

The Strange Case of Savonarola and the Painted Fish On the Bolzanization of Polish Thought*

ARIANNA BETTI

Introduction

When Twardowski came to Lvov in 1895, his aim was to establish a philosophical trend heavily inspired by Brentanism, although peppered with Bolzanian ideas. As shows from a comparison between the lectures in logic he gave in Vienna in 1894/5 and in Lvov in 1895/6, Twardowski's teaching activity in Poland was even more Brentanian than in Vienna.¹ There is little doubt that the reason for this is that Brentano's thought was unknown in late 19th Century Poland.² It is well-known that Twardowski's own thought was also significantly influenced by Bolzano, and that he played also a major role in disseminating some of Bolzano's ideas in Poland, the most important being perhaps the notion of time-independent truth.

I have previously discussed in several papers specific Bolzanian elements present in the Polish tradition. This paper will not, for the most part, add anything in particular to that. The new – and rather blunt – hypothesis to be put forward here is that, despite appearances, Twardowski also contributed *de facto* to slowing down the reception of Bolzano's most modern logical discoveries. For in Poland Bolzano was to remain one logician among many for rather long. It was chiefly thanks to two factors that Bolzano's star could, slowly, begin to rise in Poland, or, at least, that the fundamental achievements of his logic could be known. One factor is anti-psychologistic (more precisely Platonistic) influence coming from Husserl and from Twardowski's student Łukasiewicz. The other factor is the change in the conception of logic which took Polish logic from, say, Sigwart, to Tarski through Leśniewski and Łukasiewicz.

What I am going to say is meant to have impact on the standard picture of the all-Brentanian background of the Lvov-Warsaw school, though my account will be limited to two pupils of Twardowski's of the first generation, Łukasiewicz and Leśniewski. I hope this paper will contribute

both to the debate on the scope of Polish Brentanism, and to prompting further investigation into the reception of Bolzano's thought in Poland.

*I. Bolzano and the Standard Picture of the Background
of the Lvov-Warsaw School*

The following is, roughly put, what for some time has been suggested in reconstructions of the philosophical heritage of the Lvov-Warsaw School. Twardowski was a direct pupil of Brentano's; Łukasiewicz, Leśniewski and Kotarbiński were direct pupils of Twardowski's, a sort of third generation of Brentanians, as it were.³ So, if the Lvov-Warsaw School has a grandfather, this was Brentano. Although more recently attempts have been made to include in the cast of characters also Bolzano,⁴ the idea that Brentano's influence has been enormous and perhaps incomparable to that of any other contemporary philosopher in Poland is, as well-testified by the title of this collection, little disputed. The problem with this picture is its monolithic character: zoom in further, and you no longer see Brentanian homogeneity.

By now it is common knowledge that particular Polish issues come from Bolzano. These include Twardowski's and Leśniewski's (versions of) sempiternal truth (the view that a truth-bearer does not change its truth value over time), Łukasiewicz's logical probability, and Tarski's logical consequence.⁵ More recently, Bolzano's influence on Ajdukiewicz's conception of analyticity, on Ajdukiewicz's 1923 notion of consequence, and on the analysis of truth-bearers and their ontological counterparts in the early Leśniewski, Łukasiewicz and Kotarbiński have been added to the record.⁶

Telling the full story of Bolzano's influence on the Lvov-Warsaw School may seem – details aside – a relatively easy historical task. For we seem to have a clear explanation for how the issues mentioned above were passed on, namely Twardowski's mediation. This is certainly correct as to the sempiternity of truth, for that position is distinctively anti-Brentanian and Twardowski took it up explicitly in 1900. But for all other notions things are not this simple, and one cannot but suspect that the story of Bolzano's influence has not yet been told in its entirety.

It is far from the aim of this paper to suggest that we should substitute Bolzano for Brentano in the role of grandfather of the Lvov-Warsaw School. This would be just naïve. I also do not intend to dispute Brentano's general influence on choice of topics and methods in Polish analytic philosophy. There is truth in the picture, obviously, as Twardowski's initial target was the exportation of Brentanism onto Polish soil. There is also indisputably much more Brentano than Bolzano in some of Twardowski's students, one clear example being Tadeusz Czeżowski.

But that's exactly the point. There is little to object as to the Brentanian mark on choice of topics and methods insofar as it was *Twardowski's* initial choice. The Lvov-Warsaw School in its entirety, however, brought together individuals with diverging philosophical and logical tendencies, and underwent internal developments which should not be underestimated. The variety and the change over time were due, among others, to the influence of Husserl, Frege and Bolzano, which in turn contributed to at least two *Generationsstreite* inside the Lvov-Warsaw School. Sure, Husserl was himself a Brentanian, but he was Husserl, not Brentano: variety reigned in the 'loose association' – to use an expression of Kevin Mulligan's – of the Brentanians as well. The revolt against Brentano in the theory of judgement – which resulted, among others, in Husserl's, Meinong's and Twardowski's introduction of states of affairs in their ontologies – makes it in fact three *Generationsstreite*.⁷ All this should make us wary of looking at Leśniewski, Łukasiewicz, Kotarbiński, let alone Tarski, as 'Brentanians', flat.⁸

Therefore, the reason why the picture of the Brentanian roots of the Lvov-Warsaw School is so homogeneous is, it seems, that it is taken from the perspective of Twardowski's Brentanian background, peppered by isolated, specific Bolzanian points.

Can we say that Twardowski misunderstood Bolzano? As to the specific issues just mentioned – *locally*, one might say – and against what some scholars have claimed – we cannot. But we can say that as to Twardowski's *global* consideration of Bolzano's thought. It is the latter I am concerned with in this paper. Since the former issue is controversial, however, I'll say first something about Twardowski's construal of particular Bolzanian ideas.

Twardowski is said to have seriously misunderstood Bolzano in his major work, *On the Content and Object of Presentations* (1894). True, Twardowski exploited in his favour Bolzano's two-fold notion of the object of a (*subjective*) *Vorstellung*, but I think we should take this as part of the philosophical game, and not as a misrepresentation of Bolzano's thought, *pace* Husserl.⁹ To see the fundamental fairness with which Twardowski treats Bolzano, one need only compare the account of Bolzano's ideas given in his book with Marty's or Meinong's later misunderstandings. Take for instance Marty's claim in 1908 that Bolzano did not have false propositions-in-themselves alongside true ones. Or take Marty's personal Bolzanologist Shmuel Hugo Bergmann, who did concede that Bolzano had false propositions-in-themselves, but thought he would have been better off without. And, finally, take Meinong's identification of his *Objektive* with propositions-in-themselves, the reason being, as in the case of Marty and Bergmann, that propositions-in-themselves were mistaken for truth-makers.¹⁰

Such mistakes Twardowski never made. Twardowski took over a series of distinctively Bolzanian traits without perverting their role or their significance, and this, as one may expect, was of no little importance for the Polish reception of specific Bolzanian issues.¹¹ These comprise, first of all, Bolzano's distinction between object and content of presentations which, as is well-known, Twardowski rescued in 1894; the consequent distinction and discussion of the relationship between parts of the content (of a *Vorstellung an sich* in Bolzano) and parts of the object of that *Vorstellung*; the difference between content and extension of an idea; and, as already mentioned, Bolzano's view that truth is sempiternal. A very Bolzanian trait in Twardowski's thought is also that he resisted – unlike Husserl and Meinong – the introduction of *Annahmen* in favour of a Bolzano-flavoured semantic ascent: in Twardowski you can just *present* a judgement without judging, as in Bolzano you can just present a proposition-in-itself without judging. All these aspects left a long-lasting mark on the Lvov-Warsaw School.

Nevertheless, Twardowski seems to have misunderstood Bolzano in a global sense, that is to say, he failed to see his greatness as a logician. So did most others, but this is no excuse. Twardowski's global misunderstanding of Bolzano is relevant for a correct assessment of the dissemina-

tion and the popularity of Bolzano's thought in Poland, and of Twardowski's role as a *Vermittler* of Bolzanism. For it is the hiatus between the two aspects, the local and the global, that makes historical pictures like the one at issue here difficult to take.

