha (1903–1944): 1924–1926

Jerzy Słupecki (1904–1987): 1932–1939

Bolesław Sobociński (1906–1980): 1926–1930

Alfred Tarski (1902–1983): 1919–1924; Ph.D.'s degree under
the supervision of Leśniewski, based on the work *On the
Primitive Term of Logistic* (1924)

Mordechaj Wajsberg (1902–1942): 1922–1931

For a while, in the academic year of 1927/1928, Kazimierz Ajdukiewicz participated in Leśniewski's classes, and in May 1933, Willard van Orman Quine did.

After the war, Andrzej Mostowski took over the Department Chair from Leśniewski.

5 CURRICULUM VITAE OF CZESŁAW LEŚNIEWSKI, THE YOUNGEST BROTHER [OF STANISŁAW LEŚNIEWSKI]¹⁷

Private Archives of Ewa Malicka.

I was born on 16 October 1903 in Irkutsk (Siberia), where my father, an engineer, was employed in the construction of the Trans-Siberian Railway. He later worked for the Railway.

In 1905, my parents moved to Tsarskoye Selo (presently: Детское Село¹⁸), where I spent my childhood. This is also where I attended primary school. In 1915 my father died. In 1918[1919?], on account of difficult material conditions, having dropped out of 5th grade, I traveled

¹⁷ From his military ID: dark hair, blue eyes, dark blond eyebrows, 183 cm tall. Until 1931, he lived in the Wasiliszki community (County Szczuczyn, near Lida), then in Lvov. From his identity card: knowledge of Polish, French and Russian. In the years 1923–1925, he lived in Warsaw.

¹⁸ Tsarskoye Selo was called "Detskoye Selo", in 1918–1937, and then "Pushkin".

together with my [mother and] brother to my aunt [relatives?] in Lithuania. Soon I started to work as a private tutor and giving lessons remained one of the main sources of my income for many years. In 1921, I went to the 7th grade of the Polish Gymnasium in Poniewież. The following year I went to Warsaw where I graduated from 8th grade and passed my final exams at Władysław Giżycki Gymnasium in 1923.

I began my studies in the Warsaw University of Technology; the following year, I transferred to the Faculty of Mathematics and Natural Sciences at the University of Vilna, but soon I was forced to undergo long-term sanatorium treatment. Several years later, I resumed my studies at the Faculty of Philosophy at the University of Warsaw (1925–1927), where I attended lectures of Tadeusz Kotarbiński, Kazimierz Kuratowski, and my brother, Stanisław Leśniewski. In 1930, I transferred to the Department of Mechanics at the Lvov Polytechnic. I simultaneously worked at the National Oil Company as a proofreader and, later, technical editor and foreign language translator. My professional career greatly impeded my university studies, which were protracted, and in the end the outbreak of the war made it impossible to finish them. I have finished three courses. I got married in 1937. At the outbreak of World War II, I was living in Lvov. I had to abandon my studies and devote myself wholly to paid employment.

In the years 1940–1941, I worked on a contract for editing a dictionary for the oil industry in five languages. Having finished that task, I cooperated with the Department of Geophysics at the Lvov University on constructing instruments to measure the Earth's gravity (with particular focus on the development of the theories of the curvature of the blade). At the same time, I gave regular private lessons and made my living as a photographer.

During [the German] occupation, in 1941–1944, I worked at the Malechów farm near Lvov as the garden caretaker, and subsequently, at the Galikol Company in Lvov, where I was responsible for distribution of resources, and later I worked as a clerk in reporting and statistics. The company administrated a number of food and chemical industry plants.

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During the occupation of Lvov by the Russian Army, I worked (in 1945–1946) at an assembly and repair company as a translator from Polish to Russian and *vice versa*; later, I worked in a plant producing artistic signboards. In the years 1944–1946, I also taught mathematics in the higher grades of a Polish 10-grade school in Lvov. I left for Poland after the final exams.

In June [July?] 1946, together with my wife and daughter, I left for Łódź, and then was recommended by Deputy Minister Petruszewicz to the Association of Polish Steelworks in Gdańsk, where I was transferred to Shipyard no. 16 in Elbląg (modern Gen. Świerczewski Production Facility, called “Zamech”).

From September 1946 to April 1949, I headed [the department of] costs, expanding it from two people to a team of 17, and issuing 17 instructions, including the instruction on the origin of costs and the instruction introducing accounting sheets for auto transport costs, taking into account proper charging of cost carriers. I worked in the 2nd financial group there.

In May 1949, I assumed the position in the branch of results analysis in the newly formed Economical-Organizational Bureau. I conducted a thorough analysis of the Income Statement for January and February 1949. At present, I am in the 4th administrative group with a production bonus and a special duty allowance, which amounts to 33 to 36 thousand zloty gross (not including family allowance) on average (depending on the amount of the production bonus). Then I was responsible for investment reporting, and finally, I managed the department of investment documentation. Simultaneously, I taught mathematics at the Technical High School and the State School of Inland Sailing.

Due to the introduction of a new company policy and a significant reduction of the original development momentum, desiring a position which would correspond to my passion, ability and energy, I transferred to the Peat Institute, where I worked in 1952–1957. In 1955, my paper entitled “An attempt to analyze the operating costs of utilization of peat in the plant in Zalesie against technological processes of peat lump

extraction” was published in the journal *Prace Instytutu Torfowego*. In 1955, I observed the work of a *Piast* excavator. I put the results of this observation in a 100-page typescript entitled “Technological guidelines for organization of extraction of fuel peat using a *Piast* excavator”. In 1957, I observed in Gace a test application of the Russian set TEMP, together with engineer Antczak. The results were presented in [Antczak & Leśniewski 1957].

On 4 October 1957, due to financial difficulties, I transferred to Zamech, to the department of economic planning. In 1959, I obtained a diploma of a one-year extramural course on the economics of industry (Polish Economic Society, the Katowice Branch; my thesis entitled “An Analysis of Performing the Production Plan in the K. Świerczewski Mechanical Plants in Elbląg in the 1st Half of 1958 Against the Development of the Plants Since 1950” was written under the supervision of Associate Professor Marian Frank, PhD).

In the belief that the methods learned in this course will allow me to assess the profitability of machine work more thoroughly, and, having a special inclination towards research work, I decided to apply for a position in the Mechanization Laboratory at the Institute for Melioration and Grassland Farming.

Czesław Leśniewski
Elbląg, 27 August 1952.

Chapter II

Official Assessments

1 A PROPOSAL [OF THE SECTION OF SCIENCE AND HIGHER EDUCATION OF THE MINISTRY OF RELIGIOUS AFFAIRS AND PUBLIC EDUCATION] REGARDING A NOMINATION [OF STANISŁAW LEŚNIEWSKI] TO THE POSITION OF ASSOCIATE PROFESSOR AT THE UNIVERSITY OF WARSAW

Archiwum Akt Głównych w Warszawie
[Archives of Old Records in Warsaw].
(MWRiOP [Ministry of Religious Affairs
and Public Education], 3956).

Warsaw, 5 August 1919.

To the Chief of State.

The Philosophical Department and the Senate of the University of Warsaw here submit an application in the form of the enclosed document of 30 June of this year (L. 2511) to appoint Stanisław Leśniewski, Ph.D., to the position of Associate Professor of the philosophy of mathematics at the University of Warsaw.

Since Dr. Leśniewski's academic and pedagogical activity hitherto, as well as his personal characteristics, clearly make him worthy of the

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abovementioned nomination, I am honored to propose that the Chief of State appoint Stanisław Leśniewski, Ph.D., to the position of Associate Professor of philosophy of mathematics at the University of Warsaw, effective 1 October 1919.

The Minister of Religious Affairs and Public Education —
Jan Łukasiewicz.¹⁹

2 A JUSTIFICATION OF THE NEED TO CREATE AN ASSOCIATE DEPARTMENT OF PHILOSOPHY OF MATHEMATICS AT THE UNIVERSITY OF WARSAW²⁰

Archiwum Akt Głównych w Warszawie
[Archives of Old Records in Warsaw].
(MWRiOP [Ministry of Religious Affairs
and Public Education], 3956).

THE PHILOSOPHY OF MATHEMATICS is highly developed nowadays. It is a branch of science in which logic on the one hand and mathematics on the other, converge through explanation and specification of their terms and basic sentences. Thus, a great change recently occurred in logic; namely, although in J. S. Mill's times it was seen as the science of the laws of thinking, and therefore, of the laws of certain intellectual processes, and it was classified as part of psychology, no contemporary educated logician will take such a stand today. Anti-psychologism prevails, which is evidently tied to mathematicism. It has been established, that the lion's share of the old *organon* contains theses which do not in the least rule on intellectual processes, but rather, on objects in general or on sentences: the thesis on objects is that they possess certain features

¹⁹ J. Piłsudski, as the Chief of State, signed this application on 13 August 1919.

²⁰ This is an annex to the application of the Philosophical Department and the Senate of the University of Warsaw of 30 June 1919 in this case. Its author is most likely W. Sierpiński.

if they possess others, or that they remain in certain relations if they remain in others; the thesis on sentences is that they are true or false if certain other sentences are true or false.

To exemplify these theses, it is sufficient to refer to the principle of contradiction, formerly regarded as one of the most basic «laws of thinking». In the objective form, it reads: “No object may at the same time possess and not possess a given quality”; and in the sentential form, it reads: “Out of two contradictory sentences, one must be false”. The case is similar with «the principle of syllogism», which can be formulated by stating that if sentence *B* entails from sentence *A*, and sentence *C* entails from sentence *B*, then also sentence *C* entails from sentence *A*. It is not at all a statement claiming that if after a certain thought another, different thought comes and a third follows the second, then the third one must arise from the first. After all, again, sentence *B* entailing from sentence *A* is not about inducing thought *B* by thought *A* in anyone’s intellect, but instead, it is a certain relation between sentences, that is, the first sentence and the negation of the second sentence cannot be true at the same time. The objective equivalent of this sentential form of the principle of syllogism assumes the following form: “If class *A* is included in class *B* and class *B* is included in class *C*, then class *A* is included in class *C*”.

The above examples demonstrate how it happened in logic that theses on thoughts, that is, on intellectual processes, gave way to theses determining the truth or falsity of sentences, and how they again became merely one of the methods to express theses on any objects possessing such and such qualities, or on objects or classes being included in classes.

This has already left the experimental, and even as well the practical field, where psychology belongs; we enter the realm of deductive and *a priori*, that is mathematical, theory, both in method and matter.

As regards the method, logic establishes axioms and obtains theses through evidence; as for basic terms, they clearly become mathematical, at least to a large extent, since the class of objects *P* is

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a set of all objects P , and set theory constitutes a significant field of contemporary mathematics. Containment of a class within a class, an individual belonging to a class — these are also terms of set theory. Thus, Aristotelian syllogistics proves to be a chapter in one of the mathematical disciplines.

Even in the external form, logic became more mathematical, since in striving for precision and removing the confusion flowing from using natural language in theory, it began to draw inspiration from algebra and eventually turning into logistics, so that today Couturat's handbook of logic looks like an algebraic dissertation.

Here is an example:

$$(a + b)' = a'b'.$$

This formula is called De Morgan's formula, and it can be interpreted such that if it is not true that something is a or b , then it is true that it is neither a nor b , and *vice versa*. However, the algebraic reading is the following: "A negation of a sum is equal to the product of the negated elements". Thus, as we can see, algebraic expressions also occurred, such as logical sums and products.

It occurs further that the relation of inclusion is, after all, only one of the relations, and the formal property, that is, one which is independent of the distinctiveness of the objects between which it occurs (that is, if it occurs between A and B , and between B and C , then it occurs between A and C), which is called transitivity, is also inherent to many other relations, e.g., the sequence of time. Thus, there began an examination of relations in view of their formal properties, and again, a new branch of logic emerged, which may equally well be called a branch of mathematics. After all, for instance, the theory of groups in mathematics operates at the core of the notion of relation, and it is undeniably one of the chief notions in function theory.

In brief, by extending and realizing their own nature, the old theory of subordinating notions and the old theory of inference on the

one hand, and various fields called mathematical on the other hand, managed to establish the idea that they are basically detailed extensions of something more universal: certain postulated basic inquiries, and that they are homogenous with one another.

It was not only logic which underwent mathematization, but also mathematics underwent logization. In the analysis, set theory penetrated into arithmetic, and serious misconceptions appeared in the mentioned set theory. In more in-depth research, theoreticians stumbled upon a series of fundamental contradictions: various antinomies arose, or in other words, paradoxes, involving the idea that from seemingly non-contradictory assumptions, through seemingly correct deductions, one ends up having to negate not only a given statement, but also its negation, which is inconsistent with the basic principle known as the principle of excluded middle. Richard's and Russell's antinomies, the Ancient Greek antinomy of Eubulides, revived after a long period of disregard, and many others, seriously trouble the theoretical conscience of scientists, as they question the legitimacy of their constructs.

Among them, Russell's antinomy probably occupies the most prominent place, so let us mention it briefly by way of example.

Having divided all classes of objects into two groups: classes K_1 , each of which is its own element (e.g., the class of classes, which after all is a class in itself), and classes K_2 , none of which is its own element, we inquire whether the class of classes of the second kind belongs to the first or the second kind. Both answers lead to contradiction, at least seemingly. To discover the source of this guise, to free mathematics from antinomy, and thus, to lead to an explanation of the still vague definitions and assumptions — these are some great foundations arising from mathematics; the tasks which we may confidently call logical.

Even mere analysis of antinomies is sufficient nowadays as academic specialization and may be considered the core of the discipline called here “the philosophy of mathematics”.

Furthermore, the point of mathematics is to go even further than set theory, which deals with assignment, subordination, and ordering of

sets. A more general discipline ought to be built, one which is postulated by general ontology, that is, the theory of objects; or, to put it more tentatively, explicit axiomatics, which encompasses axioms, which all mathematical disciplines accept implicitly. Still, this is just as an extremely ancient task of logic, as *organon*, which Aristotle attempted to satisfy by establishing the principles of contradiction and the excluded middle. However, it must be done in a contemporary manner, that is, among other things, formally. The prevailing idea in analysis, which is inherently formal, is formalism in a certain specific meaning. The issue is precision in statements. The same tendency which algebraized logic turned mathematical analysis more logical. It attempts to express the whole of theory in the form of formulas, where apart from general symbols of numbers, only defined terms of actions and relations occur, or ones which were assumed without definition, but as such, were plainly clear. It turns out that these are predominantly wholly logical terms: not, or, and, results from...

In mathematics, a number ceased to be a landmark. We are witnesses to the decomposition of this inherently mathematical notion into more general, logical concepts.

At present, formalist trends prevail in geometry, among others. The issue there is also to build the base in the form of axioms, actually belonging to the general theory of relations, but selected in such a manner that they are also suited for application to spatial relations, e.g., relations of the intersection of straight lines or points lying on lines. Axioms are built as sentences which, while maintaining a given form, may assume different meanings, depending on whether this or that value is entered in the place of the variable; furthermore, this is true for all mathematics. Attempts are made to check the independence of axiom *B* from axiom *A* in the following way: one must choose such a value of the variable which verifies *A* but does not verify *B*. Attempts are made to prove accordance of axioms *A* and *B* in the following way: one finds such a value of the variable which verifies both *A* and *B*. Still, these methods, just as with the whole of mathematical formalism, pose a whole

array of methodological problems concerning the permissibility or lack of permissibility of substituting such and such values for the variable, correctness or even physical applicability of those methods of checking accordance and independence of axioms, strict understanding of what a variable is, what substitution is, and finally, the rules for simplifying axioms.

Besides, many other logical problems are raised by contemporary mathematics. Let us only mention the problem of axiomatic definition and the dispute over the predicative function of definitions, that is, whether we may make use of definitions which cannot be uttered with a finite number of words.

These questions are characteristic for the connection between contemporary mathematics and contemporary logic, but they do not exhaust the field of the philosophy of mathematics. After all, it includes problems which may not admittedly be in the center of attention of specialists, but are profound and significant. These include the problem of the proper character of non-Euclidean geometries, the problem of the relation of mathematical and physical space, the problem of the *a priori* and *a posteriori* character of the notion of space, the problem of the relation of space and time, as well as number and space (which is broadly discussed even today), and finally, the ideal or real character of mathematical objects, which are found, according to some, or created, according to others.

Thus, the philosophy of mathematics forms a whole comprised of researching the structure and methods of mathematics, its relation to other sciences, as well as doing mathematics itself within its fundamental sections. This is a practical whole, a discipline of science which the development of both logic and mathematics have led to. It has lately gained many distinguished representatives and valuable written sources. Let us only mention the names of Boole, Burali-Forti, Couturat, Frege, Hilbert, Padoa, Peano, Russell, and Schröder.

Therefore, it is by all means desirable that the philosophy of mathematics possess a fixed place at the University of Warsaw. After

all, although everyone in the department of philosophy or mathematics should be generally acquainted with this field, professors who hold positions of heads of department are too weighed down by other tasks to devote enough attention to the issues of the philosophy of mathematics, which require great attention. Entrusted to the proper entity, the department would certainly significantly raise the level of both logical and mathematical studies at the University.

3 WACŁAW SIERPIŃSKI *CURRICULUM VITAE* AND ASSESSMENT OF ACADEMIC WORKS [OF STANISŁAW LEŚNIEWSKI]²¹

Archiwum Akt Głównych w Warszawie
[Archives of Old Records in Warsaw].
(MWRiOP [Ministry of Religious Affairs
and Public Education], 3956).

Stanisław LEŚNIEWSKI was born on 28 March 1886 in Serpukhov in the Moscow Governorate, as a son of a communications engineer, Izidor Leśniewski, and Helena née Palczewska. In 1896, he entered grade one of primary school in Troitskosavsk in Siberia; after graduating Third Grade in this school in 1899, he transferred to the Third Grade of a philological gymnasium in Irkutsk. At the end of the 1903/1904 schoolyear, he passed the final exam in this middle school. From 1904 to 1912, he studied «philosophy» and mathematics at universities in Leipzig, Zürich, Heidelberg, Munich and Lvov. In the spring term in 1912, he obtained a Ph.D. at the Lvov University, based on his dissertation entitled “A Contribution to the Analysis of Existential Propositions”; the Ph.D. exam included philosophy and mathematics as additional subjects. His

²¹ This is a supplement to the proposal of the Faculty of Philosophy and the Senate of the University of Warsaw of 30 June 1919 regarding the appointment of S. Leśniewski as associate professor of the philosophy of mathematics at the University of Warsaw. Although the typescript is not signed, the author of the text is probably W. Sierpiński.

examiners were: Professors Twardowski (supervisor) and Wartenberg (in philosophy), and Professors Puzyna and Sierpiński (in mathematics).

Starting in 1913, he taught mathematics in Polish private schools in Warsaw, Klarysewo and Moscow.

He gave papers at the Polish Psychological Society in Warsaw, in the Warsaw Philosophical Institute, in the Philosophy Circle of the Lvov University, in the Polish Science Club in Moscow, as well as in the Moscow (Russian) Mathematical Association.

He was a member of the first, second and fourth of the mentioned institutions; he was also a member of the Philosophical Society in Lvov and of the Editorial Committee of an anticipated periodical, *Fundamenta Mathematicae*.

* * *

In his first work entitled “A Contribution to the Analysis of Existential Propositions” [Leśniewski 1911c], the author considers the issue of the truthfulness or falsity of sentences of the type: “ P exists” and “ P does not exist”. He reduces them to inherent sentences, and thus, of the type: “ S is P ” and “ S is not P ”, and being of the mind that a true sentence symbolizes the possession by an object, designated by a subject, of certain features, connoted by the predicate, as well as assuming that “existing” = “being” = “object”, and that “object” does not connote anything, as it cannot be defined, as the most general term, he arrives at the conclusion that all existential sentences, considered in their literal sense, are false.

In his “An Attempt at a Proof of the Ontological Principle of Contradiction” [Leśniewski 1912], he opposes the thesis of the improbability of the ontological principle of contradiction, which states that no object may have feature c and not have feature c , and he derives the proof of this principle based on linguistic conventions which determine the symbolic function of sentences of the type “ S is P ” as well as the symbolic function of the word “not”. The dissertation contains many ideas about meaning and the equivalence of expressions. It is

a polemic with Łukasiewicz's work *On the Principle of Contradiction in Aristotle* [Łukasiewicz 1910].

Logical Considerations [Leśniewski 1913c] is a translation of the above dissertations to Russian, with certain changes and supplements. The primary addition is a general proof of the non-existence of «general objects», that is, such objects which possess all and only common features for all given objects. This proof is also included in the subsequent dissertation entitled “The Critique of the Logical Principle of Excluded Middle” [Leśniewski 1913b]. In this dissertation, the author distinguishes the principle of excluded middle in the general formulation for any pair of contradictory sentences and “the principle of contradictory sentences” for pairs of sentences with a signifying subject. Based on the results of his previous works, he proves that the first of these principles is true, whereas the second is false. Among the conclusions which deserve special attention, there are: critical remarks on the principles of conversion of sentences in traditional logic, a solution of Meinong's and Nelson-Grelling's paradoxes, and an attempt to solve the “liar” paradox.

Considerations on the principle of excluded middle give the author the opportunity to proceed to solving Russell's paradox, already discussed in the dissertation “Is the Class of Classes not Subordinated to Themselves, Subordinated to Itself” [Leśniewski 1914a]. The core of the solution is rejecting the axiom which states that if any object is an element of a class of objects N , then it is itself an object N .

For the author, a solution of this paradox was an introduction to the development of set theory, which avoids this paradox. It contains a very original and productive axiomatics of sets and it constitutes a point of interest to all remaining in close contact with these issues.

For the last dozen or so years, there have been a number more or less successful attempts made by various authors of set theory axiomatization (Zermelo, Russell, Schoenflies). One such attempt is Stanisław Leśniewski's work: *Foundations of the General Theory of Sets. I* [Leśniewski 1916]. The author means to present such a system

of definitions and axioms which would be consistent with intuition and which would remove antinomy without narrowing the range of the notion of plurality, yet still allowing for obtaining all of those theses of set theory which are necessary in its applications. The only undefined mathematical term the author uses is the word “part”: the author establishes the meaning of this word with two simple axioms (of asymmetry and of transitivity). The terms “set” and “element”, hitherto accepted without definition in set theory, are defined by the author (indirectly with the word “part”). Based on his axioms and definitions, the author derives a whole array (58) of theses of the general theory of sets. This is only the first (published) part of his work. The proofs included in this paper are faultless in terms of mathematical precision; the layout is simple and clear. Whatever stand one may take on Leśniewski’s views on the basic notions of set theory, one must admit that his work constitutes an interesting and important contribution to the analysis of these notions and their interrelations. It must be taken into account by anyone who makes a fresh attempt to axiomatize set theory.

Apart from published works, Leśniewski achieved various, often very interesting results, so far unpublished, but referred to during meetings in various scientific institutions.

An example of such a work is, for instance, “On a Certain Theorem of the Theory of Relations” (presented at the Warsaw Institute of Philosophy) and Leśniewski’s thesis concerning trichotomy (quoted by Professor Sierpiński in his work [Sierpiński 1918: 115]). There is also a longer work by L[eśniewski], ready for print *Set Theory*, submitted as a manuscript in the Mianowski Fund.²²

Starting from issues of logic of a grammatical-nominalist character, Leśniewski gradually moves on to mathematics. At present, he is an expert in many fields within the foundations of mathematics, exceptionally well-prepared for logical treatment of them. His work

²² Work under this title has never been published.

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exhibits vast knowledge of the issues and methods of contemporary logic and is flawless in terms of accuracy. It is probably still unsurpassed now. Finally, we should mention the exceptional originality of Leśniewski's work.

Let us add in the end that L[eśniewski] is exceptionally talented in the field of pedagogy; he teaches in a clear and accessible way, introducing the students into rigorous scientific thinking.

Having considered all authors of Polish works on the philosophy of mathematics, the committee resolves that Stanisław Leśniewski, Ph.D., is the only and the most suitable candidate for the Chair of the Philosophy of Mathematics at the University of Warsaw.²³

4 A PROPOSAL TO APPOINT TO THE POST OF FULL PROFESSOR AT THE UNIVERSITY OF WARSAW

Archiwum Akt Głównych w Warszawie
[Archives of Old Records in Warsaw].
(MWRiOP [Ministry of Religious Affairs
and Public Education], 3956).

Warsaw, 28 February 1935.

To the Department of Science and Art
of the Ministry of Religious Affairs and Public Education

At the request of Jan Łukasiewicz, Ph.D., during a meeting on 26 June 1934, the Faculty Council of the Department of Mathematics and Natural Science selected a commission responsible for appointing an associate professor of the philosophy of mathematics, Stanisław

²³ The following works are mentioned: [Leśniewski 1911c], [Leśniewski 1912], [Leśniewski 1913a], [Leśniewski 1913b], [Leśniewski 1914a], [Leśniewski 1914b], [Leśniewski 1916], as well as set theory as the eighth work (paper ready for print, the manuscript at the office of the Mianowski Fund). Cf. above, footn. 22.

OFFICIAL ASSESSMENTS

Leśniewski, Ph.D., a full professor of the same subject; the committee was composed of the professors: Czesław Białobrzewski, Jan Łukasiewicz, Antoni Przeborski, and Kazimierz Żorawski.

Based on Professor Jan Łukasiewicz's paper on Professor Stanisław Leśniewski's academic work, in a meeting on 23 October 1934, the committee passed the motion to present to the Faculty Council a request to apply for the Ministry of Religious Affairs and Public Education to appoint Professor Stanisław Leśniewski a full professor.

In a meeting on 30 October 1934, the Faculty Council of the Department of Mathematics and Natural Science acknowledged the paper presented by Professor Jan Łukasiewicz, on behalf of the committee.

A vote took place in a meeting of the Faculty Council on 4 December 1934, which resulted in 17 votes for and 1 vote against the motion, as well as 4 abstentions, according to Art. 35 of The Higher Education Act from 15 March 1933, TO APPLY FOR THE MINISTRY OF RELIGIOUS AFFAIRS AND PUBLIC EDUCATION TO APPOINT AN ASSOCIATE PROFESSOR OF THE PHILOSOPHY OF MATHEMATICS, STANISŁAW LEŚNIEWSKI, PH.D., A FULL PROFESSOR OF THE SAME SUBJECT.

Dean of the Faculty of Mathematics and Natural Science
at the University of Warsaw —

Professor *Stefan Mazurkiewicz*, Ph.D.

In a meeting on 30 January 1935, the Academic Senate passed the motion to send the above motion further with positive recommendation.

Rector — Professor *Stefan Pieńkowski*, Ph.D.

Attachments: the committee's report and 10 copies of academic work.

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5. JAN ŁUKASIEWICZ: REPORT ON ACADEMIC WORK [OF STANISŁAW LEŚNIEWSKI]²⁴

Archiwum Akt Głównych w Warszawie
[Archives of Old Records in Warsaw].
(MWRiOP [Ministry of Religious Affairs
and Public Education], 3956).

Starting from 1927, Professor Stanisław Leśniewski, Ph.D., has presented in print the following papers:

- (1) "On the Foundations of Mathematics" (1927–1931).
- (2) "Fundamentals of a New System of the Foundations of Mathematics. Introduction and §§1-11" (1929).
- (3) "On Functions Whose Fields, with Respect to These Functions, are Groups" (1929).
- (4) "On Functions Whose Fields, with Respect to These Functions, are Abelian Groups" (1929).
- (5) "On the Foundations of Ontology" (1930).
- (6) "On Definitions in the So-Called Theory of Deduction" (1931).

Three of these works seem to be less significant in Leśniewski's academic output, that is, treatises mentioned in points 3 and 4, whose content constitutes axiomatic research within the field of the theory of groups, as well as the last dissertation, whose aim is to establish the directive for constructing definitions in the theory of deduction. These dissertations are less important because they are not closely related to the main direction of research, to which the author devoted 20 years of his life.

The remaining papers outline his research. They all concern various aspects of the same great problem: on which logical basis should

²⁴ The paper was presented at a committee meeting on 23 October 1934 and constituted an appendix to the proposal of the Faculty Council of the Department of Mathematics and Natural Science from 30 January 1935 on appointing S. Leśniewski a full professor of the philosophy of mathematics at the University of Warsaw.

mathematics be established in order to remove antinomies from it, that is, to demonstrate its consistency. This is the same problem as the one posed by Hilbert, and the solution of which he strives to achieve with the help of a whole array of associates, trained in mathematical logic, such as Ackermann, Bernays and others.

In order to resolve this problem, Professor Leśniewski constructed three deductive theories, the set of which is considered to be one of the possible fundaments of the entirety of mathematical science. These theories are:

- (1) A theory which he calls *PROTOTHETIC*. This is sentential calculus which extends the theory of deduction by introducing universal quantifiers and variable functors, and by adding new directives, that is, rules of inference.
- (2) A theory which he calls *ONTOLOGY*. This is the calculus of names, which refers to Aristotle's logic, but expands this logic considerably by adding individual names and sentences, nominal negation, conjunction and alternative, and by adding quantifiers and the associated directives. In terms of its content, this theory is the closest to set theory in Schröder's interpretation, including his theory of individuals.
- (3) A theory which he calls *MEREOLGY*, and which is a kind of set theory.

The first two theories belong to logic and, according to the author, they correspond to the logical system included in the work *Principia Mathematica* [Whitehead & Russell 1910–1913] in terms of their content. The latter theory belongs in the realm of mathematic rather than logic.

The author presented the principles of protothetic in a German paper presented in *Fundamenta Mathematicae*, mentioned above in point (2); the principles of ontology are contained in the German paper mentioned above in point (5), and presented in reports of meetings of the Warsaw Scientific Society; finally, a significant portion of the Polish work on the foundations of mathematics, printed in *Przegląd Filozoficzny*, mentioned earlier in point (1), is filled with mereology, the first draft of which the

author presented in an earlier paper, unconnected to the discussed period of his activity, entitled *Foundations of the General Theory of Sets*. I [Leśniewski 1916]. Each of these works deserves a short description.

In the work entitled “Foundamentals of a New System of the Foundations of Methematics” [Leśniewski 1929b], the author puts the whole of protothetic into just one axiom, from which all theses of this theory can be derived with five directives. He assumes equivalence as the primary term of protothetic. In classical sentential calculus, that is, in the theory of deduction, equivalence is not sufficient to define all logical functions. However, if we introduce universal quantifiers and variable functors, then with the help of equivalence, we are able to define not only negation, but also, as A. Tarski demonstrated in his Ph.D. dissertation, conjunction, and therefore, all other logical functions. This result from Tarski is the point of departure for Leśniewski, who accepts equivalence, rather than, *e.g.*, implication, as the primary term of protothetic on the ground that equivalence is the most convenient term to record definitions.

First, the author discusses this function in terms of the theory of deduction, axiomatizing for the first time the equivalential theory of deduction and providing evidence for the feasibility of its axiomatization (p. 15-30). Subsequently, he discusses the history of creating an axiom of protothetic together with directives. He presents the axiom on p. 59. He devotes the final portion of his work to formulating directives, of which he assumes five: the directive of substitution, of detachment, of distribution of quantifiers, of construction of definitions, and of extensionality. He attempts to formulate these directives as precisely as possible and for this purpose, he introduces 49 terminological explanations, arranged into special symbolic language to shorten the reflections.

The above work, which was to encompass the entirety of the foundations of mathematics, did not find its continuation because of publishing difficulties, which the author indicates in the dissertation, mentioned in point 5 on p. 112. In this dissertation, entitled “On the

Foundations of Ontology” [Leśniewski 1930], Professor Leśniewski presented the axiom and the directives of the second logical system, which the entirety of his foundations of mathematics is based on. The author assumes a function of the type ‘ A is b ’ as a primary term of ontology, where the word “is” is a constant functor and the letters ‘ A ’ and ‘ b ’ are nominal variables. The only axiom of ontology, coming from the year 1920, summarizes in one sentence the intuitions which the author associates with the meaning of the expression ‘ A is b ’. According to Professor Leśniewski, this expression means as much as: A exists, and there is only one A , and if something is A , then it is b . The directives of ontology are again formulated with terminological explanations, similar to the explanations concerning the directives of protothetic. The final part of the dissertation is occupied with further simplifications of the axiom of ontology made by the author and by B. Sobociński, MA.

Professor’s Leśniewski’s main opus in Polish is the work entitled “On the Foundations of Mathematics” [Leśniewski 1927–1931], which began to be published in *Przegląd Filozoficzny* in 1927. Apart from the introduction, the work encompasses eleven chapters so far. The first chapter is particularly worthy of attention, as the author pointedly criticizes comments added by Russell to the theory of deduction, included in the famous work *Principia Mathematica* [Whitehead & Russell 1910–1913]. Ascertaining the misunderstandings these comments may lead to, the author establishes that sentences of the kind ‘ $\sim p$ ’, ‘ $p \vee q$ ’, or ‘ $p \rightarrow q$ ’ should be interpreted verbally through expressions ‘not p ’, ‘ p or q ’, and “if p , then q ”, rather than reading them as, for instance: “ p is false”, “either p is true or q is true”, and “ q results from p ”, etc. In the second chapter, the author deals with Russell’s antinomy concerning “the class of classes which are not their own elements” and presents a solution for this antinomy. In an interesting remark within this chapter on pp. 198–199, the author demonstrates that general objects do not exist, thus taking a clearly «nominalist» stand in the famous dispute over universals. The third chapter concerns various ways to understand the terms “class” and “set”, wherein the author very vigorously works against introducing

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“empty” classes and sets to science. From chapter four to chapter ten, the author deals with mereology, wherein he first repeats the content of his earlier work on the foundations of the general theory of sets, published in 1916, and then he goes on to discuss further additions and changes to this theory, up until the year 1921. In an interesting remark, included in chapter four, pp. 258-259, Professor Leśniewski discusses the relation of his theory from 1916 to a related “theory of events” created by Whitehead in [Whitehead 1919]. The last, eleventh, chapter contains the origins of ontology.

Mathematical logic and research within the foundations of mathematics are on the borderline between philosophy and mathematics, and therefore, the name of the department Professor Leśniewski presides over, being a professor of “the philosophy of mathematics”, is not wrong. This borderline position of the discipline and the department entails certain inconveniences; neither do philosophers want to accept research which is too specialist and too difficult for them, nor do mathematicians want to accept as mathematics something which strays beyond their usual interests. There has not been, in Poland as well as in other countries, any periodical devoted to the foundations of mathematics or to logical mathematics. It is very hard to publish works in the field as publishers cannot be found. These publishing difficulties may explain in part why Professor Leśniewski did not manage to present in print all of his results, which he presents year after year to his students in lectures and to his colleagues in private conversations and papers given to scientific societies. However, the works which he has published are perfectly sufficient to get the idea of the significance and scientific value of Professor Leśniewski’s academic output.

First of all, it must be said that Professor Leśniewski has a highly creative mind. The fact of creating three great deductive theories, which had not existed in this form beforehand, is the best proof of that. Of these theories, especially ontology, as an extension of Aristotle’s logic, will gain lasting importance, if not within the basic mathematical sciences, then at least in general logic. This is clear from the interest which ontology

arouses among philosophers even today, to mention only Professor Kotarbiński's work [Kotarbiński 1929: 190-211] (see especially pp. 210-211 as well as the introduction on p. XII).

What is rare and very characteristic for Professor Leśniewski is that he combines great creative ability with an extraordinarily precise, sharp and critical mind. One may be certain that there are no mistakes in his deductive reasoning. His critical remarks are usually crushing; *e.g.*, the remarks on the theory of deduction in *Principia [mathematica]*. This pursuit of precision and perfection is so strong, that now and again it creates the opposite effect. As a result of striving for perfection, Professor Leśniewski began publishing his results too late, and as a result of striving for precision, some parts of his work set such high demands on the readers that they discourage them from delving into the papers. This especially concerns explanations of terminology necessary for precise formulation of directives. Because of these exceptionally difficult fragments, Professor Leśniewski's work is not as well known and appreciated abroad as it deserves to be.

Professor Leśniewski is one of the main founders of the so-called Warsaw School of Logistics, which has already gained worldwide recognition as one of the international centers of logistics. It educated a number of students, including Privatdozent of the philosophy of mathematics, A. Tarski, Ph.D., a prominent academic.

Considering the papers and the merits, and given that Professor Leśniewski has been an associate professor for fifteen years, the proposal to make him full professor should be accepted as fully justified.

Chapter III

In the Eyes of the Environment

1 JANINA JANKOWSKA-ORYNŻYNA: WEDDING IN PAGÓRKI

Janina Jankowska-Orynżyna,
“Wesele na Pagórkach” [Wedding in Pagórki].
Magazyn Wileński vol. XII (2003), No. 8, pp. 20-22.

1

Jerzy²⁵ came last. A modest, shabby *linijka*²⁶ was sent for him. Clearly, this was our no frills attitude. How different from the paltry Varsovians! They do everything for show, Grandma²⁷ used to say; although they eat pitifully.

The sorrel horses' rumps shine like freshly peeled chestnuts. The carriage passes hills of purple and russet clay. The ponds and lakes seem to be elsewhere, as if Lipniskowcy²⁸ had changed the topography by draining the swamps and cutting down the clumps of *samonica*.²⁹

²⁵ Jerzy Jankowski, the authoress's brother, a poet.

²⁶ An one-horse, four-wheeled carriage with an oblong seat on which one sits astride or sideways — used in former Poland. There are a few expressions in the story which were used in those times, especially in historical Lithuania, or even in Eastern Poland, and which are no longer present in the Polish language. They are cited here in their original Old Polish form, and explicated in footnotes.

²⁷ Probably Aleksandra Prewysz-Kwinto, née Pożaryska, paternal grandmother of the bride.

²⁸ Stanisław Prewysz-Kwinto, the owner of the property Lipniski.

²⁹ A moss interwoven with small shrubs.

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Here is the Kimborciszki Lake, all covered in thick fog. Here is the island, full of old linden trees bordered by reeds and luscious sweet stalks of *ajer*.³⁰ On the shore, the fishermen draw the nets on *luny*,³¹ bending under weight of their feet. The thin layer of roots of water grasses rocks and breaks up, and the depths of the lake are below. They say there is more than one bottom to it.

Here is a clump of linden trees, a maple with a red branch on the top, and the white pillars of the porch.

Nowhere is it so beautiful as here, on the lakes.

Jerzy felt it with his every nerve, created in the image of the twigs quivering over the water full of clouds, deep and dark. It was so beautiful that one could die without regret, listening to the sound of the pine trees in the wind and that one last wave, writing with foam on the sand.

2

Now, Aunt Marynia³² drives up to the porch on the other side of the white mansion with great flourish. Her opulent shape fills the carriage as dough rising from a baking mold.

Aunt Marynia is not afraid of anyone at all. She can handle anyone with the help of diplomacy, hospitality or *wódeczka*.³³

Only the old Tałłat-Kiełpsz³⁴, her father, had some control over her. The three daughters³⁵ knew well that if their father made up his mind, he would not change it until Judgment Day. He would throw butter out of the window every day, not even saying a word about it, even

³⁰ Reeds.

³¹ “*Luny*” has three meanings in the Old Polish language: (a) fishing net stretched on three poles; (b) fishing boat (bow-shaped); (c) floating “islands” made of tangled water plants.

³² Maria Prewysz-Kwinto née Kiełpsz, the bride’s mother.

³³ A carressing *diminutivum* from “vodka”.

³⁴ Józef Kiełpsz (or Tałłat-Kiełpsz), the owner of Kiełpszyszki, the bride’s maternal grandfather.

³⁵ Maria Prewysz-Kwino née Kiełpsz and her two sisters: Anna (Stankiewiczowa after marriage) and Helena (Tarczyńska after marriage); Józef Kiełpsz’s daughters.

though it was completely fresh. It turns out it was served in the wrong *maśleniczka*,³⁶ not the one he brought, the one with a bird painted on it. He does this every day until the daughters guess why he does it. Apparently, he ran three kilometers with a young uprooted tree after a sheeny who cheated him... He still lives in an old crooked mansion with a thatched roof green with moss in Kiełpszyszki, although he bought a palace in the Pskov region, because it was forbidden here...³⁷

3

The morning is full of the sounds of laughter and clinking glasses. Thirty people attended the memorable wedding reception. All aunts and maternal as well as paternal uncles came, all somehow related to each other. Dziutek³⁸ used to say:

— I came to the conclusion that I am my own grandfather...³⁹

My God, they eat and drink their fill, what a merry sight. Aunt Marynia consumes threefold with energy and expertise, disregarding her corpulent figure. Papuczek⁴⁰ tells a hunting story. Stefan⁴¹ says that if a dog does not want to fetch, it is best to put a duck in your teeth and swim, while blowing on the rest of the ducks to move them along.

