

Theory and History of Ontology

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Selected Bibliography on Bernard Bolzano's Contributions to Logic and Ontology. Second Part: D - L

STUDIES ON BERNARD BOLZANO'S LOGIC AND ONTOLOGY

1. Detlefsen, Michael. 2010. "Rigor, Re-Proof and Bolzano's Critical Program." In *Construction. Festschrift for Gerhard Heinzmann*, edited by Bour, Pierre Edouard, Rebuschi, Manuel and Rollet, Laurent, 171-184. London: King's College Publications.
2. Drozdek, Adam. 1997. "Logic and Ontology in the Thought of Bolzano." *Logic and Logical Philosophy* no. 5:3-18.

"Logic and theology were two domains of great importance to Bolzano. His attempt to reconcile the demands of these two domains led Bolzano to very strong logical realism, or, objectivism, whereby theology could be put on a firm ground. The paper analyzes the problem of objective concepts, propositions, and truths, with an attempt to give an interpretation of these entities, to account for their puzzling ontological status in Bolzano's system.

Bolzano is one of the forerunners of modern logic; however, his logical, and also mathematical, discussions were conducted in the context of very serious concern about the ontological status of the logical constructs. In the context of logic, he discusses the problem of propositions (*Sätze*) and their special category, namely truths; and ideas (*Vorstellungen*), and their special categories, namely intuitions (*Anschauungen*); and concepts. What is interesting in Bolzano's analyses is the considerable effort he devotes to distinguishing subjective propositions and ideas from objective propositions and ideas, the latter also called propositions and ideas in themselves. What is particularly puzzling in Bolzano's philosophy is the ontological status of the latter. According to Bolzano, objective propositions and ideas do not exist, they are not real, and yet they make logic possible." (pp. 3-4)

3. Dubucs, Jacques, and Lapointe, Sandra. 2006. "On Bolzano's Alleged Explicativism." *Synthese. An International Journal for Epistemology, Methodology and Philosophy of Science* no. 150:229-246.

"Bolzano was the first to establish an explicit distinction between the deductive methods that allow us to recognise the certainty of a given truth and those that provide its objective ground. His conception of the relation between what we, in this paper, call "subjective consequence", i.e., the relation from *epistemic reason* to consequence and "objective consequence", i.e., grounding (*Abfolge*) however allows for an interpretation according to which Bolzano advocates an "explicativist" conception of proof: proofs par excellence are those that reflect the objective order of grounding. In this paper, we expose the problems involved by such a conception and argue in favour of a more rigorous demarcation between the ontological and the epistemological concern in the elaboration of a theory of demonstration."

4. Duhn, Anita von. 2001. "Theoretical Laws and Normative Rules: Kant and Bolzano's Views on Logic." In *Kant Und Die Berliner Aufklärung. Akten Des 9. Internationalen Kant-Kongresses. Band V: Sektionen Xv-Xviii*, edited by Gerhardt, Volker, Horstmann, Rolf-Peter and Schumacher, Ralph, 3-12. Berlin: Walter de Gruyter.

"Does logic instruct us how to think correctly? If so, what place does methodology have in logic? Is logic an instrument which provides rules for correct thinking or a system of proof for scientific theories, or is the doctrine of method merely an appendix to a doctrine of elements? The question whether logic is an

organon is related to the question whether logical laws are theoretical truths or normative laws. Kant and Bolzano agree that logical laws basically provide us with truths, but that they can be apprehended as telling us how to think. (1) So a theoretical judgment that something is the case precedes the normative judgment that we may or should do something about it. Does it follow that Kant and Bolzano also agree on the question of whether logic is an *organon* which instructs us how to think? I will show that despite their divergent positions on logic, both authors claim that we apply normative rules because they are true." p. 3

(1) Kant and Bolzano agree with Husserl and Frege, who thought that a normative act, such as demanding or permitting, presupposes a theoretical act, such as judging or believing and that every law that states what *is* can be apprehended that one *ought* to think in accordance with it. Cf. Frege (1893) *Grundgesetze der Arithmetik*, intro. XV; Husserl (1900) *Prolegomena*, §§ 3, 13-14. I discuss this issue in "*Is logic a theoretical or practical discipline? Kant and/or Bolzano*", to appear in the *Archiv für Geschichte der Philosophie*. [vol. 84, no. 3 (2002) pp. 319-333]

5. ———. 2002. "Bolzano's Account of Justification." *Vienna Circle Institute Yearbook* no. 10:21-33.

"Bolzano claims that even self-evident propositions require proofs. I reconstruct his account of justification, designed to replace the criterion of intuitive self-evidence by providing a scientific base for the demonstrative sciences. Justification combines epistemological and logical aspects: it is both a mark distinguishing knowledge from opinion and a strict derivative proof excluding all relevant alternatives as well as alien intermediate concepts. I conclude that whilst Bolzano devised a procedure for grounding true propositions, he reintroduces an epistemological problem: how can we understand primitive truths without recurring to intuition and justify the applicability of logical rules without empirical verification?"

6. Dummett, Michael. 1997. "Comments on Wolfgang Künne's Paper." *Grazer Philosophische Studien* no. 53:241-248.

Comments on: *Propositions in Bolzano and Frege*.

7. Etchemendy, John. 1990. *The Concept of Logical Consequence*. Cambridge: Harvard University Press.

Chapter 3: *Tarski on Logical Truth*, pp. 27-50.

"I approach Tarski's account of logical truth and logical consequence indirectly, by considering first a simpler account developed by Bolzano nearly a century earlier.(1) The two accounts are remarkably similar; indeed, Tarski initially entertains what is, for all intents, precisely the same definition as Bolzano's, but modifies it for reasons I will eventually explain. But in spite of the striking similarity in the two accounts, Tarski was unaware of Bolzano's work until several years after the initial publication of his article. The key difference between the two accounts is simply that Bolzano employs substitution where Tarski uses the more technical, and for the purposes more adequate, notion of *satisfaction*." (p. 27).

8. Føllesdal, Dagfin. 1997. "Bolzano's Legacy." *Grazer Philosophische Studien* no. 53:1-11.

Original German published as: *Bolzos bleibende Leistungen* in: Arkadiusz Chrudzimski and Wolfgang Huemer (eds.), *Phenomenology and analysis. Essays on Central European philosophy*, Frankfurt: Ontos Verlag, 2004 pp. 57-68.

"Bernard Bolzano (1781-1848) was an original and independent thinker, who left a lasting legacy in several areas of philosophy. Four such areas are singled for special attention: political philosophy, ethics and theology, logics and semantics, and mathematics. In all these areas he was far ahead of his time. He had pioneering ideas in political philosophy and in ethics and philosophy of religion, and he argued for them in a brilliantly clear way. In logic and semantics he anticipated Frege, Carnap and Quine on important points, and he had intriguing, yet to be explored, ideas on intuition and other fundamental philosophical notions. In the foundations of mathematical analysis and the theory of infinite sets he anticipated Weierstrass and Cantor."

9. ———. 2001. "Bolzano, Frege and Husserl on Reference and Object." In *Future Pasts. The Analytic Tradition in Twentieth Century Philosophy*, edited by Floyd, Juliet and Shieh, Sanford, 67-80. Oxford: Oxford University Press.