In the following I will restrict my discussion to the relationship – from the global point of view just sketched, Twardowski's grasp of Bolzano's stature – between Bolzano on the one hand, and Leśniewski and Łukasiewicz on the other hand. Philosophers by training turned logicians, Leśniewski and Łukasiewicz were the pupils of Twardowski's with more distinctly logical interests. Their case seems particularly interesting not only because they were to be teachers, together with Kotarbiński, of Tarski, but because they had been actors of primary role in a crucial moment of transition for logic as a discipline.

II. Leśniewski, Savonarola and The Painted Fish

As far as I know, the sole remark about Bolzano we have in Leśniewski's small *oeuvre* is from 1927, refers to the 1914 edition of *Wissenschaftslehre* and is quite incidental.¹²

For I did not consider it to be out of the question that Mr. *Fraenkel* uses the expression “improper set” in the fashion of expressions known from ordinary language – “dead man”, “false diamond”, “painted fish” and so on (see for instance *Hauptwerke der Philosophie in originalgetreuen Neudrucken*. Band IV. Werke Bernard Bolzanos I. *Wissenschaftslehre in vier Bänden*. Erster Band. Leipzig 1914. p. 257 and also the quotation from *Savonarola* on p. 79).¹³

Leśniewski mentions here the notion of *modifying adjectives* and he refers to the §§ 19 and 59 of the *Wissenschaftslehre*. Although the distinction between modifying and determining adjectives had been known since Aristotle, it was very popular among Brentanians, and it played a key role in Twardowski's 1894 theory of intentionality. It was not at all customary to associate this notion with Bolzano, nor is it today: why does Leśniewski here quote the Great Bohemian where one would have expected him to see Brentano, or at least his master Twardowski? If the picture showing a pervasive presence of Brentanian heritage in the Lvov-Warsaw School would

be entirely correct, this should not have happened, one might argue. Leśniewski should have quoted Brentano or Twardowski. So why does Leśniewski quote Bolzano?

Consider the following hypothesis. The logicians among Twardowski's students became aware at a certain point of a tension between a Bolzanian (or Bolzanian/Fregean) and a Brentanian trend in their philosophical milieu, being consequently driven towards the former.

Actually, Leśniewski's choice to quote Bolzano in this particular connection may give the impression that he was siding with a crucial figure of the *Bolzano-Rezeption*, namely Benno Kerry.

Kerry was the first among Brentano's pupils to study Bolzano seriously. It was he who attracted Twardowski's attention to Bolzano, and he was the only 'organic' Brentanian to proclaim that Brentanians could have learned a great deal from Bolzano. Instead, the Brentanians were ignoring him. Kerry writes:

Brentano [...] declared that the relation of predicates to their subjects according to which the latter are not so much determined as modified by the former has been "hitherto overlooked by logicians": he could have found this point in §23 (I, S. 92) and §29 (I, S. 138) of Bolzano's *Wissenschaftslehre*. *Ibid.* in §19 (I, S. 79) even Brentano's example of the "dead man" that is no man is adduced from Savonarola's *Logic*.¹⁴

Juxtaposing quotations might yield witty results. But isn't my case too thin? First of all, one might say that if Leśniewski's passage quoted above was an attempt to express appreciation for Bolzano, it was a twisted one indeed. Secondly, however remarkable might be the concordance on Savonarola – by far more known for his burning reformatory zeal and the bonfires of vanities in the 15th Century Republic of Florence than for his logic, except to a careful reader of Bolzano –, I would still need to show that Leśniewski read Kerry's 1885–1891 series of papers, if what I say about Kerry should support my cause. Unfortunately, there is no such evidence available; furthermore, Leśniewski's reference to Bolzano is too occasional.

Is my scenario – the preference of Twardowski's more logically oriented students for the Bolzanian over the Brentanian trend – unlikely, then? Before nodding, think first of Twardowski's chronicle of the major

influences on his development, to wit, Brentano and Bolzano, whose *Wissenschaftslehre* he said he studied "*eifrigst*", after Kerry had drawn his attention to it.¹⁵ But note also that, despite appearances, Twardowski did not realize, at the beginning of his activity in Poland, that Bolzano's logical achievements surpassed those of all his contemporaries. Very positive and explicit judgements on Bolzano's greatness in this sense and on the *Wissenschaftslehre* are to be found only in Twardowski's *Actions and Products* (published as *separatum* in 1911 and in 1912 in a collection), a witness of Twardowski's anti-psychologistic turn, influenced by Husserl.¹⁶ In fact, it is a fairly established matter that at the beginning of the 20th Century Husserl had perhaps been the sole to grasp the greatness of Bolzano's work.¹⁷ Now, *Actions and Products* is a work that Leśniewski read for sure. So, one could think that it was chiefly thank to Twardowski that Leśniewski (if at all, in 1911) got to know about the *Wissenschaftslehre*. Things, actually, appear to be more complicated than this.

Actions and Products is a later work by Twardowski. It was published 16 after Twardowski's arrival in Lvov, 17 years after *Zur Lehre*, and 10 after Husserl's *Logische Untersuchungen*. That is to say, something must have happened in the meantime that had to do, at the very least, with Bolzano, Husserl and psychologism. But what exactly?

When Twardowski, in his early Polish years, was asked to recommend a logic textbook to one of his first pupils, his choice did not fall on Bolzano's *Wissenschaftslehre*, but on Höfler and Meinong's *Logik*. The year was 1898, the pupil Łukasiewicz.¹⁸ Recalling those times fifty years later, Łukasiewicz saw the things as follows:

Twardowski held in high esteem the writings of another priest <alongside Brentano, AB> who lived in the first half of the 19th century, Bernard Bolzano. Bolzano was professor of science of religion at the University of Prague and was an eminent mathematician and logician. His works in the field of philosophy have an incomparably higher scientific level than the philosophical prattle of Kant or Hegel. If Twardowski had realized the difference between the scientific method applied by Bolzano and the confused and often giddy prattle of German philosophers he would have been able to create a new trend of scientific philosophy, surpassing in worth the views of the Vienna Circle. Twardowski was instead [...] fascinated [...] by <Brentano's> later philosophical writings, infected with psychologism.¹⁹

This passage is taken from a page of Łukasiewicz's unpublished memoirs in Polish written in 1949. The context is the author's memoirs from 1904 regarding the foundation of the Polish Philosophical Society by Twardowski on the centenary of Immanuel Kant's death. It is understandable that Łukasiewicz should use such unkind words for German idealism, but it may seem incredible that he should have come close to charging Twardowski with obscurantism.

Łukasiewicz's animosity against Twardowski is less puzzling than it may seem at first, though. Although it is conceivable that after the war, having emigrated to Dublin, Łukasiewicz was not well-disposed towards Poland and Polish matters while writing his memoirs,²⁰ his dissatisfaction towards Twardowski in his Lvov years had several other reasons, both personal and scientific. One scientific reason was Łukasiewicz's antipsychologism, another a *Generationsstreit* over the conception, role and significance of logic. Both are relevant for my Bolzanian purposes here, and to them I shall devote the following two sections before coming back to Leśniewski and Savonarola.

III. Łukasiewicz, Twardowski and Psychologism

Husserl's *Logische Untersuchungen*, as we know, contained a keen appraisal of Bolzano, both in words and in facts, to such an extent that Husserl felt compelled to tell his readers that he was not just glossing the *Wissenschaftslehre*.²¹ Thanks to Husserl's work Łukasiewicz began to develop a deep aversion to psychologism early on. It is also reasonably certain that Łukasiewicz played a primary role in Twardowski's own departure from psychologism.²² The exchanges between Husserl and Twardowski were insignificant, and Twardowski did not have any opportunity to discuss with Husserl in person. Łukasiewicz, Husserl's Lvov advocate, was, on the other hand, a constant interlocutor of Twardowski.