Aunt Helutka,⁴² the essence of respectability of all Pagórki,⁴³ glances uncertainly towards the best men brought by dear Jerzy: one of them is a Jew, another is a socialist, and yet another, funnily enough, an actor. Still, he is the matchmaker after all, since he had brought the

³⁶ A dish to serve butter on.

³⁷ This is about one of the tsar's bans aiming at limiting the wealth of Poles in historical Lithuania.

³⁸ Probably Edward Majewski, the bride's uncle.

³⁹ This is a humorous remark about imaginary kinship.

⁴⁰ Władysław Prewysz-Kwinto, the owner of the property Kimborciszki, the bride's father.

⁴¹ Stefan Prewysz-Kwinto, the bride's elder brother.

⁴² Probably Helena Tarczyńska née Kiełpsz.

⁴³ An area near Smółwy.

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philosopher⁴⁴ who has now advanced to become the groom. Or actually, a mathematician of logic, or a logician of mathematics. Yet, Aunt Helutka must rightly admit that the Jew, the socialist and the actor surpass the local gentry in refinement and manners.

4

Aunt Marynia peeks at her father hesitantly.

— What is this disgusting thing — he says, making sour faces at the wonderful dessert with cream, cake and jam.

— This must be thrown out of the window — he whispers dramatically.

The aunts freeze, terrified.

— Well, then I shall follow it — I call out insolently.

— Is that so, Miss — the Terrible Grandpa⁴⁵ suddenly smiles. — You are quick-tempered!

— Let me also try.

— See, I spilled the wine — Papuszek apologizes.

You might say it is like in the proverb: did pigs eat here or was it gentry from Oszmiana?⁴⁶

5

Glasses clink.

— Hundred years, hundred years, may they live a hundred years!⁴⁷

Everybody is singing, not very harmoniously, but very loudly and sincerely. Even Lipniskowy kisses Aunt Marynia's hand. They meet "not like enemies, but like gods on their separate suns",⁴⁸ After all, they must meet, as does the wave with the lake shore since time immemorial and for all time with the same persistent force.

⁴⁴ Stanisław Leśniewski, the groom.

⁴⁵ Ludwik Kiępsz, the father of Józef Kiępsz.

⁴⁶ An allusion to one of sayings of Zagłoba, one of heroes of H. Sienkiewicz's *The Trilogy*?

⁴⁷ "Hundred years" (Polish: "Sto lat") is a traditional Polish song that is sung at such events like birthdays, name days and weddings.

⁴⁸ A quotation from the poem *Beniowski* by J. Słowacki.

6

After meats and pates, Jerzy is overwhelmed by drunken melancholy. He stands up with a glass in his hand, gazing at it against the light. The clink of cutlery and the laughs die down. As we all know, our dear matchmaker always yearns to make a toast.

Jerzy speaks fluently and resonantly, as if from the pulpit.

— Dearly beloved! I opposed the charm of the white mansion and I rebelled against it, as a ghost of the past. I believed that it was time to travel farther than past the *świronek*.⁴⁹ Yet, I see that all which is extraordinary is buried in a white mansion, even rebelling against it. I think that something even more extraordinary will come out: something which has the stubbornness of Lipniszki, the fortitude of Kimborciszki, and the charm of all Pagórki.

— The Polish Woman is a proportion of domestic virtues and romantic inspiration: half-geese, half-swan.⁵⁰ She is the one who will crush the serpent's head...⁵¹

— Do not take offense, dearest bride. After all, mere geese saved Rome,⁵² and Poland will be saved by half-geese and half-swans.

— Here is to your health and happiness!

— What is he on about? — the aunts whisper, but let it pass anyway. It's a poet's right!

⁴⁹ A building used as granary, a pantry or a treasury.

⁵⁰ Wedding speeches often referred to the family crest symbols. Half-geese and half-swan may be interpreted as an allusion to two crests: *Gąska* (Goose) and *Łabędź* (Swan), which would mean the bride's parents. Yet, the Prewysz-Kwintos used the crest of *Dryja* rather than *Gąska* (Goose), whereas the Tałat-Kielpsz family used Prus rather than *Łabędź* (Swan). Perhaps, then, it is only a metaphor: the Polish Woman combines simplicity and grace — because in Polish tradition the gosling was a symbol of simplicity, and the swan — of grace.

⁵¹ In the symbolism applied by the contemporary patriotic East-Polish gentry, a snake means the invader countries which made partitions of Poland.

⁵² An allusion to the legend of the gaggle of Capitoline geese which saved Rome from the Celts in 390 BC.

7

Everyone is so sated, so merry and happy, that it is time to drink:

— Let us love one another!⁵³ ...

Then all couples glide dancing the polonaise along a linden tree-lined lane...

*Matiola*⁵⁴ smells sweetly. Stars fall, cheers follow...

Farmhands feast outside with barrels of beer, lamps and torches.

2 FROM THE *DIARY* OF EUGENIUSZ ROMER

Eugeniusz Romer,
Dziennik [Diary]. Vol. I, 1914–1918.
Warszawa 1995: Wydawnictwo *Interlibro*, pp. 210–214.

■ 16 July 1915.

We got a perfect foretaste of gypsy life, being totally unaware of where we were going to spend the night, where we would go the next day, *etc.* In the meantime, during breaks between the rides, I engaged all the passers-by in conversation; I had to tell them about Germans and their conduct; I learned from them about the road, nearby estates, *etc.* This is how I learned from a passing Jew that my road to Turmont-Belmonty led through Kimborciszki belonging to the late Władysław Kwinto, and that Mrs. Kwinto and her son, the young heir, were at home and would definitely receive us, even “for the duration of the war”, since “the young master is very generous”, and “there is plenty of everything in the mansion”. This message cheered me up, all the more so since I knew Władysław Kwinto, who had died last autumn, very well from the time we had worked together in the Regional Council under General-Governor Freze. We were both appointed to it through gentry election, me — from Rosienie County, and Władysław Kwinto — from Jeziorosy

⁵³ A traditional Polish party toast, preceding the polonaise.

⁵⁴ A night-scented stock, *Matthiola longipetala*.

County. We worked together then for ten days in an agreeable spirit and convergent views. Later I met Mr. Władysław in Kovno, where he was the head of the Syndicate for some time. He was one of the most hard-working people of Jeziorosy County and a wise person. If the late Władysław Kwinto had still been alive, I would have been certain not only of being put up for the night, but also of obtaining useful advice and further help; but for now, the certainty that we should sleep under the roof that night was of great comfort to me. We rode on then, we crossed the Petersburg-Warsaw railroad by Turmont and, having ridden a few kilometers further, we entered Kimborciszki.

We found the house to be full of guests, which did not prevent us from being received promptly, fed, served beverages, and put to bed like old friends. We experienced again the miraculous extension of walls in mansions for the sake of guests, and the multiplication of all food stocked in the pantry to feed all the hungry, and all of it done so naturally, with such sincerity, that one would not feel embarrassed by this kindness. The family consisted of Mrs. Maria Kwinto, née Kiełpsz, two sons: Stefan, a twenty-two-year old youth, and Czesław, a few years younger, a student at the Army Corps. Having finished school, Stefan could not go on to study at university because of ill health; he did agricultural work in Łukinia at Franciszek Kończa's property last year, and after the outbreak of the war he returned home, where he took over his father's farm after his death.

Because of the war, the Kwinto's daughter is also living in Kimborciszki, married to Mr. Leśniewski, a teacher at Rontaler School in Warsaw, with her husband, as well as Mrs. Kwinto's sister, a widow of fifteen years, Mrs. Stankiewicz. Apart from this fairly large company, we also found refugees from Poniewież living in the house In addition, there were over a dozen youths from the neighborhood, from Stanisław Kwinto's Lipniskzi and from other mansions. The mansion itself creates a pleasant impression; it is well-built; it is in a picturesque village; the living quarters are on a hill with a lovely view of the lake, huge orchards and vegetable gardens, perfectly maintained, surround the house.

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What is characteristic and strange for us, the orchards are not fenced in and although a wide road passes near, no one steals the fruit nor does any damage, whereas in our “Holy Samogitia”, even high fences do not guard against theft or breaking of branches. Here, in order to prevent it, they always keep chests at the road next to the servants’ houses, where they put all waste from the gardens for public use. The farm in Kimborciszki, which covers only 130 hectares of arable land, although it is very well-kept, which could be gathered from the beautiful crops, plays a minor role. The greatest income, about 6-7000 rubles, comes from gardening and a factory of cream candy, which does not only use the milk from the household’s own cows but also buys milk from neighbors. The proximity to the railway line — three kilometers to Turmont, and over 20 to Dźwińsk — lets all products be sold without difficulty, which is why the estate had to develop in this direction. This is characteristic not only for Kimborciszki, but also for the whole area, as other estates work towards the same goal. . . . We learned many useful things in Kimborciszki, especially some things concerning storage of fruit throughout winter and cultivation of cabbage.

■ 17 July 1915

... Taking advantage of the courtesy of the hosts, we decided to stay for the whole day to wait for the arrival of our second wagon from Antonosz and the return of Montwiłł from Belmonty.

Apart from that, the children’s ill health delayed us. . . . In the afternoon, . . . Mrs. Kwinto . . . went to her neighbors and brought back a doctor who is spending her summer holiday there. The doctor recommended peace and diet, and prescribed medicines, which I sent for to Jeziorosy that night. They would not hear of us leaving the next day.

I was not in a hurry to leave; in fact, with all the kindness and care of everyone in Kimborciszki, it was the best place to be sick, but it was inconvenient to keep several dozen horses and over a dozen people there, especially since Mr. Stefan Kwinto flatly refused to accept any payment

for the pasture and upkeep of the people, even though our whole camp consisted of seventeen wagons and fifty horses

I inquired about our route and mansions which we would be passing and learned that we would be going past several familiar houses, that is, Lipniszki owned by Stanisław Kwinto, a member of the board of Mutual Insurance Company in Kovno, then Nurwiańce, bought . . . by Tadeusz Jawłowski, once the director of Kovno Syndicate, who had married countess Łubieńska a month before. . . .

The whole day passed on conversations; Professor Leśniewski was especially eager to discuss politics. He was educated in foreign universities, in Munich among others, with a diploma of the Lvov University, living in Warsaw, and as far as I could tell, a supporter of younger progressive groups standing in opposition to all other parties and to Świętochowski. He was an admirer of German culture and science, but cautious in expressing his opinion and more inquiring than stating, and altogether a pleasant man in the company. . . .

■ 19 July 1915

First thing in the morning, I sent the wagons to Kowalewo. We and the children followed after lunch, having thanked profusely our kind hosts for so much warmth and compassion. Even the evening before, Mrs. Kwinto had still proposed to us that we stay with them until the end of the war. She made a part of their house available to us and invited us to stay most cordially. We thanked her wholeheartedly for this kind offer, but we could not accept it as it was impossible to keep all the horses in this small estate, and staying with all our possessions but without the horses and people was not safe due to the proximity of Dźwińsk (20 kilometers) and the possible need to keep moving east.

The route was lovely again in terms of the countryside, as it led through pine forests, along Dryświaty Lake, which covers forty five square kilometers, past pretty mansions with immense gardens, through the village of Wesołowo, with a former Uniate church, founded by Florian Przemysław Kwinto, Stefan's great-grandfather

3 FROM THE *DIARIES* OF KAZIMIERZ TWARDOWSKI AND FROM
HIS LETTER TO TADEUSZ CZEŻOWSKI

Kazimierz Twardowski,
Dzienniki [*Diaries*]. Part I and II.
Warszawa & Toruń 1997: Adam Marszałek Publishing House.

Warsaw, 1918.

▪ 7 June: Quarter to eight [pm], got to the Petzolds. Then meeting at the Philosophical Circle with Łukasiewicz, Kotarbiński, Tatarkiewicz, Leśniewski. Until quarter to eleven. Then to a café with those four. There, a meeting with professors of the Medical Department, with Dean Mazurkiewicz. Leśniewski walks me home [*i.e.* Rzymski Hotel] [Twardowski 1997. I: 52].

▪ 9 June: [Evening] meeting with the Philosophical Faculty in the Philosophical Seminar (before, visiting Batoski) — Leśniewski's paper, café together [Twardowski 1997. I: 52].

▪ 15 June: [Late evening] café with Janiszewski, Leśniewski (who walks me home later), Tatarkiewicz, Kotarbiński, Znamierowski [Twardowski 1997. I: 53].

▪ 17 June: Meeting with ... Leśniewski. Dinner at nine [pm] in Rzymski Hotel [Twardowski 1997. I: 54].

▪ 18 June: Worked with Leśniewski from nine to half past twelve [Twardowski 1997. I: 54].

▪ 19 June: With Leśniewski at the Ministry [of Religious Faith and Public Education] from nine to half past eleven [Twardowski 1997. I: 54].

▪ 20 June: The Philosophical Institute — a lexicon session. Then café in Marszałkowska; Leśniewski and Kotarbiński walk me to the hotel [Twardowski 1997. I: 54].

▪ 21 June: at the Ministry from ten to half past twelve with Leśniewski [Twardowski 1997. I: 54].

▪ 22 June: Then [after six pm] tea with Łukasiewicz, Kotarbiński, Tatarkiewicz, Leśniewski, Znamierowski, Chojecki ... in Marszał-

kowska until half past seven. Łukasiewicz and Leśniewski walk me to Foksal [Twardowski 1997. I: 55].

- 24 June: At my place from twelve to two, working with Leśniewski [Twardowski 1997. I: 55].

- 25 June: [After seven pm] at the Leśniewskis'. Walk with him to the [Philosophical] Institute. Review of the Institute's bills: Łukasiewicz, Znamierowski, Chojecki, Tatarkiewicz, Zabielski, Kotarbiński. Then café together from ten to eleven. We get back together. Kotarbiński, Leśniewski and Zabielski walk me as far as the hotel [Twardowski 1997. I: 55].

- 31 October: [Around noon] I went to a meeting with Łukasiewicz at the *Empire* café in Krakowskie Przedmieście. Łukasiewicz excused himself for an hour as he had to be at the session of the Philosophical Seminar. He came back an hour later with Kotarbiński, Leśniewski and Czeżowski. All of them and others were at the session, which happened to be held on this day, where they decided to publish a collected edition of my works unavailable in print because of my approaching 25th anniversary of academic activity! [Twardowski 1997. I: 67].

Lvov, 1919.

- 21 May: Then [around noon] conversation about Leśniewski with Wartenberg. Wartenberg is firmly against his habilitation [Twardowski 1997. I: 104].

Warsaw, 1919.

- 28 June: Breakfast at ten together with Kotarbiński at the café on the corner of Nowy Świat and Three Crosses Square. We talked about the issue of Tatarkiewicz and Leśniewski. I told him about Wartenberg's attitude [Twardowski 1997. I: 111].

- 29 June: [In the afternoon] I discussed Leśniewski's matter ... with Łukasiewicz (the Department of Philosophy of Mathematics) [Twardowski 1997. I: 112].

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- 1 July: [In the evening] at *Warszawa* restaurant in Nowy Świat, I spent the evening with Czeżowski, Kotarbiński, Borowski, Leśniewski, Chojewski, and Radecki, who joined us later. Leśniewski elaborated on the principles of his new general axiomatics, whose first axioms states: If *a* is *b*, then *a* is *a* [Twardowski 1997. I: 113].

- 6 July: Then [around noon] discussing three cases with Sierpiński: Leśniewski's, Steinhaus', Żyliński's [Twardowski 1997. I: 115].

Warsaw, 1926.

- 28 March: From eight [in the evening] until twelve with Kazik [Ajdukiewicz], Kotarbiński, and Łukasiewicz at the Leśniewskis. He turns 40 today [Twardowski 1997. I: 236].

- 17 December: Dinner with Kazik [Ajdukiewicz], afterwards Kotarbiński and Leśniewski join us [Twardowski 1997. I: 282].

- 20 December: With the Kotarbińskis and the Leśniewskis from five to eight [Twardowski 1997. I:283].

Lvov, 1927.

- 24 March: Maryna [Ajdukiewicz] told me about unpleasant situations experienced lately by Kazik in Warsaw from Leśniewski and W. Witwicki [Twardowski 1997. I: 300].

Warsaw, 1927.

- 27 May: About ten, I visited Kotarbiński for a quarter of an hour, then W. Witwicki until twelve. On the way to visit him, I met Leśniewski on the stairs [Twardowski 1997. I: 309].

- 28 May: After dinner [late in the evening], an hour at the Leśniewskis, where Łukasiewicz also came [Twardowski 1997. I: 310].

- 20 September: After the paper of Iza [Dąmbska, during the Congress of Philosophical Circles, probably after one o'clock], I had a short private conversation with Leśniewski [Twardowski 1997. I: 324].

Warsaw, 1928.

- 13 May: Afterwards [around noon], visited Kotarbińskis, Łukasiewicz, Leśniewskis [Twardowski 1997. II: 26].

Warsaw, 1929.

- 30 May: At Leśniewskis about two o'clock [Twardowski 1997. II: 74].

Lvov, 1930.

- 11 January: The Commission [of the Faculty of Mathematics and Natural Science at the Lvov University] collected . . . opinions [on candidates for the Chair of the Department of Logic]; they were obtained from Kotarbiński, Leśniewski and Łukasiewicz, as one common opinion from Warsaw, and from Rubczyński, Heinrich, Garbowski and Wilkosz, also together, from Cracow [Twardowski 1997. II: 110-111].

- 24 January: Against the advice of Leśniewski, Kotarbiński and Łukasiewicz as well as mine, The Council . . . [of the Faculty of Mathematics and Natural Sciences at the Lvov University] resolved to propose Chwistek, rather than Tarski, for the position of Chair of the Department of Logic, which they intend to create [Twardowski 1997. II: 112].

- 27 January: In the evening, a meeting of the Directory of the Polish Philosophical Society. Having listened to a report by Kazik [Ajdukiewicz] about his conversations with Kotarbiński, Łukasiewicz, Leśniewski and Tarski (Kazik returned from Warsaw this morning, where he went last Thursday evening), the Directory unanimously resolved to continue to pass the responsibility for the organization of Polish participation in the 7th Philosophical Congress, which is to take place in Oxford, to the Warsaw Philosophical Society [Twardowski 1997. II: 113].

Warsaw, 1930.

- 26 May: Then [around noon], visiting W. Witwickis, Kotarbińskis, Leśniewskis. . . . Leśniewski told me about the reasons why he is not

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continuing to include his German paper in *Fundamenta Mathematicae*. He revealed the mystery of his interesting relation with local mathematicians, especially Sierpiński [Twardowski 1997. II: 133].

Biesiekierz, 1930.

- 12 August: Those following Leśniewski's formula very arbitrarily demand analysis where it is convenient for them, yet, when someone demands analysis from them when it is inconvenient for them, they refer to "intuition". [When] an opponent also attempts to refer to "intuition" in a discussion, they respond: "We do not understand that which, according to you, is intuitive" [Twardowski 1997. II: 149].

Lvov, 1932.

- 7 April: Kazik [Ajdukiewicz] [was] at dinner. . . . He also told me that Professor Leśniewski from Warsaw, who the Polish Philosophical Society decided to invite to Lvov for a lecture, did not accept the invitation [Twardowski 1997. II: 211].

Lvov, 1933.

- 13 October: Kazik [Ajdukiewicz] told me that he saw Chwistek, who manifested a desire to establish contact with him and maintain scientific relations. Chwistek also declared that he has nothing against Kazik, except the fact that he acknowledges Leśniewski [Twardowski 1997. II: 308].

Archiwum Uniwersytetu Mikołaja Kopernika w Toruniu
[The Archive of Mikołaj Kopernik University in Toruń].

- Warsaw, 9 June 1918

[To Tadeusz Czeżowski:]

. . . Together with the enclosed letter, which I ask you to pass on to my wife if you would be so kind, I send you cordial greetings from all the local philosophers. The group of local philosophers has expanded lately

with the addition of Stanisław Leśniewski, who returned from Moscow with his wife and brought with him a book entitled *Foundations of the General Theory of Sets*. I [Leśniewski 1916]. The author of this book is delighted to be breathing Warsaw air again. . . .

Today a meeting at the Institute of Philosophy took place, during which Leśniewski presented a lecture on antinomies. He found a general method to solve them all and today, he presented a few attempts at this method. Other people present included Łukasiewicz, Kotarbiński, Tatarkiewicz, Mazurkiewicz (a mathematician), Janiszewski, Halpern, Zieleńczyk, and Znamierowski.

4 FROM WŁADYSŁAW WITWICKI'S LETTERS TO KAZIMIERZ TWARDOWSKI

Archiwum Kazimierza Twardowskiego w Warszawie
[The Kazimierz Twardowski Archives in Warsaw].

■ In Warsaw [fall of 1919].

. . . Professor, I was very glad to read your article in *Ruch Filozoficzny*.⁵⁵ The article was even more engaging since it seems logically connected with my review, which appeared in print simultaneously.⁵⁶

I am racking my brains about what Wolski actually intended to convey, what he was thinking, as he writes unclearly, and the Professor says: "Do not wonder about obscure writing, since if someone speaks or writes imprecisely, he also thinks imprecisely; therefore, it is a waste of time".

I am of the same opinion. Still, I have a certain problem with the notion of unclarity, since it raises the question whether whatever is

⁵⁵ The article in question is [Twardowski 1919].

⁵⁶ This is about the review of [Wolski 1918] in [Witwicki 1919]. W. Wolski's retort was published as [Wolski 1919].

unclear for me is perhaps clear for the author, or even not-an-author *x*. When writing about “projection”, Wolski felt and was convinced that there could be nothing clearer. I do not know whether he has retained this view now, despite the review. He states that it is clear; I say it is not. One of us is wrong. He claims that it is me, I claim it is him. As a result, *e.g.*, Leśniewski says that neither I nor Wolski express ourselves clearly, as we use terms which we have not established axiomatically. The only obvious thing is his set theory and, to a certain degree, Russell’s *Principia* [Whitehead & Russell 1910–1913]. Everything else is fiction, which should be eradicated.

What can be done about it? I still read more understandable works even though they were not written *more geometrico*! I understand that “a clear sign” means one that is (1) unequivocal, and (2) characteristic. However, it seems to me that one can be clear in his writing without necessarily resorting to axioms, but only by appealing directly to manners of reacting common to both the author and the reader. The mother’s smile is clear to the child and spitting on his palm is clear for a peasant, even though they have not established relevant axioms. These things somehow get from person to person directly, through association.

Is there not some sort of clarity in writing, besides mathematical form? It seems to me that perhaps there is.

This seems like a significant issue to me as, just like you, Professor, I have long defended clarity, and then there are some who outdo us both, saying: “Clarity begins with us. Before us, there were only works of fiction and ‘mess’”. *Ex Oriente lux*.

Whenever Leśniewski does not know how to respond to something, in order not to fall into contradiction, he calls out with a voice of innocent sincerity: “I do not understand anything!” For him, everything is unclear, besides set theory.

Kotarbiński suffers from chronic intellectual obstruction, since he is afraid to write anything; whatever he writes will be unclear to Leśniewski, who has him on a leash like a bear and keeps haunting him with set theory and antinomies.

In the Psychological Society, some youngsters present such clear things now and again that minds are getting darker and emptier. This clarity sometimes consists in putting a slight amount of arbitrarily chosen features into the chief concepts and assumptions and then working on them in a reliable way; yet, this sort of clarity seems more similar to poverty to me.

Time and again, I would even be prepared to forgive certain lack of clarity as long as I felt that I have finished reading someone's book smarter or better than I was when I began.

I am leaning towards "a defense of fiction". I begin to think that science is not only about constructions of glass, steel and concrete, but also about digging within reality, opening people's intellects to things hitherto concealed, and putting human souls in more beautiful positions than before, simpler and more natural ones. Certainly, this work requires light and it is worth nothing when it is obscure, but I truly sometimes wonder whether this clarity is a sufficient quality of scientific work, even though I would agree that it was essential, as long as there is no misunderstanding as to what CLARITY means. . . .

■ In Warsaw, 11 January 1920.

. . . Thank you very much for your kind letter of 5 January 1920. It is, after all, like a piece of conversation. . . .

I do not even know well myself which one of my teeth hurts when Łukasiewicz and Leśniewski sit beside me and chatter about "sentences" as if it was a matter of grammar, and about words, instead of things, objects, facts, statements, negations, cognitions, the objective world and the cognitive subject as well as their interrelations, but instead, about words, words, words. . . .

I am only interested in sentences because of the thoughts expressed in them, views revealed in them. . . .

I cannot begin to doubt the existence of qualities just because Leśniewski plays tricks on the word "quality" and, influenced by these tricks, Kotarbiński earnestly theses that he does not believe — in any

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qualities, that he does not accept qualities. He states that therefore there is nothing IN COMMON between one white sheet of paper and another white sheet of paper. Both are white, but there is nothing which would be COMMON to them. Whiteness does not exist, nor does anything of the sort.

So I asked Leśniewski once in a discussion,

— Does a shape exist?

— It does not.

— Then, according to you, are color and shape the same thing or something different?

— I do not know; I know nothing about whether they are the same or not the same because this does not exist at all. I do not know anything about it and I do not understand anything about it.

— Then you do not know if color and shape are something different or if they are not different?

— I do not.

— Then you do not differentiate between color and shape? Then I am very sorry for you. You must be very miserable. This is close to confusion. This is the first time I have heard of an illness where someone does not see the difference between color and shape.

Then Leśniewski cracks up and repeats eight times, “That’s right”, which in his axiomatics does not at all mean agreeing with anything, but only proves that the speaker is thinking about something else; in the end, he calls me a sophist. Two days later Kotarbiński, wishing to spice up his lecture about the rules of conducting a dispute according to Aristotle, quotes the fragment of the discussion he learned about from Leśniewski as an example of sophism. This is where the discussion breaks off.

I know well that he wanted to say or should have said: “I do not see the difference between “color in general” and “shape in general”, or “color which would be an ideal object of an abstraction”, and an ideal shape which would be “an ideal object of an abstraction”, as I do not believe in the existence of ideal objects of abstractions and I cannot

distinguish things whose existence I do not believe in. (The question is, is it obvious?) On the other hand, I do differentiate between specific real colors of real shapes of concrete objects.”

Yes, I know this much. Still, I wanted to demonstrate to him that he nevertheless, willingly or unwillingly, distinguishes color from shape, and more importantly, that he cannot do without these concepts, and without concepts in general, and that he uses them himself, and that he intellectually associates with the objects of these concepts, although he obscures them from himself and others.

Another time then, when talking to Kotarbiński, I pressed him some more. I asked him to tell me sincerely and honestly whether, when he is comparing two ROUND bowls and calls them similar according to his best knowledge, and he is convinced that they are similar, something other does not come to his mind, apart from these two bowls which would still be represented in both of them. Does he not feel, is he not under the impression that they would not both be round if they did not have something in common with something third, the same for both of them: with a CIRCLE which is exactly the same for one and the other bowl. Not a circle here and now, but SIMPLY a circle, not necessarily this one here and now, lopsidedly drawn on the marble tabletop at a café, since after all it also has only a little in common with the circle proper. He responds to that:

— Oh yes, I know this very well. It also irresistibly comes to my mind, but I am afraid of it, I refuse to make such hypostases, as it leads to terrible consequences; it leads one terribly astray without a way out. This is the same damn thing as qualities. It's awful! One should stamp it out and fight it off. This is merely imperfect speech leading us to such disastrous theses as the ones about ideal objects, or qualities, *etc.* If language was perfect, we would not make such terrible mistakes. In fact, only solids exist; individual, specific solids and nothing else.

Naturally, this is repeating Leśniewski's words like a prayer. He taught him that only solids exist, as set theory can work only for solids. What they do not take into consideration, as far as I can see, is that “a solid”,

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or even “a specific abstract solid”, is an expression, it does not concern a CONCEPT after all, something which is not a solid in itself and is one thing only whereas there are many solids.

By and large, they do not discuss concepts at all. There are only solids and their written or spoken symbols. Their nominalism or terminism are radical. I feel like I am suffocating in this atmosphere. They only talk of words, and if b then if a then b , and the principle of reduction, and logic without the principle of reduction, and with the theory of types, or without the theory of types, logical products and sums, three-valued logic with or without truth, and any chosen groups of axioms, where truth is tortured together with common sense. If at least one became wiser from this whole kit and caboodle, and if it was useful for any scientist!

But no, these people all but ignore their intellectual needs in the fields of ethics, aesthetics, politics, daily life and its forms, natural science, emotional culture, and in any other respect apart from algebraic logic, and describe it all with any random unreliable catchword.

It is no matter, they say. After all, we cannot think precisely there anyway, since everything is so chaotic, and proper understanding of these things should be postponed. These issues are too difficult to deal with. There are no small quantities, clear main principles, and you never know which word is logically first and which one is next, which one is defined with which, and so it is better not to speak of these things at all, and it does not matter who talks and what he says about them. This is within the scope of individual psychographics without any meaning. This is a free for all, or rather, nothing is allowed if one wants to be an intelligent slave of set theory and formal logic, instead of a crowned ignorant, as stupid as Prantl. Because Leśn[iewski] calls Prantl the stupidest of people. Compared to him, Halpern is an intelligent man.

Also, Leśn[iewski] loves to read Kraszewski, and greatly values Żeromski for writing in the 2nd volume of [the novel] *Charitas*: “Shut your mouth or I will piss in it”, which is all very nice. Nikodym in Cracow believes that the bacteria of venereal diseases came into being through

the degeneration of leukocytes of lecherous people, as a punishment for their carnal sins. Chwistek supports in speech and in writing both futurism and formism in painting, or rather, smearing over paper or canvas, defacing exhibition halls (because in my opinion there are no trends like that in art as long as painting is a form of art). Łukasiewicz invites the maniac Pronaszko to conduct a lecture at the Psychological Society about new trends in the visual arts, even though he can hear how this poor man babbles as if he was feverish and does not know himself what he is talking about. Kotarbiński supposes that compassion is a result, or a product, of Catholicism.

You can never hear a conversation about any of the topics which concern a cultural person besides set theory; a conversation in which people would attempt to formulate and specify their position on manifestations of life and science, seek the general premises these positions are based on and check whether they are obvious or not, self-contradictory or not, true or false, or neither. I can never see any people here who would be willing to process intellectually a rich emotional and active life, would like to understand what they feel and act as they understand. Like hell, they do! They feel and act as any apothecary, or a professor, or a priest in a provincial town. What is supposed to define them is the ability to compose very difficult “sentences” in a certain complicated order, or rather, in various orders depending on an arbitrarily assumed principle. But what good does it do, what result is it supposed to render? I still do not know for sure. Anyway, it is certainly not very amusing.

However, I would still not be able to make an article out of this crudity, even more so as I do not know for sure if I would write it in accordance with your line of thinking, Professor. I do not know exactly which thoughts you indicated as the theme of the article. I can generally feel bile rising *adversus mathematicos* but, as they say, we should choose one and support it well. We should formulate clearly even those pretenses and delusions of certain mathematoids, as well as their own charges against them. The thought that you would gladly read my article in this

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matter shall be a great and pleasant incentive for me. I would not feel like writing at all without incentives of this kind.

Still, as they say, because I have not got the whole thing figured out yet, I cannot promise an article for as early as 22 January. . . .

My “activity” in Warsaw is of no use, since Leśniewski and Kotarbiński spread the opinion about me that I am an obscure writer and illiterate for good measure, wherever I speak about anything. This does not personally concern me, and it does not hurt me at all. Yet, I doubt that a young person who is thus prejudiced against me would be willing to listen to me without bias. Besides, I do not know enough professional sources to impress young people with quotations and authors, and this is the fashion in many circles here. Even referring to authorities. (NOT for logicians.) . . .

■ In Warsaw, 16 January 1920.

. . . Yesterday at the café there was talk of your moving to Warsaw for good, Professor. Even before my stay in Vilna, I was a member of a Committee which unanimously supported inviting you to the University of Warsaw for taking up a chair *ad personam*. During my absence, this motion raised by the Committee was adopted by the Faculty, and now, the issue is apparently only about pressing the Ministries to make them subsidize the department.

In the café, Leśniewski and Kotarbiński, who turned up unexpectedly, raised this issue, saying that it is very good that T[wardowski] is coming to Warsaw, and asking everyone present whether they are glad of it or not.

I asked first of all:

— How do you know that he is coming? They are asking him, but whether he comes, that is another matter. It is perfectly possible that he will not want to.

— Well, they say so; there is hope he will come.

— What is it based on?

— It can be inferred from letters.

— Well, then I say, I feel very sorry for him.

— Why? Aren't you glad he is coming?

— Well, I am and I am not. I am glad for my own sake and the University of Warsaw, but I am altogether not happy for his sake. It will be very pleasant and useful for me to see him sometime and talk, discuss various issues and questions; this is what I am looking forward to. The youth will benefit greatly, perhaps some activity will finally develop in philosophy in Warsaw. Still, I feel sorry for the Professor himself for this unfortunate move and these crude conditions here, and apart from that, it seems like a shame to let him leave Lvov.

— What conditions?

— He will not have an apartment here, he will waste his time pointlessly trying to settle matters which should be worked out on their own. He will have to assert things, press issues, remind people of things, wait in vain, he will be disappointed, *etc.* He will get into all these high costs, incompetence, stupidity, lack of respect for other people's time and property, crowds, arrogance, logistics and set theory. I understand that people could be sent to Warsaw as a punishment for a while, but to drag people of great merit here? Besides, he has a full library in Lvov, a peaceful institute, and here, he will not be able to find books, nor will he be able to bring them from Lvov. I am worried that Lvov will lose him and Warsaw will begin to devour him day by day with the insufferable daily grind and work relations. Since people not fulfilling their commitments were often maddening for him in Lvov, what will he say here?

— Oh — they say — but he will organize, he will have greater range of opportunities to act, he will be in the center of events here, where he should be, where he will finally be able to do what he wishes to.

Then some elderly chap, not even a philosopher, and not really an important figure, smelling of medicine, says:

— Gentlemen! I do not think it is good of you to invite him to Warsaw. First of all, why deprive Lvov of him? Who will be left there? You surely cannot leave Lvov like that. This is a borderland city, my good man!

CHAPTER III

— But, they say — that is, Leśniewski is talking and Kotarb[iński] is nodding — what do we care about Lvov? We only care about the University of Warsaw. Let them take Tatarkiewicz, and there is already Ajdukiewicz there, this should be enough. They can get Chwistek as well. Tatarkiewicz will be excellent. Wrzosek has already spoken to him, and they can also invite Ms. Joteyko.

— And who will remain in Vilna if Tatarkiewicz leaves? After all, he [is] the only one there.

— Well, tough luck. What do they need so many universities for there? We've made too many, nothing to be done about it now.

— But Tw[ardowski] — the figure says — will not come to the University of Warsaw anyway even if he comes. He will join the government here rather than the academia. Why make him come then?

— What does it matter? — says Leśniewski. — After all, we could have been against inviting Professor Łukasiewicz to the University of Warsaw, as he may have become a minister, but nothing bad happened in the end. He was a minister, he stopped, and he will lecture again. About Twardowski, let him be a minister. He would introduce order and peace. It would be better to have him than Łopusz[ański].

— Right you are — adds Kotarbiński — let him even become the Prime Minister. He would be very useful. This does not interfere with academic work, on the contrary. He can do it and will do it well, and he can always come back to philosophy.

— But gentlemen — continues the other — Professor Łuk[asiewicz] is an entirely different case. It is different when someone becomes a minister because he is FORCED to, because there is such necessity, because he MUST, even if he does not wish to, and it is entirely different when someone STRIVES to become one.

Someone responds to that:

— Have you ever seen Tward[owski] STRIVE to obtain any power? He was given some; that is for sure. But, as far as I know, it was HIM someone was trying to get, but I have never heard of HIS attempts. Have you?

— No; I am not saying that he is striving for it, he is asking for it. Not at all. I am not saying that at all. But, gentlemen, he may strive for it in different ways. He may for instance only hint at it, he may direct someone's attention at the issue. There are different ways of trying to achieve something, you do not necessarily have to STRIVE!

— Do not worry about it! I do not believe any misfortune awaits Poland or the University if Tw[ardowski] takes over this or that power. The Lvov University benefited from it. During the war, they wanted him to become the Rector three times, as he did well, so there is no need to be worried about any of this.

— Well, no, I do not mean being afraid. But it is always about power. Then why drag him out of Lvov? He is needed and useful there, and there is no one to replace him there, unless one of you goes, and he comes here to govern. Then he shall be in the government. This is how it is. You shall see.

Leśniewski, seeing that he has no one to talk to, says:

— No, you have not convinced me at all, although I am not a stubborn person. I am serious. I am easily convinced in everyday matters. Yet, I am not convinced at all. Not at all. Seriously, I am very glad that Tw[ardowski] will be in Warsaw.

— And you, Professor, why are you so silent? Why are you not saying anything? — he added, talking to Łukasiewicz, who could not respond to him from across the table, as he was just interpreting for Kotarbiński some passage, suspected to contain three-valued logic, from Aristotle's *Hermeneutics* right under my nose.

Later, when we were walking down the street, Leśniewski asked me, laughing:

— Why did you act so surprised when I asked Łuka[siewicz] why he was not saying anything? After all, as you know, I am notorious for being *l'enfant terrible*; therefore, I can allow myself to ask such naïve questions. This does not matter.

— Yes, but why did you ask at all? You could hear the echo anyway. Why ask about it?"

— Never mind — he responds to that.

... Now I am spreading nasty rumors. Still, I feel like I cause no disagreement. Isn't it good to know the ground on which one is treading?

■ In Warsaw, Thursday, 29 April 1920.

... Today, I had a lecture on [Plato's] *Phaedrus* in the afternoon. ... The room [was] FULL in this lecture. That is the worst, since a lesson in an overfilled classroom is of no value. A three-hour psychology lecture is attended regularly by 307 or 314 people. This includes crones from the town flocking to the lecture hall, some school-mistresses, schoolgirls, old ladies.⁵⁷

Leśniewski came once. He praised the method, since I try to ask questions at the auditorium as I would in a classroom as much as possible, but he accuses me of taking about dispositions, as these are “hypostases”. And he is an ass. And I'm saying this without hypostasis. Together with my mathematoidal pretenses.

They cast that logical mathematics and mathematical logic of theirs in the crowd which does not know how to answer questions, cannot pose a question, and cannot put three words together in a sensible sentence. ... I doubt that culture of logic, which you wrote about rightly in *Ruch* [*Filozoficzny*], will emerge from such higher, tree-valued, non-Aristotelean logic. ...

■ [In Warsaw,] 15 May 1920.

... In my lecture I discussed the subject of psychology in general and I outlined a few positions in the field of theory of cognition I got to the theory of cognition on purpose, because Leśniewski believes this whole path to be worth as much as palmistry, and Kotarbiński leans towards “consistent” materialism. He mentioned in the winter that he has “solids” on his mind (and that this is not hypochondria but rather an epistemological standpoint) so I thought it may be useful to the students to hear something about solids and matter

⁵⁷ Cf. below, footn. 60.

■ [In Warsaw,] 27 May 1920 — in the morning.

... I feel uncomfortable speaking about the relation of psychical and physical facts, about the CAUSAL relation, or whatever it is, when Leśniewski regards ironically any determinism in facts, understanding as much as: if *a*, then *b*. ... Łukasiewicz has always talked about the so-called theory of cognition ironically; ... Kotarbiński has solids in his head instead of psychical facts; whereas Segal is not interested in it at all, as this is philosophy and not psychology. ...

■ [In Warsaw,] 11 June 1920.

Dear Professor,

... Leśniewski caught up with me yesterday:

— Did you read Tward[owski]'s letter to Kotarb[iński]?

— I did not.

— You are mentioned in it.

— This is not a very engaging subject. Was there nothing else interesting in it?

— There was. He wrote that you should take over the regular Department of Philosophy instead of going to Vilna, as Kotarbiński is saying that you are plotting with the University of Vilna against Warsaw. I have long believed that you should teach philosophy in Warsaw. Tell me, what draws you to Vilna?

— The opportunity to work for myself, a better salary, which I desperately need, and a conviction that I can be of use there although I will be working less. Here, on the other hand, no matter what I do, the work is for nothing, and both me and my students are wasting our time. You two [*i.e.* Kotarbiński and Leśniewski] will be the first to become deeply convinced that everything I do and say is useless hassle, fiction, literature and wasting everybody's time. This is how it is. After all, you have to admit that you only tolerate me because of our friendship, whereas those in Vilna...

— Oh, no, no, no! Nothing of the sort! The issue is like this: you speak so badly that I do not how to describe it. We all like you so much

here, is what I wanted to say first. We all like you so much, but no, I can't even, because you speak so badly, you understand? We like you so much here that no one will speak badly of you. Me, on the other hand, I believe that you will speak in an intelligent way about things which cannot be discussed in an intelligent way. I had always claimed that you are like a baby in the matters of logic, but I realized that it is on the contrary: you think very logically; I am serious; logically for a philosopher. You do understand that a philosopher cannot be logical. Right? But do not take seriously what we say about philosophy in private. After all, you can also laugh in private at some sort of signs and mathematicians...