"Husserl's notion of the intentional object may be compared and contrasted with Bolzano's and Frege's views on the reference of linguistic expressions, especially since Bolzano was a main influence on the development of Husserl's views. Føllesdal responds to David Bell's criticisms of Føllesdal's earlier

readings of Husserl on reference, directedness, and the notion of a determinable object x . He argues that Husserl's treatment of indexicals and reference is in some ways more insightful than the treatments of either Bolzano or Frege. To preempt the charge that Husserl's philosophy forwards a naïve, overly mentalistic model of the mind and its expressive capacities, Føllesdal mentions that Husserl developed a thought experiment nearly identical to the well-known Twin Earth scenario later framed by Hilary Putnam to criticize internalist, mentalistic theories of meaning. Føllesdal argues that Husserl was ahead of his time in trying to account for the semantics of indexical and demonstrative terms, partly under the influence of Brentano. This study shows that the opposition between so-called continental and so-called analytic philosophy is not historically as well-grounded as many have supposed."

10. Folta, Jaroslav. 1981. "Life and Scientific Endeavour of Bernard Bolzano." In *Bolzano and the Foundations of Mathematical Analysis*, edited by Jarník, Vojtěch, Novák, Josef, Folta, Jaroslav and Jarník, Jiří, 11-32. Praha: Society of Czechoslovak Mathematicians and Physicists.

"The only field of Bolzano's non-religious interest in which his results were published relatively soon after they had been obtained, was logic, the problems of which he treated in "Beytrage ... [1810] for the first time and then again in "Wissenschaftslehre" [1837] in the years 1820—1829. (11) This was characteristic of Bolzano, for what he missed most in all branches of science were the general rules according to which individual statements should be arranged so as to facilitate their proper and convincing interpretation and proof. And, although Bolzano considered mathematics an important tool for an exercise in correct thinking, he often found fault with the ways it was presented. He tried to improve the situation and remove the defects." (pp. 19-21).

(11) According to his diary ("Adversaria"), Bolzano engaged in logical studies already in 1812 when he wanted to publish a treatise "Attempt at a new logic, which shall cause a revolution in all sciences". In 1814 he wrote "Logische Vorbegriffe" [*Gesamtausgabe*, II.A.5.g.] and soon after he completed the manuscript "Etwas aus der Logik" [*Gesamtausgabe*, II.A.5.i.], which appeared for the first time in Czech version in the journal Krok (1831, pp. 553—578).

11. George, Rolf. 1972. "Enthymematic Consequence." *American Philosophical Quarterly* no. 9:113-116.

"Enthymematic validity, in contrast to logical validity, obtains when all substitutions on some (but not all) of an argument's extralogical constants which make the premises true also make the conclusion true. This condition is shown to be equivalent to the classical view for the domain of syllogisms, and for arguments which depend on the properties of relations. Enthymematic consequence turns out to be a special case of consequence as defined by Bolzano."

12. ———. 1983. "Bolzano's Consequence, Relevance and Enthymemes." *Journal of Philosophical Logic* no. 12:299-318.

"Historians of logic tend to view their task as the application of modern insights and symbolic techniques to old texts. Perhaps they do this on the assumption that what is good in these works must be an adumbration of what was recently done and is now well known. This holds, at any rate, for most discussions of Bolzano's theory of logical consequence.

In the present paper I shall reverse this procedure and comment on some problems and beliefs of contemporary logic from what I take to be Bolzano's point of view. This will have the advantage of bringing out more forcefully than a straight exegesis what his view was and will also, I hope, put in doubt certain contemporary dogmas.

I begin by applying his definition of consequence to propositional logic. Bolzano did not entertain this branch of logic, and to this extent my account is ahistorical. That it is, nonetheless, a straight extension of his theory is shown by the fact that all 23 theorems about consequence which he proves in his *Theory of Science* hold in this application I then consider how C. I. Lewis's so-called "independent proof" for $A \& \neg A \models B$ fares in this system (it fails). After some comments on the proof, I show that in Bolzano-consequence premisses and conclusion share a subsentence (a necessary condition of relevance). There follows a discussion of enthymemes and a general procedure for generating the so-called "nutting premiss". At the end I sketch a taxonomy of consequence relations and briefly remark on earlier interpretations of Bolzano's work. In using the first person plural (from now on) I mean to speak for those who think Bolzano's approach sound, a group that includes at least Bolzano and myself." (p. 299, notes omitted)

13. ———. 1983. "A Postscript on Fallacies." *Journal of Philosophical Logic* no. 12:319-325.

14. ———. 1986. "Bolzano's Concept of Consequence." *Journal of Philosophy* no. 83:558-564.

Reprinted in: Dale Jacquette (ed.), *Philosophy of Logic. An Anthology*, Malden, Blackwell, 2002, pp. 205-209.

15. ———. 1987. "Bolzano on Time." *Philosophia Naturalis* no. 24 (4):452-468.

"(1) In the first volume of the *Wissenschaftslehre* Bolzano claims that "by the word 'time' we mean nothing but that particular determination in a real thing which is the condition for correctly attributing to it a given property."(1) He says that from this *all* properties of time can be deduced. This is supported by just one example, namely, that several contrary properties can be attributed to the same substance only on condition that times differ. This follows directly, since sentences with contrary predicates can be true only if their subjects differ. Hence one and the same substance can have contrary attributes only on the assumption that its time determinations are not the same.

In Chapter 412 he maintains that a theory can have the status of a science even if its extent is very small. Consequently, he says, "the theory of time (the properties of time, not of the art of measuring it) deserves to be treated as a special science (i.e. the pure theory of time) although this science can consist of only a very few propositions."(2) Kant, he objects, should not have denied it the name of science for no other reason than its small extent.

(2) In the following chapter Bolzano adds that a theory need not be denied the status of a science even if everyone already knows its propositions. Again the theory of time serves as an example. He maintains that all theorems of the pure theory of time are obvious to everyone (*sind jedem von selbst schon bekannt*) (3), but that it should be considered to be a science nonetheless.

These are sweeping claims. Given the voluminous publications, the many controversies and the continuing interest in the subject of time they seem strange, even absurd. I begin by discussing these assertions, then add some reflexions on Bolzano on *time perception*, and end with a brief account of his criticism of Kant's views." (p. 452)

(1) WL I, 365. Citations follow the first edition.

(2) IV, 52.

(3) IV, 53.

16. ———. 1992. "Concepts of Consequence." In *Bolzano's Wissenschaftslehre 1837-1987. International Workshop*, 3-26. Firenze: Leo S. Olschki.

"It has been held since antiquity that in all deductive argumentation there is a formal element or aspect. I wish to distinguish, and contrast, two ways of characterizing this. One of them I call «logic of schemata», or the «Received View», and the other, which was first articulated by Bolzano, «logic of variation». I shall investigate how these concepts of consequence succeed in addressing five concerns, not all of them logical issues, as we now understand logic, but connected with argumentative practice and certain epistemic matters.

(1) For the sake of completeness I mention first that a definition of consequence should fix a relation that satisfies certain formal requirements, i.e. a cut rule, thinning, and the like. There is a conventionally accepted set of these, described, e.g. by Gentzen. If a consequence relation shows deviations from this, it must be a reasoned difference that should be argued for. Also, a consequence relation (specifically logical, rather than enthymematic consequence) should be defined in such a way that first order predicate logic is strongly complete, that is, that if A is a consequence of a set of sentences X, then A should be deducible from X in a finite sequence of steps.