The first volume of Husserl's *Logical Investigations* made a big impression in Lvov, especially on me. I had been disliking the psychologism cultivated by Twardowski already for long time, now I had detached myself completely from it.²³

This passage is backed up by a lecture Łukasiewicz held in 1904, "Husserl's thesis on the relationship between logic and psychology", in which he claimed, following Husserl, that the logical laws cannot be based on psychological ones, because the latter are just probable, while the former are certain.²⁴ Note, however, that in the passage above Łukasiewicz meant only the *first* volume of the *Investigations*, the *Prolegomena zur reinen Logik* (1900). The second volume (1901) he severely reproached for being too imbibed with psychologism "to succeed in some brave reform of pure formal logic".²⁵

[...] the second volume of Husserl's logical investigations <sic> disappointed me. It contained again that certain murky prattle which was driving me away from all German philosophers. I was astonished that there could be such a difference between two volumes of the same work. Later I convinced myself that in the first volume of the logical investigations it was not Husserl talking to me, but only someone much greater than he, whom Husserl exploited in his book, and this was Gottlob Frege.²⁶

Łukasiewicz was not the only one to be astonished by the second volume of the *Investigations*. The astonishment was due to the two notions of psychology employed by Husserl and common among Brentanians: genetic psychology, an empirical science like biology, and *descriptive psychology*, or *phenomenology*, which was what interested Husserl and was considered an *a priori* science, like mathematics.²⁷ Łukasiewicz accepted only the first understanding of psychology, and it is on this basis that we must understand the disagreement between him and Twardowski which emerged during the discussion of a lecture from 1904 on Husserl.²⁸ In his lecture Łukasiewicz claimed that psychological laws are probable, to which Twardowski objected that if they are evident judgements, as in the case of inner perception, then they are as certain as mathematical laws. Łukasiewicz replied that general psychological judgements are probable even if the particular judgements on which they are based are certain: far from deriving *deductively* from definitions, these judgements derive *inductively* from observations about real objects, because psychology is an empirical science, and empirically are its laws obtained. Finally, Łukasiewicz explained that evidence could not be considered a criterion of truth.²⁹

In short, Łukasiewicz harboured a hostile attitude against what he took to be Twardowski's conservatism in questions related to psychologism in logic. In his *Memoirs* he went as far as writing this:

The apparatus of ideas and problems which Twardowski brought with him from Vienna to Lvov was incredibly poor and sterile. Whether a conviction was a mental phenomenon of a separate kind or a connexion of concepts was incessantly under discussion, intuitions, presentations, concepts, their content and object were incessantly under discussion, and no one knew whether the analyses carried out [...] belonged to psychology, logic or grammar.³⁰

And driven by his antipsychologism and Platonism, in his memoirs Łukasiewicz never misses an occasion to heap bitter words on works of Brentanian inspiration whenever such works seemed to him excessively psychologistic.³¹ There were aspects of Brentanian thought that Łukasiewicz did appreciate, but those were limited to neo-Aristotelian metaphysics and its formal treatment, like Twardowski's mereology in *Zur Lehre*.³² One might well object that these are not particularly distinctive Brentanian traits, but Leibnizian and Bolzanian as well.

Łukasiewicz's attitude towards the Brentanians seems to have undergone a change in 1907, when he became fascinated with the ideas of Alexius Meinong, who had also studied with Brentano, contained in his (then brand-new) work on *Gegenstandstheorie*.³³ Meinong's theory of objects had essentially two features dear to Łukasiewicz: it was a modern revival of Aristotle's metaphysics (a good Brentanian element),³⁴ and, with its plethora of non-existents and *possibilia*, it dovetailed with Łukasiewicz's surge towards a non-Aristotelian logic. One reason why Łukasiewicz preferred Meinong's ideas to Twardowski's (even if behind Meinong there was Twardowski's pioneering and influential talk of contradictory objects) is probably the circumstance that Twardowski, unlike Meinong, never rejected either the principle of contradiction or the principle of the excluded middle.

Still, Łukasiewicz's fascination with Meinong was not to last long. Moreover, more typically Brentanian traits of Meinong's thought, like the role of evidence, failed to win any favours with Łukasiewicz:

To exploit the concept of evidence as a criterion of truth is a relic of 'psychologism' which led philosophical logic into non-viable directions. Psychologism maintains strict links with subjectivism and skepticism. If evidence is a criterion of truth, then every judgement seeming evident to someone is true. [...] Every truth becomes, thus, something subjective and relative, and absolute and objective truth ceases to exist.³⁵

This passage comes from Łukasiewicz's book on Aristotle, well-known in the Polish environment at the time. These were provocative words for Twardowski, who ten years before had fiercely defended the absolutism of truth from relativism and skepticism, on the basis of unequivocally *Bolzanian* – though not antipsychologistic – arguments.³⁶

Łukasiewicz's insistence was successful, and he eventually managed to influence Twardowski's antipsychologistic turn significantly. In a manuscript called *Psychology of Thinking*, containing the lectures of a course given by Twardowski in Lvov in 1908/09, we read:

The relationship between psychology of thinking and Logic has not always been accepted and presented in the right way. For some define Logic as the science of thinking or the science of correct thinking, <and> are inclined to construe logic directly as the psychology of thinking, and, therefore, as part of psychology, or at least as some application of psychology. In this view Logic, although it is not a part of it, should be based on psychology. This conception, known as psychologism, is not tenable.³⁷

This all-Polish evidence shows that Husserl was not the sole stimulus Twardowski had when taking his ideas into an anti-psychologistic direction. One might be tempted to think the contrary, since in Twardowski's *Actions and Products*, where the exact separation of products from acts is said to have contributed in a decisive way to free logic from the influence of psychology,³⁸ Husserl's ideal *in-specie* meanings play a prominent role. But we can be confident enough that in the manuscript passage just quoted it is Łukasiewicz's anti-psychologistic stance on the relationship between logic and psychology that Twardowski echoed.

IV. Already Discovered Americas, that is, Old and New Logic

Łukasiewicz was a philosopher with a mission: reforming logic. There is no work by him that cannot be read as an attempt to show that traditional logic was deficient and that it was in need of profound reform. This never meant a *Brentanian* reform, though. Reform would, in his view, pass via Platonism – a strong Bolzanian element.

Leśniewski (publicly and solemnly) and Łukasiewicz (privately) both rejected their own early writings. Although their conceptions of logic were to radically differ, one of the strongest reasons for their recantations was the fact that at that time their logical tools were too poor. Here's Leśniewski's recantation, in his characteristic style:

Steeped in the influence of John Stuart Mill's logic in which I mainly grew up, and 'conditioned' by the 'universal-grammatical' and logico-semantic problems in the style of Edmund Husserl and of the exponents of the so-called Austrian School, I attacked unsuccessfully the foundations of 'logistic' from this point of view. [...] Living intellectually beyond the sphere of the valuable scientific achievements of the exponents of 'Mathematical Logic' and yielding to many destructive habits resulting from an one-sided, 'philosophico'-grammatical culture, I struggled in the works mentioned with a number of problems which were beyond my powers at that time, discovering already discovered Americas on the way. I have mentioned those works wishing to point out that I regret very much that they have appeared in print at all, to formally 'repudiate' them herewith – though I have already done this long ago from my university chair –, and to affirm the bankruptcy of the 'philosophico'-grammatical enterprises of the first period of my activity.³⁹

We do not have equally interesting quotes from the mature logician Łukasiewicz, but we find similar passages in tone and content in his memoirs, where he seems to be almost embarrassed by the poor knowledge of logic he had when lecturing to students on the algebra of logic (1906). Łukasiewicz regretted that his logical training under Twardowski was modest. He was almost incapable of hiding his contempt when recalling Twardowski's course on "Reformatory trends in logic" (1898/99) on Hamilton, Boole and others, since, as it later turned out, it was based on Liard's "very poor dissertation on English logicians".⁴⁰

If we follow Łukasiewicz's own account, it was no thanks to Twardowski that he discovered mathematical logic in 1906: he became interested in Russell through one of his colleagues, Marian Borowski, and was immediately fascinated by the exactness of Russell's method "without philosophical drive!". He then ordered Russell's *Principles of Mathematics* through the University library in Lvov. He studied the book for months on end, although he devoted himself to mathematical logic only later, during the First World War.⁴¹

The irony is that, objectively speaking, Łukasiewicz was, in his early writings, less of a sharp philosopher than Twardowski. In his early writings Łukasiewicz would often confuse use and mention of words, and there are lethal type-confusions of objects, their concepts, classes, elements of those classes, etc... Few managed to avoid this at the time, but Twardowski and Leśniewski were among these few.