— I am not laughing.

— But you can. We also talk about philosophy in private, because we can. You needn't worry, then, none of us will speak ill of your work. On the contrary, it was me and Kotarbiński after all who successfully brought you to Warsaw. Through Michalski. Through the Stabilization Committee. This was all our idea. And now, a few days after Tward[owski]'s letter, Kotarb[iński] says among friends that you have to be made full professor and be given the Chair of Philosophy. I objected, since I didn't know yet that you want to leave for Vilna, and I am essentially of the opinion that becoming full professor must be preceded with contribution of a new scientific fact. Therefore, I was generally against. Then he said that you published a volume of Plato in the meantime, so it could be done, and when I objected, he says: "Then we will lose a professor". Why? "Because he is going to Vilna to become full professor, to the Fine Arts Faculty." Well, this is another matter then. When you transfer to another faculty, I believe you should always move to a higher position. Therefore, they have to make you full professor in Vilna, as it would not be proper to offer you associate professorship. And here you could also be full professor. I have been a patriot of the University of Warsaw for as long as I've been in Warsaw and I want the best people here. So I will also support your full professorship.

— Ah, you see: you have to coerce your scientific conscience to accept Plato as scientific work, and those in Vilna will regard it with the greatest appreciation.

— But only think! Who will you talk to in Vilna? You have to admit that we are intelligent. We are, right? And in Vilna, you'll have to talk to stupid people all the time, only stupid people. There is no one here to talk to about painting, but you can find that outside of the University. There, you will be able to talk about painting, but only with stupid people. It's not worth it!

— But I'll be able to do what I like.

— You can also lecture on what you like here. Philosophy, the way you want it. The philosophy of art or whatever else, because you'll do it in an intelligent way after all. And you will get full professorship here just as you would there, and even an apartment.

Someone interrupted our conversation. . . .

■ In Warsaw, 3 December 1920.

. . . Kotarbiński told me yesterday that he sent an article to *Ruch* [*Filozoficzny*] against the adjective “philosophical” and the noun “philosophy”.⁵⁸ Leśniewski has long claimed that philosophy is something which does not exist. He states that as long as some kind of science was vague and of little value, it was called “philosophy” and whenever one of them became more respectable, it turned into a discrete branch of science. One needs only mention physics, which originated from philosophy. The same is said of logic, which now denies any association with philosophy, and of psychology, which ceased philosophizing and only measures reaction time. They say that the theory of cognition does not exist at all; only Ingarden is left to play with it in an ugly way. Soon, only metaphysics as the theory of objects will be left. Still, it seems that even that will be killed off with set theory or some other similar thing. Ethics and aesthetics also don't qualify for

⁵⁸ The article was released as [Kotarbiński 1921].

some reason, or they will turn them into deductive theories of a given section of facts, based on prearranged definitions and axioms.

Thus, they point disrespectfully fingers at a person who would still like to study philosophy in a science department. The history of philosophy is seen as the history of, *e.g.*, palmistry, astrology, white and black magic, *etc.* . . .

I do not believe there is contradiction between . . . your standpoint, Professor, and Leśniewski's. He states: "I call philosophy something which is not science". Your view is similar, Professor, since something in between science and something else is something else, NOT SCIENCE, but something in between. . . .

■ In Warsaw, 3 January 1921.

. . . Here [in Warsaw], . . . "philosophy" is a scandalous word. Leśniewski has long bitched about all philosophers and regards philosophy . . . as an indecent, if not dishonorable, pursuit. Łukasiewicz also stated at a lecture about determinism: "We would like to take it seriously, in a scientific, precise way, instead of philosophizing about it". . . .

■ [In Warsaw,] 4 July 1921.

Dearest Professor!

This is what Leśniewski calls me and I do not enjoy it. I will write to you in this manner, as I am still too shy to write "Kaziu"⁵⁹ to you. But I will get used to it and become bolder in time. . . .

Nawroczyński told me that you recommended Witwicki to him as the best author of future handbooks of propaedeutics. I blushed with embarrassment Fortunately, Nawroczyński is not in a hurry and will let the script to be handed in in two to three years.

And if I dared to let out into the world logic the way I like it, so amateurish, non-algebraic, non-deductive; since, as I hear, deductive

⁵⁹ "Kaziu" is a diminutive vocative from "Kazimierz".

means mathematical and symbolic, I would be publically expelled from science and education in Poland. Leśniewski says, and Kotarbiński confirms, that classic logic is only some sort of hassle and it has nothing to do with science, as nothing results from anything there; just like sociology and other palmistry. Being expelled does not frighten me much, but perhaps it would be more momentous if someone said: “How dare you teach logic at school if you do not know Boole, Russell, Peano and whoever else! You are not familiar with contemporary science.”

That would be painful and probably right, and to get into those issues having psychology in one’s mind, which in itself constitutes a dense forest, and Plato, who I would not want to neglect, does not seem like an easy feat. On the other hand, I get the impression that the new, fashionable logic only educates the wonderful sheenies⁶⁰ and that only in a narrow range, but does not set an intellectual backbone for young people as it should. We spoke about it briefly in Warsaw. This motivates me and encourages me to work again. . . .

■ In Warsaw, 20 January 1922.

. . . Leśniewski mentioned to me apprehensively that allegedly you were inclined to come to Warsaw, but only under the condition that Łukasiewicz go to Lvov. I do not know if he heard it somewhere or imagined it, but anyway, he could not bring himself to spare Łukasiewicz, since although he believes his three-valued logic to be a toy without consequence, he still considers him to be a great scholar who he would like to keep at the University of Warsaw at any price.

I have no opinion about this whole issue. If I cared about the University of Warsaw more than I care about you, I would make

⁶⁰ This is a reference to the fact that a large portion of the students, and very talented ones, centered around Łukasiewicz and Leśniewski, were Poles of Jewish origin. The condescending-ironic manner in which Witwicki speaks of them is not at all indication of his antipathy towards people of Jewish origin as such — just as the sarcastic remark cited above that his lecture was attended by “crones from the town, school-mistresses, schoolgirls, old ladies” — is not at all indication of Witwicki’s aversion to women. By the way, Witwicki’s second wife was a Pole of Jewish origin.

a scene so that you necessarily come here at any cost. Yet, I am not a Warsaw patriot, or a the University of Warsaw-iot at all. They want to do mathematics and let them do it; this is also a harmless way to spend time and provides salaries for the lecturers, an academic mood for some students and PhD titles for a few Jews⁶¹; in the end, a university rarely performs other functions, no matter what is said in the department. The anti-philosophical direction which philosophy assumes here will be recorded in history just as the revival of philosophy in Lvov was 25 years ago, when you stared work there. It can be done either way. . . .

■ Warsaw, 18 February 1922, in the morning.

. . . I provided an explanation to Leśniewski concerning the exchange between you and Łukasiewicz, based on the postcard you sent me in this matter on 20 January 1922. He, Leśniewski, added then that Łukasiewicz had always presented the project of this exchange as HIS OWN PROJECT RATHER THAN YOURS. . . .

In Warsaw, 20 May 1922.

Dearest Professor!

. . . I am glad that Gorgias speaks with my voice and about the commentary as well. Though, I am slightly anxious about the commentary; whether I wrote something foolish when accusing Socrates of a lack of logical correctness.

I have the impression that Plato's Socrates often takes words for things and features, or perhaps, he believes wherever there are two words, there are also two objects, and wherever a new word appears, there is also a new thing (Possibly only "a categorematic word"). I concede that wherever there is a categorematic word, there is also some sort of *ens*, some *essentia*, *aliquid*, something, but not necessarily *existens*, a real object! . . .

It necessarily seems to me that in *Gorgias*, Socrates was misled: good is not pleasure, although it sounds impressive in his words I analyze it in the commentary, as well as other matters discussed there, and I believe Socrates is wrong. Plato is seduced by words. I did not

⁶¹ Cf. the above footn. 60.

encounter my objections in any commentary, but I cannot know for sure whether I am not mistaken.

Nobody will tell me that here, as Łukasiewicz regards this text with a patronizing smile full of innocent sweetness, as he does the texts on Sherlock H[olmes], to which he gladly devotes moments free from serious and truly significant studies on the most appropriate interpretation of three-valued logic, *etc.* Leśniewski does not read it at all, he only puts it on his shelf with the whole set, and I rarely see Kotarbiński, and anyway, I prefer listening to Leśniewski himself than to hear the same he would say from Kotarbiński. . . .

■ In Turin, 16 June 1924.

For the last two weeks, the Leśniewskis were also there [*i.e.* in Italy] and I acted as Cicero towards them. This did not prove hard since he knows as much about history and art as I do about logistics. Thus, during the day, I had to tell him who Laocoon was and what happened to Proserpine, and in the evening he tried to convince me that the limit of an (infinite) sequence of points is “a point whose every environment includes all points of a given sequence, beginning from a given one”. I learned this expression, because it was supposed to be an antidote for the concept of infinity, which is hard for me, but in the end it turned out that this expression agrees well with the notion of infinity and with the notion of finiteness as well. He praised it because there is no word “infinite” in the expression, but only the word “every”, which has been specified before and its use is permitted.

I could not care less about how someone established the sequence of acceptable and unacceptable words. I only mean that the view of a straight line segment is not divisible to infinity. Only within the boundaries of visual acuity can we construct it from a FINITE number of dots, of elements. Elements visible to the naked eye, let me add. When we take the microscope, this “naked-eye” element becomes a segment, again divisible into a finite number of discernible elements. Still, there is a limit to magnification. Much can be said about it, but writing is

harder or impossible. A letter is not a lecture and, what is worse, not a conversation.

- In Warsaw, 29 October 1924.

... Hardly had you left when Kotarbiński proposed continuous Master's Degree studies during the meeting of the MA Committee, in accordance with what you were saying back on Sunday, and what I had abandoned in the face of a majority of votes against it. Is this not a miracle? Leśniewski began shaking with terror, then began to rave to Kotarb[iński] so devastatingly that Kotarbiński would soon perish, as any contradictory object. L[eśniewski] started to write the *votum separatum* in a nervous fashion, until Łukasiewicz managed to calm him down with some difficulty. ...

- In Warsaw, between 28 October 1925 and 12 January 1926.

Leśniewski and Kotarbiński stated that they would ruthlessly fight Joteykówna [as a candidate for the newly created Department of Child Psychology at the University of Warsaw], and that was based on MY OWN reviews and my own impression after a conversation with her! They want Segal.

5 KAZIMIERZ AJDUKIEWICZ: STANISŁAW LEŚNIEWSKI'S CONTRIBUTION TO PHILOSOPHY (1926–1960)

5.1 *Terrain*

Kazimierz Ajdukiewicz, "Logiczny antyirracjonalizm w Polsce"
[Logical Anti-Irrationalism in Poland].
Przegląd Filozoficzny, vol. XXXVII (1934), No. 4, pp. 403-404.

Leśniewski's activity ... includes ... the whole field of mathematical logic. Leśniewski built a complete system of the foundations of

mathematics, coinciding in its scope with Whitehead and Russell's system, but much better than it in terms of precision. The system consists of three parts: protothetic, which encompasses the whole theory of deduction together with the theory of apparent variables, which is based on only one axiom about one primary term. The second part is ontology. The choice of the name for this theory was not only the result of the fact that its only axiom contains (apart from terms drawn from protothetic) one constant, "is", "ἔστι", but also its creator's conviction that it fulfills Aristotle's program *πρώτη φιλοφία*, as the most general theory of objects. This ontology performs a similar task in Leśniewski's system as the theory of classes and relations in Whitehead and Russell's system, yet, they differ in significant ways. The third part is made up of mereology. It can be defined as the theory of collective aggregates. It deals with the same issue which Whitehead is already working on, although he just outlines it, called the theory of events. Leśniewski makes a special effort to formulate the directives of his system meticulously and accurately. The directives of defining for a given deductive system have been formulated with complete precision for the first time here. Frege's influence is visible in this tendency. In order to avoid antinomy, Leśniewski developed his theory of types, which he calls the theory of semantic categories, with utmost precision. It more or less corresponds to the simplified theory of types, but it is much richer. Unlike other attempts of this kind, which always contain something artificial in them, this theory of semantic categories is perfectly natural and intuitive. By and large, because of his research aiming at resolving all known antinomies, Leśniewski turned to semantic problems. The results obtained by him in research concerning extensional functions are among the most profound and creative in the field of logical semantics. It should be mentioned that the results achieved by Leśniewski by attempting to precisely formulate the directives of his system generally have a profound philosophical meaning. A characteristic feature of Leśniewski's fundamental research attitude is his hostility to any formalism and conventionalism. He believes in the absolute legitimacy of certain assumptions and in the

objective value of certain reasoning, and he does not want to consider his logical system as a play on concepts, but rather as the cognition of reality [Ajdukiewicz 1934b: 403-404].

Kazimierz Ajdukiewicz,
Język i poznanie [Language and Cognition]. Vol. I-II.
Warszawa 1960–1965: PWN.

5.2 Directives

- The directive of [dividing the quantifier] . . . (for equivalence) is used by Professor Leśniewski in his system, and I learned to apply it from him [Ajdukiewicz 1926: 23].

- The significance of the directives of defining was first noted by the German mathematician and logician, Frege, . . . which Professor Leśniewski also noted, and whose system is the only system of precisely formulated directives of defining [Ajdukiewicz 1928: 51].

- The functor “that which” is used in Polish in such a way that the name “that which f ” formed from it and from the sentence forming functor from one name argument ‘ f ’ has an identical range to the set of the objects which satisfy the sentential function ‘ $f(x)$ ’. . . The functor “that which” more or less corresponds in everyday speech to a certain functor used by Professor Leśniewski [Ajdukiewicz 1928: 55].

- Definitions . . . in the form of “ $\forall x [x \text{ is } N \equiv f(x)]$ ” . . . [or] “ $\forall x, y [x \text{ is } F(y) \equiv f(x, y)]$ ” . . . are called by Professor Leśniewski . . . ontological definitions. He is also to be credited for the precise formulation of the directive enabling the application of these sorts of definitions, as well as their systematic theory [Ajdukiewicz 1928: 56].

- In a deductive system, several directives [of language] are usually provided. From what we know, it is only in Professor Leśniewski’s system that only one directive occurs [Ajdukiewicz 1931: 130].

5.3 *The theory of semantic categories*

▪ The concept of semantical categories, originally introduced by E. Husserl, has been precisely elaborate by S. Leśniewski, not however in relation to natural languages but with respect to the symbolic language of his system of logic. In doing so Leśniewski was able to give a purely structural definition, *i.e.*, in terms of purely external properties which two expressions always and only have if they belong to the same semantical category. When one wants to apply the basic idea of the classification to the expressions of everyday language, one cannot be satisfied — in view of the ambiguities in which that language abounds — with a purely structural definition and one has to appeal, in addition, to the meaning of the classified expressions [Ajdukiewicz 1934a: 95].

▪ There are logicians who are prepared to classify all terms as belonging to one and the same category, and do not see any reason why one should distinguish general from singular terms as different semantical categories. These logicians distinguish the following semantical categories: (1) sentences, (2) terms and (3) an unlimited hierarchy of semantical categories of functors, *i.e.* expressions which combined with the other expressions form composite expressions with uniform sense. . . . Such is also the hierarchy of semantical categories in the language of Leśniewski's logic. Apart from numerous categories of various funcors and the category of sentences, there is in his language only one further category, *viz.* the category of terms (names). T. Kotarbiński's interpretation of the variety of syntactical forms in everyday speech is modelled on the paradigm of Leśniewski's symbolic logic [Ajdukiewicz 1934a: 97].

▪ The word "exists" can . . . be defined by paraphrasing the definition which Kotarbiński (following Leśniewski) gives for his language. In Kotarbiński's language "*a* exists" means "for some *x*, *x* is *a*"; of course, in conformity with Kotarbiński's language "is" belongs here to the category *z/nn*⁶² [Ajdukiewicz 1934a: 102].

⁶² The symbol '*z/nn*' signifies a category of functor that creates a sentence from two names.

■ There are several solutions to this problem of syntactic connexion. Russell's theory of types, for example, offers a solution. But a particularly elegant and simple way of grasping the concept of syntactic connexion is offered by the theory of semantic categories developed by Professor Stanisław Leśniewski. . . . Leśniewski has only one basic category besides the sentence category: the name category, to which belong singular as well as general names. . . . In every significant composite expression the relations of functors to their arguments have to be such that the entire expression may be divided into constituents, of which one is a functor (possibly itself a composite expression) and the others are its arguments. This functor we call the **MAIN FUNCTOR** of the expression. (The concept of the main functor and the basic notion of its definition we owe to Leśniewski) [Ajdukiewicz 1935: 118-122].

5.4 *ONTOLOGY*

■ There are three main branches of [contemporary formal] logic: co-called sentential calculus, theory of classes and relations and meta-logic with meta-mathematics, *i.e.* the theory of deductive systems. The sentential calculus is of relatively minor importance for philosophy. The significance of the theory of classes and relations is incomparably greater. It realizes in a precise and scientific fashion a sizable part of the program of Aristotle's "first philosophy" — "the general theory of being". The name "ontology" given by Professor Leśniewski to that part of his logical system which corresponds to the theory of classes and relations is therefore most appropriate. The formal schemata developed in this theory enable us to give an adequate construction of the fundamental concepts used in everyday life and in science and whose oversimplified treatment has often been the source of errors and confusions in philosophy [Ajdukiewicz 1937: 140].

5.5 FORMAL PARAPHRASE

▪ Thanks to ... paraphrase [that is, translation of problems from a substantial to a formal way of speaking], issues which have always constituted an impediment to philosophy, in which it has been difficult to speak of progress from antiquity and the Middle Ages until today, find a way to indisputable resolution. ... The author of the idea for this paraphrase and its application to numerous problems was a Polish Professor, Stanisław Leśniewski, and ... within Polish philosophy this idea was used to solve many difficulties many years before the Viennese [Ajdukiewicz 1946: 18].

5.6 INSPIRATIONS

▪ Considering ... the collected ... works [in the first volume of *Language and Cognition*], I remember with affection those youthful years when I wrote them, and the people who guided me in this work, as well as those who accompanied me. ... I owe ... much to my colleagues, Professor Stanisław Leśniewski and Professor Tadeusz Kotarbiński, who I learned a lot from and who had a great impact on what I wrote when I was younger [Ajdukiewicz 1960.I: VIII].

6 STEFAN MAZURKIEWICZ: FUNERAL ORATION⁶³

Stefan Mazurkiewicz, "Nekrolog" [Funeral Oration].
Przegląd Filozoficzny vol. XLII (1939), No. 2, p. 115.

It is with great sorrow that we say goodbye to the prematurely deceased Professor Stanisław Leśniewski, a superb scholar and simultaneously a dear companion and colleague to all of us.

⁶³ The title is mine — JJ.

CHAPTER III

When we remember his life story and, inseparable from it, the story of his thought, it is striking how very homogenous this life was, how exactly and beautifully the man was integrated with the thinker in it, how much the style of his creative work became also the mode of his distinct and charming personality. There was something monumental in him, even in his appearance, something as if made of bronze rather than dust of the earth. As a researcher, he had great need for monumentality; what he created were not contributions and fragments, but rather his own system of the basics of logic and mathematics. His works, both written and spoken, as this is what we should actually call his lectures, were continuously growing stories of this great and uniform edifice which he tirelessly but with great effort continued to erect for over twenty years. The same characteristics which give such high value to his research, that is, infinite integrity and dependability of thought, an unwavering will to get to the bottom of the researched issues, the power of dialectics, a sharp critical sense, the deceased brought to all earthly matters, with one other addition of a deep and subtle kindness, which won over the hearts of his colleagues and students. Death took him at the peak of his creative forces, but the work of his spirit will continue to live and grow, and the memory of his noble figure will remain in our hearts.

7 JAN OSTROWSKI-NAUMOFF: IRON FORTITUDE OF THOUGHT. FOR THE DEMISE OF THE LATE PROFESSOR STANISŁAW LEŚNIEWSKI

Jan Ostrowski-Naumoff,
"Stalowy hart myśli. Na zgon
śp. Prof. UJP Stanisława Leśniewskiego"
[Iron Fortitude of Thought. For the Demise
of the Late Stanisław Leśniewski,
a Professor of Józef Piłsudski University].
Kurier Poranny, vol. LXIII (1939), No. 147 (of 30 May), pp. 3-4.

Entirely unexpectedly, death snatched from among the living members of Polish science one of the leading figures. The departed was a thinker in his prime and with youthful creative vigor: FULL PROFESSOR UJP STANISŁAW LEŚNIEWSKI, who held the position of CHAIR OF THE DEPARTMENT OF MATHEMATICAL LOGIC. Born in 1886 in Serpukhov, Moscow Governorate, as the son of a Polish engineer, he was not at all in advanced age in his 53rd year of life, and judging from the posture he retained until his last years of life, it seemed as though he had a body able to match the spirit which animated him.

However, it was no secret, and not only for his loved ones, his friends and his students, that he was fighting with an illness which eventually overpowered his body and his spirit. Soon after a surgery, on Saturday, May 13th, STANISŁAW LEŚNIEWSKI's life ended, a life which may not have been long but which was filled with unusually intense work of the mind, with excellent results achieved in his beloved field of research at the border of philosophy and mathematics.

After he graduated from high school in Siberia, where his father was working as a transportation engineer, and after his university studies in Germany, he obtained his Ph.D. with Professor K. Twardowski in Lvov, in 1912, with a dissertation entitled, "A Contribution to the Analysis of Existential Propositions" [Leśniewski 1911c].

The initial prewar period of Leśniewski's philosophical research is characterized by interest in an analysis of logical principles conducted with "philosophical"-grammatical methods, as he called them himself, and which he later denounced forcefully and insistently. Under the influence of J. ŁUKASIEWICZ's research on the Aristotelian principle of contradiction, conducted with the help of results from symbolic logic, or logistics, he abandoned any previous general philosophical issues and methods and devoted himself entirely to the establishment and development of logistics, that is, modern logic which utilizes symbols along the lines of mathematics.

In this work at the baseline of human knowledge, the Polish academic made reference to previous achievements of B. RUSSELL

AND A. WHITEHEAD, . . . , which he dissected thoroughly, as well as the profound works by Frege. After Poland regained independence, Leśniewski was among the first scientists who served the Country. Having returned to Russia, he took an active part in educational work at the Polish colony, accepted the position at THE DEPARTMENT OF HIGHER EDUCATION IN THE MINISTRY OF RELIGIOUS AFFAIRS AND PUBLIC EDUCATION for a short time, then he was appointed full professor of the philosophy of mathematics, and he remained in this position until the end of his life, while being a full professor of mathematical logic since 1936.

He quickly assumed a high position in the Warsaw academic community. Together with Professor Łukasiewicz, he became one of the central figures of THE WARSAW SCHOOL OF LOGISTICS. It was to a large degree because of his effort that research on logic achieved such a high degree of precision and perfection that it broke away from its philosophical roots and assumed the position of the foundation of scientific knowledge, with its queen, mathematics, in the lead.

There occurred a sort of symbiosis between logistics, or mathematical logic, and mathematics, and that symbiosis even found its organizational expression in higher education in the form of moving a professor's lecture from the philosophical department to the natural-mathematical department. This occurred by the end of the third decade of the present century.

Besides pure mathematics, this research also influenced philosophy through general clarification of methods of work, where the results of work on logistics are used only when resolving general issues, which occurs more and more often. The achievements of Polish logic also constitute a serious contribution to scientific relations between Poland and the rest of the world and, speaking in practical language, one of the most reliable tools of propaganda for Polish science, its level and its creative power. The name of Professor Leśniewski became well known from many works which were small in size but always of critical importance.

They were printed and recognized in the most prominent research centers abroad, and most importantly, they were presented in the Polish academic publication published in several world languages, *FUNDAMENTA MATHEMATICA*. Lately, a new Polish publication has emerged, which is also mainly devoted to logistics and which also issues works in other languages. Its first issue will contain the printed version of the basic component of Leśniewski's system, that is, *PROTOETHIC*. The author of the paper did not wait to see his work in print.

Moreover, the excellent results of Leśniewski's students' work were evidence for his great academic profile, just to mention such names as Associate Professor *TARSKI*, Ph.D., a world-renowned specialist, or *SOBOCIŃSKI*, Ph.D.

Although it has recently been difficult to make the essence of logistical research accessible, . . . one may attempt to determine what Professor Leśniewski's particular ambition was focused on apart from the development of certain basic parts of the system of mathematical logic. This task was jokingly described as his endeavor to create a system of mathematical logic whose essence could be fit into a waistcoat breast pocket.

To simplify the matter significantly, the work on development of the system involved such selection of certain undefined basic terms, indicated with certain symbols, that one may construct primary sentence or sentences, called axioms, with their help, out of which one can deduce any statements belonging to the system on the basis of rules which are called spoken, as they cannot be expressed through the symbolic terms of the system. This choice determines the fate of the system, since if the choice is poor, then somewhere a contradiction between statements belonging to it will occur, and there arises an antinomy or a paradox, and the whole work is essentially ineffective.

The ambitions of Professor Leśniewski and the proponents of this course included constructing a system based on the smallest number of terms and primary sentences, that is, to reduce everything to one sentence, or actually, one formula with one primary term. In a way,

this sentence constitutes the seed of all human knowledge. Professor Leśniewski succeeded in constructing such a sentence, albeit not immediately in a form which was entirely satisfying, the mentioned postulate derived simultaneously from economy and from the aesthetics of thinking.

It turned out that the sentence had too many words, auxiliary elements, such as brackets or variables, like in algebra, and it was not certain whether there were superfluous elements in it. Therefore, what followed was long work on perfecting the axiom until 147 initial words were reduced to about 100, where alongside a primary term repeated in various combinations there are a minimal number of auxiliary words.

This painstaking work, yet in its creative consequences abounding in new results, did not only require knowledge and specific intuition but also character. It was also conducted with an indomitable fortitude of thought. The soundest dependability we can imagine may only give us a vague idea of the subtlety and integrity with which the scholar proceeded in his work. His only support was in the conviction of the rightness of his task and the value in striving for the most basic truths.

Certain derisive judgments which one can presently hear from abroad, and from the lips of those least authorized to make them, flung at the representatives of intellectual work, are most categorically refuted by the whole moral life of the sort of scholars and thinkers Leśniewski belongs to, who are the pride of not only science but also the whole Polish nation.

Students of the late professor surely remember how he used to predict the appearance in print of the entirety of his logical system for the 1950s, always in an unshakable, level and incredibly composed tone of voice. He indicated in this jocular prediction how much he still plans to complete in it, to amend and improve, and how far he was from being satisfied with his work.

Incredibly strict with himself, he only presented passages from it, for instance, his famous system of "ONTOLOGY", or a system concerning logical relations of the term "is". Also, his paper entitled "On the

Foundations of Mathematics” printed within the series of articles by *Przegląd Filozoficzny* [Leśniewski 1927–1931] was also a temporary outline. Thus, although fate did not let Leśniewski see the full result of his investigations, Polish science received academic output of primary importance in the form of his manuscript legacy, which is a valuable contribution to Polish science but also to science in general.

Publishing these results of research constitutes a memorial which academic societies wish to erect to the quiet scientist. One can assume that it will be erected in all its spiritual splendor although the cornerstone for it must be laid in times which are not very favorable to such undertakings, whose significance may only be judged from a great perspective, if not *sub specie aeternitatis*.

8 DANIELA GROMSKA: STANISŁAW LEŚNIEWSKI

Daniela Gromska, “Stanisław Leśniewski”.
Studia Philosophica vol. III(1948), pp. 46-50.

Stanisław Leśniewski, born in 1886 in Russia, studied philosophy and mathematics in Leipzig, Munich and Lvov, where he obtained a doctorate from Kazimierz Twardowski in 1912. From 1919, he was a professor of philosophy and mathematics at the University of Warsaw. This is also where he died in 1939.

Leśniewski’s contacts with the Lvov School of Philosophy began when he was already a mature thinker. Nevertheless, his stay in Lvov was crucial for his scientific development, and therefore, for further development of Polish science. It was in Lvov where he got acquainted with Jan Łukasiewicz, a philosophy lecturer at that time, and thanks to him he discovered the secrets of logistics. Since then, Leśniewski devoted all his efforts to that discipline, which would become the opus of his life, competing with his master in precision of posing questions, in dialectic zeal, in subtlety of reasoning and shrewdness of his criticism.

Leśniewski distinguished between two separate periods in his scientific work. The first period, which lasted approximately until 1916, and which he called the period of philosophical-grammatical experiments, yielded many works which he later solemnly disavowed, “wishing they had not been printed”. These works concerned issues which, if we are to believe the author, Leśniewski undertook to solve in vain, as they were beyond his capabilities. Hence, still according to him, the experiments of that period ended in fiasco. In the following period of his activity, Leśniewski abandoned philosophy, or rather, as he used to write, “philosophy”, for good. His attempts at that time are based in axiomatics and led to the creation of his own system of foundations of mathematics, a system which he deemed “quite new in respect to objective and methodology”. Although he abandoned his own work and had a negative attitude towards his work from the “philosophical”-grammatical period, we shall mention it briefly here, especially since it reveals certain of Leśniewski’s theoretical interests which survived all stages of his scientific development. The earliest of these works is his Ph.D. dissertation devoted to the analysis of existential sentences [Leśniewski 1911c]. Another, where Mill’s influence is combined with that of Cornelius, contains a proof of the ontological principle of contradiction. The polemics presented in it are directed at succeeding deductions by Jan Łukasiewicz included in his book, *On the Principle of Contradiction in Aristotle* [Łukasiewicz 1910], although Leśniewski gives full credit to the book’s high scholarly value. However, he mercilessly rejects the *tertium non datur* rule. It is a false statement for him, both in its categorical and hypothetical forms, and he considers it to be an unnecessary burden for science, which is why it should not be included in handbooks of logic. In that same work, Leśniewski cleverly criticizes the concept of general objects, as it leads to contradictory results. Additionally, he was also opposed to the relativistic argument, according to which it would be possible to create truth since some sentences may become true at a given moment. In one contemporary lecture, the young academic came to the conclusion that the question of existence

is an apparent question (a “pseudo-problem”, that is a problem such that we do not expect any true solution, either affirmative or negative), at least when it is in the form of a sentence which is most often given to it: “Does P exist?”. The notion of the pseudo-problem appears again in the study “Is the Class of Classes not Subordinated to Themselves, Subordinated to Itself” [Leśniewski 1914a], which should be placed between the two periods of Leśniewski’s scientific activity. In this case as well, no true answer, either affirmative or negative, should be expected to this question, as no object is a class of classes which do not contain themselves, since every class contains itself. Such a response to the question posed in the title is the solution to the famous Russell’s paradox, for whom two possible answers to the above mentioned question, both affirmative and negative, lead to contradictory conclusions. Leśniewski refuses the autonomous character of Russell’s paradox in his study, which he supports with other arguments which fit perfectly with his later theory of types . . . , based on axiomatic grounds. He analyzes Russell’s ‘antinomy’ in terms of the concept of classes and sets, a concept which he later formulated in the deductive theory, based on four axioms and several definitions. This was the origin of his book *Foundations of the General Theory of Sets. I*, published in Moscow [Leśniewski 1916]. According to the author, this theory has an advantage over the existing theories of sets (developed by Zermelo and Russell among others) for the following reasons: (1) because it rejects “antinomy” of the general set theory without restraining the primary (Cantor’s) meaning of the word “set”, and (2) because it does not lead to the emergence of sentences which are obviously contradictory to common opinion.

This work belongs to the second period in Leśniewski’s academic activity, devoted to the construction of a system of the foundations of mathematics and deductive sciences in general. Particular works from this period overwhelmingly became subsequent levels of the system, that monumental edifice continuing extensive logic, whose beginnings were created by Schröder and Frege and which, just as Whitehead and Russell’s *Principia Mathematica* [Whitehead & Russell

1910–1913], aimed to cleanse mathematics from antinomy, could not be avoided in set theory. There are three deductive theories which are part of Leśniewski's system of the foundations of mathematics, that is, protothetic, ontology and mereology. PROTOETHIC, the basic discipline of logistics, is a kind of sentential calculus and apart from deductive theory, it contains the theory of an apparent variable based only on one axiom with one primary term: the symbol of equivalence. ONTOLOGY, which is a sort of upgraded traditional logic and resembles Schröder's sentential logic (the added theory of individuals), owes its name to the fact that its only axiom, after repeated simplification of the axiomatic system, contains only one constant: "is" (ἐστὶ), as well as the fact that, according to Leśniewski, it constitutes the formal science of being which more or less corresponds to the Aristotelean πρώτη φιλοσοφία. Leśniewski's ontology assumes the semantic unity of subject and object and it presents a synthesis of Aristotle's syllogistics. However, it is strictly formalized. Finally, mereology is the theory of aggregates understood in the distributive manner, rather than the collective (he avoids it in the "official" terms of "set" and "class"); a theory whose first concept he published in the book described above, *Foundations of the General Theory of Sets* [Leśniewski 1916]. A similar concept can be found later in the theory of events by Whitehead, presented in [Whitehead 1919].

Among Leśniewski's greatest achievements are: the perfectly accurate form of not only the axioms in his system but also his directives, that is, rules of defining, which according to him were insufficiently or not at all formulated by others. Furthermore, his theory of types should be deemed significant, a generalization and simplification of Russell and Whitehead's theory, later named by the author himself the theory of semantic categories. As for the theoretical consequences of this theory, it is connected to the previously known theories of logical types, but Leśniewski perceives its intuitive part as a continuation of Aristotle's categories, of the study of parts of speech in traditional grammar, and of Husserl's semantic categories. Finally, we should stress the value of Leśniewski's research of extensional functions for logical

semantics. Unlike other logicians, Leśniewski was of the opinion that his logical system was not only an ostensible logical puzzle, a game of formulas, but that it also had cognitive value. As a passionate enemy of any kind of formalism and conventionalism, he was convinced of the indubitable veracity of some hypotheses and the objective value of some conclusions.

Leśniewski's premature death is one of the heaviest losses for science in the last few decades. He left in the midst of his work, in the prime of his creative powers and during the period of his greatest influence, which was most fortunate: together with Jan Łukasiewicz, he was at the forefront of the Warsaw School of Logistics, whose activity caused the city to be perceived as the greatest research center for logistics in our times [Scholz 1931]. The many brilliant logicians and disciples of this school who should be mentioned here include: Alfred Tarski, Łukasiewicz's and Leśniewski's student, a lecturer at the University of Warsaw between 1929 and 1939, who then taught logic at Berkeley University in California; Wajsberg, Sobociński and Lindenbaum, who outlived Leśniewski only by a very short time ...⁶⁴ Leśniewski's students are not only his successors and the continuators of his ideas, but also the master's collaborators in constructing his system, which he repeatedly stressed himself. Therefore, a future historian of philosophy will not encounter any difficulty in distinguishing what was αὐτοῦ εἶδος. Still, he will have to put more effort into shedding adequate light on the powerful influence Leśniewski had on all contemporary Polish logicians, influence which by far outlived his earthly life, as well as on the participation of this "apostate of philosophy", as he called himself, in shaping the philosophical climate in his homeland.

Leśniewski's academic legacy was preserved only in part and in a scattered form, as the bibliography below proves. Leśniewski's posthumously published work, including extremely important papers such as, among others, *ONTOLOGY* in its systematic, final version, almost all fell victim to a fire during the Warsaw Uprising.

⁶⁴ When D. Gromska was writing this article, the fate of B. Sobociński was unknown.

CHAPTER III

9 FROM THE MEMOIR OF JAN ŁUKASIEWICZ

Jan Łukasiewicz, *Pamiętnik* [Memoir].
Warszawa 2013, Wydawnictwo Naukowe Semper.

■ 9 May 1949. Yesterday was the day of St. Stanislaus the Bishop. It was also Leśniewski's name-day. On his name-day last year he was already lying in the hospital in which he died five days later.

I met Leśniewski in Lvov in 1912. At that time, I was living with my uncle at 10 Chmielowskiego Street. One afternoon, someone rang the front door bell. I opened the door and saw a young man with a light, pointed beard, a hat with a wide rim and a large black bow, tied in place of a tie.

The young man bowed and asked politely, "Does Professor Łukasiewicz live here?". I responded that this was the case. "I am Leśniewski and I came to show you my article in progress which I am writing against you". I invited the guest to my room. It turned out that Leśniewski is printing in *Przegląd Filozoficzny* an article⁶⁵ containing critique of some of my views presented in my book *On the Principle of Contradiction in Aristotle* [Łukasiewicz 1910]. The critique was written with such scientific accuracy that there was nothing to find fault in. I remember that when after an hour-long discussion Leśniewski said goodbye, and I went to the Scottish Café⁶⁶ as usual, I declared to my colleagues that I should close down my logic business, since a company had emerged whose competition I could not withstand [Łukasiewicz 2013: 16-17].

⁶⁵ This is about the article [Leśniewski 1912].

⁶⁶ In the first half of 20th century, the Scottish Café in Akademicki Square in Lvov was a meeting place for social and academic discussions of Polish scientists, including mathematicians and logicians.

■ 17 May 1949. From March 1918 until December 1919 I was [a clerk] at the Ministry of Education.⁶⁷ One of my subordinates was Tomczycki, previously a clerk at the University [of Warsaw] and I filled another clerical position with Leśniewski, who had just managed to get out of Moscow, where he stayed during the war together with Sierpiński, and to come to Warsaw together with his wife [Łukasiewicz 2013: 21].

■ 28 May 1949. Late autumn of 1920, after the fortunate end of the war with the Bolsheviks, I began lecturing at the University of Warsaw. . . . Stanisław Leśniewski, who felt very uncomfortable in the position of a ministry clerk, managed to get appointed to the Department of the Philosophy of Mathematics [Łukasiewicz 2013: 28-29].

■ 7 June 1949. At that,⁶⁸ the scientific level of the Academy [of Arts and Sciences in Cracow] was not very high. Besides, as is often the case, such associations are overrun by mediocre people, who look with envy upon anything which rises above their level. One of the most brilliant minds Poland has ever produced, Stanisław Leśniewski, was never even a corresponding member of the Academy [Łukasiewicz 2013: 40].

■ 12 June 1949. The most splendid reception our apartment in Sewerynów has ever been witness to took place on the sixtieth anniversary of my birthday, on 21 December 1938. . . . Among the invited guests were predominantly professors; and among them, Leśniewski and Tarski [Łukasiewicz 2013: 45].

■ 18 June 1949. We spent our holidays in Zakopane for two years in a row. The second time we rented a highland cottage in Zwijacz over the Teachers' Sanatorium. We did not go hiking, as it was too hard for me. Only once did we go to Czarny Staw Gąsienicowy with the Leśniewskis,

⁶⁷ 25 February 1918 J. Łukasiewicz was appointed by the Regency Council to the post of head of the Department of Higher Education at the Ministry of Religious Affairs and Public Education. Between 20 January and 9 December he was a Minister of Religious Affairs and Public Education in I.J. Paderewski's cabinet.

⁶⁸ This is about the 1930s.

who were staying nearby in Zwijacz, but we did not go further because a thunderstorm broke out [Łukasiewicz 2013: 51-52].

■ 7 July 1949. I did not learn precision in thinking ... from Twardowski. What it means to think precisely, that I learned only in Warsaw, from Leśniewski [Łukasiewicz 2013: 67].

■ 18 July 1949. We had long had enemies at 12 Brzozowa Street. ... Witwicki ... stopped seeing me, although there had never been any discord between us. Kotarbiński was also unsupportive of me, of which I learned very late, as I had always considered him, as well as Leśniewski, to be one of the people closest to me [Łukasiewicz 2013: 72].

10 TADEUSZ KOTARBIŃSKI: A BUNCH OF MEMOIRES ABOUT STANISŁAW LEŚNIEWSKI

10.1 *A Handful of Memories about Stanisław Leśniewski*

Tadeusz Kotarbiński,
“Garstka wspomnień o Stanisławie Leśniewskim”
[A Handful of Memories about Stanisław Leśniewski].
Przegląd Filozoficzny vol. XXIV (1958), No. 3-4, pp. 155-163.

Memories? These are more of snatches of memories. Everything that could have been reconstructed from notes vanished altogether in the fire of the professor's dwelling at 12 Brzozowa Street in Warsaw in late August and early September 1944. Stanisław Leśniewski's widow, Zofia née Prewysz-Kwinto family, the daughter of the owner of the Kimborciszki estate in the Brasław district, who is also deceased now, did not pass on any materials to me. There remain as a source of memories our own visual memories of past events, their brightness and details dimmed by the constant passing of time, snatches of visions preserved not according to the choice of the most significant threads of a historically valuable tapestry, but a motley of whimsically protruding threads, torn out from

the whole just as memory left to itself can do. We ponder, and rightly so, its fantastical frolics. It often squanders what is substantially important and perpetuates trivial, at least seemingly trivial, details. Yet, we have to trust it, since other witnesses — people and documents — are absent.