(2) A defensible definition of consequence should have the form, broadly, «If an argument satisfies this definition, it is valid, otherwise not». Contemporary definitions fail, as a rule, to satisfy the «otherwise not» clause. It is, however, argumentative practice to convict arguments of being formally fallacious. This can only be based on the assumption that if we have *fully understood* an argument, we can judge it to be valid or invalid - setting aside such esoterica as undecidable cases. I think it desirable that a definition of consequence allow an account of invalidity as well as validity.

(3) I shall consider a definition of logical consequence to be superior if it is broad enough to explain why we concede merit to some formally invalid arguments enthymemes), but withhold approbation from others (gross non-sequiturs), that is, if it treats *logical consequence* as a special, though perhaps the most important and interesting, case.

(4) Arguments as presented in both informal and formal contexts can be ambiguous, even if they are constructed of unambiguous sentences, and even if they are couched in a language that stipulates a rigid distinction between logical and extralogical constants. I call an argument *naked* if all that is presented are premisses, conclusion, and an inference indicator, like «therefore». I shall maintain that when we understand an argument, we understand more than the sentences of which it is composed, and more than

the unspecified claim that the conclusion *somehow* follows from the premisses. That is, we grasp more than the naked argument. If we fail in this, we may misconstrue arguments, which amounts to saying that naked arguments can be ambiguous. I suggest that an acceptable theory of consequence should allow us to bring into focus the problem of argument ambiguity.

(5) It is desirable that a concept of consequence, if it does not itself define a «relevant» relation, can at least be augmented so that it does. (A consequence relation is here called relevant if it stipulates or implies that premisses and conclusion share some element)." pp. 3-4.

17. ———. 1997. "Psychologism in Logic: Bacon to Bolzano." *Philosophy and Rethoric* no. 30 (3):213-242.

Reprinted in: Dale Jacquette (ed.), *Philosophy, Psychology, and Psychologism. Critical and Historical Readings on the Psychological Turn in Philosophy*, Dordrecht, Kluwer, 2003, pp. 21-49.

18. ———. 1997. "Bolzano's Programme and Abstract Objects." *Grazer Philosophische Studien* no. 53:167-180.

"Most of the Bolzano literature is exegetical, neglecting, unfortunately, the great potential of his logic as the beginning of a *Programme*. Specifically, his unorthodox construal of the consequence relation as triadic, and his account of logical form are promising beginnings which even as they stand shed light on question of relevance, the ancient problems of enthymemes and others. Instead of developing these suggestions, Bolzano scholars have been occupied with elucidating the ontology of sentences in themselves, and related topics. I argue, and believe to be in agreement with Bolzano, that the nature of sentences is fully explained by the relations that hold between them, just as money has no nature or essence beyond the transactions it makes possible. It follows that the development of his logic would contribute at least as much to the understanding of sentences than any exegesis."

19. ———. 2003. "Bolzano and the Problem of Psychologism." In *Husserl's Logical Investigations Reconsidered*, edited by Fisette, Denis, 95-108. Dordrecht: Kluwer.

"The *Theory of Elements* in the first two volumes of Bolzano's *Wissenschaftslehre* of 1837 "on which logic as a science must be built" (Husserl), is a historical first in avoiding all connection with psychological doctrine. It was then common to argue that specific "laws of thought" reflect what we can or cannot think. A brief account of the psychologism debate at the time of Husserl is followed by a survey of claims about psychology and logic in British Empiricism, Kant, Herbart and others. Then Bolzano's theory of "propositions in themselves" is discussed and justified."

20. ———. 2004. "Intuitions: The Theories of Kant and Bolzano." In *Semantik Und Ontologie. Beiträge Zur Philosophischen Forschung*, edited by Siebel, Mark and Textor, Mark, 319-354. Frankfurt: Ontos Verlag.

21. Gieske, Carsten Uwe. 1997. "Bolzano's Notion of Testifying." *Grazer Philosophische Studien* no. 53:249-266.

"The notion of testifying (or testimony) is the central notion of Bolzano's theory of communication. In his *Wissenschaftslehre* (Theory of Science) Bolzano gives an analysis of this notion. It shows surprising parallels to Paul Grice's attempt to define "A meant something by x". I will begin with an explanation of some parts of the analysis and continue with an investigation of the relationship between Bolzano's analysis and that of Grice. In conclusion I would like to present some evidence supporting the hypothesis that several of the virtues of Grice's theory had already been developed by Bolzano, whose approach even has the advantage of a better definition than Grice's, as Bolzano's analysis provides a better basis for defining a notion of successful communication of information."

22. Grossmann, Reinhardt. 1961. "Frege's Ontology." *Philosophical Review* no. 70:23-40.

Reprinted in: E. D. Klemke - *Essays on Frege* - Urbana, University of Illinois Press 1968, pp. 79-98.

23. Hafner, Johannes. 2000. "Bolzano's Criticism of Indirect Proofs." *Revue d'Histoire des Sciences* no. 52 (3-4):385-399.

"The bearing of *Ableitbarkeit* and the compatibility requirement on the possibility of indirect proofs in Bolzano's logic has frequently been misconstrued. Without additional assumptions concerning the logical

structure of indirect proofs and the relationship between proofs and *Ableitbarkeit* the compatibility requirement does not in general preclude indirect proofs. Bolzano's own objections to them are raised in the context of *Abfolge*, not *Ableitbarkeit*. Closer inspection shows that there are in fact two distinct criticisms in play. Identifying and analyzing them clarifies what exactly Bolzano views as the problem of indirect proofs."

24. Haller, Rudolf. 1992. "Bolzano and Austrian Philosophy." In *Bolzano's Wissenschaftslehre 1837-1987. International Workshop*, 191-206. Firenze: Leo S. Olschki.

"It would be fruitful to compare in detail some of the formulations in Twardowski, Husserl, Meinong, Mier, and Kerry, with the original work of Bolzano, a task which cannot be done here. That we cannot rely in all cases on a clear-cut causal relation from reading Bolzano to the adoption of his arguments may not wonder us. To speak about an entire tradition is always a tricky thing, since traditions are not easily to be identified. But if we may use the expression 'tradition' then part of a philosophical tradition is that its main tenets recur in different writings and the same or at least similar methods are applied. The fact, however, that even the philosophers of the Vienna Circle claimed to be part of this tradition has been overlooked for a long time. After all, *logical empiricism* was only one of the labels they accepted. Neurath's preferred name «rational empiricism» is somewhat nearer to what was the significant principle of Austrian philosophy. It was the attempt to base the system of science on an ontology of objects. For both fields the tradition starting with Bolzano provided a good basis to build up a philosophical program.

To investigate how many of the philosophers of this tradition came to similar conceptions under an influence of Bolzanoan ideas *without a wider knowledge of his work* and to *explain*, how at the same time we find a strong impact of this conception in different philosophers will remain a task for further research." (pp. 205-206).

25. Jong, Willem R. de. 2001. "Bernard Bolzano, Analyticity and the Aristotelian Model of Science." *Kant-Studien* no. 91:328-349.