And it must be said that Łukasiewicz's craving for exactness and clarity in writing and thought was a result of Twardowski's teaching, and for these ideals Twardowski had to thank Bolzano and Brentano in equal measure. Yet Łukasiewicz was not ready to credit Twardowski with exactness in thinking, but only with the ability to systematise and clarify even the most intricate problems.⁴² When Łukasiewicz met Leśniewski, moreover, it became harder to regard Twardowski as an example of clarity and exactness, as the comparison with the obsessive formal perfectionism of Leśniewski was certainly to Twardowski's disfavour.

Twardowski was not only too old to become an enthusiastic follower of formal logic himself, he was also not pleased by the progressive 'logicization' of his students, Łukasiewicz *in primis*. And Łukasiewicz, then in full swing with his logical research on polyvalent logics, was almost certainly the primary target of Twardowski's reproach in "Symbolomania and pragmatophobia" (1921/22).⁴³

What about Bolzano's influence upon Łukasiewicz as to some specific logical issues? The most extensive discussion of Bolzano's ideas we find in Łukasiewicz's *Die logischen Grundlagen der Wahrscheinlichkeitsrechnung* (1913).

According to Łukasiewicz it was Twardowski who attracted his attention to Bolzano's notion of validity: interestingly, Łukasiewicz says that he had already known the *Wissenschaftslehre* "for a long time", although he

did not pay attention to the notion of validity.⁴⁴ The core of Łukasiewicz's piece on probability was already ripe in 1909.⁴⁵ Twardowski had mentioned *Gültigkeit* – calling it 'logical value' – in 1911, in *Actions and Product*, but no doubt Twardowski knew already Bolzano's theory of variation, because an example involving the theory is quoted in his paper on relative truths (with no mention of Bolzano).

An important aspect linked with the fact that Łukasiewicz 'discovered' Bolzano's notion of validity, is his subsequent spreading of Bolzano's ideas on the subject. Ajdukiewicz, who formulated a rather Bolzanian, pre-Tarskian, definition of logical consequence in 1923, quoted Bolzano in 1913, in his Polish work "On the convertibility of the relation of consequence", thanking Łukasiewicz for attracting his attention to Bolzano. Note, *en passant*, that this circumstance does not seem to have been noticed in all its significance: in its light, do we really still want to believe that Tarski did not know Bolzano's notion of consequence when formulating his own?

In conclusion, for some important aspects Łukasiewicz seems to have been, in practice, a bigger 'Bolzanizer' in the Polish tradition than Twardowski. To reinforce this claim I shall now turn to Łukasiewicz's possible role in directing Leśniewski's interest towards Bolzano. I should warn the reader, though, that the whole matter of the relationship between Leśniewski and Bolzano remains hypothetical.

V. Leśniewski, Bolzano and the Painted Fish

Back to Leśniewski and Savonarola. Apart from siding with Benno Kerry, there is another possible reason why Leśniewski should have referred to the passage about modifying adjectives from the *Wissenschaftslehre*. Leśniewski's quote is from *On the Foundations of Mathematics* and the context is his criticism of set theory. As is known, this work has an "auto-biographico-synoptical character" and the quote corresponds to the years 1912–14. It is likely that Łukasiewicz and Leśniewski discussed the Bolzano/Savonarola passage precisely in those years, and that Łukasiewicz, again, played a role in attracting Leśniewski's attention to Bolzano.

How did Leśniewski enter into contact with Bolzano's thought? An anecdote told by Kotarbiński has Leśniewski arrive in Lvov in 1910 carrying Marty's *Untersuchungen* under his arm.⁴⁶ As I have shown elsewhere, Leśniewski ceased to be a follower of Marty's ideas in 1911, and arguably had come into contact with Bolzano's ideas at least by that time (recall that Marty was an orthodox Brentanian). There are striking similarities (*mutatis mutandis*) between Bolzano's theory of truth and Leśniewski's theory in 1911–12, not to mention their common, overall classical, approach, which Leśniewski never abandoned.⁴⁷ Another strong element of similarity between Leśniewski and Bolzano is the adherence of both thinkers to what has been called the Aristotelian Model of Science, and in particular to the idea that a science is a collection of truths (objective and independent of time!) about the objects of that science, with a precisely determined structure, an idea to be found everywhere in Leśniewski's work.⁴⁸

By 1910 Leśniewski had access to two sources pointing explicitly towards Bolzano: Twardowski's *Zur Lehre*, and, most importantly, Husserl's *Logische Untersuchungen*, again, like in Łukasiewicz's case. Note that Leśniewski could have known the *Logische Untersuchungen* even before knowing *Zur Lehre* through Alexander Pfänder, with whom he had studied in Munich (1909/10).⁴⁹ And we know that Leśniewski even translated into Polish at least part of Husserl's *Untersuchungen*.⁵⁰ The other book he was keen to translate at the very beginning of his Lvov days was none other than Marty's *Untersuchungen*. And since he was so keen on Marty's book – if Kotarbiński is right – he may have read Husserl's Bolzano-flavoured 1910 review of it.

Leśniewski's main interest at that time (and in fact for many years to come, up to 1920) was the regimentation of natural language in order to turn natural language into an adequate tool for scientific argumentation: both Husserl, especially in his Fourth Investigation, and Marty dealt with this. Interestingly, the Fourth Investigation, the one in which Leśniewski found the ancestor of his *semantic categories* (Husserl's *Bedeutungskategorie*) is also the one in which Bolzano is most quoted. §2 of Husserl's "Fourth Investigation" discusses Bolzano and Twardowski's *Zur Lehre* on the 'Land ohne Berge' example; §4 is on syncategorematic expressions and Bolzano's 'mistakes'; §12 is on the distinction *Unsinn/Widersinn*, Bolzano and the 'round square'. All considered Bolzano must have been already at least a household name for Leśniewski when he joined the group of Twar-

dowski's students. Then, in 1911, *Actions and Products* came out, so Leśniewski was exposed also to Twardowski's explicit appraisal of Bolzano, and in the same year Leśniewski and Łukasiewicz met in Lvov.

All these elements, however, are significant only in the light of the fact that by 1911 Leśniewski had a specific reason to consider Bolzano, namely his disagreement with Łukasiewicz on the principle of contradiction, made public in his 1912 article "An attempt at proving the principle of contradiction". On that occasion he defended the Bolzanian and anti-Twardowskian, anti-Meinongian, anti-Łukasiewiczian view that the name "round square", though having meaning, does not denote anything.⁵¹

This was a good reason to look carefully at Twardowski's fight against Bolzano's *gegenstandslose Vorstellungen* in *Zur Lehre*, §5. Moreover, someone else also attracted Leśniewski's attention to this point, namely Leon Chwistek. In a work from 1912 which Leśniewski quoted in 1913, Chwistek claimed that Bolzano stood up against the argument that expressions like "round square" are nonsense, distinguishing "the concept of nonsense from what is contrary to sense", again referring to §12 of Husserl's "Fourth Investigation".⁵²

Chwistek's work, like Łukasiewicz's, deals with the principle of contradiction and centres on various paradoxes and antinomies. Russell's antinomy, mentioned in Łukasiewicz's book on Aristotle, on the one hand awoke an interest in all other known paradoxes and antinomies, and on the other brought up – at least in Poland – a discussion of the universal applicability of the principle of contradiction. For if even mathematics is contradictory, why keep the principle of contradiction? That's why Leśniewski, who could never bring himself to believe that there was anything wrong with mathematics,⁵³ was so interested in proving the principle of contradiction: he was convinced that there could never be contradiction in reality or in our reconstruction of it, and particularly not in mathematics.