We shall follow the advice the man himself did: if you are to say something in earnest, keep to the chronological sequence of events. According to this sequence, prehistory precedes history. Therefore, we must begin not with first contact but rather with what was before and is only known from recounts. Leśniewski was an exact, almost to the day, peer of Professor Władysław Tatarkiewicz and me. We were all born in the same week, at the end of March and beginning of April 1886. Thus, Stanisław would be 78 today and my imagination somehow cannot reconcile itself with that fact, as it only preserves in the memory such visions which present the visage of a handsome man in his prime. Apparently, he had always been a dashing lad. He was born in Russia, in the town of Serpukhovo⁶⁹ near the city of Ivanovo-Voznesensk,⁷⁰ somewhere near Moscow, as the son of an engineer employed there. The mother, of the Palczewski family, died in his early childhood. The father remarried another Pole. The boy treated his stepmother with respect, but without affection, and even his father, who was invariably kind towards him, did not always evoke constant cordial feelings in him. He was certainly injured by the fact that it was his stepmother, rather than his mother, who dealt with the house budget and education in his father's home. He often used to recall how well his father looked after him. For instance, when he hurt his eye with a screw once when he was a child (which left him for life with rectangular mydriasis), he owed it to his father's care that the accident did not entail any consequences which could be injurious to his sight. He graduated from high school, a classic format as far as I know, in Siberia, probably in Irkutsk. He was

⁶⁹ To be more precise: Serpukhov.

⁷⁰ This is incorrect information. Ivanovo is north-east of Moscow, whereas Serpukhov is south of it.

a quarrelsome and feisty schoolboy. One time, at a soiree organized by the school, the headmaster used a familiar pronoun form towards him instead of the official one (and high school students are especially sensitive to “personal dignity”). Then, the youth did not fail to reciprocate the sentiment: “Поди сам, потанцуй!”⁷¹ This is perhaps the moment to add information necessary to understand Leśniewski’s personality. With all his assertive and conscious Polishness, at bottom, in his soul, he was also a typical and model Russian. It was either extreme “yes” or extreme “no”, aversion to half measures, loathing of pettiness, affinity to sudden passion, violent changes, radical breaking of friendly terms, passionate antipathy towards insincere feelings, adherence to principles and a lack of tolerance for exceptions, an ability and inclination to lead endless discussions... These were his characteristics. Yet, perhaps we are getting ahead of ourselves and must return to youthful years. When he was asked about life back there, in this exotic, distant, great city in Siberia, he did not reveal much. Only things like that every man is called “папень” [guy] there, and every woman is called “дева” [maiden], that it is enough to hang a shirt outside for the night in winter to let the frost itself make it perfectly aseptic, that even in July his mother covered flowers in the flowerbed for the night so that ground frost did not blight them, that it is pretty there, because mountains and forests are nearby... What is in the forests? Some would go mushroom picking in company, but this was what others did, since he pondered upon notional matters, having nothing to do with mushrooming. He spent at least part of his university years in Germany, where he listened to Cornelius and tried to crack his specific *mélange* of positivism and Kantianism, with a guiding notion which was supposed to be called “das immanente Ding an sich” [the immanent thing in itself]. It seems that it was about an unchangeable system of relations which bind the whole array of elements of the content comprising reality. There was a moment when Leśniewski saw himself following the path of some

⁷¹ In translation: “Go, dance yourself!”.

sort of psychology, but when he suddenly appeared in Lvov as a new addition to the group of Twardowski's Ph.D. students, the book he used to carry was the work of Brentano's follower, Marty, entitled *Studies on the Foundation of General Grammar and the Philosophy of Language* [Marty 1908]. He then cherished the conviction that one must realize the meaning of words first in order to philosophize responsibly. Anecdotes circulated then about this likeable eccentric, who was very enthusiastic about the translation of Marty's book and who forced every philosopher he encountered at a café to have an insightful discussion. What about? About how to translate the word "zur" in the title of the work to reflect fully the meaning of it... What was characteristic for this man was that he always lived in some sort of impressive, absorbing problem, and he dragged everyone from his surroundings into his interest, not taking into account the fact that others may have other interests. Sometimes these were some personal matters. I remember that one time, when I was occupied with an important exam, he kept me at a café table for ages and talked about some such matter. He needed, as Russians say, "душу отвести" [unburden himself]. Still, it was hard not to be charmed by this lively, beaming young man. His peaceful, gentle way of interacting with people made one think of a kindly tame bear, never irritated, always certain of its power. His personality was rich, so there was no shortage of twists and turns when struggling with this richness. He used to have a friend, who he remembered with sentiment full of respect, who took his own life for some never revealed reasons, having been composed and absolutely even-tempered until the last moment. Leśniewski himself decided to do the same at some point; he never said why. Having sneaked into a chemist's study, he stole a portion of potassium cyanide and swallowed it at home, but his suicide attempt did not work, although a test of the remnants of the powder confirmed that the cyanide was not stale, and it was substantially lethal. This adventure may supposedly find its explanation in the fact that cyanide taken *per os* kills or does not kill, depending on what it encounters in the stomach. Apparently, it is sufficient to eat a few sweet cakes beforehand and the poison ceases

to be poisonous. Who knows how it was in that case! Anyway, after an unsuccessful attempt at taking his own life, Stanisław lost interest in repeating it. Another story: at some point he was a vegetarian for ethical reasons... But one time he decided to feast on meat. Why? I asked, thinking that I would hear some reasoning behind it — a presentation of sufficient reason. Nothing of the sort: “Well, I was a vegetarian, but then I just stopped at once...” . I suspect that was the time of a great breakthrough: a romantic, idealistic boy, wishing for triumph of moral values and determining some sort of philosophy of not hurting anyone, no living creature, suddenly transformed into a skeptic, who told himself that he could not change the world and decided to do what he felt like doing, regarding all attempts to improve the world as a proof of naivety. Yet, this is only my guess, based on Stanisław’s later reactions and declarations. The injured were being carried... “How sad that this is happening... But I am not going to interfere...” . Yet, he interfered when he was a youngster... Socialism, yes, we should join it... But not the PPS kind... What sort of socialism is this?! The real one is SD, or the then-Social-Democracy of the Polish Kingdom and Lithuania... Feliks Dzierżyński himself admitted him to the party, “голубиное сердце” [dove heart].⁷²

Still, this was already behind us when Leśniewski threw himself into the depths of philosophical problems with his usual absolute passion in the last years before World War I. He attempted to overturn the principle of excluded middle, and what directed the current of his energy was probably reading the supplement on logic attached to Łukasiewicz’s work, *On the Principle of Contradiction in Aristotle* [Łukasiewicz 1910]. This supplement is Łukasiewicz’s lecture on a certain general theory of objects, a chapter in logistics, as it was often said then, presented in the symbolic method, more or less the way Couturat’s *Algebra of Logic* is explained. Well, this is not only more accurate in its method

⁷² We can only call Feliks Dzierżyński that ironically, as he was one of the worst perpetrators of crimes against humanity, responsible for bloody terror after overthrowing the tsar in Russia (which T. Kotarbiński obviously knew very well).

of recording theses than arguments presented in colloquial speech, but also more general than semantic investigations — this was Leśniewski's line of reasoning. However, more general problems and assumptions should have logical priority. This is how Leśniewski, a commentator and potential translator of Marty's work, disappeared and a new Leśniewski was born, an enthusiastic adherent of modern mathematical formal logic. This change was similar to Nelson's departure from Locke's seemingly correct directive stating that science should be preceded with reflection on the essence and boundaries of the cognitive function fulfilled in its practice. Even epistemology itself would then have to have itself for its predecessor... No, this is not the way to do it! Cognition is a particular issue... When practicing the analysis of cognition, one must do it based on ontology. Ontological issues have logical precedent and, what is more, temporal precedent. After all, first we build a fundament and only then erect a building on it. Similarly, Leśniewski threw himself into the roaring whirl and hubbub of mathematical logic awakened to a gorgeous flourish. About that same time Bertrand Russell's attractive paradox shone on the firmament of inquisitive thought. How to extricate oneself from the antinomy included in the notion of a class of classes which are not their own elements? After all, irrefutable deduction, it seems, reveals that if a class is its own element, then it is not its element, and *vice versa*, although it surely must be or not be its own element. And so it happened that Leśniewski (probably just before World War I) took on a lecture on Russell's antinomy within a cycle of public lectures organized in Warsaw in the seat of the Psychological Society. I think of the mansion, preserved until modern times, now inside the property at 44 Piękna Street, not without certain sentiment, as this is where psychologists and philosophers coexisted under the auspices of the sorely missed Władysław Weryho. This house should be saved from demolition and restored to its former function after renovation. While preparing for the lecture, our lecturer stated at some point that the critique of the discussed antinomy conceived by him contained a mistake, "it lies in ruins", as he used to say in such situations. He was

in despair! The lecture was beginning in a few hours, the students would come, the situation was threatening to discredit him. This is when he decided to focus to the maximum, supporting his effort with chocolate. The result was that, according to his own diagnosis, chocolate gave birth to mereology. After all, while it is obvious that although something which is M is therefore an element of the class of M , it is however, by no means true that something which is an element of the class of M must be M itself because of it! Still, this faulty step is taken by Russell in the construction of his antinomy. This is an obvious mistake if we take into consideration a chessboard, for instance, the habitual class of its own fields. Each field on a chessboard is its element, an element of a class of its fields. Yet, the same chessboard is also notoriously a class of eight-field rectangular strips. However, although each field of our chessboard is an element of this chessboard, and therefore, an element of a class of those rectangular strips, it is not at all any of those strips! Thus resolving Russell's paradox, Leśniewski clearly relied on the concept of class as an object which is a whole composed of objects which are its elements. From another point of view, such an object may still be a whole composed of other objects and those objects also have the right to call themselves its elements. Therefore, the same object, *e.g.*, a tangible chess board, turns out to be simultaneously a class of M s and a class of N s, although M s are not N s. Class in the interpretation of mereology is similarly understood. Let Russell and his companions deal with class interpreted otherwise, if they can. For now, it leads to contradiction. Thus, Leśniewski left for Russia for the period of World War I with the bud of mereology in his mind. There he taught mathematics at a Polish school, apparently attempting to treat the little ones *a limine* to formidable abstractions and clarifications. This period of his life could probably be described best by two gentlemen, Professor Waław Sierpiński and Professor Wojciech Świątosławski, the former of whom could especially observe his activity from up close. There and at that time, Leśniewski formulated and presented in Polish the first draft of the formal system of mereology, but still called it "set theory". "Mereology" came into use later.

Although he has not graduated in mathematics and probably never had a course in calculus or analytical geometry, *etc.*, he joined the group of young mathematicians dealing with foundations of mathematics after he came back to independent Warsaw as he was well acquainted with mathematical logic. The group included and was led by Zygmunt Janiszewski (who was very promising but died soon after) and Stefan Mazurkiewicz. He soon moved to the University of Warsaw. That was the beginning of the heyday of the University in the area of basic mathematics and mathematical logic. The departments were headed by the brilliant Sierpiński, Mazurkiewicz and Łukasiewicz, and later also Ajdukiewicz. Kuratowski and Knaster participated in the movement; also young Tarski and Mostowski bravely tried their hands at it, as well as many others. Leśniewski's importance grew. Here is a digression. He returned from Russia entirely devoid of the social activist streak. He always considered Russia to be a great nation, but he regarded their scientific intelligentsia to be epigones, and he saw the relations prevailing in this country as simply criminal. However, he was preoccupied with his logical-thinker passion. He grew in the eyes of the environment and in his own. He constructed his own system of name calculus, naming it ontology. This is how it happened. From old, pre-logical texts, like the aftermath of reading the initial parts of Mill's [*System of*] *Logic* [Mill 1843], he retained the following description of the conditions of veracity of a simple predicative-objective sentence: such a sentence is true always and only if the object designated by the subject has features connoted by the predicate. The revolutionary breakthrough consisted in abandoning these features and the relation of connoting. Having gotten rid of these interruptions, we obtain the formula: a simple predicative-objective sentence is true always and only if the object designated by the subject is the object designated by the predicate. It is easily noticeable that when we add the reservation of individuality of the subject and write everything with logical symbols of another line, it occurs that no one apart from the author himself can intuitively describe a given thesis, developed thus and written in logical symbols in such a refined manner

that is probably reached the limit of comprehensive reading. In the final phase, Leśniewski attempted to criticize Gödel's famous proof which substantiates the incompleteness of any formal hypothetical-deductive system which assumes regular arithmetic of integers. After all, he was already used to the fact that the greatest luminaries of scientific thought could also get entangled in faulty reasoning... Was it not proven by the antinomies which Russell could not resolve properly? Did Russell not demonstrate to Frege the contradiction in his many-volume system, and that was Frege, one of the most remarkable logicians (such was Leśniewski's assessment). Yet, all attacks on Gödel's stronghold remained futile... On the other hand, all known logical and semantic antinomies as well as paradoxes (like Eubulides' paradox, the one concerning "a liar") were considered resolved by Leśniewski, which he presented ways of doing. For instance, he proved generally that it is contradictory to assume the existence of such a class of M and such relation R that the following condition is met: there is such x that x is M and remains in relation R with itself, and x remains in relation R with every y which is M not remaining in relation R with itself, but it does not remain in relation R with any y which is M remaining in relation R with itself. For instance, Nelson and Grelling's paradox (the paradox of the term "heterosemantic") falls under such a general solution according to the scheme which allows for the shaping of any series of analogous examples.

Leśniewski was a great eccentric and had his striking quirks. For instance, he could not bear deviation from any system which he himself established, and these were sometimes very pedantic systems. For instance, in order to avoid mistakes in references, he quoted the full information about the work he was referring to in a given publication every time, that is, the name of the author, the title of the work, the place and the year of publishing. What is more, when citing a title of a work which contained a printing error, he insisted on respecting this error and restored the cited error, eliminated by a proofreader, in his own proofreading. If it said, "Warsawa" instead of "Warszawa", then he left "Warsawa" in the citation. He excelled in witticisms, he could always

choose an appropriate way to describe something, and it was noted that his jokes were almost always some sort of truths expressed in an unusual way. He liked the effect; he liked to dazzle with such sayings. At some point, he began to take pleasure in repeating the slogan, “Down with sense in logic!”, which raised eyebrows and caused indignation, and was only supposed to state that when constructing a deductive system of logic, one can do without terms such as “meaning”, “connotation”, *etc.*

He was fully aware of the importance of his own work and its originality. He was very sensitive to correct assessment of the authorship of concepts, and he made sure that no one presented any of his ideas as their own. Therefore, he demanded that pretense of incorrect authorship of this or that advance in thinking be avoided and protested against presenting results based on exploiting someone else’s achievement before this achievement was published, which halted the publications of those who had learned plenty of new things from him. With all his self-confidence, he was not conceited, he was fully aware of the limitations in the issues he worked with, and he explained the fact that he did not deal with problems within epistemology, *e.g.*, the relation of data in sensory perception of quality and objective reality, by simply saying that these issues are too difficult for him. He worshiped science. He valued excellent the competence of specialist scientists, he accepted the fact that specialization meant focusing on a limited range of issues. He was annoyed that instead of confining myself to respectable logic, I read something like *Logical Investigations* by Husserl [1900–1901] and that I browse through popular natural science journals. He only had one word to describe the great specialist in synthesis, Wilhelm Wundt, in private conversation with colleagues: “Boor!”. This is how he condemned under-analytical omniscience. Scheduling and systematic method were something which he understood very well, which he was excellent at, and he wondered about achieving results differently. He used to say to his friend who produced poetic works with certain ease: “I do not know how you do it, you get inspired and there is a poem”. By “getting inspired” he meant the act of experiencing the state of inspiration.

CHAPTER III

His emotional construct was quite peculiar. He liked music and there were times when he went to every entry of the cycle of symphonic concerts (but here there was also a system at work, as he collected the posters). Chopin was not his cup of tea. "I do not like Mr. Frederic", he used to say. He despised money and living on a tight budget, but he expressed the relevant emotions by saying, "Oh, how I love coins!". This love of "coins" was expressed in spending them immediately on whatever was his fancy at that moment. This is why there was never enough. The Leśniewskis did not have children, but they did have a dog. Stanisław loved this creature almost as much as one would his own child; he cared for it very tenderly in sickness and suffered greatly after it died. He often experienced emotional dilemmas and when he had to sacrifice something precious for another precious thing, he compared it to a situation in which he would only be able to choose between breaking his right or left jaw... These extremes of emotional outbursts corresponded to the lack of restraint in emotional evaluations. This was the greatest paradox of Leśniewski's mind: he could indicate the essence with the greatest precision whenever the issue concerned purely material problems, but he tended to be irrational in judgments involving emotions and matters connected with them. He would always make a mountain out of a molehill, he always blew things out of proportion. In the Housing Association, he did not allow for even minimal deviation from the rules, even when dictated by common sense, for instance, to grant a few applicants an apartment in a joint decision when the rules called for an overly time-consuming procedure of sequence. He was especially sensitive to the issue of rights of an individual in a community, and when he defended it with respect to himself, one could not count on his restraint and prudence. This partly explains why he sometimes held a position which his friends found hard to sympathize with when there was conflict at the university.

Medical knowledge could probably explain many of the peculiarities of his personality. He had a thyroid condition and treated it... He chain-smoked... and when his doctors ordered him to quit, he demonstrated

strong willpower. He did not touch a cigarette for a year. Still, he was so addicted to nicotine and his work progressed so slowly during that period that apparently the doctors themselves advised him to return to the addiction... Thus, he died at the age of 53, most probably a victim of nicotine and its charms. A huge tumor began to press more and more on his respiratory system and choke him at night. It turned out surgery was necessary. Afterwards, the doctors did not leave much hope. Stanisław understood the situation. He asked a certain old man, who he owed a lot to, to visit him. He did not accept the invitation... When I visited him the day before he passed away, he told me to fill two cups with wine. We drank, as if before parting for his last journey. The next day he ordered his armchair, which he was used to, to be brought from his apartment to the hospital. This whim was satisfied, and when Stanisław Leśniewski placed his broad-shouldered body in his favorite seat in one quick movement, it occurred that it was not him anymore, that he had ceased to live. It took place in Warsaw, on 13 May 1939. Whatever critics say about his work, assessing it comparatively and according to the tests of quickly developing science, one thing will always remain unquestionably true for me. Based on my lifetime of experience, I believe that he was a man of genius: the only man of genius who fate allowed me to encounter, and once, that happened almost daily.

10.2 *Notes on the Development of Formal Logic in Poland in the Years 1900–1939.*

Tadeusz Kotarbiński,
“Notes of the Development of Formal Logic in Poland
in the Years 1900–1939”.

McCall, Storrs (ed.): *Polish Logic*. 1920–1939.
Oxford 1967: Clarendon Press, pp. 4–10.

A fragment devoted to Leśniewski written by Kotarbiński in the introduction to the volume *Polish Logic*, 1920–1939, edited in 1967 by

Storrs McCall [Kotarbiński 1967] is an important addendum to the above “A Handful of Memories”. I quote the fragment below.

Among Łukasiewicz’s disciples and later colleagues, Stanisław Leśniewski (1886–1939), also a philosopher by training, was distinguished by an extraordinary originality of mind, which went with a capacity for accurate and most powerful argumentation. Devoured by a passion for an absolute exactness of statement, he looked for inspiration to Hans Cornelius, who was at the same time close to both empirio-criticism and Kantianism, to the writing on general grammar and the philosophy of language of the Brentanist Marty, and to the semantic chapters of Mill’s *System of Logic* [Mill 1843]; observing with mistrust attempts at formulating theses on anything else than language before the construction of a system of principles for the rational use of language. After studies abroad he came to Lvov, where he listened both to Twardowski and to Łukasiewicz, then lecturing on philosophy in the Lvov University. As far as I can remember, Łukasiewicz was at that time speaking in very critical terms of the issues and doctrines of the theory of cognition, and popularizing Schröder’s algebra of logic and the theory of relations; he also held exercises on the theory of probability for philosophy students; read Aristotle in the original at seminars and commented on him, interpreting, among others, passages pertaining to the paradoxical arguments by subscribers to the view that only the real was possible and only the necessary was real. His students often returned in private conversation to Russell’s paradox of a class of classes not members of themselves and to other antinomies, a host of which had been discovered by the contemporary analysis of the foundations of mathematics. In this climate, Leśniewski moved from the position as it were of a searcher after an appropriate linguo-technical introduction to philosophy to that of a searcher for replies to problems concerning the general theory of objects, which after all must constitute the basis for any more special researches, and consequently also for linguo-technical investigations. And this general theory of objects must be pursued with the help of the

most appropriate and the most adequate logistic symbols — provided these are applied with the necessary exactness, consistency, and self-control. It seems that Leśniewski was most powerfully impressed by the supplement “Principle of Contradiction and Symbolic Logic” attached to the ... work by Łukasiewicz *On the Principle of Contradiction in Aristotle* [Łukasiewicz 1910], which contained an exposition of the algebra of logic based mainly on Couturat’s textbook [1905].

What happened later was highly paradoxical. Leśniewski embarked on the construction of a system of logical foundations of mathematics that would be free of all antinomies, fully rational, and cognitively adequate, though he was himself a philosopher by training, and by no means a mathematician. He was, moreover, a man who knew very little about numerical mathematical calculations and so-called higher mathematics in the usual meaning of the words, nor did he wish to learn more. But the issue for him was clear: the problem on which he was engaged were obviously logically independent of the theorems, be it of differential calculus, analytical geometry, or other branches of higher mathematics, while those same branches of mathematics were logically dependent on the former basic problems. The point of contact between the two worlds — that of the logician and that of the mathematician — was in the domain of the basic concepts and theorems of the set theory, which began to prosper very much in Poland and some representatives of which were most willing to co-operate with the logicians on matters of mutual interest. In Warsaw, these contacts became in fact quite lively, and in the early years of independent Poland after World War I Łukasiewicz and Leśniewski met as professors in the University of Warsaw, where they co-operated in harmony, and, thanks to that harmony stimulated most beneficially the minds of their students.

What did Leśniewski achieve in the course of his extraordinarily lively career as scholar and teacher? There is hardly any disagreement on that among people conversant with his work. He constructed

a truly original deductive system of the calculus of names,⁷³ a radically new deductive system with variable, the values of which consisted of intersentential connectives (such as “and” and “if”) or, in other cases, of modifying sentential particles (such as “not”),⁷⁴ as well as a truly original deductive system of the theory of the relation of the part to the whole, with part understood as a fragment of the whole (in the sense in which, for instance, a hand is a part of the whole human body).⁷⁵ The best developed of these systems is the first, which we refrain from calling a theory of predicates, since such a term implies that some expressions are suitable to the role of predicates and predicates only, and not, for instance, to that of subjects of singular propositions. In fact, the basic originality of Leśniewski’s system (which he himself rather preferred to call an “ontology”) consists in, that in it, expressions suitable as subjects of singular propositions are suitable also as predicates of propositions, and *vice versa*; in a word, the subjects of singular propositions and the predicates of propositions belong in this system to the same semantic category, the category of names. That is why we choose rather to speak here about a system of the calculus of names. This is connected with Leśniewski’s original conception of semantic categories. According to it, there are but two such fundamental categories: the category of names and the category of propositions. The other categories are filled by the so-called functors, the category of each being determined by whether it creates from the terms it joins a name or a proposition, and also whether these terms are themselves propositions or names, as well as how many there are. Thus, for instance, the copula “is” in the singular proposition “A is B” belongs to the category of proposition-forming functors attached to two name terms, the particle “not” in the proposition “not *p*” to the category of proposition-forming functors attached to one sentential term, the connective “and” in the proposition

⁷³ Cf. [Słupecki 1955].

⁷⁴ Cf. [Słupecki 1953].

⁷⁵ Cf. [Leśniewski 1916], [Leśniewski 1927–1931], and [Słupecki 1958].

“Every A is B and C ” to the category of name-forming functors attached to two name terms, *etc.* Leśniewski’s ontology makes possible the investigation of dependences, involving semantic categories of any degree of complication. It is accompanied by a system of directives, the most exactly defined of any I know, for the construction of definitions, while the system of ontological axioms is brought to such a degree of simplification by its author that it consists of a single short inscription containing the only primary specific term. This term consists precisely of the copula “is”, linking the subject of the singular proposition with the predicate. In Greek this would be $\acute{\epsilon}\sigma\tau\acute{\iota}$, the infinitive being $\acute{\epsilon}\acute{\iota}\nu\alpha\iota$, or “to be”. The term “ontology”, as a name for the whole system, is derived from the participle of the word $\acute{\epsilon}\acute{\iota}\nu\alpha\iota$, which is $\acute{\omicron}\nu$, $\acute{\omicron}\nu\sigma\alpha$, $\acute{\omicron}\nu$, genitive $\acute{\omicron}\nu\tau\omicron\varsigma$, $\acute{\omicron}\nu\sigma\eta\varsigma$, $\acute{\omicron}\nu\tau\omega\varsigma$.

Logically, ontology is, of course, preceded by the normal sentential calculus. Leśniewski’s innovation in the field of the foundations of the sentential calculus consisted in basing it on what he called protothetic, a system the variable of which take as their values functors of the sentential calculus. Let me give an example of a protothetical thesis. First, however, let me recall that, besides the particle “not”, three other particles can be used which have the character of proposition-forming functors of one propositional argument. These differ from one another depending on what logical value is acquired by the proposition with the particle in question for different logical values of the same proposition without the particle. Let them be the functor “as”, “ver”, and “fal”, besides the functor “neg” (since this is how we shall denote the negation “not”). Let their distribution of values conform to the following table:

p	as p	neg p	ver p	fal p
1	1	0	1	0
0	0	1	1	0

where ‘1’ is the symbol of a true proposition and ‘0’ the symbol of a false proposition.

With the above notations, and if, in addition, ' F ' is the variable taking as its values the functors "as", "neg", "ver", and "fal", we obtain, for instance, the following equivalence,⁷⁶ indicating the possibility of defining conjunction with the help of ' F ' and the quantifier:

$$\wedge p \wedge q \{pq \equiv \wedge F [p \equiv (Fp \equiv Fq)]\}.$$

Leśniewski's third system was named "mereology", *i.e.* the theory of the relation of the fragment to the whole, which assumes both the sentential calculus with protothetic and ontology as systems logically precedent. Its formulation is linked up closely in the history of Leśniewski's studies with his efforts at a solution of Russell's paradox of classes. The latter ceases to hold if the relation of element to class and the relation of sub-class to class is formulated precisely as a relation of the component fragment to the whole. Because in that case it cannot be inferred from the fact that x is an element of the M class that x is M , which passage is one of the steps in the construction of the paradox. Such a conclusion would not in fact be correct, since x 's being a fragment of a whole composed of M 's does not imply that the whole has no other fragments. While it is true, for example, that the heart is a fragment of a whole composed of cells, the body of a creature with a heart being composed of cells, the heart itself is not a cell.

Leśniewski offered solutions to all the then-known antinomies of logic, semantics, and set theory, in some of them showing (a pioneering exercise at that time) how indispensable it was, if nonsense was to be avoided, to distinguish between the range of a given name in a given language and the range of an identically sounding (or identically shaped) name in another language, the latter being used to talk about the expressions of the former. Some solutions to antinomies given by Leśniewski were questioned; his solution of Russell's paradox was among those attacked. The argument put forward against that solution was that

⁷⁶ Cf. [Czeżowski 1949: 91].

it suggested a different interpretation of class from that assumed in the formulation of the paradox. Views differ also on the importance of his achievements in relation to problems relevant to modern science.⁷⁷

I am most curious concerning what Leśniewski's own answer to his critics would be, since I cannot recall even a single logical discussion in which he was not shown to be right. This at least is how that extraordinary man impressed himself on the memory of his contemporaries.

Leśniewski's attitude to philosophy was most interesting. He was rather contemptuous of the usual ways of philosophical thought, but himself refrained from pursuing problems of the theory of cognition or general philosophical questions, *e.g.*, the problem of the relation of mind to matter. When asked for the reason, he used to answer: "These are problems too difficult for me".

11 JERZY ŚŁUPECKI: STANISŁAW LEŚNIEWSKI⁷⁸

11.1 *Stanisław Leśniewski* [1]

Jerzy Śłupecki, "Stanisław Leśniewski".
[In:] Bronisław Baczko *et.al.* (eds.):
Filozofia w Polsce: Słownik pisarzy
[*Philosophy in Poland: a Dictionary of Writers*].
Wrocław 1971: Ossolineum, pp. 221-224.

Stanisław Leśniewski (1886–1939), a philosopher and a logician.

He was born on 28 March 1886 in Serpukhov, in Russia. He studied in Lvov and at universities in Germany. He obtained his Ph.D. title at the

⁷⁷ Cf. [Grzegorzczak 1955]. Grzegorzczak has some objections. These are answered in [Luschei 1962], the only documentary and exhaustive monograph on the whole of Leśniewski's opus.

⁷⁸ The title is mine — JJ.

Lvov University. In 1919, he was appointed the Head of the Department of Philosophy of Mathematics at the University of Warsaw. He died on 13 May 1939 in Warsaw.

Leśniewski's academic work concerned logic, philosophy and mathematics. He obtained his most valuable results in mathematical logic. His work can be divided into two periods. During the first, lasting until about 1914, which he later evaluated very critically, he worked with general logic and philosophy; in the following period, he built the system of mereology as well as a logical groundwork for ontology and protothetic.

The construction of Leśniewski's logical systems is strictly tied to his theory of the division of expressions into semantic (syntactic) categories. The categories of sentences and names are the basic semantic categories. Leśniewski distinguishes sentence- and name-forming functors, depending on whether they, together with their arguments, create sentence or name expressions. Further, division of functors is obtained by putting in different semantic categories functors which differ in the number of arguments or their semantic categories. Thus, an infinite hierarchy of functors of higher and higher semantic categories is formed. No semantic category is ascribed to quantifiers in Leśniewski's systems; functor-forming functors also do not occur in these systems. In formal terms, his theory of semantic categories approaches B. Russell's theory of logical types, and just as with that theory, it prevents antinomies. However, Leśniewski's is much more intuitive than Russell's. According to Leśniewski, the idea of dividing expressions into semantic categories is valuable regardless of the fact that it removes antinomies from the foundations of mathematics.

If constants of certain semantic category occur in Leśniewski's logical systems, then variables of that category also occur, and *vice versa*. Constants which are not primary terms are introduced into the system with the help of definitions. These constants may depend on parameters. Definitions, which are always theses of the system, meet the condition of translatability, but they do not meet the condition of non-creativity.

In Leśniewski's systems, it is possible to substitute for a variable of any semantic category an expression from that same category, whereas expression from another category cannot be substituted. Also, complex expressions may not be substituted. A variable of any semantic category may also be connected through quantifiers which fall under the same principles in Leśniewski's systems as in functional calculus.

The most basic (although created the latest) of Leśniewski's systems is protothetic. This system is a generalization of the two-valued sentential calculus. The functors of protothetic are sentence-forming functors. The arguments of these functors are sentences, functors with sentential arguments, *etc.* Thanks to the richness of the language of protothetic, we can define concepts and formulate theorems in it which correspond to the concepts and theorems of the methodology of sentential calculus. In particular, symbols '1' and '0' occur in protothetic, the former of which is an abbreviation for a true sentence, and the latter, for a false sentence. The axioms of the system of protothetic, the only primary term of which is implication (Leśniewski did not include quantifiers into primary terms, even though he did not define them in the systems), are the following: the axiom of bivalent implicative sentential calculus, and the axiom:

$$f(1) \rightarrow [f(0) \rightarrow f(p)],$$

which we note here with defined terms and which is the equivalent of the binary method of verifying expressions in sentential calculus. The rules that apply in protothetic are the rules of detaching, substituting, operating quantifiers, rules which determine the structure of definitions which in this system have the form of two implications: simple and reverse, as well as a rule which allows it to join the system of the principle of extensionality, formulated for functors of any semantic category characteristic to protothetic. Leśniewski also constructed a system of protothetic whose only primary term is equivalence. This system can be based on only one axiom.

The other of Leśniewski's logical systems is ontology. This is a system of calculus of names. The only primary term of ontology is a sentence-forming functor with two name arguments 'ε', which is the equivalent of the word "is" in everyday language. All names, individual as well as empty and general, belong to the same semantic category, according to Leśniewski. The number of objects within its scope determines which of the three kinds of names a given name belongs to. The only axiom of ontology has the form of:

$$(1) A \varepsilon a \equiv \forall B (B \varepsilon A) \wedge \wedge B \wedge C (B \varepsilon A \wedge C \varepsilon A \rightarrow B \varepsilon C) \wedge \wedge B (B \varepsilon A \rightarrow B \varepsilon a).$$

From the three parts of the conjunction put in this axiom on the right side of the equals sign it results that the name 'A' is non-empty, the name is not general, and its range does not go beyond the range of the name 'a'. Every one of these conditions is therefore a necessary condition, whereas their conjunction is a sufficient condition for the sentence 'A ε a' to be true. The axiom (1) has been greatly simplified. The following expression is an axiom of ontology with the simplest construction, albeit less intuitive than axiom (1):

$$(2) A \varepsilon a \equiv \forall B (A \varepsilon B \wedge B \varepsilon a).$$

Ontology is a system superstructured over sentential calculus. The rules of ontology are analogous to the rules of protothetic. In particular, the principle of extensionality is in operation in ontology, analogous to the principle of the same name in protothetic.

Among others, the terms of Aristotle's syllogistics, equality of ranges, negation, conjunction and alternative of names can be defined in ontology. The concepts of object and existence are defined in the following manner:

$$\begin{aligned} A \varepsilon ob &\equiv \forall a (A \varepsilon a). \\ ex(a) &\equiv \forall A (A \varepsilon a). \end{aligned}$$

The expression ' $A = B$ ' is defined as the conjunction of expressions ' $A \varepsilon B$ ' and ' $B \varepsilon A$ '.

The theses of ontology are equivalents to all laws of algebra of sets and those of Aristotle's syllogisms which are true for any names, including empty ones. Further sections of set theory can also be recreated in ontology. It is worth noting that the expressions ' $\forall A (A \varepsilon ob)$ ' and ' $ex(ob)$ ' are not theses of ontology.

The third of Leśniewski's systems is mereology. It is a mathematical system based on ontology. The only primary term of mereology is the symbol ' cz ' which is a name-forming functor with one name argument. The expression ' $P \varepsilon cz(Q)$ ' is read: P is a part (proper or improper) of the object Q . The three first axioms of mereology are as follows:

$$P \varepsilon cz(Q) \wedge Q \varepsilon czR \rightarrow P \varepsilon czR.$$

$$P \varepsilon cz(Q) \wedge Q \varepsilon cz(P) \equiv P = Q.$$

$$P \varepsilon cz(Q) \rightarrow Q \varepsilon ob.$$

In order to note the last two axioms of mereology, the following definitions are necessary:

$$P \varepsilon zw(Q) \equiv \sim \forall R [R \varepsilon cz(P) \wedge R \varepsilon cz(Q)].$$

$$P \varepsilon kl(a) \equiv \wedge Q_{\varepsilon a} (Q \varepsilon cz(P) \wedge \wedge R_{\varepsilon a} \forall Q_{\varepsilon a} \sim [Q \varepsilon zwR]).$$

The expression ' $P \varepsilon zw(Q)$ ' is read: P is external in relation to the object Q (objects P and Q do not have a common part). The expression ' $P \varepsilon kl(a)$ ' is read: object P is a class of all objects which are a . For instance, a chessboard is a class of its fields, since every field is a part of the chessboard and for any part of the chessboard there is a field which is not an external object with respect to its parts. The last two axioms of mereology have the following form:

$$ex(a) \rightarrow ex[kl(a)].$$

$$[P \varepsilon kl(a) \wedge Q \varepsilon kl(a)] \rightarrow P = Q.$$

Therefore, as long as there are objects which are *a*, there is exactly one object which is a class of these objects. Mereology determines the properties of classes in a manner which is significantly different from set theory. Therefore, it is not one of the systems of this theory, as Leśniewski believed for some time, but rather a separate theory.

The scientific value of the systems constructed by Leśniewski is great. Protothetic is a natural, and at the same time, possibly the broadest, generalization of bivalent sentential calculus. Ontology has outstanding intuitive advantages; its language is exceptionally close to everyday language. Due to this, it is a convenient basis for philosophical discussions. Lately, there have been attempts to apply ontology to the theory of machine translation from one language to another. The part of ontology which encompasses more extended sections of set theory has not been thoroughly evaluated so far. Mereology, the earliest system, found important applications in laying the groundwork for biology and geometry (works by Woodger, Tarski, Jaśkowski and others). The accuracy of Leśniewski's systems is absolute; however, they are not simple. The rules for Leśniewski's systems are particularly precisely developed. Leśniewski's symbols are original and ingenious.

Only a part of Leśniewski's results were published. For instance, he never published his valuable research on intensional functions. Many of his achievements are only known from the works of his disciples and colleagues. Besides, his results appeared in print with significant delay. For these reasons, Leśniewski's rich, original and profound output exerted comparatively little influence over the development of logic in the world. However, Leśniewski greatly influenced Polish logic, mostly thanks to personal contact and lectures.

Leśniewski's philosophical views are similar to T. Kotarbiński's concretism. Leśniewski rejected the existence of universals, relations and sets, interpreted according to set theory; he was a consistent nominalist.⁷⁹

⁷⁹ Here I omit the subjective and objective bibliography cited by J. Słupecki, as it is included in the bibliography of the whole volume.

11.2 Stanisław Leśniewski [2]

Jerzy Słupecki, "Stanisław Leśniewski".
[In:] *Polski słownik bibliograficzny*
[*Polish Bibliographical Dictionary*]. Vol. XVII.
Wrocław 1972: Ossolineum, pp. 177-179.

Stanisław Leśniewski (1886–1939), a logician and a philosopher, a professor at the University of Warsaw. He was born on 18 March in Serpukhov (Russia). His father was an engineer. His mother, née Palczewska, died when Leśniewski was a child. He graduated from high school in Russia, in Irkutsk. He studied in Leipzig, Zurich, Heidelberg and Lvov; he took part in Hans Cornelius's lectures. His first work, "A Contribution to the Analysis of Existential Propositions" was printed in *Przegląd Filozoficzny* [1911c], and based on this work he obtained his Ph.D. at the Lvov University. His supervisor was K. Twardowski. As a very young man, Leśniewski became a member of Social Democracy of the Polish Kingdom and Lithuania. He never took active part in political life afterwards.

All of Leśniewski's works from before World War I fall under research which he called "philosophical-grammatical". In the article "The Critique of the Logical Principle of Excluded Middle" [1913b], he presents a proof of non-existence of general objects, repeated in *Elements* by Tadeusz Kotarbiński (1st edition 1929, 2nd edition 1961) [Kotarbiński 1929]. Some semantic analyses performed at that time influenced the system of "ontology" constructed by Leśniewski in the interwar period. In 1911, Leśniewski acquainted himself with Jan Łukasiewicz's book, *On the Principle of Contradiction in Aristotle* [Łukasiewicz 1910] and the included short lecture on mathematical logic. As Leśniewski claimed himself, his standpoint towards this logic was "decidedly skeptical" at that time, which was caused by "vague and ambiguous comments supplied by its representatives". On the other hand, he learned about B. Russell's antinomy from Łukasiewicz's

book. Reflections on it contributed to the formulation of the original concept of the notion of a set in 1915. He was also deeply involved in other antinomies. Leśniewski understood solving an antinomy as intuitively undermining the reasoning or assumptions constituting a contradiction.

During World War I, Leśniewski was in Moscow, where he taught mathematics at a Polish high school for a short time. In 1916, he published *Foundations of the General Theory of Sets* [Leśniewski 1916]. The system presented in it, later called by Leśniewski mereology, was to replace other contemporary systems of set theory. Yet, he did not fulfill this goal, although he found numerous applications of it. A system of elementary geometry based on mereology was constructed by A. Tarski. S. Jaśkowski and others continued the research. Mereology also found its application in the basics for biological sciences (J.H. Woodger) and linguistics (T. Batóg). From 1919 until the end of his life, Leśniewski was a professor of the philosophy of mathematics at the University of Warsaw. Henceforth, he dealt almost exclusively with mathematical logic. He constructed the systems of ontology (1919) and protothetic (1922), as well as extending and perfecting mereology. The first of these systems is in its elementary part a calculus of names and in its further parts, it is an equivalent of the theory of classes and relations by A.N. Whitehead and B. Russell. The latter system constitutes a great expansion of the classic sentential calculus. Leśniewski presented his own and his students' results concerning mereology in an unfinished work entitled "On the Foundations of Mathematics" [Leśniewski 1927–1931]. These systems were supposed to be new foundations of mathematics based on philosophical assumptions of contemporary systems. However, Leśniewski merely began working on this task.