"In this article I intend to make clear that Bolzano's perception and use of the distinction in question [analytic-synthetic] should also be understood in the framework of this model of science. The effect of doing so is to render more comprehensible Bolzano's highly personal and, in its application, upon first acquaintance rather strange characterization of the analytic-synthetic distinction. This characterization can then also be placed more easily in its historical context. [Joëlle] Proust aside, most interpreters have looked somewhat askance at Bolzano's notion of analyticity. And most of them seem not to be able to go on and do much with this apparently anomalous element in Bolzano's thinking. (4)

In § 2 Bolzano is presented as an adherent of the Aristotelian model of science. Section 3 discusses briefly Kant's view of the analytic-synthetic distinction; Bolzano studied it thoroughly. In § 4 his criticism of Kant's notion of analyticity is considered, while in § 5 and § 6 Bolzano's own characterization of this distinction is discussed. Section 7 connects Bolzano's notion of analyticity with his view of derivability or (logical) inference. In the following two sections this theme is further elaborated and developed in the light of the Aristotelian model of science and the notion of scientific demonstration implicit in it. Finally, § 10 presents some conclusions." (pp. 328-329)

(4) Cf. Y. Bar-Hillel, "Bolzano's Definition of Analytic Propositions." *Theoria* 16 (1950), pp. 91-117; p. 100. W. and M. Kneale, *The Development of Logic*, Oxford 1962, p. 367. J. Berg, "Introduction." In: B. Bolzano, *Theory of Science* (ed. by J. Berg; transl. by B. Terrell), Dordrecht 1973, pp. 12-44; p. 18. Coffa, *The Semantic Tradition*, Cambridge, 1991, p. 34.

26. ———. 2010. "The Analytic-Synthetic Distinction and the Classical Model of Science: Kant, Bolzano and Frege." *Synthese* no. 174:237-261.

"This paper concentrates on some aspects of the history of the analytic-synthetic distinction from Kant to Bolzano and Frege. This history evinces considerable continuity but also some important discontinuities. The analytic-synthetic distinction has to be seen in the first place in relation to a science, i.e. an ordered system of cognition. Looking especially to the place and role of logic it will be argued that Kant, Bolzano and Frege each developed the analytic-synthetic distinction within the same conception of scientific rationality, that is, within the Classical Model of Science: scientific knowledge as *cognitio ex principiis*. But as we will see, the way the distinction between analytic and synthetic judgments or propositions functions within this model turns out to differ considerably between them."

27. Kasabova, Anita. 2002. "Is Logic a Theoretical or Practical Discipline? Kant and / or Bolzano." *Archiv für Geschichte der Philosophie* no. 84:319-333.

"Does logic describe something or not? If not, is it a normative or practical discipline? Is there a radical division between the practical or normative level and the theoretical or descriptive level? A discipline is theoretical, we may say, if its main propositions contain descriptive expressions, such as "is" or "have", but no normative expressions, such as "ought", "ought not" or "may". A discipline is normative if its main propositions are of the form "it ought to be". Theoretical propositions express what is, whereas practical propositions express what should be. So a theoretical discipline is descriptive and a normative discipline is prescriptive, but what does a theoretical discipline describe?

According to one view, logic is only theoretical and only describes how things are. Logic as a purely theoretical discipline can then be said to be about mental or linguistic activities, or about non-temporal entities and their non-natural connections, such as entailment or derivability. The practical alternative of this purely theoretical view is that logic is only a practical discipline. Its propositions tell us how we may, should or should not judge and reason. Logic as a normative discipline states norms for human activities. According to another view, logic is primarily a theoretical discipline and its counterpart says that logic is primarily a practical discipline. Yet another view of logic says that it can be conceived as both theoretical and practical." (p. 319).

"Which view of logic does Bolzano take? Whereas Husserl insists on delineating a separate pure logic, Bolzano's Theory of Science combines theoretical and practical logic. Unlike Husserl and contrary to Kant, Bolzano claims that logic as a theory of science, must have both a theoretical and a practical character. Bolzano's wide understanding of logic as a Wissenschaftslehre or doctrine of how to present sciences (WL I, § 1) extends to epistemology and methodology, including didactic and methodological rules for classifying and teaching the sciences. These latter are collections of truths (WL I, § 1) and it is the practical task of a theory of science or logic to direct our acquaintance with these collections of true propositions. Bolzano even claims that logic in this wide sense is essentially a normative discipline, which depends on psychology (WL I, § 11) (21) and that logic proper (22) is a methodology containing laws that regulate our acquisition of knowledge (WL I, § 15.2) (23)." (p. 326).

(21) Cf. also Heinrich Fels, "Die Philosophie Bolzanos", *Philosophisches Jahrbuch der Görres-Gesellschaft*, vol. 40, pp. 319-448, 1927, pp. 319-448).

(22) Bolzano calls the 4th part of the *Theory of Science* "Eigentliche Wissenschaftslehre".

(23) Cf. Heinrich Scholz, *Die Wissenschaftslehre Bolzanos*, Verlag Oeffentliches Leben, Berlin.1937, p.421.

28. ———. 2004. "Colour Sensations and Colour Qualities: Bolzano between Modern and Contemporary Views." *British Journal for the History of Philosophy* no. 12:247-276.

"My aim in this paper is to reconstruct an account of colour sensations and colour qualities, where Bolzano's position serves as a bridge that draws together various philosophical and scientific views from the 17th to the 20th century, from Locke to Jackson."

29. ———. 2006. "Bolzano's Semiotic Method of Explication." *History of Philosophy Quarterly* no. 23:21-40.

"This paper is programmatic: it presents a so-far undiscussed part of Bolzano's *Theory of Science*, namely the *Semiotics*.(1) Bolzano's account of explication is reconstructed to show his contribution to the contemporary discussion."

(1) Bolzano, Bernard (1837), *Wissenschaftslehre (Theory of Science)*, Sulzbach, Seidel, [WL] IV, §§ 637-677; (1833-1841) *Von der mathematischen Lehrart (On the mathematical method)*, in Bernard Bolzano *Gesamtausgabe*, Stuttgart: Fromann-Holzboog, 1969-, Nachlass II, A, 7, [ML] § 9.

30. ———. 2013. "Dubislav and Bolzano." In *The Berlin Group and the Philosophy of Logical Empiricism*, edited by Milkov, Nikolay and Peckhaus, Volker, 205-228. Dordrecht: Springer.

"This chapter deals with Dubislav's reconstruction of Bolzano's Kant criticism and his discussion of analyticity and analytic declarative statements (*Sätze*) which is central to Kant and Bolzano. Dubislav's views are discussed, namely that Bolzano anticipated modern mathematical logic, his examination of Bolzano's propositional functions, as well as the implications of other Bolzanian notions, such as derivability and probability. Bolzano's contributions are reconstructed and situated in the contemporary discussion by Bolzano's commentators. In regard to [Walter] Dubislav's (*Bolzano, Bernard: Wissenschaftslehre* [review in:] *Erkenntnis*, 1:408–409, *Die Definition*, Hamburg: Meiner 1931) account of definition, his interpretation of Bolzano and Bolzano's replies concerning definition are reconstructed and evaluated. Dubislav brought Bolzano to the attention of the Berlin Group. The aim of this chapter is to reconstruct and evaluate their respective contributions to logic and philosophy for the current discussion in this volume."