Enter Savonarola. In Leśniewski's philosophy at the time, as was standard in the Lvov philosophical milieu, Russell's paradox and three other themes, the principle of contradiction, the principle of excluded middle and the liar paradox, were brought together under the same heading: the semantics of empty names and in particular the semantics of what Bolzano would call 'objectless propositions'. Both Leśniewski and Łukasiewicz worked on their respective solutions to the Liar in the period to which

Leśniewski's passage from *On the Foundations of Mathematics* corresponds. Leśniewski's solution, published in 1913, comprises a ban on self-reference, which also Bolzano discusses, and he thinks, like Bolzano, that the Liar is false;⁵⁴ Łukasiewicz maintained in 1915 that Liar-sentences are outside the scope of logic: they aren't well-formed sentences and they cannot be employed in logical transformations.⁵⁵ Now Łukasiewicz's stand is exactly the same as Savonarola's as quoted by Bolzano: the Liar is no proposition, exactly like a dead man is no man and a painted fish is not a fish.

Conclusion

Suppose that what I said to back up my case is convincing, that indeed Twardowski blindness to Bolzano's stature and his overall Brentanian teaching was a regrettable thing to some of his pupils, and that it was in fact rather Łukasiewicz the one who played the main role in adjusting Bolzano's image and in spreading some of the novelties of Bolzano's logic. Well, then, there is still a good number of questions which the above considerations leave wide open. We may agree that you have to be a logician, or at least logically-minded, possibly an anti-psychologist, and perhaps a Platonist, to appreciate Bolzano. We do not have much material, though, let alone published or in vehicular languages, that might help us disentangle the as yet intricate matter of Bolzano's influence in Poland and how this related to Brentanian inputs, even if we limit the scope, as I have done, to some of Twardowski's students. The conjectures I have advanced, including Twardowski's negative role, need more support than I have been able to provide. What I said does not go far towards proving, for instance, that Leśniewski did read the *Wissenschaftslehre*, or, if so, read it before the 1914 edition appeared, if this is what we aim at. Could he? Was a pre-1914 edition of *Wissenschaftslehre* available to Twardowski's students? The kind of philosophy Twardowski was to teach was *terra incognita* when Twardowski moved to Lvov, so there is no guarantee that a copy of *Wissenschaftslehre* was around before 1914. Unless, of course, Twardowski brought a copy with him, for he put his personal library at his students'

disposal. Was the copy he used in Vienna his own? To quote Peter Simons,⁵⁶ “answers on a postcard, please”.⁵⁷

My aim has been to show that a critical in depth assessment of the real meaning of “Polish Brentanism”, independently of what we can infer from Twardowski’s own story, and with particular attention to Bolzano’s role, is an urgent matter, though not an easy one.⁵⁸ To make headway with this we will have to publish editions, search for manuscript material, train young scholars interested in digging things out. *Do pracy!*

Notes

* A version of this paper has been presented at the *Bolzano Atelier* in Geneva in September/October 2001 under the title “Twardowski’s Misunderstanding of Bolzano and its Polish Consequences”, which I owed to Kevin Mulligan, and under which other versions have circulated so far. I am indebted to Arkadiusz Chrudzinski and Jan Woleński for comments, to Bjørn Jespersen, Göran Sundholm for suggesting language improvements, and to Marije Martijn for comments, language and stylistic improvements on a previous version. Thanks also to Jan Woleński and Jan Siek, director of the library of the Institute of Philosophy and Sociology of Warsaw University, for having provided me with copies of the valuable manuscripts I use in the text, and to Jacek Juliusz Jadacki, custodian of Twardowski’s Archives, for allowing me to quote from this material. Work on this paper has been funded by the Netherlands Scientific Research Organization (NWO), project no. 275-80-001.

¹ Cf. Twardowski (1894/5) and Twardowski (1895/6). The edition of these manuscripts is in progress. A 50-page draft English résumé of the latter can be downloaded from the Polish Philosophy Page at <http://www.fmag.unict.it/PolPhil/Tward/TwardLog.html>. The manuscripts and the letters quoted in this paper are all housed in the Library of the Institute of Philosophy and Sociology at the University of Warsaw.

² Cf. Ingarden (1938), p. 25.

³ See the influential Woleński & Simons (1989).

⁴ See for instance Woleński (1999b).

⁵ See Betti (2005a), Künne (2003), pp. 180–4, Woleński & Simons (1989), pp. 430 fn 24. Siebel (1996) challenges the vulgate on the Bolzano-Tarski consequence relation, thereby confirming the existence of standard lore on this issue.

⁶ Cf. on the first point Künne (1997), p. 74 and (2003) pp. 186–9. On the second point, Batóg (1995). On the third point, Betti (2005c) in which I suggest that non-Brentanian stances in the analysis of truth-bearers and their ontological counterparts in the early Leśniewski, Łukasiewicz and Kotarbiński come, via Twardowski, from Bolzano. Other Polish works dealing with Bolzano or mentioning him are: Biegański (1912),

Fränklówna (1914), Smolka (1927), Kotarbiński (1929), Wiegner (1930), as reported by Batóg (1995), and most of all Jan Franciszek Drewnowski’s doctoral thesis under Kotarbiński, *Podstawy logiki Bernarda Bolzana* (1927), entirely devoted to Bolzano – but destroyed during the Second World War. A Polish translation of Bolzano’s *Paradoxes* appeared, with Kotarbiński’s preface, in 1966. On Fränklówna (1914) see Künne (2003), pp. 184–5.

⁷ On Twardowski’s criticism of Brentano’s theory of judgement, see Betti & van der Schaar (2004). On Meinong’s see Rollinger (2005). On Meinong’s and Husserl’s, Rollinger (2004), especially pp. 270 and ff.

⁸ The meaning of expressions like ‘Brentanism’ or ‘Brentanian tradition’ when more is meant than a genealogical line of pupils and students starting from Brentano, seems to me already rather difficult to define in a satisfactory way. Though I will use freely these and similar expressions in this paper, I am aware that this issue is more relevant to the main thesis of this paper than I will be able to account for here.

⁹ And *pace* Künne (1997), pp. 41 and ff., (2003), p. 180; cf. Husserl (1896). By “two-fold notion of the object of a (*subjective*) *Vorstellung*”, I mean that there is a sense in which all Bolzanian subjective presentations (Twardowski’s presentations) can be taken to have an object, this object being a presentation-in-itself, and being what is *thinkable* in a subjective presentation, cf. Bolzano WL §99 (I 461), §67 (I 305) and cf. also Bolzano-Exner p. 11 ll. 26–34. Although it’s clear that for Bolzano the object of a subjective presentation is the object of the presentation-in-itself contained in the subjective presentation, cf. Bolzano-Exner p. 26 ll. 19–22 and 69 ll. 31–4, the point is what stance one takes on the relation between *object* and *thinkable*.

¹⁰ Cf. also Künne (1997), p. 56.

¹¹ For the record, in *Zur Lehre* Twardowski quotes, in this order, §289, §49, §67, §89, §103, §108, then again §49, §65, §112, §58, §90, §64, §63, §68 of Bolzano’s *Wissenschaftslehre*. Bolzano’s name, with approximately thirty occurrences, is the most cited in this work.

¹² For Bolzano and the early Leśniewski cf. Betti (1998b), (2005a), (2005c).

¹³ Leśniewski (1927), p. 196, fn 1. Eng. Transl. p. 214, fn 19, reproduced here with changes. Translations from Polish are mine unless otherwise indicated.

¹⁴ Cf. Kerry (1885–1891), VIII, pp. 135–6. The translation from German is mine. The passage is also quoted in Künne (1997), p. 34.

¹⁵ Cf. Twardowski (1926), p. 10.

¹⁶ Cf. Twardowski (1911), p. 30. Eng. Trans. p. 131.

¹⁷ Cf. Sebestik (2003), p. 62.

¹⁸ Cf. Łukasiewicz (1949–54), p. 38 *versò*.

¹⁹ Łukasiewicz (1949–54), p. 57. The passage quoted also in Jadczak (1997), p. 46–7.

²⁰ Göran Sundholm has suggested this to me. Actually, this might explain how Łukasiewicz could suggest that the philosophical achievements of the Vienna Circle could be superior to the ones of the Lvov-Warsaw School: he had clearly denied this

superiority in 1936, at least concerning the Viennese anti-metaphysical stand. Cf. Łukasiewicz (1936).

²¹ Cf. in Husserl (1900/01), the *Anhang* to the *Prolegomena*.

²² By 'psychologism' in this paper exclusively psychologism in logic is meant, that is, in all generality the view that logic ought to be based on psychology.