In the work "Fundamentals of a New System of the Foundations of Mathematics", printed in *Fundamenta Mathematicae* [Leśniewski 1929b], Leśniewski presented a precise description of the directives of reasoning assumed in his systems, especially the directive of adding definitions to the system. In the same work, he also constructed a theory

of semantic categories which, just as B. Russell's theory of logical types, was to protect logic from antinomies. He detected contradiction in L. Chwistek's and J. von Neumann's systems. The issue of eliminating colloquial language from intensional expressions was similar to those he had dealt with before World War I. Leśniewski did not publish this insightful research, but he did devote one of his lectures to it. Between 1920 and 1928 he belonged to the editorial committee of *Fundamenta Mathematicae*. Not long before the war, he became Deputy Dean of the Faculty of Mathematics and Natural Sciences at the University of Warsaw. His only Ph.D. student was A. Tarski. The illness which caused Leśniewski's death was lung cancer. He died on 13 May 1939, a few days after a surgery. He was buried at Powązki Cemetery in Warsaw. He had no children from his marriage with Zofia, née Prewysz-Kwinto.

Leśniewski's most significant achievements were three systems which he constructed. They are characterized by perfect formal precision and great intuitive qualities, which Leśniewski always valued greatly. His theory of semantic categories, formally close to the simple theory of logical types, is much more natural than the latter. Leśniewski's formulation of the directives of reasoning for his systems is proof of the fact that he saw issues others never even noticed. Leśniewski published little, and he often presented his results with great delay. He also often published less significant results while neglecting to present the most important ones. The way he edited his work made it hard to understand. These are the reasons why his output is not well known outside Poland. Still, thanks to personal contact and lectures, Leśniewski's impact on Polish logic was very significant. After World War II, Leśniewski's results were popularized by his students. In 1962, an extensive monograph by Eugene C. Luschei [1962], was published in Amsterdam by North-Holland Publishing Company. Lately, more and more works connected to Leśniewski's systems have been published, also in Japan. Leśniewski did not publish any works wholly devoted to philosophical issues. However, his offhand comments suggest that his philosophical views approached Kotarbiński's reism, though they were

less radical. According to K. Ajdukiewicz, Leśniewski believed in “the absolute truth of certain assumptions and the objective value of certain reasoning and did not want to consider his logical system to be playing with concepts, but rather knowing reality”.⁸⁰

12 CZESŁAW LEJEWSKI: MEMORY OF STANISŁAW LEŚNIEWSKI

Czesław Lejewski,
“Wspomnienie o Stanisławie Leśniewskim”
[Memory of Stanisław Leśniewski].
*Fragmenty filozoficzne ofiarowane Henrykowi Hiżowi
w siedemdziesiątą piątą rocznicę urodzin*
[Philosophical Fragments Offered to Henry Hiż
on the Seventy-Fifth Anniversary of His Birth].
Warszawa 1992:

Wydawnictwo Polskiego Towarzystwa Semiotycznego, pp. 61-89.

The centenary of S. Leśniewski’s birthday in 1886 and the relatively recent fiftieth anniversary of his premature death in 1939 remind us that the time is ripe to reflect again on his scientific output, which earned him a prominent place among the most brilliant Polish logicians and philosophers.

1

S. Leśniewski’s unpublished manuscripts and notes, as well as all his personal documents and private correspondence were irretrievably lost during a fire and in bombings which turned Warsaw into a heap of rubble in the late summer of 1944. Autobiographical elements included in his published work, naturally the reliable ones, are too meager and fragmentary to conduct even a broad reconstruction of his life. In order to do so, one must refer to equally meager drafts based on

⁸⁰ As above, the bibliography has been omitted.

undocumented and isolated, but important bits of information found in letters from his friends, colleagues and coworkers. We owe the most reliable biographical material to Tadeusz Kotarbiński, and especially to [Kotarbiński 1958b].⁸¹

We learn from T. Kotarbiński's memoirs that Stanisław Leśniewski was born in Serpukhov, in the region Ivanovo-Voznesensk, about 150 miles north-east of Moscow.⁸² He was born in the same year, and even in the same week, as Kotarbiński, end of March and beginning of April 1886. Bolesław Sobociński, who is generally very cautious when it comes to biographical details, noted in a footnote in one of his works that Leśniewski was born on 18 March 1886 [Sobociński 1949–1950: 21]. The source of this information is not cited by Sobociński, but Kotarbiński, who was consulted on this matter by Eugene Luschei, the author of an extensive monograph on Leśniewski's logical systems, suggests that this date should be interpreted according to the Julian calendar, which was in general use in Russia before the revolution [Luschei 1962: 308, footn. 16]. According to the Gregorian calendar, this would be 30 March 1886, and let us remember that Kotarbiński's birthday was on 31 March 1886 [*ibid.*].

Jerzy Słupecki, Stanisław Surma and Jan Woleński consider 28th March to be S. Leśniewski's birthday.⁸³ This disparity is settled by "official" documentation which my colleague, Barry Smith, Ph.D., was able to obtain from the archive of Leipzig University. We learn from that source that S. Leśniewski was registered as a philosophy student at Leipzig University from 17 October 1904 to 30 April 1906. On his student ID, the date of birth was 16 March 1886 rather than 18 March, which corresponds to 28 March 1886 in the Gregorian calendar.

⁸¹ The text is reprinted in this volume.

⁸² Cz. Lejewski repeats T. Kotarbiński's incorrect information. Most of Lejewski's biographical doubts are corrected and supplemented in my calendarium.

⁸³ In [Słupecki 1965], J. Słupecki provided a birth date of 28 March 1886, but in [Słupecki 1972: 177], he wrote that Leśniewski was born on 18 March 1886, and therefore established the same date as Sobociński. S. Surma assumes 28 March 1886, and J. Woleński told me in 1986 that it is undoubtedly the correct date. [Footnote — CzL.]

CHAPTER III

As T. Kotarbiński claims, Leśniewski received secondary education at a middle school, probably in Irkutsk (a city on the river Angara, which flows into Lake Baikal), where his father was employed as an engineer at the construction of the Trans-Siberian railway. In order to obtain a higher education, Leśniewski traveled abroad and it is fully possible that his first destination was Leipzig. According to documents preserved in the university archives, Leśniewski attended the following lectures: in the winter term of 1904/1905, (1) inorganic chemistry and its applications, (2) human anatomy (bone anatomy, arthrology), (3) human anatomy (muscles and vessels), (4) economic, social and political history; in the summer term of 1905, (1) psychology, (2) general political economy; in the winter term of 1905/1906, (1) theory of knowledge as an introduction to philosophy.

We do not know where he went when he left Leipzig University. Undocumented tradition has it that he visited universities in Zurich and Heidelberg [Ślupecki 1972: 177]. We know for certain, thanks to B. Smith's research, that in the summer term of 1909 and in the winter term of 1909/1910, Leśniewski was registered at Ludwig Maximilian University of Munich, where he attended lectures and classes conducted by Hans Cornelius and others.

Having visited German universities, S. Leśniewski came to Lvov and signed up for the Lvov University courses in the summer term of 1909/1910 and in the winter term of 1910/1911, aiming to work on his Ph.D. thesis under Kazimierz Twardowski. Having registered as a student, Leśniewski joined a group of K. Twardowski's Ph.D. students. This group included, among others, Zygmunt Zawirski (1882–1948), Ph.D. in 1910; Tadeusz Kotarbiński (1886–1981), Ph.D. in 1912; Kazimierz Ajdukiewicz (1890–1963), Ph.D. in 1913; and Tadeusz Czeżowski (1889–1981), Ph.D. in 1914 [Woleński 1985: 17–18].

Stanisław Leśniewski finished the first part of his Ph.D. dissertation "A Contribution to the Analysis of Existential Sentences" in 1910. Having taken into account Twardowski's critical remarks, he published the revised dissertation in 1911 [Leśniewski 1911]. Based on this work,

Leśniewski obtained a Ph.D. degree in 1912; his supervisor was K. Twardowski.⁸⁴

In 1911, S. Leśniewski befriended Jan Łukasiewicz, who was one of K. Twardowski's older students, as he began his philosophical studies under his direction as early as 1897, and five years later, he obtained the title of Ph.D. in philosophy [Sobociński 1956a: 25]. Since 1906, J. Łukasiewicz taught philosophy and logic in Lvov as a supernumerary assistant professor (Privatdozent). In 1911, he became an associate professor of the Lvov University. A year earlier, he had published monograph [Łukasiewicz 1910]. It fell into Leśniewski's hands in 1911 and impressed him as one of the most interesting and original works of all philosophical literature known to him at that time. Sixteen years later, he wrote that Łukasiewicz's monograph was a revelation to him in many ways. He first learned from it of the existence of symbolic logic and of Bertrand Russell and his antinomy concerning the class of all classes which are not their own elements [Leśniewski 1927–1931/1992.I: 181, 197].

Having studied this monograph, S. Leśniewski decided to meet J. Łukasiewicz. As Łukasiewicz mentioned to me at some point, he introduced himself and said he had come to critique the author. He was invited inside, and the subsequent lengthy discussion turned out to mark the beginning of a friendship and close cooperation in the area of logic. The discussion resulted in Leśniewski's work "An Attempt at a Proof of the Ontological Principle of Contradiction" which he finished in Paris in July 1911. The following year, it appeared in print in *Przegląd Filozoficzny* [Leśniewski 1912].

Leśniewski's Ph.D. dissertation and his work on the principle of contradiction were also jointly published in Russian in 1913. In this edition, Leśniewski corrected the presentation method and placed them in reverse chronological order.⁸⁵

⁸⁴ S. Leśniewski paid his tribute to his supervisor in an inscription preceding his article [Leśniewski 1927–1931/1992.I: 174]. [Footnote — CzL.]

⁸⁵ Leśniewski himself announced it when providing titles in the Russian version [Leśniewski 1927–1931/1992.I: 197]. [Footnote — CzL.]

CHAPTER III

In the summer term of 1912, S. Leśniewski presented a series of lectures on the principle of excluded middle during the meetings of the student science circle at the Lvov University. These materials became the foundation of the work “The Critique of the Logical Principle of Excluded Middle”. Leśniewski prepared it for publication at the Italian Riviera in San Remo early in 1913 [Leśniewski 1913b]. This is when he read T. Kotarbiński’s essay, which appeared in *Przegląd Filozoficzny* [Kotarbiński 1913]. His colleague’s ideas made such a great impression on him that he could not resist critically evaluating them and offering his own, contrary point of view. He did it in his work “Is All Truth Only True Eternally or Is It Also True Without a Beginning?” the manuscript of which was ready to be handed over to the publisher of *Nowe Tory* in March 1913. The same month, Leśniewski finished an article on the logical principle of excluded middle and sent it to *Przegląd Filozoficzny*. Both works appeared in print in the abovementioned journals in 1913 ([Leśniewski 1913a], [Leśniewski 1913b]).

Referring to the four aforementioned works, Leśniewski wrote in 1927:

I regret that they have appeared in print, and I formally “repudiate” them herewith, though I have already done this within the university faculty, affirming the bankruptcy of the “philosophical”-grammatical work of the initial period of my work. [Leśniewski 1927–1931/1992: 198]

Russell’s antinomy concerning the class of all classes which are not their own elements had unsettled Leśniewski since he had first read about it in 1911. Initially, he thought that finding a mistake in the reasoning leading to a paradoxical conclusion would not pose a problem. I remember when during one of his lectures he told the students that soon after having read J. Łukasiewicz’s monograph on the principle of contradiction, he had to go to Moscow. Therefore, he took the monograph with him, assuming that he would have more than enough time during the journey to solve Russell’s puzzle. He had to

change trains in one of the stations and had to wait for his connection for several hours. He continued to contemplate the antinomy in the waiting room, missed his connection and reached Moscow later than planned, still not having solved the problem.

Yet, within the next few years, his fascination with paradoxes started to bear fruit. His interest in Russell's antinomy resulted in an essay entitled "Is the Class of Classes not Subordinated to Themselves, Subordinated to Itself" (Leśniewski owes the original form of the title to the manner in which Łukasiewicz presented Russell's antinomy in a monograph on the Aristotle's principle of contradiction [Łukasiewicz 1910]). Leśniewski's essay was finished in Kimborciszki in January 1914 [Leśniewski 1914a]. It was also in Kimborciszki that he wrote a review of Benedykt Bornstein's work "Philosophical Foundations of Set Theory" [Bornstein 1914], which he finished in September 1914 [Leśniewski 1914b].

We know from T. Kotarbiński's memoirs that Kimborciszki in the Braslaw District was a country house belonging to Leśniewski's father-in-law. Yet, Kotarbiński states nothing of the circumstances of Leśniewski's meeting with Miss Zofia Prewysz-Kwinto, his future wife, or of when they got married [Kotarbiński 1958b: 293].

Jan Woleński claims that in T. Kotarbiński's preserved correspondence there is a letter from Leśniewski written in 1913⁸⁶ in San Remo, where he notifies his teacher of his marriage plans for the following winter. There is no reason to believe that these plans were later changed.

Leśniewski never renounced his work from 1914 dealing with Russell's antinomy, but considered it weak. He ceased to be satisfied with it because what he had claimed about classes there was not based on axiomatic grounds [Leśniewski 1927–1931/1992.I: 201, footn. 7].

However, there is no mention in Leśniewski's later works of a review-essay concerning B. Bornstein's article.

⁸⁶ In fact, this refers to a letter of 17 December 1912.

After the outbreak of World War I, Leśniewski went to Russia and lived in Moscow for several years, teaching mathematics at a Polish middle school and continuing his work on problems posed by Russell's antinomy. It was in Moscow in 1916 that he published his dissertation *Foundations of the General Theory of Sets* which, incidentally, was dedicated to his wife [Leśniewski 1916]. This dissertation was supposed to amend the shortcomings of the work of 1914 by adjusting the concept of class (in his interpretation) to the new deductive theory, which he named MEREOLOGY ten years later.

The publication in Moscow marked the end of the first period of Leśniewski's scientific activity. In 1916, he published texts which totaled about 190 pages. Moreover, between 1911 and 1915 he presented several lectures on the subject of logic in the student philosophical circle in Lvov as well as during sessions of the Warsaw Psychological Society ([Leśniewski 1913b/1992.I: 47]; see also ["Siódme sprawozdanie PTP" 1915: 166] and ["Ósme sprawozdanie PTP" 1915: 321]).

For a logician, S. Leśniewski's publications between 1911 and 1915 are interesting to a much lesser degree, since everything which was valuable according to the author was later amended and included in later works. However, for a historian of logic, they are of utmost importance, even though they shed more light on the creator of the new system of foundations of mathematics than on the system itself. These works provided us with information on Leśniewski's journey before World War I. We also learn from them that precision in wording and paying attention to detail, so characteristic for his works in the last twelve years of his life, were not the result of acquainting himself with symbolic logic. His Ph.D. thesis on existential sentences proves it sufficiently. It is well illustrated in its beginning:

The expression "existential proposition" refers to those proposition whose predicates (including copulas) contain the positive or negative forms of the verbs: "be", "exist" or their synonyms. Existential propositions can be exemplified by the following: "People exist", "God exist", "Square circle do not exist", etc.

REMARK I

I adopt this definition of the expression “existential proposition” as the point of departure for the analysis of existential propositions. This definition, naturally, remains the same through the analysis in order to preserve terminological uniformity. The analysis of existential proposition is then an analysis of propositions which possess properties connoted . . . by the expression “existential proposition” in its above meaning. It is neither an analysis of the expression “existential proposition” nor an analysis of the meaning of that expression since neither the former nor the latter possesses properties connoted by the expression “existential proposition”. Thus, the analysis of existential propositions can only result in various views concerning existential propositions but not concerning the expression “existential proposition” or its meaning. Hence, it follows that investigations of existential propositions cannot in logic lead to this or another definition of the expression “existential proposition”. The analysis which I am going to pursue cannot therefore lead to a change in the definition from which I have started.

The foregoing remark explains why I have defined the expression “existential proposition” prior to the analysis of existential propositions — against the recommendations of Cornelius who settles a similar problem in the analysis of existential judgments in the following manner: the analysis of existential judgments can be preceded only by a temporary delimitation of the sense of the expression “existential judgment” whilst its exhaustive definition can originate only towards the end of the analysis of existential judgments themselves [Cornelius 1894: 5]. I could not use this interesting work to a larger extent because it does not deal especially with propositions of language with which I am primarily concerned here, but with “alle diejenigen Erkenntnisse und Aussagen, . . . welche in irgend einer Weise das Dasein eines denkbaren Inhaltes betreffen” [all those insights and statements . . . which in some way relate to the existence of a conceivable content] [Cornelius 1894: 6].

REMARK II

The expression “existential proposition” is or is not synonymous with the expression “existential judgment” as used in various terminologies, that is: both these expressions connote identical or different properties. If the expression “existential judgment” connotes properties the same as those connoted by the expression “existential proposition”, then the analysis of

existential propositions is an analysis of existential judgments. If, however, the expression “existential judgment” connotes properties different from those connoted by the expression “existential proposition”, then the analysis of existential propositions may have no bearing whatever on existential judgments. Thus, *e.g.*, the present analysis of existential propositions is not an analysis of existential judgments if the expression “existential judgment” denotes the “logical content” of an existential proposition, for the expression “logical content of an existential proposition” does not connote properties connoted by the expression “existential proposition”. [Leśniewski 1911c/1992.I: 1-2]

This is a very representative sample of the style inherent to Leśniewski’s writing. Even the form, which consists of a compilation of a series of assertions and consecutive numbered remarks, is repeated, *e.g.*, in [1938a], his last work. The summary of [Leśniewski 1929b] is followed by seven SUPPLEMENTARY REMARKS [Leśniewski 1938a/1992.II: 665-710].

What is interesting is that even when writing his Ph.D. thesis, Leśniewski strictly, one might even say: pedantically, adhered to the principle of observing the distinction between subject language and metalanguage, or, to put it in other words, between using and mentioning. This principle was not respected in traditional logic, the only logic Leśniewski knew at the time.

Another piece of information revealed in Leśniewski’s early publications is the scope of his reading. He refers to the following works in his Ph.D. thesis: Hans Cornelius: *Attempting a Theory of Existential Judgments* [Cornelius 1894]; John Stuart Mill: *A System of Logic* [Mill 1843] (in German translation); Edmund Husserl: *Logical Investigations II* [Husserl 1900–1901]; Kazimierz Twardowski: *On the Content and Object of Presentations* [Twardowski 1894]; Leon Petrażycki: *Introduction to the Field of Law and Morality* [Petrażycki 1905] (in Russian). In other essays published before World War I, we find references to: Jan Łukasiewicz’s *On the Principle of Contradiction in Aristotle* [Łukasiewicz 1910]; Anton Marty’s *Studies on the Foundation of General Grammar and the Philosophy of Language* [Marty 1908]; Christoph Sigwart’s *Logik* [Sigwart

1873–1878]. Vol. I; Leon Chwistek’s *The Principle of Contradiction in the Light of the Recent Investigations by Bertrand Russell* [Chwistek 1912]; Alexius Meinong’s *On the Position of the Theory of Objects in the System of Sciences* [Meinong 1907]; Leonard Nelson’s and Kurt Grelling’s “Comments on the Paradoxes of Russell and Burali-Forti” [Nelson & Grelling 1908]; Tadeusz Kotarbiński’s “The Problem of the Existence of the Future” [Kotarbiński 1913]; Louis Couturat’s *Algebra of Logic* [Couturat 1905]; Henri Poincaré’s *Science and Method* [Poincaré 1908]; Ernst Zermelo’s “Proof that Every Set Can Be Well-Ordered” [Zermelo 1904] and “A New Proof of the Possibility of Well-Ordering” [Zermelo 1904].

One cannot say that Leśniewski was a bookworm but whatever he read, he did so attentively and conscientiously, recording every ambiguity of theses and lack of conclusiveness of argumentations.

2

Early in 1918, Leśniewski moved to Warsaw. He became a member of the Warsaw Institute of Philosophy founded in 1915, and he took active part in the newly created Division of Logic at the Institute.⁸⁷ In 1919, he was appointed professor of philosophy of mathematics at the University of Warsaw, reopened as a Polish university in 1915.

In the “Preface” to his treatise of 1916 on set theory, Leśniewski wrote:

The present work is the first link in an extended series of works, which I intend to publish in the near or distant future, desiring to contribute as much as possible to the justification of modern mathematics. That such a justification is not a superfluous matter, is clear to anyone who is even acquainted with no more than the “antinomies” which mathematics has arrived at in the last decades of its development. [Leśniewski 1916/1992.I: 129]

⁸⁷ In [“Trzecie Sprawozdanie WIF” 1918: 190-191], S. Leśniewski is mentioned as “a member of the Institute” participating in the meetings of the Division of Logic. [Footnote — CzL.]

After 1916, Leśniewski continued to work on his set theory, attempting to amend and expand its published version. Having become a professor at the university, he chose it as the subject of his lectures in his inaugural academic year of 1919/1920 [Leśniewski 1927–1931/1992.I: 367].

The first deductive system of Leśniewski's set theory was based on the term "part" as the only non-definable term. In his introduction to the treatise of 1916, he considered it to be a mathematical term. Naturally, he treated rest of the vocabulary of old [terms] used to formulate axioms and definitions of the system, as belonging to logic. The term "part", occurring in such sentences as "object P is a part of object P_1 ", is interpreted as "a proper part". With its help, Leśniewski defined the term "ingrediens", which has the same meaning as "being part of or identical with", and used the latter in the definition of a term which plays a key role in formulating Russell's antinomy, that is, a term occurring in such sentences as "Object P is a class of objects m ". The definition of the term "class" implies that a sentence of this type can be deemed true provided that the following two conditions are met: (1) every object m is an ingrediens of object P and (2) if object P_1 is an ingrediens of object P , then a certain ingrediens of object P_1 is an ingrediens of object m ([Leśniewski 1916/1992.I: 135], [Leśniewski 1927–1931/1992.I: 230–231]). All theses of the system are formulated in natural language and statements are proven in a manner reminiscent of traditional methods used by mathematicians.

Leśniewski's early attempts to familiarize himself with symbolic logic, attempts inspired by reading, in 1911, Łukasiewicz's monograph on Aristotle's principle of contradiction, brought frustration and dissatisfaction, which he thought were not exclusively his fault. After all, despite genuinely trying, he could not understand what the axioms and theses of the systems he attempted to study were about and what they were supposed to ascertain. He made a breakthrough only when he "discovered" for himself in 1918 that in *Principia Mathematica* [Whitehead & Russell 1910–1913], which he had studied diligently for four years, the theses of the "deductive theory" began to make sense

when, contrary to the explanations and comments of the authors, one consistently interprets sentences of the type ' $\sim p$ ', ' $p \vee q$ ', ' $p \rightarrow q$ ', etc., occurring in these theses, with sentences of the type, respectively: 'not p ', ' p or q ', 'if p , then q ', etc. Therefore, for instance, sentence of the type ' $(p \vee p) \rightarrow p$ ' should be interpreted, Leśniewski claims, as having the same meaning as a sentence of the type "If p or p , then p ". Contrary to the suggestions of the authors of *Principia*, it cannot be interpreted as a sentence stating that "If either p is true, or p is true, then p is true". Similarly, a sentence of the type ' $\sim p \rightarrow (p \rightarrow q)$ ' should be interpreted as having the same meaning as a sentence of the type "If not p , then if p , then q ". However, it does not state that "A false sentence implies every sentence", although the authors of *Principia* tell their readers that it is so ([Leśniewski 1927–1931/1992.I.: 195–196], [Leśniewski 1927–1931/1992.I: 366]).

As a result of a discussion with Leon Chwistek in 1920, Leśniewski decided to use symbolic language in his research on logic as well as in his university lectures and other public statements [Leśniewski 1927–1931/1992.I: 365–366]. The symbols he assumed were based on symbols used by Alfred Whitehead, Bertrand Russell and Giuseppe Peano. He owed the first two the shape of basic functor constants in sentential logic and the use of sets of dots as an alternative to brackets to give more focus to the syntactic structure of sentences. In symbolization of quantifiers, he changed parentheses to square brackets, because he believed this way quantifiers would be more conspicuous. He borrowed from Peano the idea to symbolize the copula, that is, the functor "is" in sentences of the type " A is b " with the Greek letter epsilon ' ϵ ' [Leśniewski 1927–1931/1992.I: 366]. He considers his modified version of Russell-Peano symbols to be a very convenient tool for formulating theses and drawing up proofs of statements within various deductive theories which he was interested in.

The period when the means of communicating logical ideas was natural language for Leśniewski resulted in attempts to work out a consistent method of handling sentences described in traditional

logic as individual, particular, universal and existential. Therefore, the central point of his research in 1920 constituted the problem of reducing sentences of one type to sentences of other types, and especially, the problem of explaining the way of understanding and using individual sentences of the type: “ A is b ”. Leśniewski achieved significant results in that matter and believed them to be worth presenting in a deductive system which would utilize ‘ ϵ ’ in axioms as the only primitive term and draw the remaining vocabulary from sentential logic. In 1920, he found a sentence which proved suitable for the only axiom of the created system. He called the theory represented by this system ONTOLOGY [Leśniewski 1927–1931/1992.I: 366–369, 379–382].

Leśniewski presented the first, very general outline of ontology in a meeting of the Polish Psychological Society on 10 January 1921. On 24 March of the same year, Łukasiewicz presented his paper on Leśniewski’s ontology in a meeting of the members of the Division of Logic at the Warsaw Philosophical Institute. Leśniewski conducted a systematic presentation of this theory in a university lecture course on the foundations of mathematics. This course began in the second trimester of the academic year 1920/1921 and was continued in the third trimester and for the next two academic years, that is, 1921/1922 and 1922/1923 [Leśniewski 1927–1931/1992.I: 370–371].

After axiomatizing ONTOLOGY, what remains is to establish axiomatic grounds for the assumptions of ONTOLOGY, so far accepted tacitly, that is, axiomatizing the basics of sentential logic. The way Leśniewski solved this problem was influenced by a surprising discovery by Alfred Tarski in 1922 which was that the functor of a sentential conjunction “and” can be defined with a functor of sentential equivalence “always and only when”, as long as a general quantifier is used in the *definiens*, which would bind functor variables ([Tarski 1923], [Leśniewski 1929b/1992. II: 419–421], [Sobociński 1956b: 62]). This important finding made it possible to base a full and complete system of sentential bivalent logic on the functor of sentential equivalence as the only constant primitive term. It is commonly thought that sentences which can be used as

single axioms of such a system are less intuitive than the axioms of a system based on the functor of implication “if... then” as the non-definable term. However, Leśniewski preferred the former kind of system [Sobociński 1960–1961.I: 55-56]. One of the reasons was undoubtedly the fact that the functor of equivalence provides the most intuitive “structure” or “form” to formulate definitions which, according to Leśniewski, should be treated as integral parts of deductive theories. Another reason was probably that he wanted the axioms of standard systems in his deductive theories to be canonical, which meant in his terminology that they were to be equivalences, just as definitions with the primitive functor “defined” [Sobociński 1956b: 62].

A systematic presentation of sentential logic was the subject of Leśniewski’s course entitled “Foundations of logistics”. The course began in the winter trimester of the academic year of 1922/1923 and was continued for the next four years. Other lectures on issues related to sentential logic were conducted by Leśniewski every year, beginning with the academic year of 1929/1930, and later, from 1935/1936 to 1938/1939.

3

In the ten years which passed after the publication of the 1st part of the treatise *Foundations of the General Theory of Sets* [Leśniewski 1916], Leśniewski achieved numerous and significant results in the fields of logic and foundations of mathematics. It was impossible to further postpone making them available to the scientific world outside the narrow circle of colleagues and coworkers, which is why in 1927 Leśniewski accepted the offer of *Przegląd Filozoficzny* to publish in parts what was considered to be his main achievement concerning the foundations of mathematics.

S. Leśniewski wrote in the introduction:

The system of foundations of mathematics whose outline I wish to present in this work, new in some respects in essentials and in method, embraces three deductive theories, whose union I consider to be one of the possible foundations for the whole of the system of the mathematical sciences. These theories are:

- (1) the theory I call “protothetic” which corresponds in content, although very roughly, to the theory known in the science as “calculus of equivalent statements”, “Aussagenkalkül”, “theory of deduction”, in connection with the “theory of apparent variables” *etc.*;
- (2) the theory I call “ontology”, which forms a certain kind of modernized “traditional logic”, and which in content and “power” most nearly approaches the Schröderian “Klassenkalkül”, considered as including the theory of “individuals”;
- (3) the theory which I name “mereology” and whose first, but in many respects imperfect, outline I published in a work entitled “Foundations of the General Theory of Sets”.I. [Leśniewski 1927–1931/1992.I: 176-177]

In the Division of Logic of the Second Polish Philosophical Congress, which took place in Warsaw in September 1927, Leśniewski presented three lectures entitled: “On the Foundations of the Theory of Classes”, “On the Foundations of Ontology”, and “On the Foundations of Logistics” ([Leśniewski 1927–1931/1992.I: 370-371], [Leśniewski 1928]). Naturally, he wrote the introduction to the paper “On the Foundations of Mathematics” [1927–1931], the introduction to which I have already quoted, just after the convention since, if I am not mistaken, the terms “protothetic” and “mereology”, which appear in the fragment of the above cited introduction, were used in print for the first time here. It must be admitted that their specific meanings concord with the term “ontology” and correspond better to the content of the theories which they refer to than expressions previously used for this purpose.

In a general description of his system of the foundations of mathematics, Leśniewski enumerated in logical order theories which together create a system. PROTOTHETIC was mentioned at the beginning of the list, since it does not assume any other, logically more primitive, theory. ONTOLOGY assumes PROTOTHETIC. To be more precise, ONTOLOGY is expanded PROTOTHETIC, as we obtain it by: (1) at a certain stage of development, attaching to the latter an ontological axiom which is a “self-definition” of the primitive term ‘ ϵ ’, non-definable

within PROTOTHEtic, (2) adapting primary directives of PROTOTHEtic to the new axiomatic base, or (3) adding the directive of ONTOLOGICAL definition and the directive of ontological extensionality to thusly adapted directives. In this sense, PROTOTHEtic becomes a part of ONTOLOGY. MEREOLoGY, which in turn assumes ONTOLOGY, emerges by adding a MEREOLoGICAL axiom to ONTOLOGY and by adapting ONTOLOGICAL directives so that they can be used regardless of what term is selected as the MEREOLoGICAL primitive term. If we regard MEREOLoGY as a kind of expansion of ONTOLOGY, then conversely, primitive ONTOLOGY can be regarded as a part of MEREOLoGY [Lejewski 1986: 188-192].

When presenting his system of the foundations of mathematics in the work “On the Foundation of Mathematics” [Leśniewski 1927–1931], Leśniewski decided to apply a method which he described as autobiographical and synoptic. In other words, Leśniewski aimed to present a historical report of his own ideas and discoveries and those of his coworkers, beginning with MEREOLoGY, which was the first deductive theory created and analyzed by him, under the name of “set theory”, and later “class theory”. Supposedly, the presentation of mereology was supposed to be followed by a presentation of ontology, similar in style, which would then be summarized with the history and content of protothetic.

In *Przegląd Filozoficzny*, Leśniewski published only the introduction and the first eleven chapters of the work “On the Foundation of Mathematics”. In the introduction, he enumerated the reasons for accelerating the publication of the results of his long-term research on the foundations of mathematics, and he expressed his admiration for Gottlob Frege’s achievements. He criticized briefly, but in harsh words, the way some philosophers and mathematicians had tried to act with antinomies occurring in mathematics since the beginning of the century, and he expressed his own views on how the anti-nominal problem should be approached. In chapters I to III, he strongly criticized the chaotic and misleading explanations and comments provided by the

authors of *Principia* in connection to their primitive sentence “ $\vdash:[q \rightarrow (p \vee q)]$ ” and symbolic vocabulary occurring in it to arouse *bona fide* in the reader or student. Afterwards, he analyzed Russell’s antinomy concerning the class of all classes which are not their own elements, explaining his interpretation of expressions of the type: “Object *A* is a class of objects *a*” and, in the light of this interpretation of the expression “class”, demonstrating that the proof of the antinomy is based on assumptions of which at least one is false. Finally, he compared his own concept of class with some ideas by George Cantor and Frege, and he analyzed what Felix Hausdorff, Waclaw Sierpiński, Adolf Fraenkel and the authors of *Principia* stated on sets and classes in their handbooks and monographs. Chapters IV to X contained a revised, improved and greatly expanded version of the general set theory, that is, MEREOLOGY. In chapter XI, Leśniewski discussed certain problems connected to the interpretation of individual sentences of the type ‘ $A \in a$ ’. This chapter actually belongs to ontology, or rather, its early history. Leśniewski wrote it in 1929 or 1930 in response to appreciative, flattering comments on ONTOLOGY expressed by T. Kotarbiński in *Elements of Epistemology, Formal Logic and Methodology of Science*, published in 1929 [Kotarbiński 1929]. The last line of chapter XI reads: “to be continued”. However, this promise was never fulfilled.⁸⁸

In chapters IV to X, MEREOLOGICAL theses are presented in natural language, and theses are proven in a way which is reminiscent of traditional methods applied by mathematicians. In other words, the correctness of the proofs is ensured by the sense of infallible accuracy of the steps leading from axioms and definitions to the argued theses, rather than some clearly established rules or principles of logic. It would not be a mistake to deem Leśniewski’s method of arguing in the work

⁸⁸ This information is found in the German original: “Fortsetzung folgt” (cf. [Leśniewski 2015.II], p. 567); in English translation it was abandoned. Contrary to the wording of Cz. Lejewski, the continuation — namely §12 — appeared soon before World War II (cf. [Leśniewski 1938b]).

Foundations of Mathematics informal and, in some respects, more natural “natural deduction”.

The part of *Foundations of Mathematics* which was printed in *Przegląd Filozoficzny* was 180 pages long. If its intended further part, which was to contain presentations of ONTOLOGY and PROTOTHETIC, was written in the same style and similar form, the whole monograph would probably expand to 600 pages.

Leśniewski realized that publishing a paper of such volume in a philosophical quarterly could take several years, as the quarterly could not be expected to suspend the publication of articles on different domains in philosophy. This is why he decided to begin the publication of a shorter version of his system of foundations of mathematics, which omitted philosophical details connected to various theoretical problems. Unlike the treatise *Foundations of Mathematics*, the shorter version was going to include a formalization of the system. This assumed its symbolization and determined the sequence in which the deductive theories making up the system were to be presented. The first part of the new treatise appeared in German in *Fundamenta Mathematicae* in 1929 and was entitled “Fundamentals of a New System of the Foundations of Mathematics” [Leśniewski 1929b]. It included an introduction and the first eleven parts or “paragraphs”, as Leśniewski called them, of chapter I, entitled “The Foundations of Protothetic”. Paragraph 12 of chapter I of “Fundamentals” was also accepted for publication, but in 1930 Leśniewski withdrew it for “personal reasons”. Eight years later, this paragraph and some introductory remarks to it were published in volume I of a new periodical *Collectanea Logica* [Leśniewski 1938b]. Due to the outbreak of World War II and the damage to the premises and the equipment of the printing house, volume I never appeared in print, but fortunately, Leśniewski’s articles: “Introductory Remarks to the Continuation of My Article ‘Fundamentals of a New System of the Foundations of Mathematics’” [Leśniewski 1938b].

The work “Introductory Remarks...” was especially interesting, as Leśniewski included in it an outline of a “calculable” system of

PROTOTHETIC. Leśniewski constructed several such systems, whose consistency can be easily demonstrated by means of a generalized method of logical matrices. Now, Leśniewski could prove that if a certain system of “calculable” PROTOTHETIC is consistent, then the standard system of PROTOTHETIC is also consistent [Leśniewski 1938a/1992.I: 686-694]. Unfortunately, he never published such a proof. It was destroyed together with other notes and manuscripts.

Strictly speaking, this was everything Leśniewski had published on the subject of PROTOTHETIC. Perhaps one other work can be added to the three mentioned so far, an article entitled “On Definitions in the So-Called Theory of Deduction”, published in 1931 [Leśniewski 1931]. The author presented in natural language the formalization of something which may be considered a fragment of PROTOTHETIC, that is, a formalization of a full sentential calculus done in Łukasiewicz’s parenthesis-free symbols.

In chapter XI of *Foundations of Mathematics* we find a report of the first stage of axiomatization of ONTOLOGY. The formalized system of this theory was presented by Leśniewski in the work “On the Foundations of Ontology” published in 1930. It should be read together with chapter I, §11 of “Fundamentals of New System” ([Leśniewski 1930], [Leśniewski 1929b: 467-488]).

Leśniewski never published the formalization of mereology. This theory remained non-formalized, but its formalization does not require the introduction of any new MEREOLOGICAL directives, but merely adaptation of ONTOLOGICAL directives, regardless of which MEREOLOGICAL terms would be assumed as primitive terms in corresponding MEREOLOGICAL AXIOMS.

For the full picture, we should mention two other works published by Leśniewski in *Fundamenta Mathematicae* in 1929. These are: “Fundamentals of a New System of the Foundations of Mathematics” and “On Functions Whose Fields, with Respect to These Functions, are Abelian Groups” [Leśniewski 1929b; 1929c]. Both works can be

recommended, especially to those mathematicians who are interested in axiomatization of algebraic theories.

This is because Leśniewski demonstrates in one of them that regular axiomatic systems of the theory of groups may be reduced to a single thesis, and in the other one, he demonstrates a similar result for the theory of abelian groups. Both works provide a substantial sample of working symbols used by Leśniewski during lectures and on less formal occasions. They also illustrate his method of presentation of outlines of proofs within axiomatic theories which have not undergone the rigor of formalization. An extended example of strict deduction within a formalized theory can be found in §12 of “Fundamentals of a New System” [Leśniewski 1938b]. In this paper, the theses of the theory are expressed in symbolic language invented by Leśniewski especially to facilitate formalization.

“Paragraph 12”, finished in 1939, is officially Leśniewski’s last publication, as he died on 13 May 1939, at the age of 53, after an unsuccessful surgery of a malignant tumor in the lungs.

According to a list included in J. Woleński’s book, Leśniewski’s bibliography encompasses 16 positions [Woleński 1985: 328]. The only material from among his works published in Polish between 1911 and 1931 which was worth saving, according to him, was included in the work entitled “On the Foundations of Mathematics” [Leśniewski 1927–1931], his last publication in Polish. Therefore, if one wishes to learn about his logic and philosophy, one must study the eight publications from 1927–1938. Except the work “On the Foundations of Mathematics” (174 pages), which was published in Polish, all remaining works appeared in print in German (292 pages). On the whole, a full set of his works in Polish and German would result in a volume of about 650 pages.

Neither of Leśniewski’s main projects, meaning the one which began to take shape through the publications in *Przegląd Filozoficzny* in 1927 and the one in *Fundamenta Mathematicae* in 1929, were fully realized. However, what was published provided enough hints to imagine the content and form of a finished product. Although they resemble an

incomplete puzzle full of missing elements, the general picture is quite clear. Reconstructing the missing elements is within our reach.

4

The task of organizing Leśniewski's academic notes and preparing them for publication was entrusted in 1939 to B. Sobociński, who had been his closest coworker for many years. Sobociński worked on this responsible task throughout the hard times of German occupation, but sadly, as I mentioned before, Leśniewski's notes and all of unfinished work which Sobociński kept went missing during the annihilation of Warsaw in 1944. Sobociński's manuscripts, about 1000 pages long, containing a reconstruction of Leśniewski's ontology, also disappeared. Despite these setbacks, Sobociński managed to recreate and publish the analysis of Russell's antinomy conducted by Leśniewski in an Italian periodical *Methodos* [Sobociński 1949–1950]. Sobociński also recreated and published in *Rocznik Polskiego Towarzystwa Naukowego na Obczyźnie* the requirements to be met by the axioms of theories making up his system of basics for mathematics, according to Leśniewski's expectations [Sobociński 1956b]. Still, ONTOLOGY awaited reconstruction. Sobociński achieved this goal during his lectures at Notre Dame University. One may hope that in due course his notes from those lectures will be edited and published by his American students or their successors.

Soon after the end of World War II, T. Kotarbiński began his search for unpublished material concerning Leśniewski's research of logic. He appealed to former students at the University of Warsaw to share notes from the Professor's lectures or seminars which might have been preserved. The notes provided for Kotarbiński in response to this appeal were transferred to J. Śłupecki with a request to determine what new information about Leśniewski's theories could be elicited from them. Śłupecki presented his findings in two extensive works: one on PROTOTHEIC, and the other on ONTOLOGY. He based the former on notes from the course entitled "On Certain Problems of Protolithic"

conducted by Leśniewski in the academic year of 1932/1933, and the latter was based on notes from the course entitled “Elementary Outline of Ontology”, which Leśniewski began in the academic year of 1929/1930 and continued for the next two years ([Śłupecki 1953], [Śłupecki 1955]).