31. Kluge, Eike Henner. 1980. "Bolzano and Frege: Some Conceptual Parallels." *Grazer Philosophische Studien* no. 10:21-41.

"Bolzano's position on logic and his theory of sentences-in-themselves and their analysis, as well as his position on existence statements and subjective representations show a striking and profound similarity to Frege's theory of thoughts, his analysis of propositions, representations and judgement, as well as his position on the nature of logic in general. Bolzano's theories on these points, therefore, may well have been seminal to the development of Frege's position."

32. Konzelmann, Ziv Anita. 2009. "Naturalized Rationality. A Glance at Bolzano's Philosophy of Mind." *Baltic International Yearbook ofCognition, Logic and Communication* no. 4:1-21.

"Bernard Bolzano's philosophy of mind is closely related to his metaphysical conceptions of substance, adherence and force. Questions as to how the mind is working are treated in terms of efficient (causal) faculties producing simple and complex representations, conclusive and non-conclusive judgments, and meta-representational attitudes such as believing and knowing. My paper outlines the proximity of Bolzano's account of "mental forces" to contemporary accounts of faculty psychology such as Modularity Theory and Simple Heuristics. While the modularist notions of domain specificity and encapsulated mental faculties align with Bolzano's allotment of domain specific tasks to correspondingly specified psychological forces (e.g. judging to "judgmental force", inferring to "inferential force" etc.), the emphasis of Simple Heuristics on accurate "fast and frugal" processes aligns with Bolzano's views regarding cognitive resources and the importance of epistemic economy. The paper attempts to show how Bolzano's metaphysics of mind supposes a conception of bound rationality that determines his epistemology. Combining the rationalist concern for epistemic agent responsibility in the pursuit of knowledge with a strong confidence in the reliability of causal processes to generate the right beliefs, his epistemology shows close affinities with contemporary Virtue Epistemology. According to Virtue Epistemology, knowledge requires that true beliefs be generated by reliable processes typical of a virtuous character. The thesis that Bolzano anticipates virtue epistemological considerations is corroborated by his discussion of heuristic principles that set the norms for the acquisition of knowledge. The paper explores possible relations between such principles and the presumed low-level heuristics of cognitive processes."

33. ———. 2011. "Bolzanian Knowing: Infallibility, Virtue and Foundational Truth." *Synthese* no. 183:27-45.

"The paper discusses Bernard Bolzano's epistemological approach to believing and knowing with regard to the epistemic requirements of an axiomatic model of science. It relates Bolzano's notions of believing, knowing and evaluation to his notions of infallibility, immediacy and foundational truth. If axiomatic systems require their foundational truths to be infallibly known, this knowledge involves both evaluation of the infallibility of the asserted truth and evaluation of its being foundational. The twofold attempt to examine one's assertions and to do so by searching for the objective grounds of the truths asserted lies at the heart of Bolzano's notion of knowledge. However, the explanatory task of searching for grounds requires methods that cannot warrant infallibility. Hence, its constitutive role in a conception of knowledge seems to imply the fallibility of such knowledge. I argue that the explanatory task contained in Bolzanian knowing involves a high degree of epistemic virtues, and that it is only through some salient virtue that the credit of infallibility can distinguish Bolzanian knowing from a high degree of Bolzanian believing."

34. Krämer, Stephan. 2011. "Bolzano on the Intransparency of Content." *Grazer Philosophische Studien* no. 82:189-208.

"Content, according to Bolzano, is intransparent: our knowledge of certain essential features of the contents of our contentful mental acts (such as their identity and composition) is often severely limited. In this paper, I identify various intransparency theses Bolzano is committed to, and present and evaluate the defence he offers for his view. I argue that while his intransparency theses may be correct, his defence is unsuccessful. Moreover, I argue that improving on his defence would require substantial modifications to his general epistemology of content."

35. Krause, Andrej. 2006. "Are Bolzano's Substances Simple?" *American Catholic Philosophical Quarterly* no. 80:543-562.

"This article analyzes one aspect of Bolzano's metaphysics. It discusses the question of whether, according to Bolzano, substances are simple or not. In the opinion of some commentators, he accepts composed substances, that is, substances having substances as proper parts. However, it is easily possible to misinterpret his position. This paper first tries to reconstruct Bolzano's definitions of the concept of substance and suggests that he should be able to agree with the following final definition: *x* is a substance if and only if *x* is real and not a property. After this, it is shown that, according to Bolzano, every substance is simple in a fourfold sense: No substance has (1) adherences as parts, (2) substances as proper parts, (3) spatially extended parts, and (4) temporal parts."

36. Künne, Wolfgang. 1997. "Propositions in Bolzano and Frege." *Grazer Philosophische Studien* no. 53:203-240.

Reprint in W. Künne, *Versuche über Bolzano / Essays on Bolzano*, pp. 157-195 and in Michael Beaney and Erich H. Reck (eds.), *Gottlob Frege. Critical Assessments of Leading Philosophers. Vol. I: Frege's Philosophy in Context*, New York: Routledge, 2005, pp. 124-153.

"In the Preface to his book *Frege and Other Philosophers* [New York: Oxford University Press, 1996] Michael Dummett says: "The only nineteenth-century philosopher of whom it would be reasonable to guess, just from the content of his writings and those of Frege, that he had influenced Frege, is Bernhard Bolzano, who died in the year Frege was born; but there is no evidence whatever that Frege ever read Bolzano".(1) Apart from one grave mistake this seems to me to be exactly right. Did you notice the "grave" mistake? Bolzano's first name is spelled with an "h" and thereby deprived of its Italian flavour.(2)

To be sure, there were two mathematically minded philosophers and one philosophically minded mathematician who emphatically appealed to Bolzano in the course of their discussions with Frege. So he was made aware of the fact that Bolzano's work was potentially relevant for his own concerns. But Husserl, Kerry and Korselt were critical of Frege, and Frege in turn was very critical of them. Perhaps that's why he never bothered to read an author they praised, — who knows... (3)

There are many respects in which a comparison between Bolzano and Frege could be philosophically fruitful. But what is most striking for everyone who reads both Frege's *Logische Untersuchungen* and Bolzano's *Wissenschaftslehre* is the close similarity between what Frege calls *Gedanken* and what Bolzano calls *Sätze an sich*. In the literature this resemblance is frequently mentioned, but I have never seen a detailed investigation into this topic.(4) In this paper I shall recall some of the well-known respects, and point out some less well-known respects, in which F(rege)-Propositions and B(olzano)-Propositions (as I shall call them) resemble each other. But I am at least as keen to underline some philosophically important differences beneath those similarities."

(1) Dummett, vii. The same claim is to be found in Dummett *Ursprünge der analytischen Philosophie*, Frankfurt /M., 1988, 34; *Origins of Analytical Philosophy*, Cambridge/MA, 1993, 24, and *Frege. Philosophy of Mathematics*, London, 1991, 47. I cannot take seriously E.-H. Kluge's contention that there was "a de facto, perhaps even unconscious influence that manifested itself in a similarity of conceptual approach and a parallelism of positions defended" (Kluge "Bolzano and Frege: Some Conceptual Parallels, in: *Grazer Philosophische Studien* 10 (1980), pp. 21-42, 21 ff.). Several extremely careless translations from the *Wissenschaftslehre* in Kluge's article seem to be symptomatic of a rather superficial acquaintance with Bolzano's work. I also disagree with much of his interpretation of Frege.