²³ Łukasiewicz (1949–54), p. 57 v.

²⁴ Cf. Łukasiewicz (1904a), p. 341.

²⁵ Cf. Łukasiewicz (1905), p. 469.

²⁶ Łukasiewicz (1949–54), p. 57 v. There are 45 years of difference between the quotations I use in this section, but we do not have reasons to think Łukasiewicz changed his mind in this respect.

²⁷ The kind of accusation put forward by Łukasiewicz was so common that (in the third edition of his work) Husserl referred to it, as a *groteske Vorwurf*. Cf. Husserl (HUA), B₂ III. Cf. also Bell (1990), p. 86.

²⁸ Cf. Łukasiewicz (1904a) and the replies contained in it to an anonymous speaker. Some, including myself, have taken the anonymous speaker to be Twardowski (cf. also Rojszczak (1996), p. 140). This does not seem entirely sure, however. Łukasiewicz (1904a) is a report of the Husserl lecture, which was split in two meetings of the Polish Philosophical Society in Lvov, on 11 and 25 May 1904. According to Jadczak (1997), p. 43, in that period Twardowski spent several months abroad, and in a letter dated 17 May 1904 (cf. (1904b)) Łukasiewicz reports to Twardowski on the meeting of 11 May. So, Twardowski was not present at the first meeting. He could have been present at the second one, but I have not been able to check this.

²⁹ See also the passage on the next page.

³⁰ Łukasiewicz (1949–54), p. 57 v. Note the last line: "at the borders of logic, psychology and grammar" was the subtitle of Twardowski (1911). The passage is quoted also in Ingarden (2000), p. 65 and in Jadczak (1997), p. 47.

³¹ Cf. in Łukasiewicz (1910), p. 28 the footnote against Höfler & Meinong (1890).

³² Cf. Łukasiewicz (1904c), also quoted in Jadczak (1997), pp. 43–4.

³³ Cf. Łukasiewicz (1909).

³⁴ *Ibidem*.

³⁵ Cf. Łukasiewicz (1910), p. 104. In the letter of 19 November 1908 from Graz Łukasiewicz tells Twardowski that he could not reach an agreement with Meinong regarding evidence. The relevant fragment is also quoted in Jadczak (1997), pp. 46–7.

³⁶ Cf. Twardowski (1900).

³⁷ Twardowski (1908/09). Twardowski's turn could be dated to ca. 1907. Support comes from Rojszczak (1996, p. 140), who quotes as significant the fact that in Łukasiewicz (1907) there was no discussion similar to the one mentioned above regarding Łukasiewicz's 1904 lecture (but see fn 28 above). An opponent of my thesis might argue that Twardowski himself in his *Selbstdarstellung* (cf. Twardowski (1926), pp. 19–20) states to have been convinced by Husserl's *Logische Untersuchungen* to aban-

don psychologism, and does not mention Łukasiewicz. To this I would answer that in the passages in question Twardowski aims at portraying himself as an early follower of the antipsychologistic trend. All other evidence points however in the direction on a later adoption of this stance.

³⁸ Cf. Twardowski (1911), p. 31; Eng. trans. p. 132.

³⁹ I juxtapose here two passages: the piece before '[...]' is from Chapter I of Leśniewski (1927), p. 169, that thereafter is from Chapter II of the same work, p. 182–3. The latter, rather famous, passage is easier to interpret in the context of the theme of this section. It has been read as a pure and simple recantation of Leśniewski's early writings, but the difficulty with this is that there is continuity in Leśniewski's *oeuvre*. When the passage is placed in the context of the theme of this paper it becomes clearer that the recantation is less about Leśniewski's philosophical convictions in those works than about his research tools at the time. I reproduced the English translation (p. 181 and 197–8) with changes.

⁴⁰ Łukasiewicz (1949–54), pp. 59–60. Despite what other sources report, it is uncertain whether Twardowski dealt with Bolzano in that course.

⁴¹ Cf. Łukasiewicz (1949/54), p. 60. I think Woleński is absolutely right in saying that the level of Łukasiewicz's teaching at the time probably did not exceed the level of Couturat's *L'Algèbre de la Logique* (1905), on which the Appendix to Łukasiewicz (1910) was based. Cf. Woleński (1999a), p. 65.

⁴² Łukasiewicz (1949/54), 61r. See also Jadczak (1997), p. 49.

⁴³ Cf. Twardowski (1921/22). See also Jadczak (1997), p. 49. Twardowski's attitude in this piece would deserve extensive treatment in connection with the changes in the conception of logic in Poland in those years, rather than the few scattered remarks I offer here.

⁴⁴ Cf. Łukasiewicz (1913), §24. Despite different accounts (Simons (1989)), Łukasiewicz's own theory of probability seems to have been influenced not by Meinong, but by Bolzano. True, Meinong's ideas on probability were mentioned by Stumpf in a footnote of his 1892 work on probability which Łukasiewicz also quotes, where Bolzano is completely absent, and, moreover, Łukasiewicz spent some time with Stumpf in Berlin in 1905. Yet Łukasiewicz himself says explicitly that "<my> ideas were not after Meinong" cf. Łukasiewicz (1949–54), pp. 61r, 61v. The influence of Bolzano seems to be evident when we examine the notion of undetermined sentence (*unbestimmte Aussage*), cf. also Childers & Majer (1998), Niiniluoto (1998) and Künne (2003), p. 180–4.

⁴⁵ The first time Bolzano's name appears in Łukasiewicz's works – next to Cantor's and Dedekind's – is as early as 1905, in Łukasiewicz's lecture on the concept of infinity. This is linked to the *Paradoxes of the Infinite*, but not to the *Wissenschaftslehre* (as far as I know, Twardowski never dealt with the *Paradoxes*).

⁴⁶ Cf. Kotarbiński (1966), p. 157.

- ⁴⁷ For Marty's and Bolzano's influence on Leśniewski see Betti (1998a), p. 95, 99–101 and (1998b), in particular p. 131.
- ⁴⁸ Cf. Betti (2005d).
- ⁴⁹ Cf. the list of courses in Avé-Lallemant (1982), p. 373. Pfänder used Husserl's *Investigations* in his exercises in logic.
- ⁵⁰ As one would expect, this seems to have happened before 1915, cf. Głombik (1999), p. 98 and fn.
- ⁵¹ On Leśniewski and contradiction see my (2005b).
- ⁵² Chwistek (1912), p. 16.
- ⁵³ Leśniewski was to be hardly convinced at first that Gödel's incompleteness theorem was correct.
- ⁵⁴ The solution for the rest is quite different, cf. Betti (2004).
- ⁵⁵ Cf. Łukasiewicz (1915), pp. 29–30. His formulation of the liar sentence is famous because Tarski took it over in 1933 in his epoch-making work on truth.
- ⁵⁶ Simons (1987), pp. 15.
- ⁵⁷ *Added in proof.* Twardowski's home library housed at present at the Institute of Philosophy and Sociology of Warsaw University includes an annotated copy of the *Wissenschaftslehre* from 1837.
- ⁵⁸ This is not to say that a parallel and thorough investigation of Frege's influence on the development of Polish logic would be a less urgent matter, quite the contrary. For a first recognition see Woleński (2004).

References

- Avé-Lallemant, Eberhard 1982. 'Nachlaß-Uebersicht', in H. Spiegelberg & E. Avé-Lallemant (eds.), *Pfänder-Studien*, The Hague/Boston/London, M.Nijhoff, pp. 371–379.
- Batóg, Tadeusz 1995. 'Ajdukiewicz and the Development of Formal Logic', in V. Sinisi & J. Woleński (eds.), *The Heritage of Kazimierz Ajdukiewicz*, Amsterdam/Atlanta, Rodopi, pp. 53–67.
- Bell, David 1990. *Husserl*, London & New York, Routledge.
- Betti, Arianna 1998a. 'Il rasoio di Leśniewski', *Rivista di Filosofia* LXXIX, pp. 89–117.
- Betti, Arianna 1998b. 'De Veritate: another Chapter – The Bolzano Leśniewski Connection', in K. Kijania-Placek & J. Woleński (eds.), *The Lvov-Warsaw School and Contemporary Philosophy*, Dordrecht, Kluwer Academic Publishers, pp. 115–137.
- Betti, Arianna 2002. 'The Incomplete Story of Łukasiewicz and Bivalence', in T. Childers (ed.), *The Logica 200 Yearbook*, Prague, The Czech Academy of Sciences – Filosofia, pp. 21–36.