5⁸⁹

It seems that development in logic followed diverse paths. The turning points on the road leading to Leśniewski’s system of logic and foundations of mathematics were: Aristotle’s syllogistics, traditional logic, *Basic Laws of Arithmetic* by Frege [1894] and finally, *Principia Mathematica* by Whitehead and Russell [1910–1913].

ONTOLOGY, which Leśniewski himself described as a kind of modernized traditional logic, derived from his inquiries into the meaning and logical properties of various types of sentences, mentioned by Aristotle and usually discussed in handbooks of logic by 19th-century traditional logicians. Like Frege, Leśniewski was very critical of the “formalistic” approach to logic and mathematics, manifested in a purely formal “calculus”, not interpreted in principle, or dis-interpreted in the name of questionable merits of the “art” of “manipulation” of symbols devoid of meaning. He rejected the concept of mathematical disciplines as deductive systems which enable the derivation of some nonsensical formulas from some other, more or less showy formulas devoid of meaning, according to certain conventional rules of transformation. From his point of view, deductive theories, whether mathematical or not, should help reduce the diversity of reality to strict rules or principles. He attached established and unchangeable meanings to the theses of his theories, and he believed the axioms of the deductive systems constructed by him and interpreted in advance were undoubtedly true. The rules of defining, inference and extensionality, codified in directives and appropriate terminological explanations, were irrefutably

⁸⁹ From this point onwards, the text [Lejewski 1990] differs greatly in many places from the text [Lejewski 1989], whose translation is included here. This is why I present the appropriate fragment below from [Lejewski 1990] *in extenso*.

accurate in his view. In order to highlight his anti-formalistic approach to deductive theories, Leśniewski described himself as a zealous “intuitionist” [Leśniewski 1929b/1992.II: 487]. He used this term in the sense that being an intuitionist did not imply any favors towards intuitionist logic and the philosophy of mathematics proclaimed by L.E.J. Brouwer and his successors.

Just as Frege did, Leśniewski considered it unacceptable to “discover” objects which do not occur in the world in which we live, a practice often applied by mathematicians. He would certainly agree with Russell, the author of *Introduction to Mathematical Philosophy*, who wrote that “logic is concerned with the real world just as truly as zoology”, and that “the sense of reality is vital in logic, and whoever juggles with it by pretending that Hamlet has another kind of reality is doing a disservice to thought” [Russell 1919: 169]. In terms of ontology, interpreted as the theory of what exists, Frege, early Russell and Leśniewski turn out to be the proponents of mono-categorical reality. Whatever exists is an object for them, and objects make a single ontological category. The belief in the existence of entities “of a higher type” or “of a higher order” would be rejected by Leśniewski as “mythology” [Leśniewski 1938a/1992.II: 709]. He also explicitly rejected the faith in the existence of any kind of universals. This he did as early as in 1913 in his work on the principle of excluded middle [Leśniewski 1913b/1992.I: 49-53]. In this period he still believed in the existence of “objects called properties” and “objects called relations”; yet, in 1927 he wrote that he abandoned this conviction some time before, as he could no longer see the reasons to keep it [Leśniewski 1927–1931/1992.I: 199-200]. This is why Leśniewski may be described as a nominalist in the traditional sense of the term, as far as the problem of universals is concerned, although the term unfortunately seems to have assumed a new meaning in contemporary logical and philosophical writing.

Leśniewski’s interest in the philosophy of mathematics was apparent during his studies in Munich. However, as he was raised on traditional logic and John Stuart Mill’s logic, he continued his work on this issue for a short period of time from the position of “universal grammar” and

logical semantics in Meinong's, Marty's, and Husserl's style. Russell's antinomy, of which he learned from Łukasiewicz's monograph, opened for him an unknown world of modern symbolic logic, with its exciting discoveries and troublesome paradoxes [Leśniewski 1927–1931/1992.I: 189]. His solution for the antinomy of the class of all classes which are not their own elements differed from Frege's or Russell's solutions and ultimately brought about the system of foundations of mathematics which contained all the positive aspects of Frege's *Basic Laws*... [Frege 1893–1903] and Whitehead and Russell's *Principia* [Whitehead & Russell 1910–1913], but was free from their defects.

According to Leśniewski's practice, the fundamental question to be answered during an attempt to solve an antinomy is not the question of how to "block" the possibility to derive contradictions from assumptions which the construction of the antinomy is based on, either implicitly or explicitly, but rather, which of the assumptions is false. When the false assumption is identified once, the antinomy loses its power to mislead. There is nothing surprising in the fact that the assumptions, one of which is false, imply contradiction between them.

As for the notion of class and element, Leśniewski assumed that: (1) if a certain object, let us call it P , is a class of objects a , then that certain object is a , and that (2) object P is an element of object Q always and only when for a certain a , Q is a class of objects a and P is a . The first assumption is equivalent to discarding the idea of "empty classes", strongly criticized by Frege. The latter, as Leśniewski points out, fits the way contemporary specialists in set theory applied the term "element".

It results from (1) that (3) if a certain object P is a class of all classes which are not their own elements, then that certain object is a class which is not its own element.

The manner in which Leśniewski used individual sentences of the type " A is a " authorized him to claim that (4) if object P is a , then P is object P and there exists exactly one object P .

He also believed it to be obvious that (5) if there exists exactly one object P , then P is a class of objects P . It results from (4) and (5) that (6)

if P is a class, then P is class P and P is object P , and in turn, (6) entails that (7) if P is a class, then for a certain a , P is a class of objects a and P is object a . It may be derived from (2) and (7) that (8) if P is a class, then P is element P , in other words, that (9) if P is a class, then P is its own element. It results from (9) that (10) no object is a class which is not its own element and therefore, in view of (3), the conclusion may be drawn that (11) no object is a class of all classes which are not their own elements.

Having obtained such a result, Leśniewski ceased to note anything surprising in Russell's antinomy. The assumption that a class of all classes which are not their own elements is its own element leads to a contradiction, just as the assumption that a class of all classes which are not their own elements is not its own element, since, unlike what was adopted in the assumptions, there is no such object as a class of all classes which are not their own elements. Therefore, the case of Russell's antinomy became similar to the case of "a square circle" for Leśniewski. Since no object is a square circle, there is nothing antinomical in the fact that the contradiction results from both the assumption that a square circle is a circle and from the assumption that a square circle is not a circle [Leśniewski 1927–1931/1992.I: 205].

According to Leśniewski's silent assumption underlying his analysis of Russell's antinomy and the notion of class as a whole, expressions referring to classes, such as expressions of the type "a class of objects a " or the expression "class" occurring in sentences of the type "object A is a class" are name expressions or names which are used in order to refer to certain objects. Many expressions referring to classes designate perfectly normal objects. Indeed, every object is a class, namely, a class of objects which create it, that is, a class of its parts, proper or improper. By interpreting thusly expressions referring to classes, Leśniewski differs from those theoreticians who see classes as objects of some sort of "higher type" or "higher order". He also differs from those, such as the authors of *Principia*, who do not really treat expressions referring to classes as

name expressions, but as their imitations which belong to a completely different semantic category [Leśniewski 1938a/1992.II: 709].

Frege's ill-considered attempt to solve the antinomy and save his system of the foundations of mathematics from contradiction consisted in weakening one of the axioms. The new, weaker axiom did not in truth have an intuitive justification, but it created hope that the possibility to derive contradiction within the system would be blocked. However, in 1938, Leśniewski demonstrated that Frege's middle does not achieve its aim [Sobociński 1949–1950: 221].

Attempting to overcome the antinomy he himself identified, Russell created the theory of logical types, which in various forms was considered by many logicians and philosophers a reliable safeguard against the threat of paradoxes by and large. This theory turned out to be a kind of ontological theory. It classifies and organizes hierarchically extra-linguistic entities called types. According to Russell, individual objects make up one logical type, classes of individual objects make up another type, and classes of individuals make up yet another logical type. In 1921, Leśniewski provisionally took over a slightly simplified version of Russell's theory of logical types, but in 1922 he replaced it with his own theory of "semantic categories", which classified systematically manner SENSIBLE expressions of his artificial logical language. Examined from a purely formal point of view, Leśniewski's concept of semantic categories is akin to the theory of logical types, as far as its theoretical consequences go. But in terms of its intuitive content, it was more closely tied to the idea of parts of speech in traditional grammar as well as Edmund Husserl's *Bedeutungskategorien* [Leśniewski 1929b/1992.II: 413, 421–422].

Notably, in 1944 Russell admitted that his ontological interpretation of logical types was incorrect and that he never believed the theory of types he presented to be final [Schilpp (ed.) 1944: 691].

In the analysis of Russell's antinomy conducted by Leśniewski, neither the theory of types nor the theory of semantic categories played any role. S. Leśniewski recognized the assumptions of the antinomy in

Łukasiewicz's formulation as sensible sentences and did not find fault in the reasoning leading to a contradiction. However, he identified one of the sensible assumptions as false, and that, in his view, was the solution of the antinomy. Leśniewski was of the opinion that in order to construct sensible expressions about anything in his symbolic language, one should apply the rules of the theory of categories, even if no antinomy was invented. Unlike Russell, who seemed to treat the emergence of the antinomy as proof of the lack of precision of our intuitions referring to sense and nonsense, Leśniewski believed that the cure for "the antinomical puzzle" consists in specifying, as much as possible, the meaning of the key expressions used in the formulation of the analyzed antinomy. This is why he wanted to define his concept of class within the deductive theory and for this purpose he developed "general set theory". As it turns out, Leśniewski could initially consider this new deductive theory an alternative to contemporary set theories. It is significant that the subheading of his paper of 1916, *Foundations of General Theory of Sets. I* [Leśniewski 1916], enumerates the following "set of theoretical concepts": set, class, element, subset, in addition to the concepts of part and ingrediens. However, the term "general set theory" was soon abandoned in favor of the term "theory of classes" or "mereology", which enabled us to differentiate between Leśniewski's theory and the ones which he himself used to call "official" theories of sets and classes [Leśniewski 1938a/1992.II: 464-467].

6

Leśniewski's research on the logical basics of MEREOLOGY resulted in the construction of a system of foundations of mathematics, which in his view was innovative in certain respects in terms of content and manner of presentation.

Unlike Frege's system, Leśniewski's system of the foundations of mathematics is non-contradictory. Strictly speaking, the combination of PROTOTHETIC, ONTOLOGY AND MEREOLOGY is non-contradictory if protothetic is non-contradictory. This is because standard systems

of ONTOLOGY and MEREOLGY are interpreted within the system of PROTOTHETIC. In turn, the standard system of PROTOTHETIC, whose non-contradictory character may not be so obvious, is inferentially equivalent to the calculable system of PROTOTHETIC, and it is hard to doubt the non-contradictory character of this system ([Lejewski 1969], [Leśniewski 1938a/1992.II: 444-454]).

In contrast to the system in *Principia*, Leśniewski's standard systems of PROTOTHETIC AND ONTOLOGY, which are altogether at least as rich in content as the system in *Principia*, are formalized systems. It must also be strongly emphasized that in the context of Leśniewski's logic formalization is not the same as symbolization. As I mentioned before, Leśniewski understands the formalization of a deductive system as a precise and unambiguous specification of directives, that is, principles of defining, inference and extensionality, which state the conditions an expression must meet to be added to the system as a new thesis.

Attempts at formalization of mathematics in the above presented sense were conducted by many mathematical logicians, starting from Frege, and especially by logicians connected to David Hilbert. According to Leśniewski, none of these attempts achieved the stage of formalization, which would ensure the derivation of all known theses of a given theory, at the same time securing it from unexpected, but correct derivation of a contradiction. Seeking examples to support this view, Leśniewski indicated how a pair of contradictory theses can be derived because of imprecise formalization in the system constructed by J. von Neuman and the system constructed by L. Chwistek ([Leśniewski 1938a/1992.II: 488-490], [Leśniewski 1938b/1992.II: 694-707]).

To prevent the perils of overly liberal formalization, Leśniewski worked out a new and original method of formalization of systems of deductive theories. This method assumed that language undergoing formalization, that is, so to say, OBJECTIVE LANGUAGE, should facilitate the introduction of all semantic categories which may occur in the system's theses. Such language should also be suitable to make precise descriptions in the corresponding METALANGUAGE, descriptions which

would only refer to the syntactic properties of the objective language and would overlook the meaning of linguistic constructions. The systems which are easiest to formalize are such systems which can be adequately symbolized in the non-parenthesis and dotless notation invented by Łukasiewicz and often erroneously described as Polish notation. The number of various semantic categories which may occur in such a system is usually finite and very small. Non-parenthesis notation is therefore useless for symbolization, and therefore, for formalization of systems which, just as with Leśniewski's *PROTOTHETIC AND ONTOLOGY*, are not limited in terms of semantic categories. Therefore, Leśniewski had to invent new symbols. Here, just as in Łukasiewicz, every functor precedes its arguments, but Leśniewski closes them with a couple of symmetrical parentheses, the shape of which indicates in some cases the kind of semantic category to which the specific functor belongs. In principle, he conducted formalizations of his theories in a "smoothed-out" version of natural language. He warned, though, that the symbols applied in connection with the formalization of *PROTOTHETIC* in "Fundamentals of a New System of the Foundations of Mathematics" ([Leśniewski 1929b], [Leśniewski 1938a], [Leśniewski 1938b]) and in *ONTOLOGY* in "On the Foundations of Ontology" [Leśniewski 1930] is only a kind of shorthand which could be given up if only the publishers and editors were more generous in granting space for an author. The meaning of expressions in natural language, necessary for the ultimate formulation of directives applicable in a system which underwent formalization, is clarified with the help of a certain number of "terminological explanations". Leśniewski formulates them as "autobiographical" sentences of the type "I claim about every object A that it is b , always and only when p ", preceded by a general quantifier binding the appropriate variables [Leśniewski 1929b/1992.II: 471]. In the work "On Definitions in the So-Called Theory of Deduction" [Leśniewski 1931], Leśniewski illustrates each terminological explanation with examples demonstrating that the term which is being explained can be applied and that the conditions which the object designated by this term must meet are mutually independent.

Examples which would illustrate the terminological explanations necessary to formalize PROTOTHEtic AND ONTOLOGY were never published. Leśniewski discussed them in detail during his lectures, but his extensive notes on this subject were lost in 1944. Recreating these examples according to the formula Leśniewski created could be a very instructive and valuable undertaking.

Formalization of the “deductive theory” was a comparatively easy task for Leśniewski. To accomplish it, he only required 12 terminological explanations, whereas the formalization of PROTOTHEtic AND ONTOLOGY required 73 such explanations ([Leśniewski 1929b/1992. II: 472-484], [Leśniewski 1930/1992.II: 610-628]). I do not know if Leśniewski attempted to formalize MEREOLOGY, and if so, if he actually managed to accomplish it or not; in the latter case, we would face another challenge.

Directives applicable in a deductive system are not theses of this system. This is why Leśniewski generally formulated them in natural language. It was only for the sake of minor convenience that he resorted to symbolic “shorthand” instead of regular notation. In any case, he observed and conscientiously revealed the distinction between a suitable objective language and metalanguage. It seems that the method of formalization Leśniewski worked out and used has hitherto been the safest way to prevent misunderstandings which may occur when new arguments are added to a deductive system.

7

As Leśniewski himself admitted, the most difficult problem he had to deal with in connection with PROTOTHEtic AND ONTOLOGY was inventing a correct “definition of a definition”, as he used to say. In fact, the *definiens* in a “definition” of PROTOTHEtic DEFINITIONS, that is, definitions which introduce to the standard system of PROTOTHEtic AND ONTOLOGY sentential and functor constants, which create, directly or indirectly, sentences or sentential functions, is a conjunction of 18 conditions, each one of which is independent with respect to the others

all together. In turn the *definiens* in the “definition” of ONTOLOGICAL DEFINITIONS, that is, definitions which introduce to the standard system of ontology name and functor constants, which create, directly or indirectly, names or name functions, is a conjunction of 21 conditions, each one of which is independent with respect to the others all together.⁹⁰

As for definitions, and their function and position in deductive systems, most contemporary logicians seem to share the view proclaimed by the authors of *Principia*, who do not count definitions as theses of a system. According to them, definitions concern the symbols of a system rather than what the symbols are about. Unlike theses of a deductive system, definitions are neither true nor false. They express the creator of the system’s decision to accept *definiendum*, which is an expression preceding the symbol ‘... Df’ in a definition, as equivalent to *definiens*, which is an expression placed between the symbols ‘=’ and ‘Df’. The nature of the symbol ‘=’ is somewhat unclear. It is not a sentence-creating functor for sentential arguments. According to the logical doctrine of *Principia*, definitions are printing means which replace long and, in some cases, rather complicated expressions with shorter and simpler ones. With an understandable reservation that they later have the same meaning as the expressions which they are convenient abbreviations for [Whitehead & Russell 1925–1927.I: 11–12].

Leśniewski treated definitions very differently. For him, definitions were theses of a system on a par with axioms, the law of extensionality and theses derived from theses already included in a system. Unlike the authors of *Principia*, he did not introduce any special symbol to denote definitions. He wrote them with primary terms or terms of any system of logic of sentences which was assumed in a given context. In the standard system of PROTOTHETIC and in deductive systems which assume PROTOTHETIC, protothetic definitions have the form of an

⁹⁰ Terminological explanations XLIV and LVI. Cf. [Leśniewski 1930/1992.II: 613–615, 619–6622]. [Footnote — CzL.]

equivalence. These are sentences of the type “For any ... α always and only when β ”, if formulated in natural language, or of the type “[...] $\alpha \equiv \beta$ ” in the language of Leśniewski’s working system, or of the type “ $\vdash \dots \vdash \vdash \Phi(\alpha\beta) \vdash$ ” in the notation used to formalize systems. In the presented schemes ‘ α ’ replacing the *definiens* and ‘ β ’ replacing the *definiendum* must meet the conditions set very precisely in the directives concerning PROTOTHETIC definitions and in terminological explanations connected to them. Traditionally, *definiendum* precedes *definiens* in a definition, but the reversed order, as Leśniewski noticed, facilitates the simplification of the axiomatic basics of the standard system of PROTOTHETIC [Leśniewski 1929b/1992.II: 463-464].

In the system of PROTOTHETIC, with the functor of implication as a primitive term, definitions fall under the following scheme expressed in natural language: “For any r ..., if (if (if α , then β), then (if (if β , then α), then r)), then r ”. As Tarski demonstrated, the axiomatic base of such a system can be simplified if we apply the principle of definitions, which allows for adding to the system two sentences rather than just one, where one of the sentences would be of the type “For any..., if α , then β ”, immediately followed by a corresponding sentence of the type “For any..., if β , then α ”. In these schemes and their translations to a desired notation, the Greek letters ‘ α ’ and ‘ β ’ represent, respectively, *definiendum* and *definiens* [Leśniewski 1929b/1992.II: 465-459], [Śłupecki 1953: 53, 75]).

In PROTOTHETICAL definitions formulated as equivalences, both the *definiens* and the *definiendum* occur only once. In PROTOTHETICAL definitions formulated with a functor of an implication, both the *definiens* and the *definiendum* occur twice, as we have seen before, and in PROTOTHETICAL definitions formulated with Sheffer’s disjunction, they occur three times [Leśniewski 1938a/1992.II: 665-666].

In ONTOLOGY and theories which assume ONTOLOGY, there are ONTOLOGICAL definitions besides PROTOTHETICAL ones. The difference between these two kinds of definitions can be explained as follows. The *definiendum* in a PROTOTHETICAL definition is either a constant term

belonging to the semantic category of sentences or it is a sentential function whose constant functor creates the function, directly or indirectly. Apart from the new term, which is being defined, no other constant term occurs in the *definiendum* of a PROTOTHEICAL definition. ONTOLOGICAL definitions introduce to a given system name constants or functor constants which create, either directly or indirectly, functions belonging to the semantic category of names. Apart from the new term, which is being defined, a primitive term of the assumed ontological system occurs in the *definiendum* of the definition. In deductive theories, which assume a standard ONTOLOGICAL system, ontological definitions assume the form of sentences of the type: "For any $a \dots, \alpha$, always and only when a is b " in natural language, or the type: " $[a \dots] .\alpha.. \equiv .a \varepsilon b$ " in the language of Leśniewski's working symbols, or the type: " $\ulcorner a \dots \urcorner \vdash \Phi (\alpha \varepsilon \{a \beta\}) \top$ " in the symbols applied by him as a subjective language of a formalized system.

The conditions which the expressions represented by ' α ' and ' β ' in the above schemes must meet are set in the directives of ONTOLOGICAL definitions and in the corresponding terminological explanations. It is worth noting that in theories which assume the standard system of ONTOLOGY, ONTOLOGICAL definitions are more intuitive than the corresponding ontological definitions in theories which assume a system of analogy based on a primary term different from ' ε ', that is, a functor of simple inclusion [Lejewski 1958: 174-175].

When building his system of logic, Leśniewski touched upon more issues associated with definitions than any other logician. However, he encountered criticism on the part of other logicians, especially Łukasiewicz, who shared the view of the authors of *Principia* that definitions are not theses of a system and who consequently claimed that definitions should not be used as additional premises when deriving such theses from axioms which could not be derived merely from the axioms, although, just like axioms, they were formulated with the use of a primary dictionary of terms. According to Łukasiewicz, axioms of a deductive system should implicitly contain a full description of the

primitive terms used. In other words, axioms should be equivalent to the implicit definitions of the primitive terms of a system [Łukasiewicz 1939: 275-277]. In turn, Leśniewski was of the opinion that primitive terms are in fact characterized jointly by axioms and theses attached to the system based on directives. His and his coworkers' research demonstrated that reasonable use of definitions, and the laws of extensionality in some situations, opens the possibility of simplifying axiomatic basics of a given deductive system. Leśniewski was fine with using "creative" definitions, just as he was fine with "creative" use of the laws of extensionality. He would probably deem objections against using creative definitions no more justified than the objections put forward by some logicians against indirect proofs.

In 1951, Łukasiewicz published a paper on variables in sentence-creating functors with sentential arguments. He outlined a system of the logic of sentences which, when it comes to its force, surpasses traditional sentential "calculus" but does not equal Leśniewski's PROTOTHEtic. It is worth noting that Łukasiewicz's systems allow for definitions. They are formulated with the use of a primary dictionary of the system and treated as theses of the system, along with axioms, rather than with the use of a special symbol expressing equivalence of *definiendum* and *definiens*. They do not concern symbols but what the symbols symbolize.

Therefore, Łukasiewicz, at the end of life, having dealt with the system of sentences akin to the system of PROTOTHEtic, seemed to have eventually accepted Leśniewski's views on definitions, which he had criticized and rejected in Warsaw [Łukasiewicz 1951: 315-318].

To summarize my certainly incomplete review of the innovations introduced by Leśniewski to the art of constructing and formalizing deductive systems, let me now present, with the use of his working symbols, the axioms of three fundamental theories: protothetic, ontology, and mereology, in the form in which we recognize these axioms at present:

$$PA_1. [p\ q]::p \equiv q. \equiv \therefore [f] \therefore f(p\ f(p[u].u)). \equiv \therefore [r]:f(q\ r). \equiv .q \equiv p$$

$$\begin{aligned}
 & \text{OA}_1. [A \varepsilon a] : A \varepsilon a. \equiv .[\exists B] .A \varepsilon B. B \varepsilon a \\
 & \text{MA}_1. [A B] :: A \varepsilon \text{ingr}(B). \equiv :: [\exists a] :: [C] :: C \varepsilon B. \equiv \therefore [D] : D \varepsilon a. \supset \\
 & \quad .D \varepsilon \text{ingr}(C) \therefore [D] : D \varepsilon \text{ingr}(C). \supset .[\exists EF] : E \varepsilon \text{ingr}(D) \\
 & \quad .E \varepsilon \text{ingr}(F). F \varepsilon a :: [C] : B \varepsilon \text{ingr}(C). \supset .A \varepsilon \text{ingr}(C)^{91}
 \end{aligned}$$

The axiom PA_1 , discovered by Sobociński in 1945, is a single axiom of the standard system of *PROTOTHETIC*. The axiom OA_1 , discovered by Leśniewski in 1929, is a single axiom of a standard system of *ONTOLOGY*. Since *ONTOLOGY* assumes *PROTOTHETIC*, the axiomatic basis of a standard system in *ONTOLOGY*, understood as an expansion of the system of *PROTOTHETIC*, consist of PA_1 and OA_1 . In turn, the axiom MA_1 was discovered by Audoënus Le Blanc in 1982 and is a single axiom of a standard system of *MEREOLGY*. As *MEREOLGY* assumes *ONTOLOGY*, interpreted as an extended system of *PROTOTHETIC*, the axiomatic basis of a standard system of *MEREOLGY* consists of all three sentences: PA_1 , OA_1 , and MA_1 ([Sobociński 1949–1950: 257], [Leśniewski 1930/1992. II: 628]).

We know that arithmetic in Leśniewski's interpretation was a proper part of *ONTOLOGY*, but we do not know exactly what his concept of arithmetic was [Leśniewski 1927–1931/1992.I: 370–371]. Sobociński recognizes arithmetic as an example of a deductive theory assuming *ONTOLOGY* [Sobociński 1949–1950: 256]. Yet, we still do not know whether in this context he is expressing his own view or that of his teacher. In any case, assuming *ONTOLOGY* is not the same as being a proper part of it. In his academic career at the University of Warsaw, Leśniewski conducted several courses on the basics of arithmetic, which was also the subject of his seminars. It turns out some notes made by

⁹¹ In a more widespread notation:

$$\begin{aligned}
 & \text{PA}_1: \wedge p \wedge q \{ (p \equiv q) \equiv \wedge f \{ f[p \wedge \wedge u(u)] \equiv \wedge r [f(q \wedge r) \equiv (q \equiv p)] \} \} \\
 & \text{OA}_1: \wedge A \wedge a \{ (A \varepsilon a) \equiv \forall B [(A \varepsilon B) \wedge (B \varepsilon a)] \} \\
 & \text{MA}_1: \wedge A \wedge B \top [A \varepsilon \text{ingr}(B)] \equiv \top \forall a \wedge C [(C \varepsilon B) \equiv \langle \wedge D \{ (D \varepsilon a) \rightarrow [D \varepsilon \text{ingr}(C)] \} \wedge \\
 & \quad \wedge D \{ [D \varepsilon \text{ingr}(C)] \rightarrow \vee E \vee F \{ [E \varepsilon \text{ingr}(D)] \wedge [E \varepsilon \text{ingr}(F)] \wedge (F \varepsilon a) \} \} \wedge \\
 & \quad \wedge C \{ [B \varepsilon \text{ingr}(C)] \rightarrow [A \varepsilon \text{ingr}(C)] \} \} \top].
 \end{aligned}$$

Leśniewski's students in his lectures on the basics of arithmetic have survived. Hopefully, they will soon be made public in some form, which will provide necessary material to bridge a significant gap in Leśniewski's published legacy.

Twenty-one years after the publication of the second volume of *Basic Laws of Arithmetic*, Frege began to suspect, as he wrote in his diary, that expressions referring to numbers are not proper names at all, and such words as "number", "square number", and others do not refer to notions; and in consequence, a sentence such as "Four is a square number" does not simply state that a certain object falls under a notion, and therefore, it cannot be constructed as the sentence "Sirius is a fixed star". Yet, how is it supposed to be constructed then [Frege 1979: 263]?

I do not know if Frege had an idea of how to answer his own question. I also do not know if Leśniewski considered a similar question, and if so, what would his answer be, but from what I can ascertain, the syntactic difference between the two kinds of sentences presented in the fragment quoted above can be expressed clearly within ONTOLOGY [Lejewski 1958: 237-238]. What is more, it turns out that Frege's program of deriving a vocabulary of arithmetic from a vocabulary of logic was conducted by Leśniewski within ontology, although it is not certain to what degree his concept was similar to Frege's concept. In the last sentence of "Introductory Remarks..." Leśniewski states only that all theses of the basic mathematic system, which can in practice be interpreted as corresponding to appropriate theses of "the theory of classes" by Whitehead and Russell, is an integral part of ONTOLOGY [Leśniewski 1938a/1992.II: 710-711].

An equivalent to MEREOLGY cannot be found in either Frege's system or in the system of the authors of *Principia*. Although Leśniewski created MEREOLGY in association with the analysis of Russell's antinomy concerning all classes which are not their own elements, he still included it in his basic mathematic system as it was used as an assumption in some systems of geometry and in other disciplines [Sobociński 1949-1950: 256].

I trust this has been a successful attempt to demonstrate that in many important aspects the basic mathematic system created by Leśniewski is an improvement on the systems from *Basic Laws...* and *Principia*, and that it constitutes the most advanced stage of development of logistics.

8

Frege and Russell, Leśniewski's great predecessors in research on the foundations of mathematics, met with little appreciation on the part of most mathematicians; the same may be said of Leśniewski. This is understandable to some degree, as research on the foundations of mathematics is included in the philosophy of mathematics, and philosophy of mathematics is philosophy rather than mathematics, or to be more precise, it is part of philosophy. In the discussion of the papers Leśniewski presented in the Section of Logic at the Second Polish Philosophical Congress in 1927, where he outlined his basic mathematic system, some mathematicians noted that, in contrast to what he proclaimed, the sole task of mathematics is a description of reality, and as for accepting a given deductive theory, mathematicians make their decision dependent on whether the analyzed theory is useful rather than on the truthfulness of the axioms it is based on [Leśniewski 1928].

Indeed, the truthfulness of axioms in an interpreted deductive theory or the validity of directives in that theory is more of an issue for philosophers than mathematicians, whose interests are usually connected with researching purely formal deductive theories which had not hitherto been interpreted. Kotarbiński was probably the first philosopher who noted that Leśniewski's ONTOLOGY has a lot in common with Aristotle's "study of being as being" presented in the volumes of *Metaphysics* [Kotarbiński 1967: 5]. Aristotle interpreted it as PRIMARY PHILOSOPHY and stressed its general character. In his view, the natural sciences dealt with only some subjects; whereas, the study of being as being searched for the principles which would be true about everything which exists. Many centuries after Aristotle,

the study of being as being was named ontology. In the first decade of the 20th century, ontology was revived by Meinong as the theory of objects (*Gegenstandstheorie*) and returned to its previous name in the basic mathematic system laid out by Leśniewski. In a way, this system was complete. Within its elements, that is, within ONTOLOGY, one may reconstruct arithmetic, and another element, MEREOLOGY, provides important assumptions which geometrical theories are based on. However, ONTOLOGY can also be interpreted as a part of the study of being, or in other words, as a part of the theory of objects, that is, a part of ontology in the traditional sense of the term [Kotarbiński 1967: 5]. Ontology in the traditional sense will never achieve completion, as we will never be able to provide a complete description of reality. Leśniewski's ONTOLOGY proposes a very general and, therefore, the least controversial, description of objects. Such ONTOLOGY can be gradually expanded to theory, which provides a more detailed description of what exists. A description which is possible to obtain within MEREOLOGY is still very general, but partly controversial, as some ontologists believe. According to one thesis of mereology, if there is more than one object in the world, then some objects are parts of other objects, and if so, then certain objects must be extended in time and space, which suggests that mereology should be followed by a theory concerning extended and temporally ordered objects or a theory which deals with expansion and placement of objects in space. Only the first of them, called CHRONOLOGY, begins to assume the form of a deductive theory which, when it comes to clarity and precision, can someday achieve the standard of Leśniewski's MEREOLOGY. The second of the theories, which one could call STEREOLOGY, and which is conceivably more complicated than CHRONOLOGY, is still at the "drawing board" stage, so to say, a design. However, when the axiomatization of MEREOLOGY is successful, it will be able to create a correct structure in which it would be possible to describe moving objects, in combination with CHRONOLOGY. Thus, STEREOLOGY can be expected to compile something on the order of KINEMATICS [Leśniewski 1927–1931/1992.I: 373–382].

CHAPTER III

Developing the extensions to the theory of objects suggested above to the point where they would become deductive theories of a standard comparable to the standard of Leśniewski's mereology will probably take many years of intensive research on the part of those philosophers who, apart from exhibiting interest in symbolic logic, would also have to display interest in the preservation and development of the branch of πρώτη φιλοσοφία created by Leśniewski.

* * *

The ending of the text in the version from [Lejewski 1990]:

In contrast to Leśniewski's works published from 1911–1916, the works published between 1927 and 1938 do not contain any information on Leśniewski's trips abroad, either to conduct guest lectures or to participate in philosophical conferences or congresses. If I recall correctly, Leśniewski was in Germany in the spring of 1938 for a lecture on Frege. After his return, he talked about his stay in Münster, where a friend of the Warsaw School, Professor Heinrich Scholz, taught, during one of his lectures.

In his paper entitled "On the Foundations of Mathematics", Leśniewski described his basic mathematic system as "essentially and methodically new in certain aspects" and he described himself as a hardened "intuitionist" who practices radical "formalism" in constructing his system without contradicting himself ([Leśniewski 1927–1931/1992.I: 377], [Leśniewski 1929b/1992.II: 487]).

In mathematical studies, Leśniewski wished to see deductive theories "used to put the diverse reality of the world into rigorous laws". He rejected the concept of mathematical science as deductive systems "which . . . ensure the possibility of obtaining, on their basis, an abundance of ever new theorems, but which simultaneously distinguish themselves by the lack of any connection with reality of any intuitive, scientific value" [Leśniewski 1927–1931/1992.I: 177–178]. Therefore, Leśniewski called himself a hardened intuitionist, using this term in its traditional

philosophical meaning, wholly unconnected with intuitionism in the sense of theories developed by Brouwer and his supporters.

Leśniewski believed the system of set theory based on axiomatics constructed by Ernst Zermelo to be a deductive system devoid of intuitive-deductive qualities connecting it to reality. In reference to the abovementioned academic, and to the axiomatics devised by him, Leśniewski wrote:

I can not imagine what sorts of objects there could be to which his axiomatization of the “theory of sets” would apply for some specific meaning of the expression *Menge* [“set”] and of expression ‘ ϵ ’. [Leśniewski 1927–1931/1992.I: 221]

Having assumed this standpoint in reference to mathematical sciences, Leśniewski joined the trend of research on foundations of mathematics represented by Gottlob Frege, and later by Russell. Leśniewski was impressed with *Basic Laws of Arithmetic* by Frege, especially with the reliability of the deductive method and the wealth of the achievements aimed at substantiating mathematics [Leśniewski 1927–1931/1992.I: 177]. According to Leśniewski, the fact that within Frege’s system Russell was able to construct an antinomy in which Frege could find no fault proved that the basics of formulation of this system were sound. On the other hand, Leśniewski was generous in criticism of the authors of *Principia* for careless comments to the symbols they assumed, which he thought were full of “refined cruelty towards a reader who is accustomed to giving some attention to anything he reads” [Leśniewski 1927–1931/1992.I: 182]. He also criticized them for failing to mention the conditions concerning the introduction of definitions and including new theses into a constructed system [Leśniewski 1927–1931/1992.I: 177–179]. However, when building his ontological system, Leśniewski aimed to prove within it the equivalents of all major theses mentioned in *Principia Mathematica*, and when he decided to start developing his results, he first attempted to present them *via*

“a systematic-compendium method . . . [modelled on] the well-known work of Whitehead and Russell” [Leśniewski 1927–1931/1992.I: 175].

Deductive systems, whether wholly or partly formal, were not within Leśniewski’s field of interest, unless they could be transformed into descriptions of certain aspects of reality by selecting a proper interpretation. We speak of formal systems which can be interpreted in such a way that they have an application. Leśniewski’s theories, in all their stages of development, have a definitive application. According to the intention of their creator, they provide a very general description of everything that exists; in other words, they provide a description of reality [Leśniewski 1927–1931/1992.I: 373–374]. In Leśniewski’s theories, interpretation precedes axiomatization and symbolization, and formalization, which is the next stage in the construction and presentation of deductive theories, does not violate the previously established interpretation. Strictly speaking, the formalization of an axiomatized deductive theory is a formalization of one of the systems of this theory. It is expressed in incredibly precise editing of the directives of a system, which determine the conditions which a given expression must meet if it is to be included in the system as a new thesis, assuming that another thesis of the system is the last thesis in a given stage of development of the system.

Formalization of axiomatized deductive theories aims to replace certain language operations, based on the impression of grammatical and syntactic accuracy, and certain reasoning based on intuition, with rules of formulation of reasonable expressions in the field of language of a formalized theory and with rules of transforming expressions. These rules, called directives by Leśniewski, depart from the formulated meanings and the transformed expressions and only concern the structure of these expressions and the shape, that is, the form, of the words contained within them. Despite the above, the formulations being transformed and the formulations which are the result of the transformations do not cease to be reasonable expressions [Leśniewski 1927–1931/1992.I: 316].

Theories formalized in this spirit differ from the entirely or partly formal systems discussed by some logicians and mathematicians. The difference can be explained as follows. In the case of formal systems, the phase of formalization precedes the phase of seeking interpretation which would change the initial formulations of the system into true sentences and change the rules of transformation into reasoning meeting the requirements of intuition. In the case of deductive theories based on Leśniewski's, interpretation precedes formalization, which must be adjusted to it. The question of how to interpret Leśniewski's formalized theories, which appears in some works, is for me a wrongly posed question. The important issue in this context is the question of how Leśniewski understood or interpreted the theses of the theory which he was going to axiomatize and then formalize.

Leśniewski repeatedly stressed that formalization of protothetic and ontology and the projected formalization of mereology represented only one of many attempts to formalize mathematics made since Frege's time by many researchers, especially the members of the mathematical school grouped around David Hilbert. None of the attempts known to Leśniewski led, in his opinion, to formalization which would make it possible to obtain all accepted theses of a given system and simultaneously would not lead to contradiction in some way unpredicted by the proponent but according to the requirements of the proposed formalization. For instance, Leśniewski demonstrated that, in Chwistek's and Neuman's systems, insufficiently precise formalization allows for proving theses which are contradictory ([Leśniewski 1938a/1992.II: 488-490], [Leśniewski 1938b/1992.II: 694-707]).

In order to avoid the risks of overly lax formalization, Leśniewski worked out his own method of formalizing deductive theories. According to this method, the language of the formalized theory is a symbolic language, the grammar and syntax of which is rigorously systematized, as opposed to the grammar and syntax of natural languages. Łukasiewicz's symbols, lacking in parentheses and dots, is an example of such a language. It is a perfect tool to formulate expressions

which represent a rather limited categorical variety. It is also relatively easy to describe in terms of metalanguage. The categorical variety of the language of protothetic, ontology and mereology is unlimited. As none of the commonly used symbolic languages in logic reflected this variety, Leśniewski was forced to invent new symbolism which would correspond to his needs. In Leśniewski's symbolism, just as in Łukasiewicz's symbolism, each functor precedes its arguments, which are within a pair of symmetrical parentheses. The shape of the parentheses is one of the factors enabling the identification of the semantic category of a given functor.

Unlike the symbolic language of a theory which is the subject of formalization, the language of formalization, that is, the language which Leśniewski used to formulate directives referring to the formalized system, is natural language. Leśniewski warns that symbolism, clear to the readers of *Principia*, and used by him in connection to formalization of protothetic in "Fundamentals of a New System of the Foundations of Mathematics" and in connection to formalization of ontology in "On the Foundations of Ontology", should be treated like some sort of shorthand which he would not resort to had he had more space at his disposal. The meaning of natural language expressions present in the formulation of directives is made more precise with the help of many "terminological explanations" which Leśniewski puts in the form of sentences of the type: "I say of object A that it is b always and only when p ". Symbolic expressions of the type ' $A \varepsilon b \equiv p$ ' preceded by universal quantifiers ascribed to them are used as shorthand for sentences of this type. Expressions of natural language without more precise terminological explanations, occurring in these explanations, were given preliminary comments by Leśniewski, who thus attempted to avoid possible interpretive misunderstandings [Leśniewski 1929b/1992. II: 471]. In his academic lectures as well as in his work "On Definitions in the So-Called Theory of Deduction" Leśniewski added examples to each terminological explanation which demonstrated that the term being explained has applications and that the conditions it must meet

are independent of each other [Leśniewski 1931]. In order to limit the size of the publications in question, Leśniewski omitted the examples concerning terminological explanations which he needed to formalize protothetic and ontology. These examples were lost in 1944 together with other remaining handwritten notes.