(2) Bernard(o)'s father was born at the Lago di Como. By the way, the misspelling is endemic. In Vienna it marred even the attempt to name a street after Bolzano.

(3) Cp. Künne "Die Ernte wird erscheinen...! Die Geschichte der Bolzano-Rezeption (1849-1939)", pp. 9-82, esp. 31-50; revised version in this volume: 326-359.

(4) Of course, in Dummett *Ursprünge.../ Origins...* ch. 4, it is also duly registered, but the focus is rather on Frege.

37. ———. 2001. "Constituents of Concepts: Bolzano Vs. Frege." In *Building on Frege. New Essays on Sense, Content, and Concept*, edited by Newen, Albert, Nortmann, Ulrich and Stuhlmann-Laeisz, Rainer, 267-285. Stanford: CLSI Publications.

Reprinted in: W. Künne, *Versuche über Bolzano / Essays on Bolzano*, Sankt Augustin: Academia Verlag, 2008, pp. 211-232.

"In section 1 of this paper I shall point out that in one respect the grandfather of analytical philosophy was more conservative than its great-grandfather: Frege at least partially endorsed the Canon of Reciprocity which was a prominent ingredient of the post-Cartesian logical tradition, Bolzano rejected it completely. In section 2 I shall try to defend one part of this bipartite principle. In section 3 I shall try to show that this line of defence is open to Frege. This claim is based on a reconsideration of Frege's notion of the marks (*Merkmale*) of a concept, — a notion which is generally treated rather cavalierly in the literature on Frege. In section 4 I shall present a problem that Bolzano and Frege share because they both

think of complex senses in part-whole terms. Finally, in part 5, I shall briefly celebrate what I deem to be Bolzano's victorious attack on the other part of the Canon of Reciprocity (CR)." (p. 211)

(...)

Here is Kant's formulation of CR: (4)

(CR) Content and extension of a concept stand in an inverse relation. The more objects fall under a concept, the fewer conceptual components are contained within the concept, and vice versa.

Bolzano attacks CR in § 120 of his monumental *Wissenschaftslehre* (1837; henceforth 'WL' for short).

(5)

(4) 'Inhalt und Umfang eines Begriffs stehen gegen einander in umgekehrtem Verhältnisse. Je mehr nämlich ein Begriffunter sich enthält, desto weniger enthält er in sich und umgekehrt' (Kant (10), 148).

Bolzano's contention in WL I 294, 570, repeated by many authors, that (CR) is to be found already in the Logic of Port Royal (Arnauld/Nicole) is not tenable (Schmauks 14f.). An early (if not the earliest) formulation of (CR) is given in Wolff (1), 138.

(5) Bolzano quotes (CR) in WL I 292.

[Another definition of CR: "Every concept, as partial concept, is contained in the representation of things; as ground of cognition, i.e., as mark, these things are contained under it. In the former respect every concept has a content, in the other an extension.

The content and extension of a concept stand in inverse relation to one another. The more a concept contains under itself, namely, the less it contains in itself, and conversely.

Note. The universality or universal validity of a concept does not rest on the fact that the concept is a partial concept, but rather on the fact that it is a ground of cognition." (I. Kant, *The Jäsche Logic*, § 7, *Content and extension of concepts*, in: *Lecture on Logic*, Cambridge: Cambridge University Press, 1992, p. 96]

38. ———. 2003. "Bernard Bolzano's *Wissenschaftslehre* and Polish Analytical Philosophy between 1894 and 1935." In *Philosophy and Logic. In Search of the Polish Tradition. Essays in Honour of Jan Wolenski on the Occasion of His 60th Birthday*, edited by Kijania-Placek, Katarzyna, 179-192. Dordrecht: Kluwer.
39. ———. 2003. "Are Questions Propositions?" *Revue Internationale de Philosophie* no. 57:157-168.

Reprinted in: W. Künne, *Versuche über Bolzano / Essays on Bolzano*, Sankt Augustin, Academia Verlag, 2008, pp. 197-210.

"In the Prolegomena to his *Logische Untersuchungen* (LU) Edmund Husserl praised the first two volumes of Bernard Bolzano's *Wissenschaftslehre* (WL) as 'far surpassing everything else world literature has to offer as systematic exposition of logic'. Eleven years later the key is a bit lower: These volumes, he now says, occupy 'the highest rank in the logical world literature of the 19th century'.(2) To the best of my knowledge, the most extensive and most thorough discussion of a single contention in Bolzano's philosophy of logic that can be found in any of Husserl's books and articles published during his lifetime is contained in the last chapter of his LU.(3) The topic of this discussion is a courageous if not outrageous Bolzanian contention which, at least on the face of it, flatly contradicts what most philosophers since Aristotle took for granted. *Questions*, Bolzano claims, *are a special kind of propositions and hence truth-evaluable*. Let me call this Bolzano's *Tenet*.

In my little exercise I shall reconstruct and evaluate both Bolzano's *Tenet* and Husserl's criticism thereof. I shall argue that the latter is largely correct, but that in the end Husserl and Bolzano are both wrong.

Somebody else got it right: a philosopher and mathematician for whom one would also claim a very high rank indeed in the logical world literature of the 19th, and of any, century. But this is to anticipate.

What exactly is it that Bolzano maintains when he says that questions are a kind of propositions? By 'proposition (Satz an sich)' he means something that is neither mental nor linguistic. Propositions are thinkables and sayables which can be singled out by that-clauses. Such thinkables and sayables are truth-evaluable, hence, assuming bivalence as Bolzano does, they are either true or false. If Bolzano's *Tenet* is to make any sense at all, by 'questions' he cannot mean anything mental or linguistic. Now the term 'question' is multiply ambiguous, and for our inquiry it is most important not to get entangled in this ambiguity. We must distinguish

Questions1 mental acts of asking oneself a question,

Questions2 illocutionary acts of asking a question,

Questions3: interrogative sentences, and

Questions4: askables.

Wonderings, i. e. sense-1-questions, are voiced by sense-2-questions. Husserl occasionally labels the former 'innerliche Fragen' and the latter 'Anfragen'. The second term (which in ordinary German has a far narrower application) is meant to register the fact that sense-2-questions are essentially addressed to someone. Sense-3-questions are linguistic vehicles of sense-2-questions; unsurprisingly Husserl calls them 'Fragensätze'. Sense-4-questions, finally, are possible contents of sense-1- and of sense-2-questions, and sometimes they coincide with the conventional linguistic meaning of sense-3-questions. (They do so

only if the latter are free of context-sensitive elements.) In Husserl's language, an askable is a 'Frageinhalt', and he identifies it with the 'Bedeutung' (meaning) des *Fragesatzes*'. (4) Askables are those thinkables and sayables which can be singled out by indirect sense-3-questions (for example, by the clauses in 'He asked whether the conference had started' or 'She asks when the conference will end'). So let us reformulate Bolzano's Tenet: *Askables are a proper sub-set of propositions.*" (pp. 197-198). (...)