- Betti, Arianna 2004. 'Leśniewski's Early Liar, Tarski and Natural Language', *Annals of Pure and Applied Logic* 127, pp. 267–287.
- Betti, Arianna 2005a. 'Sempiternal Truth. The Bolzano Leśniewski Twardowski Axis', in J. J. Jadacki & J. Pańniczek (eds.), *The Lvov-Warsaw School. The Second Generation*, Amsterdam, Rodopi (Poznań Studies in the Philosophy of the Sciences and the Humanities), forthcoming.
- Betti, Arianna 2005b. 'Łukasiewicz and Leśniewski on Contradiction', *Reports on Philosophy* 22/2004, pp. 247–271.
- Betti, Arianna 2005c. 'A Note on Early Polish Semantics, Bolzano and the Woleński Thesis', in J. Hartman (ed.), *Logics and Philosophy. Towards Jan Woleński*, Amsterdam, Rodopi, forthcoming.
- Betti, Arianna 2005d. 'Logic as Universal Medium? Leśniewski's Systems and the Aristotelian Model of Science', to appear in S. Lapointe and M. Marion (eds.), *Logic, Ontology, and Aesthetics in Poland*, Berlin, Springer.
- Betti, Arianna & Van der Schaar, Maria 2004. 'The Road from Vienna to Lvov: Twardowski's Theory of Judgement 1894–1897', *Grazer Philosophische Studien* 67, pp. 1–20.
- Biegański, Władysław 1912. *Teorya Logiki*, Warszawa, Skład główny w księgarni E. Wende i spółki.
- Bolzano, Bernard WL, *Wissenschaftslehre*, hrsg. von J. Berg *Bernard Bolzano-Gesamtausgabe* Reihe I, Bande 11–14 (1985–2000).
- Bolzano-Exner, E. Winter (ed.) 1935. *Spisy Bernarda Bolzana, Korespondence B. Bolzana s F. Exnerem / Bernard Bolzano's Schriften, Band 4 – Der Briefwechsel B. Bolzanos mit F. Exner*, Praha / Prag, Königliche böhmischen Gesellschaft der Wissenschaften / Královská česká společnost nauk.
- Childers, Timothy & Majer, Ondrej 1998. 'On Łukasiewicz's Theory of Probability', in K. Kijania-Placek & J. Woleński (eds.), *The Lvov-Warsaw School and Contemporary Philosophy*, Dordrecht, Kluwer Academic Publishers, pp. 303–312.
- Chwistek, Leon 1912. 'Zasada sprzeczności w świetle nowszych badań Bertranda Russella', *Rozprawy Akademii Umiejętności*, Wydział Historyczno-Filozoficzny 2, vol. LV, series 30, Kraków, 1912, pp. 270–334.
- Fränklówna, Maria 1914. 'O pewnym paradoksie w logice Bolzana', *Przegląd Filozoficzny* 17, pp. 315–323.
- Głombik, Czesław 1999. 'O niedoszłych polskich przekładach Logische Untersuchungen', in *Polska filozofia analityczna w kręgu Szkoły Lwowsko Warszawskiej*, Toruń, Wydawnictwo Uniwersytetu Mikołaja Kopernika, pp. 89–106.
- Höfler, Alois & Meinong, Alexius (1890) *Philosophische Propädeutik – I Theil Logik*, Prag/Wien/Leipzig, Tempsky/Freytag.
- Husserl, Edmund 1896. '<Besprechung von> K. Twardowski, *Zur Lehre vom Inhalt und Gegenstand der Vorstellungen – Eine psychologische Untersuchung*, Wien

- 1894', in *Aufsätze und Rezensionen* (1890–1910), Husserliana XXII, M. Nijhoff publ., The Hague/Boston/London, 1979, pp. 357–80.
- Husserl, Edmund 1900/01. *Logische Untersuchungen*, Max Niemeyer: Halle a.d.S., 1900–1901; *Husserliana* XVIII, XIX/1, XIX/2, M. Nijhoff publ., The Hague / Boston / London.
- Ingarden, Roman 1938. 'Działalność naukowa Twardowskiego' in *Kazimierz Twardowski. Nauczyciel-Uczony-Obywatel*, Lwów, Nakładem Polskiego Towarzystwa Filozoficznego – Skład główny w księgarni "Książka" (A. Mazzucato), pp. 13–30.
- Ingarden, Roman Stanisław 2000. *Roman Ingarden – Życie filozofa w okresie toruńskim (1921–1926)*, Toruń, Uniwersytet Mikołaja Kopernika.
- Jadczak, Ryszard 1997. *Mistrz i jego uczniowie*, Warszawa, SCHOLAR.
- Kerry, Benno 1885–1891. 'Über Anschauung und ihre Psychische Verarbeitung', *Vierteljahrsschrift für wissenschaftliche Philosophie*, IX, 1885, pp. 433–493 (I); X, 1886, pp. 419–467 (II); XI, 1887, pp. 53–116 (III); 4, XI, 1887, pp. 249–307 (IV); 5 XIII 1889 pp. 71–124 (V), pp. 392–419 (VI); XIV, 1890, pp. 317–353 (VII); XV, 1891, pp. 127–167 (VIII).
- Kotarbiński, Tadeusz 1913. 'Zagadnienie istnienia przyszłości', *Przegląd filozoficzny* XVI, pp. 74–92.
- Kotarbiński, Tadeusz 1929. *Elementy teorii poznania, logiki formalnej i metodologii nauk*, Lvov, Ossolineum, 1929; Eng. Transl. *Gnosiology. The Scientific Approach to Theory of Knowledge*, Oxford, Pergamon Press, 1966.
- Kotarbiński, Tadeusz 1966. 'Garstka wspomnień o Stanisławie Leśniewskim', *Ruch Filozoficzny* n. 3–4, 1966, pp. 155–63.
- Künne, Wolfgang 1997. 'Die Ernte wird erscheinen – Die Geschichte der Bolzano-Rezeption (1849-1939)', in Ganthaler, H. & Neumaier O. (eds.) *Bolzano und die österreichische Geistesgeschichte*, Sankt Augustin, Academia Verlag, pp. 9–82.
- Künne, Wolfgang 2003. 'Bernard Bolzano's *Wissenschaftslehre* and Polish Analytical Philosophy Between 1894 and 1935' in: J. Hintikka, T. Czarniecki, K. Kijania-Placek, T. Placek, A. Rojszczak (eds.) *Philosophy and Logic – In Search of the Polish Tradition – Essays in honour of Jan Woleński on the Occasion of his 60th Birthday*, Dordrecht, Kluwer Academic Publishers, pp. 179–192.
- Leśniewski, Stanisław 1927. *O Podstawach Matematyki* (On the Foundations of Mathematics), Chs. I–III, *Przegląd Filozoficzny* XXX, pp. 164–206, 1927. Eng. Trans. in Stanisław Leśniewski, *Collected Works*, 1 vol., ed. by S. J. Surma, J. T. Srzednicki, D. I. Barnett e V. F. Rickey, Dordrecht, Kluwer Academic Publishers, 1992, pp. 181–382.
- Łukasiewicz, Jan 1904a. 'Teza Husserla o stosunku logiki do psychologii', *Przegląd Filozoficzny* 7, 1904, pp. 476–7. Page numbers refer to the reprint in Łukasiewicz (1998), pp. 341–2.