The simplest, and simultaneously the most faithful, example of the method of formalization of deductive theories formalized by Leśniewski is the formalization of sentential calculus presented in his dissertation on definitions in deductive theory. It required 12 terminological explanations which enabled precise formulation of the methods of expansion of the formalized system. Formulating directives regulating the expansion of the system of protothetic and the system of ontology based on the system of protothetic required 75 terminological explanations. It seems Leśniewski did not manage to formalize mereology.

The directives referring to a given deductive system are not the theses of this system. Therefore, Leśniewski essentially formulated them in natural language or in symbols, treated as shorthand for natural language and differing greatly from symbols used to formulate the theses of a given system. The method of formalization of deductive theories worked out by Leśniewski seems to be the most certain of all the known methods to prevent misunderstanding when adding new theses to axiomatized systems. It is not an easy method. Yet, I doubt whether it can be greatly simplified without undesirable consequences. When applying it to the construction of his systems, Leśniewski practiced radical formalism, as he himself declared [Leśniewski 1927–1931/1992.II: 487].

For Leśniewski, the most difficult issue within the formalization of protothetic and ontology was “defining the definitions”. It is no wonder if you consider the fact that “a definition of definitions” in protothetic, that is, definitions which introduce directly or indirectly sentence-creating functors to the system of protothetic and the system of ontology, finds its expression in XLIV and in XLIV^o terminological explanation; its *definiens* is the conjunction of 18 sentences ([Leśniewski

1927–1931/1992.II: 479–481], [Leśniewski 1930/1992.II: 613–614]). The definition of ontological definitions, which are introduced into the system of ontology by directly or indirectly name-creating functors, finds its expression in LVI^o terminological explanation; its *definiens* is a conjunction composed of 21 sentences [Leśniewski 1930/1992.II: 619–622]. In both cases, Leśniewski had examples indicating that every sentence which is an argument of a referred to conjunction is independent of the remaining sentences. These examples were never published. We can get some idea about the role examples played in the formalization of deductive theories in Leśniewski's method on the basis of the communication on definitions in the deductive theory, mentioned several times before [Leśniewski 1931].

The issue of definitions in deductive theories is often underestimated by contemporary logicians who, when it comes to this issue, seem to share Whitehead's and Russell's views laid out in *Principia Mathematica*. According to these authors, definitions are not theses of a system. They are outside a system and, strictly speaking, they are theoretically redundant. Definitions concern the symbolic language in which the theses of a system are formulated. The symbol ' $\equiv \dots Df$ ', used to write definitions, does not belong to this language. Unlike the theses of a system, definitions are neither true nor false. They express the resolution that the *definiendum*, that is, a symbolic expression preceding the symbol ' $\equiv \dots Df$ ' in a definition will be treated as equal to the *definiens*, that is, with the symbolic expression directly following the symbol ' $\equiv \dots Df$ ' in a definition. Definitions are simply a kind of typographic convenience which enable us to replace longer and often complex expressions with simpler expressions which supposedly mean the same as the original expressions they replaced [Whitehead and Russell 1910–1913.I: 11, 94].

Leśniewski's approach to definitions is entirely different. He considered definitions to be theses of a system in the same sense that he considered axioms, expressions included in a system according to the directives of extensionality, as well as theses deduced from earlier

theses of a system, to be theses of a system. To formulate definitions in his standard deductive systems, Leśniewski used the functor of equivalence “if and only if” instead of the symbol ‘ $\equiv$ ’ of which at least one is certain, that is, that it is not one of the functors of sentential logic. Definitions formulated with the functor of equivalence assume the following form in Leśniewski’s work: “with any $\dots$, α when and only when β ” (in the symbolic languages used by him: $\vdash \dots \vdash \Phi(\alpha\beta) \supset, \dots, \alpha \equiv \beta$, where ‘ α ’ and ‘ β ’ meet the strictly defined conditions in a relevant directive and in terminological explanations associated with it, and they represent, respectively, *definiens* and *definiendum*).⁹² If free variables occur in a definitional equivalence, they are tied with a universal quantifier which precedes the equivalence. The form exemplified above is the simplest and most intuitive definitional format, which is why Leśniewski insisted on having a system of protothetic based on the functor of equivalence as the only primary term.

In the system of protothetic based on the functor of implication “if $\dots$ then” definitions have the following, more complicated, form: “For any $r \dots$ (if (if (if α , then β), then (if (if β , then α) then r)), then r)”, where ‘ α ’ and ‘ β ’ represent, respectively, *definiendum* and *definiens*. Both the definitional form and the axioms of the system of protothetic based on the functor of implication as the only primary term can be simplified if the directive of attaching protothetical definitions to the constructed system is formulated in such a way that it is allowed to attach to the system, as a definition, two theses one after another rather than one, of the following type: “For any $\dots$, if α , then β ”, “For any $\dots$, if β , then α ”, where ‘ α ’ and ‘ β ’ represent respectively *definiendum* and *definiens* [Śłupecki 1953].

In definitions formulated with the help of the functor of equivalence, the *definiendum* and *definiens* occur only once, whereas in definitions formulated with the help of the functor of Sheffer’s disjunction, the

⁹² Putting *definiens* in the initial position and putting *definiendum* in the second position in a definitional equivalence makes it possible to simplify the axioms of a standard system of protothetic. Cf. [Leśniewski 1929b/1992.II: 459-467]. [Footn. — CzŁ.]

definiendum and *definiens* would have to occur three times [Leśniewski 1938a/1992.II: 666].

In ontology and in theories based on ontology, there are ontological definitions besides protothetical definitions. The formal difference between these two kinds of definitions is that the *definiendum* of a protothetical function is either a defined term belonging to the semantic category of sentence or it is a sentential function whose functor, directly or indirectly creating it, is the defined term, whereas in the *definiendum* of an ontological definition, apart from the defined term, a primary term of a given system of ontology also occurs. In a standard system of ontology, ontological definitions have the following form: “For any $A \dots, \alpha$ if and only if A is b ” (in the symbolic languages used by Leśniewski: $\vdash A \dots \vdash \vdash \Phi \alpha \in (Ab) \vdash, [A \dots], \alpha \equiv A b$), where ‘ α ’ and “ A is b ” meet the conditions precisely determined in a corresponding directive and the terminological explanations ascribed to it, and they represent, respectively, the *definiens* and *definiendum* and where ‘ b ’ represents either the defined term in the semantic category of names or a name function, the functor of which, creating it either directly or indirectly, is the defined term.

In the system of protothetic, the functor of equivalence “if and only if” is a primary term. In deductive theories based on such a system, protothetical definitions are more intuitive than in theories based on the system of protothetic, where a functor different from the functor of equivalence is a primary term. It is similar with the system of ontology, where the functor “is” is a primary term, and in deductive theories based on such a system, ontological definitions are more intuitive than in deductive theories based on the system of ontology where the functor is different from the functor creating single sentences of the type “ A is b ” as a primary term ([Lejewski 1958: 174, 175] and [Lejewski 1977]).

The stand taken by the authors of *Principia Mathematica* in view of the problem of definitions was supported by Łukasiewicz, who shared their conviction that definitions are not theses of a deductive system but rather, they only serve to replace certain expressions in the theses of

a system with shorter, but synonymous, expressions. Łukasiewicz added a remark that introducing a definition to a deductive system should not enable obtaining something new within the expanded system, something which would not be possible to obtain before introducing the definition. This additional remark was directed against the “creative” function performed by certain definitions in certain circumstances in Leśniewski’s deductive systems [Łukasiewicz 1939: 247-249].

Definition D is called a creative definition due to theses $T_1 \dots T_m$ if we can deduce theses T_n as a conclusion from a set of theses $D, T_1 \dots T_m$, where T_n is independent of the set of theses $T_1 \dots T_m$ and in which, as in $T_1 \dots T_m$, the term defined with the definition D does not occur at all. In my opinion, Łukasiewicz’s reservations actually concerned axioms on which Leśniewski based his protothetic and ontology rather than definitions as such. After all, Łukasiewicz did not propose any changes in the directives of defining; he only required primary terms of deductive systems to be defined exclusively through axioms. In other words, Łukasiewicz was of the opinion that any thesis of a deductive system formulated in primary terms should be deducible from axioms without having to refer to definitions.

It seems that, unlike Łukasiewicz, Leśniewski adhered to the rule that primary terms of deductive systems are in fact defined jointly by axioms and by directives. Therefore, when one weakens directives somewhat, one must also strengthen the axioms of the system so that the whole deductive system is not weakened. Conversely, weakened axioms require strengthened directives. It should also be remembered that it is not only the use of definitions which sometimes enables simplification or weakening of axioms. In some cases, a similar result can be achieved using theses attached to the system according to the directives of extensionality. When building a deductive system with a view to formalize it, one can either aim at minimizing axioms in favor of directives or at minimizing directives in favor of axioms, or choose a kind of compromise, with some important justification or other in mind [Lejewski 1977: 347-349].

The language of deductive systems without definitions is a ready-made language in some sense. Its vocabulary consists of primary terms characteristic to a given system and of primary terms defining the systems a given system is based on. This vocabulary is usually very limited and the amount of semantic categories, that is, parts of speech represented by this vocabulary and by variables occurring in the theses of a system in connection with this vocabulary, is very limited.

The language of deductive systems, the directives of which allow for including definitions, is a growing language. Every definition enriches the vocabulary of the system belonging to semantic categories not represented in the theses of the system preceding the said definitions [Tarski 1933: 61, 62].

According to Tarski, the language of Leśniewski's deductive systems is an unrewarding subject of semantic study as, in reference to this language, "terms such as 'sentence', 'consequence', 'thesis', or 'true sentence'" do not have absolute meaning and must be relativized to the current state of the discussed systems [*ibid.*]. It is beyond doubt that the language of deductive systems with definitions is a more difficult subject of semantic research than the language of deductive systems without definitions. However, it is too soon to deem it "unrewarding". As far as I know, there is no proof that the semantics of the language of deductive systems with definitions is impossible or disappointingly boring.

The formalization of deductive systems with definitions is also a far more difficult issue than the formalization of deductive systems without definitions. Yet, the results of Leśniewski's research demonstrated that this is not an unresolvable issue. The formalization of protothetic and ontology which he conducted has not yet encountered any theoretical reservations. Admittedly, Leśniewski's example did not find many followers as yet. However, there have been attempts to base terminological explanations on axiomatic grounds [Rickey 1972–1973]. It is hopefully not overly optimistic to hope that someone will succeed in constructing a semantics of a growing language which is no less precise

in formalizing protothetic and ontology than Leśniewski's system in the nearest or further future.

As I mentioned before, a definition attached to the system of foundations of mathematics constructed by Leśniewski may sometimes introduce more than a new term, that is, a new term belonging to a new semantic category, not encountered in theses of the system preceding the definition. The precursor of semantic categories (Leśniewski tended to use the term MEANING CATEGORIES in his lectures) was the theory of types constructed by Leśniewski based on the theory of "logical types" developed in *Principia Mathematica*. Leśniewski simplified this theory in some respects and generalized it in some respects. According to Leśniewski, the hierarchies of types lack an intuitively convincing justification. Therefore, in 1922, Leśniewski replaced his theory of types with a newly invented theory of semantic categories, which was supposed to be a preventive measure against the occurrence of antinomies in the constructed system, but it referred to the tradition of Aristotle's *Categories*, to the parts of speech of a traditional grammar, and to Edmund Husserl's *Bedeutungskategorien*, while remaining closely formally associated with the theories of logical types well known at that time [Whitehead & Russell 1910–1913.I: 203]. Even if the concept of a logical type was identified with the concept of a semantic category, there would still remain a difference between the language of *Principia* and the language of ontology, a part of which is the language of protothetic. The difference may be explained as follows. In the language of ontology, the hierarchies of semantic categories are based on two different basic categories: the semantic category of sentences and the semantic category of names, which are divided into individual names, general names and empty names. In the language of *Principia*, there are also two basic categories, the category of sentences and the category of proper names, rather than the more general category of names. Just as any individual name, every name signifies one and only one object. Unlike individual names, some of which are simple, one-word names, while others are complex, consisting of several words, all proper names

are simple. This is why there is no equivalent of ontological definitions in the system of *Principia*.

In a language where proper names are one of the basic semantic categories, quantifiers, which link variables of the same category as proper names, imply existence. Therefore, in the system of *Principia* it is possible to prove an empirical sentence which states that there is at least one object. Russell himself saw this as a flaw of the “logical purity” of his system [Russell 1919: 203]. A similar thesis cannot be obtained in ontology. However, it is possible to include in the system of ontology definitions from which it results that something does not exist. In the system of ontology, neither theses beginning with a universal quantifier nor theses which are negations of expressions beginning with a universal quantifier imply any existential consequences. In the system of *Principia*, existential consequences result from theses beginning with quantifiers, either universal or existential, which link the variables of the same semantic category as proper names. It is therefore clear the quantifiers in Leśniewski’s systems and the quantifiers in the system of *Principia* differ in meaning, although it seems that formally, there are no differences between them. The difference in meaning is the most pronounced in sentences beginning with an existential quantifier linking variables belonging to a basing semantic category which is different from the semantic category of sentences. For instance, a sentence of the type ‘ $(\exists a) \cdot f(a)$ ’ in the language of *Principia* means the same as the sentence “There is a such that $f(a)$ ” in natural language, where ‘ $f(a)$ ’ represents a sentential function in both sentences, where the variable a occurs as a free variable.⁹³ An analogous sentence in the symbolic language used by Leśniewski in everyday practice, namely, a sentence of the type ‘ $(\exists a) \cdot f(a)$ ’ is not an existential sentence. Its translation to everyday language, that is, a sentence of the type “For a given a , $f(a)$ ” does not

⁹³ In sentences of the type ‘ $(\exists a) \times f(a)$ ’, variable a is obviously a bound variable. If an expression of the type ‘ $(\exists a) \cdot f(a)$ ’ is not a sentence but a sentential function, variable a occurring in it is also a bound variable, whereas variable ‘ f ’ in it is a free variable [Footn. — CzL].

entail a sentence of the type “There is a such that $f(a)$ ”. The difference in meaning between a general quantifier in the system of *Principia* and a general quantifier in Leśniewski’s systems is less pronounced. In the language of *Principia*, a sentence of the type ‘ $(a) \times f(a)$ ’ means the same as a sentence of the type “Every a is such that $f(a)$ ”. A sentence of this type is an existential sentence, since on the basis of the system of *Principia* a sentence entails from it which states clearly that there is a such that $f(a)$. In Leśniewski’s symbolic language, a sentence of the type ‘ $[a] \times f(a)$ ’ means the same as “For any a , $f(a)$ ” and it does not imply any existential consequences. Name variables from the system of *Principia* correspond to a universe of values, that is, individual objects. As I mentioned before, according to Russell’s interpretation of quantifiers, which is considered a classic interpretation, one may state that everything exists in the meaning of existence possible to express with quantifiers. Leśniewski’s system does not imply any specific suppositions as to the universe of values corresponding to name variables. Either something exists or there is nothing. None of these possibilities is inconsistent with theses of ontology. The range of substitutions for name variables in the system of *Principia* is limited to proper names, that is, to simple individual names, each of which signifies only one object. In the system of ontology, the range of substitutions for name variables encompasses name functions and names, simple and complex, each of which either signifies at least one object or does not signify any object.

Over the last dozen years or so, it has become common belief the logical and philosophical literature that quantification in the language of Leśniewski’s systems is SUBSTITUTIONAL quantification, whereas, according to the classic theory of quantification, which does not differ from the theory of apparent variable within *Principia*, quantifiers should be interpreted as OBJECTIVE. According to one of the commentators, the difference mentioned before is revealed in translations of the symbols referred to into natural language. Others see it in the semantics of the quantified expressions. After all, the interpretation of quantifiers assumed by Leśniewski caused some confusion. There were publications

of authors who, having noted rightly that Leśniewski does not read symbolic expressions of the type $(\exists a) \cdot f(a)$ and of the type $[a] \cdot f(a)$ with the help of expressions of the type “A given object is object a such that $f(a)$ ” and the type “Every object is object a such that $f(a)$ ”, maintain that according to him the abovementioned symbolic expressions should be read with the help of expressions of the type “For a given reasonable expression ‘ a ’, $f(a)$ ” and “For every reasonable expression ‘ a ’, $f(a)$ ”. These authors rely on Leśniewski’s statement which, with some omissions irrelevant to the present argument, reads as follows:

At the time I did not yet know how to operate with quantifiers . . . I used corresponding expressions of the type “For some meaning of expression ‘ a ’, $f(a)$ ”, “For some meanings of expressions ‘ X ’ and ‘ a ’, $f(X, a)$ ” [Leśniewski 1927–1931/1992.I: 203].

This statement can be found in Leśniewski’s work “On the Foundations of Mathematics”, Chapter II, published in 1927, and refers to dissertations from 1914 and 1916, clearly implying that after having learned how to use quantifiers, Leśniewski began to use different equivalents of symbolic expressions of the type $(\exists a) \cdot f(a)$ and $(\exists X, a) \cdot f(X, a)$. It becomes clear from further chapters of the work “On the Foundations of Mathematics” that these equivalents are expressions of the type “For a given a , $f(a)$ ”, “For a given X and a , $f(X, a)$ ”, *etc.*, and in the case of a general quantifier, “For any a , $f(a)$ ”, “For any X and a , $f(X, a)$ ”, *etc.* Nonetheless, the authors concerned accepted the quoted text, or rather, its distorted translation, as proof that the concept of “substitutional quantification” was born while writing “On the Foundations of Mathematics”. Having ascribed this concept to Leśniewski, the mentioned authors claim unjustifiably, as it seems, that according to him, quantifiers make sentences about expressions which can be substituted for variables, which would in turn result in the fact that the universe of values corresponding to name variables in the language of Leśniewski’s systems consists of certain expressions or certain inscriptions rather than objects in the general sense of this

term. I have not managed to find any justification for such an erroneous paraphrase of his views in Leśniewski's lectures or his publications from 1927–1938.

Those who see the difference between objective and substitutional quantification in the semantics of sentences beginning with quantifiers point at the fact that, according to objective quantification, equivalences of the following types apply:

' $(\exists a) \cdot f(a)$ ' is a true sentence if and only if $(\exists a) \cdot f(a)$, ' $(a) \cdot f(a)$ ' is a true sentence if and only if $(a) \cdot f(a)$, whereas equivalences of the type:

' $(\exists a) \cdot f(a)$ ' is a true sentence if and only if the result of the substitution of a given individual name for the variable ' a ' in ' $f(a)$ ' is a true sentence,

' $(a) \cdot f(a)$ ' is a true sentence if and only if each result of substitution of any individual name for the variable ' a ' in ' $f(a)$ ' is a true sentence, describe substitutional quantification.

In light of the above distinctions, Leśniewski is ascribed substitutional interpretation of quantified expressions, which would be characterized by equivalences of the following types:

' $(\exists a) \cdot f(a)$ ' is a true sentence if and only if the result of the substitution of a substitution of a given name for the variable ' a ' in ' $f(a)$ ' is a true sentence,

' $(a) \cdot f(a)$ ' is a true sentence if and only if each result of substitution of any name for the variable ' a ' in ' $f(a)$ ' is a true sentence.

The two latter equivalences, which are far from ideal when it comes to precision of wording, belong to the semantics of language of Leśniewski's systems, that is, to that field of meta-logical research which deals with relations between expressions of a given language on the one hand and objects which this language describes on the other hand ([Haack 1978], [Scoggin 1978], [Küng & Canty 1970], [Marcus 1969], [Quine 1968], [Kearns 1967]). Leśniewski did not leave us the semantics of the language of his systems although he was interested in the issues of semantics from the beginnings of his academic activity. He

discussed this in his university lectures and private discussions, dealing with individual problems, as it seems, without attempts at synthetic description within a general theory. §1 of Tarski's dissertation on the notion of truth in the languages of deductive sciences [Tarski 1933: 4-15] sheds some light on the content of these lectures and discussions. The language of ontology and mereology is used to formulate utterances on objects. Leśniewski never doubted the existence of individual objects, but in his work on the ontological rule of excluded middle he attempted to demonstrate that no object is a general object. However, he believed at that time (1913) that "there are features and there are relations, as two special kinds of objects". He soon lost this faith. In 1927, he wrote that he had long ceased to believe in the existence of objects which are features and in the existence of objects which are relations, as nothing induced him to believe in the existence of such objects [Leśniewski 1927-1931/1992.II: 198]. Moreover, Leśniewski did not believe in the existence of classes interpreted as objects of some higher type or higher rank. He considered such kinds of ideas to be mythology. He was a nominalist in the traditional meaning of this term, but he rejected reism [Leśniewski 1938a/1992.II: 709-710]. Unlike Kotarbiński [Kotarbiński 1958a: 432-433], he believed in the existence of immanent images, such as afterimages, which he included in individual objects. What other kinds of individual objects did Leśniewski distinguish, besides material objects and non-material immanent images? I have not found an answer to that question.

Frege and Russell, Leśniewski's predecessors in the field of research on the foundations of mathematics, were not greatly esteemed by most mathematicians. Leśniewski was treated similarly. Mathematicians' indifference towards the ideas and achievements of the proponents of logicism, with their common belief that all the vocabulary of arithmetic is derived from logical vocabulary, is understandable to a certain degree. Research on the foundations of mathematics is part of the philosophy of mathematics, and the philosophy of mathematics is not mathematics, but rather, it is part of philosophy. During a discussion of the papers

presented by Leśniewski during the Second Polish Philosophical Congress, where he presented an outline of his three deductive theories making up the system of the foundations of mathematic, mathematicians present among the participants attracted the speaker's attention to the fact that describing reality is not the main task of mathematics and that in mathematical research it is a theory's utility that determines the acceptance of a given deductive theory rather than the truthfulness of its axioms [Leśniewski 1928: 160].

Caring about a true and general description of reality is more suited to philosophers than mathematicians. It is no wonder then that Leśniewski's theories stir such an interest and resonate with students of philosophy. The set of these theories does not only make it possible to both implement Frege's program within ontology and rest geometry on mereology. In terms of content, ontology, as Kotarbiński remarked [Kotarbiński 1929: 210-211], has a lot in common with Aristotle's first philosophy interpreted as a general theory of objects, that is, the study of being as such. Kotarbiński's remark applies equally well to mereology, in which Leśniewski still formulates general rules of being. Therefore, as it turns out, the group of protothetic, ontology, and mereology is part of ontology in the traditional sense of this term. What is more, it is the core of ontology. On this ground, unparalleled as a uniform deductive system and almost entirely formalized, scientific ontology can now be constructed by reinforcing mereology with axioms of deductive theories describing aspects of reality not yet described by mereology [Lejewski 1986: 192-197].

Leśniewski's work *On the Foundations of Mathematics* stands out from his other works because of the following inscription:

To my Esteemed and Beloved Professor of Philosophy, Dr. Kazimierz Twardowski, I offer this work as a delayed jubilee tribute, a philosophical apostate, but a grateful pupil. [Leśniewski 1927-1931/1992.I: 174]

This unusual inscription is marked by antinomy. How can one dismiss philosophy and simultaneously be grateful to someone from

whom one learned philosophy? Yet, this is only an apparent antinomy. Twardowski, following Brentano, was a fervent proponent of scientific philosophy, which is why Leśniewski paid tribute to him, taking this opportunity to reject irrational and non-scientific philosophy, which he sometimes called “philosophical philosophy”.

In sources on contemporary logic, mathematical logic is contrasted with philosophical logic. Leśniewski excelled in both. In terms of form, the system of his foundations of mathematics is included in mathematical logic, but in terms of the interpretation expressed in it, it should be included in scientific philosophical logic. Professors of philosophy at the University of Warsaw were more interested in Leśniewski’s findings than their colleagues in the departments of mathematical sciences. Leśniewski found his most faithful allies in Łukasiewicz and Kotarbiński. There were more mathematicians than philosophers among Leśniewski’s students, and he owed many discoveries and suggestions, leading to further simplification of axioms and the directives of his system of the foundations of mathematics, to mathematicians, especially Tarski. Soon after Leśniewski formalized protothetic and ontology, mathematicians from his student group began to lose interest in his theories. At this point, Tarski should be mentioned again, as he became independent of Leśniewski’s problems in the 1920s and found satisfaction in mathematical and semantic research, leaning on ontology but also on “official” set theory. After the war, Leśniewski’s students with a philosophical rather than mathematical background attempted to popularize and continue Leśniewski’s traditions. Due to these attempts, more and more lecturers of philosophy at some universities in the United States, Great Britain, Austria, Switzerland, Italy, Japan, and Latvia are interested in Leśniewski’s theories, which seems to indicate that the philosophy of an apostate of philosophy is not a dead end.⁹⁴

⁹⁴ An index of S. Leśniewski’s works and quoted works of other authors are omitted here.

13 HENRYK HIŻ: STANISŁAW LEŚNIEWSKI⁹⁵

13.1 *Remarks about Leśniewski*

Henryk Hiż,
Uwagi o Leśniewskim [Remarks about Leśniewski].
Ruch Filozoficzny, vol. L (1993), No. 1, pp. 60-64.

Taking advantage of Henryk Hiż's stay in Poland, being one of only a few of Leśniewski's surviving students, I asked him 31 questions in writing and obtained some more or less exhaustive responses. Hiż decided to publish the answers in *Ruch Filozoficzny*. I believe reading them will be made easier by quoting my questions *in extenso*. I added some complimentary footnotes to some questions, based on my own notes taken back then. Here are these questions. I found full and correct answers to many of them in other sources and insert into the *Calendarium* (chapter I, §1.2).

A. *Questions about the person*

- 1 Leśniewski lived at 12 Brzozowa Street. Which floor was it and which apartment?
- 2 Leśniewski's wife was Zofia Prewysz-Kwinto. When was she born and when did she die?
- 3 Leśniewski's mother's family name was Palczewska. What was her first name? When was she born and when did she die?
- 4 What was the name of Leśniewski's stepmother? When was she born and when did she die?
- 5 What was Leśniewski's father's name? When was he born and when did he die? Where did he come from?
- 6 Did Leśniewski have any siblings?
- 7 Did Leśniewski in fact graduate from a classical high school in Irkutsk?

⁹⁵ The title comes from me — JJ.

CHAPTER III

- 8 Did Leśniewski really belong to the Social Democracy of the Kingdom of Poland and Lithuania? Where and when?
- 9 What did Leśniewski do in St. Petersburg? Did he contact Petrażycki?
- 10 Why did Leśniewski leave for Russia after the outbreak of World War I and teach at a Polish high school in Moscow (1915–1919)?
- 11 Leśniewski supposedly belonged to some housing cooperative. Which one?
- 12 Apparently, after his surgery, Leśniewski “asked an elderly person, to whom he owed much and whom he felt guilty towards, to visit him. The person did not accept the invitation.” Who was it?
- 13 Which hospital did Leśniewski die in?
- 14 Where was he buried?
- 15 During World War II, a significant portion of Leśniewski’s output was destroyed. Do we at least know what was it?
- 16 In 1920, Leśniewski began teaching at the University of Warsaw. What lectures and classes did he give?
- 17 Is this the correct list of Leśniewski’s co-workers? Lejewski, Lindenbaum, Kruszewski (What happened to him?), Słupecki, Sobociński, Tarski, and Wajsberg.
- 18 Apart from Tarski, did Leśniewski have any other Ph.D. or M.A. students?
- 19 Is the anecdote about reading one page of *Principia Mathematica* by Whitehead and Russell for a whole academic year (which one?) true?

B. Questions about the work

- 20 Leśniewski wrote about his works from 1911–1918 in 1927: “I regret that they have appeared in print, and I formally ‘repudiate’ them herewith, though I have already done this within the university faculty, affirming the bankruptcy of the ‘philosophical’-grammatical work of the initial period of my

work”. Did Leśniewski ever mention what this bankruptcy was all about?

- 21 In particular, did he recall his critique of the concept of UNIVERSAL in “The Critique of the Logical Principle of Excluded Middle”?
- 22 Leśniewski supposedly developed a method of dis-intensio-nalization. What is known about it?
- 23 The axiom of ontology can be interpreted as a definition of “is”. Is it an *idem per idem* definition (“is” occurs on both sides of the equation)?
- 24 Leśniewski stressed that his systems are intuitive. What intuitions are presented in the system: “ A is b when: (a) A is non-empty, (b) there is one A , and (c) whatever is A is also b ”? It is certainly not the Polish [as well as English] “is” ...
- 25 Are (a) and (b) independent?
- 26 Does the word “is” have the same meaning in the definitions of “existence” (There is A when something is A) and “object” (A is an object when A has some property)?
- 27 Was the fractional notation of semantic (or syntactic) categories devised by Leśniewski or Ajdukiewicz?
- 28 How did Leśniewski define the concept of the main functor?
- 29 It is said that definitions in protothetic are theses of the system and are (can be) creative definitions. Is that not the same?
- 30 Did Leśniewski formulate some criteria of the correctness of the method of formal paraphrase of metaphysical problems, which he applied following Ajdukiewicz?
- 31 Did Leśniewski follow the work of Chwistek and his students after 1925?

Jacek Jadacki.

Over the last few weeks, several colleagues and students have asked me numerous questions about the work and life of Stanisław Leśniewski. I will attempt to respond briefly as far as it is possible. Primarily,

though, I recommend Tadeusz Kotarbiński's beautiful recollection of Leśniewski [Kotarbiński 1958b]. I apologize in advance for possible memory shortcomings; let me begin with questions about Leśniewski's personal life.

Leśniewski, together with his wife Zofia, née Kwinto, lived at 12 Brzozowa Street, a floor or two below the Kotarbiński family. Zofia came from a landowner family. Her brother had an estate called Lipniskis in the north of Vilna region, practically at the border with Lithuania. I went there with the Kotarbińskis soon after Leśniewski's death in 1939. There, in the park, I took my exam on *Elements*. Zofia Leśniewska died several years after the war. Naturally, Kotarbiński looked after her when she became a widow.

The house at 12 Brzozowa Str. was the property of a Professor Cooperative. Leśniewski, Kotarbiński, and Władysław Witwicki, who lived in the house, were members. The cooperative had three other houses. One of them was at 10 Brzozowa St., where Adam Krokiewicz lived. He was a classical philologist, an expert on Greek philosophy and literature; it was in his apartment that seminars on the history of logic took place during the war, attended by Jan Łukasiewicz, Jerzy Śłupecki, Jan Salamucha, Bolesław Sobociński, and me, and possibly others; Krokiewicz wrote of these meetings in *Kwartalnik Filozoficzny* in a footnote to the article "On the Logic of Stoics" and I also wrote about them in *From the History of Underground the University of Warsaw* [Hiż 1961]. Another house was in Nowy Zjazd (where the Wasiutyński and Kozłowski families lived) and yet another was in Sewerynów, at No. 6, where Jan Łukasiewicz, Witold Doroszewski and Kazimierz Kumaniecki lived. In Leśniewski's study there was his portrait painted by Władysław Witwicki. Leśniewski used to say that he would throw the portrait away, as he had fallen out with Witwicki, but he never did. Leśniewski's father, Izydor, an engineer, lived in Russia. Leśniewski graduated from a classical high school in Irkutsk. I only know of Leśniewski's stepmother that she contributed to spoiling his relations with his father, which Leśniewski regretted. I know nothing more of

Leśniewski's other family members. At the beginning of World War I he left for Moscow, probably because he had family in Russia. I do not know if he was in St. Petersburg then, but he probably knew Petrażycki from previous encounters in Russia. During the war, in Moscow, Leśniewski was an active member of the Moscow Mathematical Association. He said that the best blackboard he knows of is in the headquarters of that association, as it went around the whole room. I believe he joined the communist party in Russia during the war. However, he left it. He was a follower of Piłsudski in the 1920s; in 1923 he participated in the famous banquet in the Malinowa Room at the Bristol Hotel.⁹⁶ Later on he shifted towards more and more right-wing views. By the end of his life, he was an anti-Semite.⁹⁷ He died of thyroid cancer, several days after surgery. The surgery was without anesthesia, as in those times there were no anesthetics which would not shrink the blood vessels around the thyroid. He was allowed to smoke cigarettes during the surgery. I gave a packet of Płaskie cigarettes to Kotarbiński, who went to the hospital the next day, since this was the brand Leśniewski smoked at that time. Kotarbiński said after his return from the hospital: "We talked calmly. We smoked your cigarettes". (Except of course Kotarbiński did not smoke.) A day

⁹⁶ It was a banquet on July 3rd, 1923, organized by Piłsudski's legionaries, during which J. Piłsudski, after his cabinet resigned, made a speech attacking his political opponents: "a hideous, monstrous dwarf with crooked legs . . . , who does not spare what should be spared — family, relations, relatives". Ironically, the communist propaganda called AK (The Home Army) "a hideous reactionary dwarf" on the famous poster by Włodzimierz Zakrzewski from 1945. The information that Leśniewski took part in this banquet finds no confirmation in other sources. However, a photo survived from a banquet held on October 9th, 1936, in the Europejski Hotel, with Leśniewski, Łukasiewicz, and Mazurkiewicz.

⁹⁷ Andrzej Grzegorzczuk told me in a private conversation we had on November 12th, 1987, when we were on a train together, that Hiż described Leśniewski as "a selective anti-Semite" (*cf.* below — about his relations with Tarski). In the same conversation, I learned from Grzegorzczuk that the relations between Leśniewski and Polish mathematicians of Jewish origin were marked by *MUTUAL* aversion. Grzegorzczuk mentioned Kazimierz Kuratowski; it is also symptomatic that in his texts, otherwise filled with interesting remarks concerning the circle of Warsaw mathematicians (and logicians), Kuratowski only mentions Leśniewski once, in passing; *cf.* [Kuratowski 1973: 44]

before his death, Leśniewski said: “I am below zero”. He was buried in the old Powązki cemetery, right next to the Kotarbiński family tomb. Stefan Mazurkiewicz made a speech at the funeral, stating that “what he created were not contributions and fragments, but rather his own system of the basics of logic and mathematics”. How apt! (See Mazurkiewicz’s memories of Leśniewski in *Przegląd Filozoficzny* [Mazurkiewicz 1939]). Łukasiewicz also spoke, saying how he and Leśniewski strived to achieve accuracy in logic, *etc.*, him and Leśniewski. Someone said cheekily after the funeral: “I could not tell which one of them was in the coffin”.

A list of Leśniewski’s lectures at the University of Warsaw is provided in the preface to the first volume of *Collected works* [Surma & Szrednicki & Barnett 1992: XII-XIII]. I am not certain that the anecdote about Leśniewski reading one page of *P[rincipia] m[atematica]* for a year in his class is true. However, I took part in his seminar, where in one term we read one and a half pages of Łukasiewicz’s article “Philosophical Remarks on Many-Valued Systems of Sentential calculus”. The way it worked was that Leśniewski read out a sentence from the article, then he presented the 1st interpretation of this sentence, and in a long argument, he demonstrated that it is untenable. This was followed by interpretation number 2, 3, *etc.*, all of which led to contradiction or other unpleasantness. Then we moved on to the next sentence. I wish for every philosopher to go through this sort of educational process. Leśniewski used to say that he did not accept many-valued logic, but he regretted not having invented it. It is hard to determine at this point who attended Leśniewski’s lectures and seminars. Alfred Tarski, Adolf Lindenbaum, Janina Hosiasson-Lindenbaumowa, M. Presburger, Zygmunt Kобрzyński, Z. Kruszewski (who published his text “Ontology without axioms” [Kruszewski 1925] in the *Przegląd Filozoficzny* of 1925; soon after his graduation, he went for a trip around the world and died of some tropical illness in Ceylon; see [Rickey 1992: 743]), B. Sobociński, S. Jaśkowski, M. Wajsberg, Cz. Lejewski, J. Śłupecki, Stanisław Muttermilch (who died in the rank of second lieutenant in the battle of Monte Cassino during the first night of the attack of the hill; he was posthumously awarded the

Virtuti Militari medal), sometimes Mieczysław Choynowski. Leśniewski took part in Wajsberg's Ph.D.,⁹⁸ but I cannot say if he was the supervisor or a reviewer; I believe he accepted Kruszewski's M.A. thesis, the one printed in the *P[rzegląd] F[ilozoficzny]*.

During the war, all of Leśniewski's manuscripts burned up in Sobociński's apartment.⁹⁹ In particular, this included a manuscript of his book on antinomies, of which, there was only one copy, written in pencil.

About 1935 Leśniewski said he found an error in the proof of Gödel's theorem. However, he then took it back, saying that he was the one who had made a mistake.

In the academic year of 1927/1928, Ajdukiewicz taught in Warsaw. Then, as well as before, Ajdukiewicz often talked to Leśniewski and probably went to his classes. This is when Leśniewski exerted a strong influence on Ajdukiewicz. More on this can be found in the text of Ajdukiewicz's lectures from 1928.

Moving on to essential issues, let me begin with questions on the relation of Ajdukiewicz's article "Syntactic Connexion" [Ajdukiewicz 1935] to Leśniewski's thoughts on semantic categories. Fractional notation comes from Ajdukiewicz. He introduced it in the article "On the issue of universals" [Ajdukiewicz 1934a]. It is hard to recall exactly what notation for semantic categories Leśniewski used during his lectures. I only know that my notations used in, e.g., [Hiż 1960], [Hiż 1967], and [Hiż 1968], are modifications of that notation. Similar ones are used by P. Simons. As the semantic category in Leśniewski's work is fully determined by the shape and setting of parentheses, providing this setting is a good notation. However, Leśniewski usually applied verbal statements. Apart from notations, there are other important discrepancies between him and Ajdukiewicz, mainly in handling quantifiers and definitions.

⁹⁸ Precisely speaking, he took part in his Ph.D. exam.

⁹⁹ Some destroyed manuscripts were later reconstructed and published by Sobociński in the journal *Methods* [Sobociński 1949–1950].

For Leśniewski, a quantifier is not an expression of a given semantic category. This is why in Leśniewski's original notation, there is no symbol for a quantifier, but rather, certain punctuation symbols are used, encompassing variables which are bound. A bound variable is called "objątko" [hugging]. (Leśniewski had a very extensive Polish terminology in logic. He used it a lot in his lectures.) If we follow standard notation, *e.g.*, according to Peirce, the symbol " $\wedge$ " would have to occur in various semantic categories, depending on the semantic category and the number of variables. However, the rules of operation for quantifiers are the same for all semantic categories and numbers of variables. In Leśniewski's systems, if there is a constant of a given semantic category, variables of this category can be used. Therefore, if a quantifier had a semantic category, there would have to be variables going through this category. Leśniewski used only one quantifier: the universal quantifier. This was because he was unable to introduce all the possible quantifiers and operators. He said: "If someone can introduce all quantifiers into my systems, I am prepared to accept it as a M.A. thesis, Ph.D. thesis, or habilitation thesis, depending on what the person needs". The rules of handling quantifiers are introduced only once, in protothetic, and they operate in all further systems. These are primarily: the rule of substitution and the rule of breaking down a quantifier with equivalence or with implication, depending on what the primary term of protothetic is. However, this is not all. A quantifier occurs in the axioms of protothetic and further systems, as well as in other rules, *e.g.*, in the rule of definition and in the rule of extensionality. All of this together influences the meaning of a quantifier. Explaining the meaning of a quantifier is particularly problematic. Leśniewski was suspected of having a substitutional concept of quantifiers, and therefore, it was further suspected that his quantifier is metalinguistic. This suspicion is false. His basic understanding of a quantifier is the same as Peirce's: ' $\wedge x[f(x)]$ ' is a generalization to all powers of the conjunction ' $f(x_1) \wedge f(x_2) \wedge \dots$ '. For some systems a set of verifiers can be provided, that is, such $x, y, z, \dots w$, that $f(x) \wedge f(y) \wedge f(z) \wedge f(w) \rightarrow \wedge a [f(a)]$. For instance, in

protothetic: $\wedge f[f(0) \wedge f(1) \rightarrow \wedge p[f(p)]]$. For such systems, Leśniewski built computing systems (cf. [Leśniewski 1938a/1992.II: 686 and further]). Yet, it does not result from this that the meaning of a quantifier ends with verifiers. Some grammatical categories do not accept an infinite number of verifiers. Moreover, a quantifier does not only go through the set of its verifiers, if it has one, but also the whole set of its values, the expression of which may contain variables unbound within this expression. All variables must only be bound in a sentence which is a thesis of the system. It is significant that Leśniewski treated semantic categories as certain semantic relations, relations between categories of expressions and categories of “beings”, rather than as syntactic categories. For instance, ‘ $\wedge p[p \rightarrow p]$ ’ states as much as “When something is like that, then it is always like that”, and ‘ $\wedge p[p]$ ’ means as much as “It is always like that”. The first sentence is true, whereas the second sentence is false.