"At the point we have now reached we can recognize that the following stance has a chance of being coherent: conceding that English yes/no interrogatives are not true or false (sc. in English) any more than any other interrogatives are, while maintaining that yes/no interrogatives, in contradistinction to search interrogatives, express propositions which are true or false (*simpliciter*). This is coherent if we take yes/no interrogatives to be an exception to the right-to-left half of a bridge-principle that is unexceptionable as regards *declarative* sentences: Sentence S is true in language L at context c if and only if what is expressed by S in L at c is true. This move would mitigate the tension between Aristotle's and Bolzano's views about questions, which Husserl emphasized at the outset of his discussion of Bolzano's Tenet." (pp. 209-210).

(2) Husserl (3), I 225; letter to Friedjung, in Husserl (14), VII 97.

(3) In 1920 Husserl emphasized that he had refrained from modifying the text of the 1st edition only because in the meantime his views had changed too drastically (preface to the 2nd edition of Husserl(3), II/2 vii). I shall concentrate exclusively on his 1901 position, more precisely: on those aspects of that position which are relevant for an evaluation of Bolzano's thesis about questions. (Page references are always to the 2nd edition.)

(4) Husserl(3), II/2 211-212.

40. ———. 2006. "Analyticity and Logical Truth: From Bolzano to Quine." In *The Austrian Contribution to Analytic Philosophy*, edited by Textor, Mark, 184-249. New York: Routledge.

Reprinted in: W. Kühne, *Versuche über Bolzano / Essays on Bolzano*, Sankt Augustin, Academia Verlag, 2008, pp. 233-303.

Table of contents: 1. Truth-value bearers and the concept of truth 233; 2. Degree of validity - rediscovered by Lukasiewicz 238; 3. Analyticity (in the broader sense) 246; 4. Logical analyticity 252; 5. Merely apparent analyticity and hidden analyticity 270; 6. Contrasts (Locke, Kant, Frege, and Logical Empiricism) 274; 7. W. V. Quine on logical truth, Ajdukiewicz and Bolzano 290-303.

41. ———. 2007. "Some Varieties of Deception." In *Explaining the Mental. Naturalist and Non-Naturalist Approaches to Mental Acts and Processes*, edited by Penco, Carlo, Beaney, Michael and Vignolo, Massimiliano, 106-122. Cambridge: Cambridge Scholars Publishing.

"Wolfgang Kühne presents here a detailed analysis of the semantic field of deception, drawing on the accounts offered by Bernard Bolzano and Gottlob Frege. He starts with Bolzano's definition of deception, which he formulates as follows:

(D) x deceives y in regard to P if and only if

(1) x brings it about, by acting as he does, that y acquires, or retains, the belief in P; &

(2) P is false.

He notes that this allows for unintentional deception, and modifies (D) to define intentional deception. He comments on the related concept of misleading someone, and defines both concept of cheating, as a special kind of deceiving, and the trickier concept of intentional self-deception.

In the second and third sections of his paper, Kühne turns to the concept of trying to deceive. He first characterizes the general notion, before defining, in turn, simulating, acting hypocritically, and lying. He compares Bolzano's view of lying with Frege's, which does not treat lying as a form of deception. Kühne criticizes Frege's simpler view, arguing that a liar's "intentional profile" involves both "thematic" and "expressive" deceptive intentions. But he also criticizes Bolzano's view, and offers his own definition, combining and improving on both Frege's and Bolzano's.

During the course of his paper, Kühne discusses a range of examples, both his own and ones drawn from philosophical discussions and works of literature. The paper as a whole illustrates very well just how subtle and complex are the interrelationships between the various concepts that are invoked in analyzing what might initially seem to be fairly straightforward mental acts such as those of deception. "

42. ———. 2009. "Bolzano and (Early) Husserl on Intentionality." In *Acts of Knowledge: History, Philosophy and Logic, Essays Dedicated to Göran Sundholm*, edited by Primiero, Giuseppe and Rahman, Shahid, 95-140. London: College Publications.

43. Lapointe, Sandra. 2002. "Bolzano's Hidden Theory of Universal Quantification." In *Logica Yearbook 2001*, edited by Childer, Timothy and Ondrej, Majer, 37-48. Prague: Filosofia. Publishing House of Prague Institut of Philosophy.
44. ———. 2004. "Why Frege Never Read Bolzano." In *Logica Yearbook 2003*, edited by Behounek, Libor, 183-194. Prague: Filosofia. Publishing House of Prague Institute of Philosophy.
45. ———. 2006. "Bolzano on Grounding or Why Is Logic Synthetic." In *The Logica Yearbook 2005*, 113-126. Prague: Filosofia.
46. ———. 2007. "Bolzano Semantics and His Critique of the Decompositional Conception of Analysis." In *The Analytic Turn*, edited by Beaney, Michael, 219-234. London: Routledge.

"When asked to explain what conceptual analysis is, philosophers often resort to the idea of decomposition: to analyse an expression or a concept is to break it down into its (simpler) components. Although the notion of decomposition is a convenient figure of speech, without qualifications it can hardly be said to provide an informative description of what is involved in conceptual analysis. It could be argued, however, that this was not always the case. In Kant's theory, for instance, the conception of analysis is literally decompositional: notions such as *Zergliederung*, *Auflösung*, *Inhalt* and *enthalten sein* are meant to provide a relatively straightforward description of the mereological conception of the formal features of and relations between concepts he had inherited from his predecessors, contrary to what influential interpretations such as Quine (1953: 21) suggest.⁽²⁾ In what follows, I'll use the expression 'decompositional conception of analysis' to refer to the conception of analysis that underlies Kantian semantics and, most notoriously, the Kantian definition of analyticity. My concern, though, is not primarily with Kant nor with analyticity but with Bernard Bolzano's conception of analysis. A superficial reading of Bolzano's *Theory of Science - Wissenschaftslehre* (Bolzano 1837; hereafter *WL*) - could lead one to think that Bolzano also subscribed to the decompositional conception of analysis. Yet, while Bolzano sanctions Kant's account in his earlier work (cf. Bolzano 1810: §5; 1812: §30) he came explicitly to reject it. Contrary to what is often assumed, Bolzano's understanding of what it means for a concept to be 'included' in another concept or for a given concept to have a particular content is radically different from Kant's and from that of Bolzano's other immediate predecessors. In fact, Bolzano anticipated some of the most important developments of twentieth-century semantics.⁽³⁾

I begin the paper with a brief sketch of the decompositional conception of analysis in section 1, and then in section 2 I present Bolzano's criticism of this conception. In section 3, I explain the main lines of Bolzano's reductive programme of analysis. Section 3, I hope, will go some way towards establishing the continued interest of Bolzano's semantic analyses. One of the main consequences of Bolzano's rejection of the decompositional conception of analysis is the need to find a new way to define semantic notions such as analyticity or validity. For that purpose, Bolzano developed a new and ingenious substitutional method. I sketch this method in section 4. I conclude by pointing out some important aspects of Bolzano's historical impact." (pp. 219-220)

(2) I deal in more length with this question in Lapointe *Qu'est-ce que l'analyse?*, Paris, Vrin, 2008.

(3) Superficial knowledge of medieval semantics suffices to convince that similarities are not scarce but this, unfortunately, remains to be studied.

47. ———. 2009. "A Priori Knowledge and Bolzano's Classical Model of Science." *Synthese* no. 173:263-281.
48. ———. 2010. "Bolzano *a Priori* Knowledge, and the Classical Model of Science." *Synthese* no. 174:263-281.