- Łukasiewicz, Jan 1904b. Letter to Kazimierz Twardowski (Lvov, 17.5.1905), in Łukasiewicz (1998), pp. 459–60.
- Łukasiewicz, Jan 1904c. Letter to Kazimierz Twardowski (Charlottenburg, 12.12.1904), in Łukasiewicz (1998), pp. 467–8.
- Łukasiewicz, Jan 1905. Letter to Kazimierz Twardowski (Charlottenburg, 6.2.1905), in Łukasiewicz (1998), pp. 468–71.
- Łukasiewicz, Jan 1906. 'Analiza i konstrukcja pojęcia przyczyny', *Przegląd Filozoficzny* 9, pp. 105–179. Page numbers refer to the reprint in Łukasiewicz (1961), pp. 9–62.
- Łukasiewicz, Jan 1907. 'Logika a psychologia', *Przegląd Filozoficzny* 10, 1907, pp. 489–91. Page numbers refer to the reprint in Łukasiewicz (1961), pp. 63–5.
- Łukasiewicz, Jan 1909. 'O poglądach filozoficznych Meinonga', *Przegląd Filozoficzny* 12, p. 559. Page numbers refer to the reprint in Łukasiewicz (1998), pp. 344–5.
- Łukasiewicz, Jan 1910. *O zasadzie sprzeczności u Arystotelesa – Studium Krytyczne*, Kraków, Polska Akademia Umiejętności.
- Łukasiewicz, Jan 1913. *Die logische Grundlagen der Wahrscheinlichkeitsrechnung*, Krakau, Akademie der Wissenschaften.
- Łukasiewicz, Jan 1915. 'O nauce', in *Poradnik dla samouków* (wyd. nowe), Tom 1, Warszawa, Wydawnictwo A. Heflicha i S. Michalskiego, pp. XV–XXXIX. Page numbers refer to the reprint in Łukasiewicz (1998), pp. 9–32.
- Łukasiewicz, Jan 1936. 'Logistyka a filozofia' in Łukasiewicz (1961), pp. 195–209.
- Łukasiewicz, Jan 1949/54. *Pamiętnik* (Memoirs), unpublished typescript, housed by the library of the Institute of the Philosophy and Sociology of the University of Warsaw.
- Łukasiewicz, Jan 1961. *Z zagadnień logiki i filozofii. Pisma wybrane*, Warszawa, PWN.
- Łukasiewicz, Jan 1998. *Łukasiewicz – Logika i metafizyka*, ed. by J. J. Jadacki, Warszawa, Wydział Filozofii i Socjologii Uniwersytetu Warszawskiego.
- Meinong, Alexius 1907. *Über die Stellung der Gegenstandstheorie im System der Wissenschaften*, Leipzig, Voigtländer, 1907. Repr. in *Alexius Meinong Gesamtausgabe V*, R. M. Chisholm ed., Graz, Akademische Druck- u. Verlagsanstalt, 1973.
- Niiniluoto, Ilkka 1998. 'Induction and probability in the Lvov-Warsaw School', in K. Kijania-Placek & J. Woleński (eds.), *The Lvov-Warsaw School and Contemporary Philosophy*, Dordrecht, Kluwer Academic Publishers, pp. 323–335.
- Rojszczak, Artur 1997. *Vom Urteil zum Satz. Das Wahrheitsträgerproblem von Bolzano zu Tarski*, PhD thesis, Jagiellonian University, Krakow, 1997.
- Rollinger, Robin D. 2004. 'Austrian Theories of Judgement' in A. Chrudzimski & W. Huemer, *Phenomenology and Analysis. Essays on Central European Philosophy*, Frankfurt/Lancaster, Ontos Verlag, pp. 257–84.

- Rollinger, Robin D. 2005. 'Meinong and Brentano' *Meinong Studies* 1, pp. 159–197.
- Sebestik, Jan 2003. 'Husserl Reader of Bolzano' in D. Fisette (ed.), *Husserl's Logische Untersuchungen Reconsidered*, Dordrecht, Kluwer Academic Publishers, 2003.
- Siebel, Mark 1996. *Der Begriff der Ableitbarkeit bei Bolzano*, Sankt Augustin, Academia Verlag.
- Simons, Peter 1987. 'Meinong, Łukasiewicz and Many-Valued Logics', in id., *Philosophy and Logic in Central Europe from Bolzano to Tarski*, Dordrecht, Kluwer Academic Publishers, 1992.
- Simons, Peter 1989. 'Bolzano, Tarski and the Limits of Logic', in id., *Philosophy and Logic in Central Europe from Bolzano to Tarski*, Dordrecht, Kluwer Academic Publishers, 1992.
- Smolka, Fr. 1927. 'Pojęcie zmiany u Bolzana i u Russella', *Przegląd Filozoficzny* 30, p. 291.
- Twardowski, Kazimierz 1894. *Zur Lehre vom Inhalt und Gegenstand der Vorstellungen – Eine psychologische Untersuchung*, Wien, Hölder (anast. repr., München-Wien, Philosophia Verlag, 1982).
- Twardowski, Kazimierz 1894/5. *Logik – Wintersemester 1894/5*, manuscript containing the lecture notes in logic given in the A.A. 1894/5 at Vienna University, pp. 272. Edition by Arianna Betti and Venanzio Raspa in progress.
- Twardowski, Kazimierz 1895/6. *Logika – Kurs zimowy 1895/6*, manuscript containing the lecture notes in logic given in the A.A. 1895/6 at Lvov University, pp. 264. Edition by Arianna Betti in progress. Partial English (working) translation on the *Polish Philosophy Page* at <http://www.fmag.unict.it/PolPhil/Tward/TwardLog.html>.
- Twardowski, Kazimierz 1900. 'O tak zwanych prawdach względnych', *Księga pamiątkowa Uniwersytetu Lwowskiego ku uczczeniu pięćsetnej rocznicy fundacji Jagiellońskiego Uniwersytetu Krakowskiego*, Lwów, Nakładem Senatu Akademickiego Uniwersytetu Lwowskiego. Eng. trans. in *On Actions, Products and Other Topics in philosophy*, Johannes Brandl and Jan Woleński (eds.), Amsterdam, Rodopi, 1999, pp. 147–169.
- Twardowski, Kazimierz 1908/9. *Psychologia myślenia*, lecture notes, Archiwum Kazimierza Twardowskiego, Biblioteka IFiS PAN, Warsaw, pp. 31.
- Twardowski, Kazimierz 1911. 'O czynnościach i wytworach – Kilka uwag z pogranicza psychologii, gramatyki i logiki', Gubrynowicz i syn, Kraków, 1911, pp. 33 (extract from *Księga pamiątkowa ku uczczeniu 250-tej rocznicy założenia Uniwersytetu Lwowskiego przez króla Jana Kazimierza* vol. II, Lwów, Nakładem Uniwersytetu Lwowskiego, 1912) pp. 33. Eng. trans. in *On Actions, Products and Other Topics in philosophy*, Johannes Brandl and Jan Woleński (eds.), Amsterdam, Rodopi, 1999, pp. 103–132.

- Twardowski, Kazimierz 1921/22. 'Symbolomania i pragmatofobia', *Ruch filozoficzny* VI, pp. 1–10.
- Twardowski, Kazimierz 1926. 'Kazimierz Twardowski: Selbstdarstellung', hrsg. Jan Woleński & Thomas Binder, *Grazer Philosophische Studien* 39, 1991, pp. 1–24.
- Wiegner, Adam 1930. *W sprawie zasady odwrotności między treścią a zakresem pojęć*, Poznań, Nakładem Poznańskiego Towarzystwa Przyjaciół Nauk z zasiłku Ministerstwa Wyznań Religijnych i Oświecenia Publicznego.
- Woleński, Jan 1999a. 'Mathematical Logic in Poland 1900–1939 People, Circles, Institutions, Ideas', in id., *Essays in the History of Logic and Logical Philosophy*, Jagiellonian University Press, Dialogikon, pp. 59–84.
- Woleński, Jan 1999b. 'Theories of Truth in Austrian Philosophy' in id., *Essays in the History of Logic and Logical Philosophy*, Kraków, Jagiellonian University Press, Dialogikon, pp. 150–175.
- Woleński, Jan 2004. 'The reception of Frege in Poland', *History and Philosophy of Logic* 25, pp. 37–51.
- Woleński, Jan & Simons, Peter 1989. 'De veritate: Austro-Polish Contributions to the Theory of Truth from Brentano to Tarski', in K. Szaniawski (ed.), *The Vienna Circle and the Lvov Warsaw School*, Dordrecht, Kluwer Academic Publishers, pp. 391–442.