Leśniewski’s definitions can introduce new semantic categories and new grammar structures, e.g.:

$$(D1) \wedge pq[\equiv (\equiv \langle p \rangle (p) \equiv (pq))].$$

The first and third occurrence of the symbol of equivalence is in the semantic category of a sentence-creating functor from two sentential arguments. The second occurrence is in a new semantic category, that is, a functor which, together with one sentence, creates a functor which creates a sentence with one sentential argument. It is important that the grammatical structure, and therefore also the semantic structure, of a *definiendum* is fully calculable from the structure of the *definiens*. The system is devised in such a way that at any point of development of the system the number of semantic categories of the system is finite and it is not known which new structures will be introduced with the new definitions. Thus, this system does not meet the requirement that language should be determined recursively. With such an inscription, we do not know in advance whether it is in the language of the system, as it may depend on future definitions. The rule of definitions is like

a rule which allows for adopting grammar transformations, except here the transformations are in the language itself. The definitions are “substantial” rather than “verbal”.

Besides (D1), we can assume:

$$(D2) \wedge pq[\equiv (\rightarrow \langle p \rangle(p) \rightarrow (pq))].$$

It is similar for all two-argument functors. There is a temptation to generalize these transformations.

$$(D3) \wedge pq[\equiv (f\langle p \rangle(p) f(pq))].$$

But (D3) is inadmissible for Leśniewski, as the variable ‘ f ’ occurs twice with the same quantifier in different semantic categories; once as $z/z//z$, and the second time as z/zz . I say then that this variable has a semantic spectrum of the size 2. Leśniewski only admitted 1 as the size of a variable’s semantic spectrum. This is a fairly significant limitation and it impedes comparison of his systems with, *e.g.*, the systems of combinatorial logic.

The rules of definition were first introduced by Frege. Leśniewski expanded and specified them. Thus formulated, rules of definitions allow for proper use of functional substitutions. Twenty years after Leśniewski’s work, leading logicians had trouble properly formulating a rule which would allow for substituting a function in place of a corresponding variable. For instance, Peirce’s law ‘ $\rightarrow(\rightarrow(\rightarrow(pq)p)p)$ ’, which can be interpreted as a function of two variables, defines it thus:

$$(D4) \wedge pq[\equiv (Peirce(pq) \rightarrow (\rightarrow(\rightarrow(pq)p)p))]$$

and substitute any variable of a semantic category z/zz with ‘*Peirce*’.

Ontology was “invented on a bench in Saski Garden” in 1920 or 1921. It is a vast system, and what is included in Kotarbiński’s *Elements* is only a fragment of the first “chapter” of ontology.

Whitehead and Russell defined definitions in *14.01. After breaking free from their convoluted notations, it is reduced to (I shall simplify the symbols):

$$(R1) \ \wedge \Phi \Psi [\Phi \varepsilon \Psi \equiv \forall c [\wedge x [\Phi \{x\} \equiv x=c] \wedge \Psi \{c\}]].$$

(R1) is referentially equivalent to the thesis:

$$(R2) \ \wedge ab [a \text{ est } b \equiv (\forall c [c \text{ est } a] \wedge \wedge c [c \text{ est } a \rightarrow c \text{ est } b] \wedge \wedge cd [c \text{ est } a \wedge d \text{ est } a) \rightarrow c \text{ est } d]].$$

In (R2) “*est*” is used instead of epsilon. The semantic categories *a*, *b*, *c* are unrestricted, but not *n*. In order to understand the meaning of the expression “*a est b*” let me provide one of the further theses:

$$(R3) \ \wedge ab [a \text{ est } b \equiv (\forall c [a = \langle c \rangle \wedge b \{c\}]]],$$

where ‘ $\langle c \rangle$ ’ is a “class including *c* as the only element”. If we assume (R2) where *a*, *b*, and *c* are of the grammar category of the name, it will become an axiom of ontology. Therefore, one may view ontology as a kind of simple theory of types, expanded by similar relations occurring in the semantic category of names. However, ontology has stronger rules of reasoning. Protothetical definitions are supplemented with a general rule of ontological definitions, allowing for the assumption of the scheme:

$$\wedge abc [a \text{ es}^*(bc) \equiv (a \text{ est } a) \wedge F(abc)],$$

where the asterisk is a new term in its semantic category and “*est*” is a functor about which there is a formula, working as a thesis, which differs most from the axiom of ontology in semantic categories. This rule is very strong, similar to the postulates of set theory (*cf.* my [text] [Hiž 1977]).

Leśniewski eliminated intensional functions. I went to his seminars where he spoke on this. I was not prepared enough to understand it. He ascribed certain objects to sentences and I believe a sentence with an intensional function was about the relation between the speaker and the object. Yet, I do not know how it was done.

13.2 *A Handful of Memories of a Supporter of Mathematicians*

Henryk Hiż:

“Garstka wspomnień kibica matematyków”

[A Handful of Memories of a Supporter of Mathematicians].

Mathematical News, vol. XXXVI (2000), pp. 53-59.

In 1937–1939 I was a student of philosophy and during the war I continued these studies at the Underground the University of Warsaw. My main field of interest was logic. Logic meant both Kotarbiński and Leśniewski. Kotarbiński taught logic with a philosophical background, and Leśniewski taught it with mathematical gusto. Leśniewski said to Kotarbiński once: “What I do is **LOG**ic, and what you do is **log**IC” (with two different syllables stressed¹⁰⁰). The friendship of these two logicians dated back to their studies in Lvov with Kazimierz Twardowski before World War I. Both had been Ph.D. students of philosophy. Kotarbiński had taken classical philology as his additional subject, and then taught Latin in “my” Mikołaj Rej High School in Warsaw. Leśniewski had studied various branches of mathematics with Józef Puzyna, who was at that time the main professor of mathematics in Lvov. Leśniewski taught mathematics at a girls’ school for a while, where he made high demands of accuracy, which became a well-known anecdote. He spent most of the war in Moscow, where he also taught at a high school and took part in the meetings of the Moscow Mathematical Association. He remembered that the society had the best blackboard, as it went around the room.

¹⁰⁰ In Polish, the stress of the word “**LOG**ika” is correct, and the use of the stress “**log**ICA” is a kind of lingual provincialism.

It seems amazing that their friendship lasted until Leśniewski's death. Kotarbiński was very systematic, composed, and had well established views. Leśniewski was capricious, rakish, and easily offended, in fact, insufferable. Someone challenged him to a duel once. He put forward two women as his seconds and never heard of the issue again. (I applied his method when a captain challenged me to a duel for mocking courts of honor for officers at the oflag (POW camp). I claimed that perhaps there is a soldier's honor, rather than an officer's honor. I put forward as my seconds two privates and that was the end of it.) Leśniewski went through quite a revolution of his political views. First, he was a member of the Russian communist party. In the 20s he supported Piłsudski, and in the 30s he became more and more unrelentingly anti-Semitic. He was larger than life, both in good and bad things. I went to his lectures and seminars for two or three years. There were usually three or four participants in the lectures, and no more than that in the seminars, including Bolesław Sobociński, who was present in the seminar meetings in an official capacity, as an assistant from the Department of the Philosophy of Mathematics. It took one term to read Łukasiewicz's article "Philosophical Remarks on Many-Valued Systems of Sentential calculus". The procedure was that one sentence was read, then translated into Polish, then Leśniewski provided an interpretation of this sentence and presented reasoning on the board as to why it was untenable. Then he provided another interpretation, which he drew horrible conclusions from. And so on. No wonder we only did two pages of the article in a term. I wish every young logician could experience this sort of training. Leśniewski did not accept many-valued logic, but he used to say he wished he invented it. It seems like his anti-Semitism did not influence his academic relations. For many years, probably until 1938, Leśniewski and Tarski met once a week, at a fixed time, to have a private conversation. Nobody else could have kept up with them.

During my two-year period there (actually, less than that, as he was too sick in spring 1939; he had thyroid cancer), Leśniewski gave lectures on his ontology. He wrote a thesis on the board. He provided a verbal

intuitive proof. He asked the participants, “Does that work?” and then wrote a precisely formalized proof. He stopped the lecture whenever the bell rang, even if it was in the middle of a proof, and finished it a week later. It was said among the students than once he began his lecture with “now close the parenthesis”. (I heard the same of Alonzo Church at Princeton.) The lectures were always about his foundations of mathematics. He never popularized his works, which were pedantic, with specific, systematically thought out symbols, which however made reading difficult. He published very little and late, which caused a lot of problems. For instance, Kazimierz Ajdukiewicz was interested in his theory of semantic categories, very conscientiously developed and partly drawn from Husserl’s book *Logical Investigation* and Russell’s theory of types in Chwistek’s simplified form. In the academic year of 1927/1928, Ajdukiewicz conducted lectures at the University of Warsaw. A manuscript was written based on these lectures, compiled by Presburger and entitled *Main Principles of the Methodology of Science and Formal Logic*. This text was never published, which is a pity, as it contains many interesting attempts. A lot of the ideas, which he knew from conversation, are ascribed to Leśniewski, but they were formulated with some significant modifications. Leśniewski was offended by that. He believed one should not publish someone’s ideas until that person has published them. His own presentation of the theory based on semantic categories was published as late as 1929 and was drowned in difficult formalization of rules of inference for protothetic. In 1935, Ajdukiewicz published in German a straightforward article “Syntactic Connexion”, which became well known in the circles of logicians, algebraists, and grammarians, and is thought to constitute the origin of categorical grammar. Wojciech Buszkowski works in this field of science in Poland. However, eminent proponents of categorical grammar did not read Leśniewski’s work of 1929 and in these circles Leśniewski’s name is virtually unknown.

Here is another of Leśniewski’s peculiarities. He posed the same requirements for an M.A. theses, a Ph.D. thesis and a habilitation thesis:

“If I accept the work, I will give you credit for whatever you need at that point”.

Łukasiewicz spoke at Leśniewski's funeral in May 1939. He said how they both, Łukasiewicz and Leśniewski, created the Warsaw School of Logic, how he cared about accuracy, *etc.* In the end, it wasn't clear who was actually in the coffin. The second speaker was Stefan Mazurkiewicz. Great speech. I still remember: “Leśniewski did not write contributions, but instead, he created a great system of the foundations of mathematics”.

My only other colleague who regularly took part in Leśniewski's lectures was Stanisław Muttermilch. He was brilliant as simplifying a set of rules of implication. He died as a second lieutenant on the first night of the attack of Monte Cassino.

Łukasiewicz was very different from Leśniewski. His lectures were always very well planned as a whole. As with a good speech, there was a clear plan. Listening to such a lecture was a pleasure. It ended with a conclusion just before the bell rang. He liked puzzles and played *solitaire*. This resembled simplifying axioms, which he mastered. He participated in politics in the Catholic right wing circles. He was the Minister of Education in the government of Paderewski, the rector of the University of Warsaw twice, and a deputy rector twice. He liked holding office. He told me once that in Lvov, at some university celebration, he was the secretary and therefore got to read out the names of decorated people. “I knew that someone”, he said with pride, “would not be well-received by the public. Since there was applause after every name, I read the name of that person during the applause for the previous awarded person and therefore the public did not hear that name.” He also maintained good, friendly relations with Leśniewski, who was a witness at Łukasiewicz's wedding in 1929. However, Mrs. Łukasiewicz turned out to be the evil spirit of Polish logic; she managed to create divisions between her husband and almost all of his colleagues, except for the clergy, including even Kotarbiński for a while. An old anecdote was recalled and associated with Mrs. Łukasiewicz. Dmowski was asked what to do so that the three great statesmen, him, Paderewski, and Piłsudski, could be reconciled.

Dmowski responded: “Poison Mrs. Paderewska”. Łukasiewicz was different during seminars from how he was during lectures. He was more lax. He was late. He selected topics randomly. The discussion was mostly about various issues of many-valued logic, and the fact that the logic is not modal. This was what Muttermilch was brilliant at.

During the war, at the Underground University of Warsaw, I was Łukasiewicz’s assistant as well as Kotarbiński’s assistant. I conducted lectures for both of them, and they conducted exams. Both courses used as study material their *Elements*; Łukasiewicz’s *Elements of Mathematical Logic* (the text was edited by Presburger) and Kotarbiński’s *Elements of Epistemology, Formal Logic, and Methodology of Science* [published in English as *Gnosiology*]. Naturally, the latter *Elements* contained much more material, and therefore the course took a year, whereas it was only one term for the former *Elements*. Yet, mathematical logic attracted some students and there were several less formal meetings, where various logical systems were discussed. This was where Andrzej Grzegorzczak shone.

At that time in Warsaw there were quite a few meetings besides regular university courses. Tadeusz Kotarbiński put together a group with various interests that met on Sunday mornings at his place and discussed issues of contemporary culture. I met Andrzej Mostowski in those meetings. In another group, also led by Kotarbiński, we worked through various theories of literature. I remember comparing Ingarden’s theories with Kridl’s works.

During the War, I worked as a cryptographer for the Home Army Headquarters. Recommended by a mutual friend, Stefan Mazurkiewicz gave me unforgettable lessons on this art. A cipher must obliterate repetition, and when deciphering someone else’s text, one should look for repetition and glasses, that is, sets of x_x , like in “proton”, “sister”, “herbert”. He gave me an example. When he was a juryman before the war, a notebook was found on an accused person filled with unknown script. The prosecutor supposed it could be a list of accomplices. What were the names of the suspects? One of them was “Zylberberg”. He

found Zylberg immediately and then revealed all other names. The accused was so surprised that he admitted his guilt. The guy had simply invented a bit of scribble for every letter. This is the worst cipher you can use. Language has permanent structures at many levels. There is the frequency with which letters occur, and also the frequency of sequences of letters; *f* is the least often used of Polish letters, but *e* at the beginning of a word is even rarer than *f* in this position (all Polish words beginning with an *e* are borrowed from other languages). There are two basic operations in cryptography: substitution and permutation. Their applications must depart as far as possible from the structures of the language of the text, but also from the structures of any language. There are many of these structures: phonetic, syntactic, sequences of sentences, combination of anaphoras and epistrophes, and many others. We probably have not yet come to understand many others. Work with Mazurkiewicz turned out to be a good introduction to my subsequent profession of structural linguist.

In the fall of 1938 I began frequenting Alfred Tarski's lectures. It was dazzling: depth, power, quality. I am dazzled until this day. I knew him privately before, and we were colleagues at the Democratic Club. At that point I began to read his book on the concept of truth, with the aid of Kotarbiński's review of it. However, I did not understand it all until much later.

A quick remark on Mojżesz Presburger. In 1929, he presented a paper on the First Congress of Mathematicians from Slavic Countries in Warsaw. The paper was published in German in reports from the congress. Presburger proved that the arithmetic of adding natural numbers is a decidable system. This is a frequently quoted result in sources on logic, among others, by Gödel and in the famous book by Hilbert and Bernays, as it was the first result of this type, and the issue of decidability soon became significant due to Gödel's negative results. Several foreign mathematicians asked me during one of the international congresses on logic in the 1960s whether it was true that Presburger had no Ph.D. I asked Tarski and I heard: "Yes. When the book by Hilbert

and Bernays was published, Presburger ran up to me and showed that he was quoted there, and complained that I did not give him a Ph.D. for it. But I responded that it was mostly my work.”

Just before the war, Tarski left for the USA, and several years later he became a professor of mathematics at the University of California in Berkeley. There he expanded his activity, which is commonly recognized. He invited a number of Polish mathematicians for a term or two, and Leon Henkin joked that it was University of Warsaw in Berkeley.

Leśniewski did not have many continuators. Tarski was the most brilliant of them. His book about truth from 1935 was filled with Leśniewski's spirit although the subject is different. The division between language and his metalanguage and the theory of semantic categories are key issues there and clearly ascribed to Leśniewski. However, in the German version of 1935, there is an appendix in which Tarski rejects the rigor of semantic categories. This was characteristic for the new era.

Czesław Lejewski is active in England as the author of numerous and profound works, some of which were issued in Poland. Several of them are lectures for philosophers. They demonstrate the philosophical meaning of Leśniewski's standpoint. Lejewski is an exceptional thinker, a master of logical technique and a wise philosopher. As a competent classical philologist, he completed his Ph.D. under Łukasiewicz on the logic of the stoics. Popper, whose seminar he attended in London, spoke high praise of him. He was a professor in Manchester. He was awarded by the Jurzykowski Foundation, which is why he went to New York. This was an exceptionally valuable meeting for me.

Bolesław Sobociński was a faithful advocate for Leśniewski. He was a professor at the University of Notre Dame for over a dozen years, and he educated a sizeable group of logicians there in this tradition. Jerzy Śłupecki was active in Poland. Leśniewski exerted strong influence over both of the Lindenbaums, Adolf and Janina Hosiasson-Lindenbaum. He was invited to their home. They lived right next door to the Ossowskis. One door had a plate with ADOLF I JANINA LINDENBAUMOWIE written on it, and the other had MARIA I STANISŁAW OSSOWSCY. Leśniewski

claimed that there is patriarchy in one home and matriarchy in the other. In fact, the order was alphabetical in both cases.

Leśniewski's influence over Kotarbiński was overpowering. They lived in the same professorial house in Brzozowa and saw each other almost every day. In *Elements* (see above), Kotarbiński presents the logic of names according to Leśniewski's ontology. It works for him with the doctrine of reism. Ontology deals with individuals from the very beginning. However, Leśniewski did not agree with the interpretation of things as purely material entities. For instance, he wanted to treat a part of his dream as a thing. In this, he followed Husserl and Roman Ingarden, who he was on good terms with. However, *Elements* mention only the elementary part of [Leśniewski's] ontology and says nothing of higher levels. These higher levels are obtained through definitions which are strong enough so that not every formula with a defined expression can be translated to primary language. Thus, theses from higher levels of ontology are not reducible to primary language, and only that language works well with reism. Leśniewski's definitions are similar to Zellig Harris' grammar transformations as they do not only introduce new expressions but also new grammar structures.

Warsaw logicians maintained scientific relations with Heinrich Scholz, a professor at Münster University in Westfalen. Łukasiewicz traveled there several times, Leśniewski had a lecture there, Łukasiewicz also obtained a *h[onoris] c[ausa]* Ph.D. there. About 1937, Scholz came to Warsaw. These were difficult times. The German embassy organized a reception. Kotarbiński rejected his invitation and personally apologized to Scholz, who understood Kotarbiński's reasons. Władysław Witwicki with his wife came to this reception (or perhaps to a party on some other occasion, such as the *honoris causa* Ph.D. for Łukasiewicz). When they approached the ambassador Moltke, the ambassador said loudly to his wife: "Do not shake this woman's hand, she is a Jew". Scholz visited Tarski. The first thing he said was: "I am coming to show you there are still decent Germans". Scholz believed that Tarski's definitions of truth and logical consequence may constitute the basis

CHAPTER III

for Platonism, of which he was a proponent. Scholz was a protestant theologian and attempted to combine mathematical logic with metaphysics and religion, just as Łukasiewicz did. Also, similarly to Łukasiewicz, he was radically right-wing in politics. During the war, thanks to Scholz's protection, Łukasiewicz got the job of a translator in Warsaw administration. He (and naturally his wife) left for Germany just before the uprising, without forewarning the rector. Scholz had some trouble with them there. They had to be moved from city to city. In winter 1945/1946 they came to Brussels. I taught at a university there at that time, under good care of Chaim Perelman, and Łukasiewicz helped supervise my M.A. thesis. After that, he left for Ireland, where the political climate was more to his liking.

Warsaw logicians were also in close contact with Vienna, the Vienna Circle, Gödel, and Popper. Tarski went to Vienna in February 1930, where he presented a series of lectures, mainly on mathematics. His meeting with the Vienna Circle revealed a significant array of opinions within the Circle: Carnap was closer to Tarski, Schlick was the furthest. In November of that same year Carnap spent a week in Warsaw and talked to Kotarbiński, Leśniewski, and Tarski. He found a lot in common with each of them. His kept in touch with Tarski for years, throughout his American period. Tarski and Popper became close friends, which Popper spoke of widely, even after Tarski's death. Kotarbiński conducted classes accompanying Popper's *The Logic of Scientific Discovery*. Andrzej Mostowski spent about a year in Vienna before the war, mostly absorbing Gödel. Jakub Rajgrodzki wrote a Ph.D. thesis on logical empiricism under Kotarbiński's supervision.

To conclude, here is a little gem from 1949. Stanisław Jaśkowski, a professor in Toruń at that time, said: "I have axiomatized dialectic logic. I have reduced it to one axiom and I have proved that it is the shortest possible axiom of dialectic logic. Here is the axiom: p ."

14 MENTIONS BY VARIOUS PEOPLE

14.1 *Tadeusz Kotarbiński: From the letters to Kazimierz Twardowski (1912–1934)*

Archiwum Kazimierza Twardowskiego w Warszawie
[The Kazimierz Twardowski Archives in Warsaw].

- Warsaw, 5 April, 1912.

I am sending . . . Leśniewski's address . . . : San Remo, via Castiglioli 77 I. I am looking forward to the lecture he is to present in a meeting of our Society in the second half of April, probably in the first half of the second half. He will talk about creating truth. I anticipate a storm.

- Warsaw, 13 October 1913.

I have organized here [*i.e.*, in Warsaw] — together with Stanisław Leśniewski, a newly married man, rid of his café habits, and a hard-working teacher of mathematics — meetings of amateurs of logic, usually along with philosophers, where we meticulously analyze the basics of Couturat's symbolic logic. . . . We are dealing with the interpretation of the concept of interpretation, the difference between a variable and an ambiguous term, with the possibility of purely formal, and therefore, not-taking into account their meaning, treatment of certain formulas of symbolic logic (and algebra), with the possibility of interpreting uniformly the symbol ' $\rightarrow$ ' in formulas such as ' $(a \rightarrow b) \rightarrow (c \rightarrow d)$ ', *etc.* It is a pity we only have a few passive participants of these meetings, and I am afraid that soon there will be fewer than three active participants.

- Warsaw, 26 October 1913.

I asked Leśniewski about a review of *Humanism and Cognition* [by Florian Znaniecki]. I learned that "work on it is hard", that he wrote many pages, he had to change plenty, that it is coming along with great difficulty, but that he is overcoming these hardships and that he will finish the review. He has already entered the Warsaw mode of distracting

work in many areas and is dog-tired, which naturally does not leave much hope for the future of the work.

■ Warsaw, 30 November 1913.

I talked . . . to Leśniewski . . . several times about everything in terms of the request. It seems he cares about the issue and asks me to assure you that every day, after he does his teaching work, he works very hard on the review of *Humanism*. I am sure he is deep within it, and if he postpones the completion of the review, it is primarily because he wishes to approach it with proper diligence, which Znaniecki seems to understand pretty well.

■ Warsaw, 9 December 1913.

The last volume of *Nowe Tory* (a pedagogical journal) . . . [published] my popular article entitled “A Theoretician and a Practician Facing the Future” . . . , whereas in the next volume of *Nowe Tory*, which entered into closer cooperation with the philosophical movement, Leśniewski is publishing a harsh critique of my “Problem of the Existence of the Future”, well known to you. Generally speaking, he’s top brass here now and makes a similar impression as he did in the past in Lvov: people fear him terribly in discussions; at first, they misunderstand or get offended or mock him . . . , call him “a formalist”, . . . but essentially . . . [it turns out] they do not accept his assumptions. He, on the other hand, has made it his specialty to reduce other people’s views to absurdity and in this regard . . . he acts very successfully, raising the requirements made by speakers themselves. Tatarkiewicz and Znaniecki are representatives of the opposite faction (as two have emerged). The former is gaining plenty of experience, but his lecture on ideal objects, although very well constructed, thought out, and presented, does not immediately attract one towards his views. His polemic with Leśniewski on the problem of the existence of ideal objects came out worse for him (for T[atarkiewicz]).¹⁰¹

¹⁰¹ The omissions marked within this letter are due to some illegible fragments.

- Warsaw, 2 May 1914.

About the issue of the review of Znaniecki's book, he is well-informed about the current state of affairs and knows very well that Stanisław Leśniewski is the cause of the delay, which the latter is trying hard to explain to him as something natural, since it is normal to work on a review for a fairly long time if that review is to be serious. Znaniecki, a true gentleman, and also Leśniewski's close friend, always adopts a polite expression, but it seems to me he must really be a bit embittered.

- Warsaw, 27 November 1916.

I miss Stanisław Leśniewski terribly [in Warsaw], a man who stirs up commotion wherever he finds himself.

- Warsaw, 18 April 1921.

Stan[isław] Leśn[iewski] left for Zakopane for three months. Spending 8 hours straight in an army office doing hard work gave him a pallid complexion.

- Warsaw, 4 August 1927.

[The Congress] lacks ... the participation of several speakers we would care most about. [Unfortunately,] there are no speeches ... by the Professor [*i.e.* Kazimierz Twardowski], Witwicki, Leśniewski, Ajdukiewicz...

- Warsaw, 10 February 1934.

[Dina Szejnberg¹⁰²] is my [first] true student. ... She also clearly owes a lot to Witwicki's school, and besides, generally, to the local atmosphere of logic, refreshed mostly by Łukasiewicz and Leśniewski. But in this case, I was the main head of studies.

¹⁰² After World War II — Janina Kotarbińska.

14.2 *Władysław Weryho: From the letter to Kazimierz Twardowski (1915)*

Archiwum Kazimierza Twardowskiego w Warszawie
[The Kazimierz Twardowski Archives in Warsaw].

- Warsaw, 25 September 1915.

Leśniewski visited his mother-in-law in the Kovno Governorate in the summer. We do not know about his present whereabouts.

14.3 *Tadeusz Czeżowski: From the letters to Kazimierz Twardowski (1918–1921)*

Tadeusz Czeżowski:
Listy do Kazimierza Twardowskiego (1918–1921)
[Letters to Kazimierz Twardowski (1918–1921)].
Archiwum Kazimierza Twardowskiego w Warszawie
[The Kazimierz Twardowski Archives in Warsaw].

- Warsaw, 12 October 1918.

The relations in the office are very pleasant. Naturally, I'm closest with Łukasiewicz, Tomczycki, and Leśniewski; the latter in particular is charming (we are on very friendly terms).

- Warsaw, 8 January 1921.

Leśn[iewskis] returned from Zakopane late December; they both feel fine; I shall probably visit them soon.

14.4 *Wacław Sierpiński: From the letter to Kazimierz Twardowski (1919)*

Archiwum Kazimierza Twardowskiego w Warszawie
[The Kazimierz Twardowski Archives in Warsaw].

- Warsaw, 26 February 1919.

In response to your kind letter of 14 February, dear Rector, I am delighted to send an assessment of St. Leśniewski's work. I apologize for not writing more. But I just now have the opportunity to send this letter to Lvov and have to hurry to take advantage of it.

14.5 Mścisław Wartenberg: *From the letters to Kazimierz Twardowski (1919)*

Archiwum Kazimierza Twardowskiego w Warszawie
[The Kazimierz Twardowski Archives in Warsaw].

- Cracow, 10 April 1919.

Dear Colleague,

Just after paths of communication with Lvov were opened, I wrote you with a request to send me Leśniewski's habilitation dissertation, so I could have a look at it before I decide to go to Lvov to participate in possible further stages of habilitation. However, I have not yet received any messages or packages from you. Was my letter perhaps lost?

I am not familiar with Leśniewski's present work. Still, judging from the candidate's earlier works, I am not convinced Leśniewski as an associate professor is a desirable addition to our University. He has a strange frame of mind: he is a juggler and a conjurer, who turns everything he touches upside down with his devious dialectics, which he perceives as his original streak and teases others with it. I would say about him what Schopenhauer once said about Herbart, that he is "a man who's dressed up in his mind". However, I do not wish to prejudge matters. Perhaps Leśniewski has put forward something more realistic. In any case, please send me his dissertation if possible. . . .

Greetings for your wife and regards from my whole family.

Yours —

Mścisław.

- Cracow, 16 April 1919.

Dear Colleague,

Since at this point I cannot go to Lvov for an extended period of time, which would be necessary to take active part in three habilitations, I agree to your proposal to leave the issue of habilitations and conducting the necessary procedures to you and the remaining members of the Faculty.

Having surrendered my active participation in the habilitations, I still cannot refrain from remarking that although I have no doubts as to the qualifications of Tatarkiewicz and Kotarbiński, such doubts do come to mind when it comes to allowing Leśniewski to become an associate professor and a teacher of students, due to his weird mental organization and his whole way and direction of thinking, which might exert a negative influence over our youth. I have written about it already in my previous letter. I hope, however, that the members of the commission will consider this matter seriously and resolve it objectively. . . .

I send heartfelt wishes of Happy Easter to you all.

Sincerely —

Wartenberg.

14.6 *Marian Borowski: From the letters to Kazimierz Twardowski (1920–1922)*

Archiwum Kazimierza Twardowskiego w Warszawie
[The Kazimierz Twardowski Archives in Warsaw].

- Warsaw, 15 September 1920.

Philosophical life in Warsaw came to a halt. Leśniewski has a lot of work with reading encrypted Bolshevik telegrams; . . . Witwicki is cooped up at the University, replacing the Psychological Laboratory into a painting workshop.

- Warsaw, 24 February 1922.

I report (in secrecy) that *Przegląd Filozoficzny* does not have in the editorial portfolio a lot of really good papers. Warsaw experts write very little as they are afraid of Leśniewski (although he has also met his scourge in the form of his student, Tajtelbaum¹⁰³).

14.7 *Walter Auerbach: From the letter to Kazimierz Twardowski (1931)*

Archiwum Kazimierza Twardowskiego w Warszawie
[The Kazimierz Twardowski Archives in Warsaw].

- Vienna, 29 May 1931.

Carnap (who finally stayed in Vienna this term rather than moving to Prague) includes Leśniewski and Tarski [*scil.* presentation of their views] in his classes.

14.8 *Leon Chwistek (1935)*

Leon Chwistek,
The Limits of Science.
Outline of Logic and of the Methodology of Exact Sciences.
London & New York 2014: Routledge, pp. 124-125, 136-137.

Russell's analysis led to the reduction of the patterns of Aristotle to the pattern " x is B ", where ' x ' denotes any individual, the concept "for all x ", which is abbreviated by ' $\wedge x$ ' and which is called a quantifier, and the concepts of the elementary calculus of propositions. . . .

On the basis of this analysis Russell reduced Aristotle's theory of the syllogism to the elementary calculus of propositions and the calculus of sentential functions.

¹⁰³ Later: Alfred Tarski.

The late Professor Leśniewski opposed the CALCULUS OF NAMES to the method of analysis given by Russell. The two methods differ in so far as the former is based not upon the general pattern of a propositional function but upon the pattern “*A is B*”, where *A* is not an element of the class *B* but the class whose only element is a certain element of the class *B*.

This modification is justifiable only because of Leśniewski’s desire to employ the traditional pattern “*A is B*”. It does not, however, yield anything essentially new. One can hardly agree with Professor Kotarbiński that Leśniewski’s “system of the calculus of names is the mature, natural, and practical... in its applications of all the systems known to us” [Kotarbiński 1929: 210].

On the contrary, it seems to me that this system is artificial and complicated. However, I agree with Kotarbiński that Leśniewski’s calculus of names “is very closely related to the traditional Aristotelian formal logic” [Kotarbiński 1929: 210], but this is no great recommendation. A calculus which is based upon the vague concept of a name and which postulates the existence of only one designate of a name is clearly metaphysical and consequently cannot be employed as a constituent element of the system of the mathematical sciences. . . .

The concept of the UNIVERSAL CLASS and that of the NULL CLASS were introduced by Boole. . . .

The late Stanisław Leśniewski did not like the concept of the NULL CLASS. He cited the following passage from Frege in support of his position:

If a class is composed of objects, is a set, a collective combination of objects, it must disappear if these objects disappear. By burning all the trees of a forest, we burn the forest itself. Consequently, there cannot be a null class. [Frege 1895: 436, 437]

Leśniewski boasted that “there has never been a time in my life in which I would not have been in complete agreement with . . . [this] lapidary remark” [Leśniewski 1927–1931/1992.I: 214].

One could tell that throughout Leśniewski's life there was, on the whole, no time when he understood the concept of a class. A forest is not a class, and a class is not a collective combination of objects, nor need it disappear if these objects disappear.

If the concept:

$$\text{THE ROOT OF THE EQUATION: } x + 1 = x$$

is considered, it is clear that it does not denote numbers and therefore does not denote the roots of the equation: ' $x + 1 = x$ '. This equation has no roots. The concept is a null class.

If null classes were rejected as illegitimate constructions, a theory of equations could not be developed. The question might be raised whether the function ' $f(x)$ ' becomes zero at some point. To discover the answer to this question, the equation: ' $f(x) = 0$ ' must be investigated. This cannot be done if null classes are held to be illegitimate constructions. Similarly, the so-called *reductio ad absurdum* proof could not be employed in geometry.

A critique of the assumptions upon which the development of science has been based is absolutely necessary and is one of the main ways of obtaining a view of the world which is based upon sound reason. However, a critique which is based upon common misunderstandings and which is imposed on the reader by the use of powerful dialectical devices, must lead to confusion of concepts.

Leśniewski spoke as if it were a common mistake to employ null classes. Actually mathematicians are to be censured only because they interpret classes as material collections. Consequently, it is indeed difficult to understand what a null class is. But just as it does not follow that there are no infinitely small numbers, merely because the differentials of Newton and Leibniz were not defined precisely and intelligibly, it does not follow that there are no null classes.

Logic and mathematics can deal only with certain expressions. Obviously therefore classes are certain expressions. Null classes are

equally good expressions as universal classes. Nothing further need be said.

Leśniewski's argument that in daily life null classes are not handled cannot be sustained. It can be confirmed repeatedly that certain classes which are regarded as universal classes are in fact null classes. Progress could not be made if discussion were limited to non-null classes; discussion of unknown stars, unknown roots, *etc.*, would be precluded. Artificial language like that of Leśniewski would have to be employed.

14.9 *Bolesław Sobociński (1939)*

Józef M. Bocheński,
Korespondencja z logikami polskimi. 1934–1956
 [Correspondence with Polish Logicians. 1934–1956].
 Photocopy.

Warsaw, 29 May 1939.

Venerable Reverend Professor,

You probably (and rightly) took offense as I did not manage to write a letter to Rome for a whole year. What I can say in my defense is that the year was truly hard for me. At first, I stalled due to the overwhelming amount of work. Then (sadly) came Professor Leśniewski's illness, his surgery, and death. All of this together threw me off balance, took vast amounts of time and entirely deprived me of the desire to exchange letters. . . .

With cordial greetings. My parents send their regards —

Bolesław Sobociński.

PS. I will write about Professor Leśniewski's illness, the repercussions of his death and various Warsaw "gossip" separately.¹⁰⁴ Please hurry with the proofreading!¹⁰⁵

¹⁰⁴ The outbreak of World War II thwarted this plan.

¹⁰⁵ He means J.M. Bocheński's text, intended for volume I of *Collectanea Logica* [or perhaps *Przegląd Filozoficzny?*].

14.10 *Czesław Znamierowski (1967)*

Czesław Znamierowski,
“Przemówienie z okazji doktoratu honorowego”
[Speech upon Receiving an Honorary Ph.D.].
Przegląd Filozoficzny, vol. XXVI(1967), No. 1, p. 36.

My first true teacher was not Wundt, but my peer, met in Leipzig [in about 1905], the unforgettable logician, Stanisław Leśniewski. After each lecture of famous thinkers of the time he demonstrated in a few questions and remarks how ambiguous the reasoning of these authors was. This was a hard private school of reasoning for a seventeen-year-old boy. However, it freed me from the glamour of authority and awakened tendencies to think independently and clearly.

14.11 *Kazimierz Kuratowski (1973)*

Kazimierz Kuratowski,
Pół wieku matematyki polskiej (1920–1970).
Wspomnienia i refleksje
[*Half a Century of Polish Mathematics (1920–1970).*
Memories and Reflections].
Warsaw 1973: *Wiedza Powszechna*, pp. 43–45.

Fundamenta Mathematicae, initiated by [Zygmunt] Janiszewski, still performs the role intended for it. . . . The first volume . . . came out in 1920. . . . After Janiszewski’s death, Professors Stefan Mazurkiewicz and Waław Sierpiński became the chief editors. Moreover, Professors Stanisław Leśniewski and Jan Łukasiewicz were members of the editorial committee until 1928, and starting from that same year, also the author of the present study (as editorial secretary and, from 1952, as the chief editor).

Professors Leśniewski and Łukasiewicz were to watch over the development of mathematical logic and the foundations of mathematics. The name of the journal itself speaks volumes about the attention the initiators of this journal paid to the latter scope of study mentioned. It was even planned that volumes be published interchangeably: one devoted to set theory and the fields associated with it, and the other, devoted to mathematical logic and the foundations of mathematics. This did not come to pass, though, as there seemed to be much less material from the second scope, although many important results were published concerning the foundations of mathematics.

14.12 *Kazimierz Pasenkiewicz (1984)*

McFarland, Andrew & McFarland, Joanna & Smith, James T.,
Alfred Tarski. Early Work in Poland — Geometry and Teaching.
 New York 2014: Springer, p. 33.

Three people participated regularly in Leśniewski's lectures ... [in the academic year of 1921/1922]: Jan Drewnowski, Witold Jabłoński (1901–1957), and me. ... Several people came irregularly, among them, Alfred Tarski. He used to sit in the last row and read a newspaper. After the lecture, or during the break, he would talk to the professor; he never had conversations with fellow students. In the academic year of 1922/1923, Leśniewski gained several new students: Adolf Lindenbaum, Mordechaj Wajsberg, and a few others appeared.

14.13 *Willard van Orman Quine (1985)*

Willard van Orman Quine,
The Time of My Life. An Autobiography.
 Cambridge (MA) 1985: The MIT Press, pp. 102-104.

[After arriving in Warsaw, on May 6, 1933,] we [*scil.* Quine and his wife, Naomi] went home with ... [Łukasiewicz] and I talked logic

for hours with him while his wife worked on our lodging problem by telephone.¹⁰⁶ They had us stay for lunch — four o'clock in Poland — and we were joined afterward by Leśniewski. The two professors were neighbors in the seventeenth-century Stare Miasto [Old Town], the one picturesque quarter of Warsaw. Talk continued for another two hours. . . .

Next day I was at Leśniewski's house discussing with him from ten until two

[During our stay in Warsaw for several weeks,] I went to Leśniewski's lectures, which consisted in filling the blackboard with formulas; no language problem there. . . . With Leśniewski I would argue far into the night, trying to convince him that his system of logic did not avoid, as he supposed, the assuming of abstract objects.

14.14 *Józef M. Bocheński (1993)*

Józef M. Bocheński, *Wspomnienia* [Memoirs].
Cracow 1993: Wydawnictwo *Philed*, pp. 115-116, 118-119.

The Lvov-Warsaw School . . . was an excellent school, world-famous. There were courses on the Polish language in the Westphalia Monastery, where logicians learned our language in order to read Polish logicians in the original version. Logicians from various countries traveled to Warsaw. Not long ago, I met a Japanese logician who spoke excellent Polish, who was coming back from there. The School's achievements were significant; it does not seem an exaggeration to say that Warsaw was one of the most important centers of studies of logic in the world in the interwar period. . . .

Many of the . . . [Polish logicians], especially Leśniewski, avowed that they followed . . . extremely realistic philosophy. I knew Leśniewski . . . quite well He was a large man, I would say formidable. He received me while always smoking a huge pipe and drinking coffee

¹⁰⁶ W.v.O. Quine's wallet was stolen on the Vienna–Warsaw train.

from a huge pot.¹⁰⁷ He also invariably held *разговоры* [discussions] about the stupidity of many people who speak as if they believed they had glass heads, for instance, they believe in the existence of God, or classes. These classes were his main bane. I often saw, he said, bunches of stones, but I have not in my life seen a class of stones. For him, there were only things, bodies, but no features, or mental phenomena. To serve this ontology, he built his unique formal logic which is just only beginning to gain wider support; logic which, in contrast to virtually all others, is not a theory of classes, but a theory of bunches, groups.

I myself was closer to Łukasiewicz than Leśniewski in philosophy. I thought that, as Whitehead said rightly, reality cannot be explained without accepting the ideal world. This does not prevent the fact that Leśniewski's idea made great impact on me, as my own views crystalized in a clash with this idea.

14.15 Roman Ingarden (1999)

Roman Ingarden,
 “Dzieje mojej ‘kariery uniwersyteckiej’”
 [“The History of my ‘University Career’”].
Przegląd Filozoficzny vol. XXVII (1999), No. 2, p. 185.

There are people in Warsaw who are only a few years older than me, but leading departments: Leśniewski, Kotarbiński, but when you listen to them, they seem to have been occupying their head of department positions for dozens of years, to have published a whole library of books, to have such severe judgment, so much self-confidence. Yet, Leśniewski only published two small articles in *Przegląd* [*Filozoficzny*], and of dubious scientific value at that.

¹⁰⁷ J.M. Bocheński also mentioned “a huge pot of coffee, which Leśniewski drank in vast quantities” in a private conversation with me (carried out on 1 November 1987 in Warsaw), and he added that “he was really lazy”.