"This paper is aimed at understanding one central aspect of Bolzano's views on deductive knowledge: what it means for a proposition and for a term to be known *a priori*. I argue that, for Bolzano, a *priori* knowledge is knowledge by virtue of meaning and that Bolzano has substantial views about meaning and what it is to know the latter. In particular, Bolzano believes that meaning is determined by implicit definition, i.e. the fundamental propositions in a deductive system. I go into some detail in presenting and discussing Bolzano's views on grounding, *a priori* knowledge and implicit definition. I explain why other aspects of Bolzano's theory and, in particular, his peculiar understanding of analyticity and the related notion of *Ableitbarkeit* might, as it has invariably in the past, mislead one to believe that Bolzano lacks a significant account of *a priori* knowledge. Throughout the paper, I point out to the ways in which, in this respect, Bolzano's antagonistic relationship to Kant directly shaped his own views."

49. ———. 2011. *Bolzano's Theoretical Philosophy. An Introduction*. New York: Palgrave Macmillan.

Contents: Michael Beaney: Foreword VIII; Acknowledgements XI; Introduction 1; 1. Kant and German Philosophy 11; 2. Decomposition 18; 3. Meaning and Analysis 29; 4. A Substitutional Theory 43; 5. Analyticity 59; 6. *Ableitbarkeit* and *Abfolge* 72; 7. Justification and Proof 91; 8. *A priori* Knowledge 102; 9. Things, Collections and Numbers 116; 10. Frege, Meaning and Communication 128; 11. Husserl, Logical Psychologism and the Theory of Knowledge 139; Notes 158; Bibliography 170; Index 180-183. "Bernard Bolzano (1781-1848) occupies a unique place in the history of modern philosophy. Born in the year in which Kant's *Critique of Pure Reason* was published and dying in the year in which Frege was born, his philosophy - like his life - can be seen as offering a bridge between Kant's seminal work and the birth of analytic philosophy. In Bolzano's writings, one finds many of the characteristic themes of analytic philosophy anticipated. Like Frege and Russell after him, Bolzano was dissatisfied with Kant's account of mathematics and realised that a better conception of logic was required to do justice to mathematics. Bolzano's conception of logic was not Frege's or Russell's, but he did criticise traditional subject-predicate analysis, suggested that there was a fundamental form underlying all types of proposition and was insistent on the need to keep psychology out of logic. Like Frege, Bolzano construed existential statements as being concerned with the non-emptiness of appropriate 'ideas' (*Vorstellungen an sich* in Bolzano's terms) or 'concepts' (*Begriffe* in Frege's terms), and his conception of 'propositions' (*Sätze an sich*) is similar in many respects to Frege's conception of 'thoughts' (*Gedanken*). Like Frege, too, Bolzano emphasised that there is a class of entities, including both 'ideas'/'concepts' and 'propositions'/'thoughts', which are objective but not actual (*wirklich*), in the sense of not existing in the spatio-temporal realm.

Despite these similarities, however, Bolzano had no direct influence on any of the acknowledged founders of analytic philosophy. He had an influence on other German-speaking philosophers such as Franz Brentano, Benno Kerry, Edmund Husserl, Alwin Korselt and Kazimierz Twardowski, who themselves had an influence on the early analytic philosophers, both through correspondence and in their own publications (even if, often, mainly as a target of criticism). Through Twardowski, the founder of the Lvov-Warsaw school, he also had an influence on a whole generation of Polish logicians and philosophers, including Jan Lukasiewicz, Stanislaw Lesniewski and Alfred Tarski, who played an important role in the development of analytic philosophy. So a full account of the history of analytic philosophy must certainly pay attention to Bolzano's work. His significance, however, lies not just in these patterns of influence. The similarities and differences between his views and those of Frege, in particular, reveal much about the nature of analytic philosophy: the conceptions of analysis and logical form involved, for example, and key debates such as those about analyticity and other modal notions. These influences and connections are explored and elucidated by Sandra Lapointe in this book.

At the heart of Bolzano's logic - logic being understood in the traditional broad sense as including both methodology and theory of science (hence the title of Bolzano's major work, the *Wissenschaftslehre*) - lies his critique of Kant. As Lapointe explains in the first three chapters, Bolzano criticises Kant's theory of intuition and his decompositional conception of analysis. In doing so, Bolzano develops his own positive doctrines, concerning analyticity and logical consequence, in particular, based on a method of substitution, as Lapointe elaborates in Chapters 4-6. In the remaining chapters, further clarifying his semantic theory, she discusses his epistemological and ontological views and his connection with Frege and Husserl." (from the Foreword by Michael Beaney).

50. ———. 2014. "Bolzano, Quine and Logical Truth." In *A Companion to W.V.O. Quine*, edited by Harman, Gilbert and Lepore, Ernie, 296-312. Malden: Wiley Blackwell.

In this paper, I compare Quine's discussion of logical truth to Bolzano's theory of "logical analyticity". It is by now a received view that Bolzano largely anticipated Quine's views on logical truth, a conclusion Quine himself was retroactively prompted to draw:

"[M]y much cited definition of logical truth was meant only as an improved exposition of a long-current idea. So I was not taken aback at Bar-Hillel's finding the idea in Bolzano [...]" (Quine 1960, 65; see also 1966b, 110)."

According to the standard interpretation, the similarity between Bolzano and Quine comes from the fact that they are both "demarkating logic [...] with the help of a set of logical particles which are held constant, while the other non-logical expressions are freely substituted for each other".³ This interpretation assumes that Bolzano and Quine share at least some substantial views about what makes a term a "logical" term. I think that this interpretation is largely mistaken. My paper has four parts. In the first part, I give some background to Bolzano's theory, focusing on his views on syntax and form. In the second part, I show why it is mistaken to assume that Bolzano and Quine mean the same when they speak of logical concepts/words. In the third part of the paper I discuss Bolzano's views on logical truth and sentences that can be turned into logical truth by putting synonyms for synonyms. I conclude by asking whether Bolzano's position allows him to fulfil the epistemic requirement (and answer, with a twist, in the

affirmative)." (p.297).

51. Lukaszewicz, Dariusz. 2007. "Logical and Metaphysical Assumptions of Bernard Bolzano's Theodicy." *Forum Philosophicum: International Journal for Philosophy* no. 12:33-56.

"Bolzano's theodicy is a very good example of Platonism in the philosophy of religion. Above all, Bolzano believes that there obtains an ideal realm of truths in themselves and mathematical objects, which are independent of God. Therefore, we are allowed to conclude that God is only a contractor; true, more powerful than Plato's demiurge because He created substances (and matter) and sustains them in existence, but God must follow a project which is independent of Him. Since the world is determined, by the program and God follows the program, then in fact the program is a god, or better, there is no God (at least in the sense of the classical Christian tradition). Bolzano's project is not related to God's essence, since it is external to God, and is not made by God. Thus, Bolzano's theodicy is also the absolute opposite of the Cartesian theodicy. God in the Cartesian theodicy can change all rules, all scientific laws and, in consequence, He can create any world He wants. Bolzano's God cannot change anything and cannot create a different world than the world determined by the project, a world different than the one He has created. The responsibility of Bolzano's God for the evil in the world is limited by the project of the world."

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