Notes on Books

Johann van Benthem, Gerhardt Heinzmann, Manuel Rebuschi, Henk Visser (Eds.), *The Age of Alternative Logics. Assessing Philosophy of Logic and Mathematics Today*. Dordrecht: Springer 2008, VII + 348 pp. ISBN-10 1-420-5011(HB), ISBN-13 978-1-4020-5011-4 (HB),
ISBN-10 1-420-5012-7(e-book), ISBN-13 978-1-4020-5012-7 (e-book). Series: Logic, Epistemology, and the Unity of Science, Volume 3.

The title of this collection is not very accurate. The reason is that the label "The Age of Alternative Logics" has at least two meanings. After the works of Brouwer, Lewis, Łukasiewicz and Post about intuitionistic, modal and many-valued logic appeared, an alternative logic was understood as a rival of classical logic as codified by Frege and Russell, and as something invented in order to replace the classical logical idiom; note, however, that Lewis' modal systems are presently considered to be extensions of classical logic, not its rivals. The present understanding of alternative logics is wider. The phrase covers not only classically rival systems, but also various formal schemes to be used in different fields, such as mathematics, computer science, and physics, schemes which are extensions or modifications of logical orthodoxy. Thus, the title *The Age of Pluralism in Logic. Assessing Philosophy of Logic and Mathematics Today* would seem more appropriate. In fact, the papers collected in this book deal with alternativeness in logic in both the senses distinguished here.

The reviewed collection consists of the following parts: I. Proof, Knowledge and Computation; II. Truth-Values beyond Bivalence (this is the only part devoted to alternative logics in the classical understanding); III. Category-Theoretic Structures; IV. Independence, Evaluation Games and Imperfect Information; V. Dialogue and Pragmatics; moreover, we have Johann van Benthem's introduction and Roger Pouivet's appendix ("Louis Joly as a Platonic Painter?"). Van Benthem summarizes the content of all papers. He also points out that the adjectives "alternative" or "non-classical" should not be considered as referring to mass production

and "everything goes" in logic. Van Benthem explains that the conference "Philosophical Insights into Logic and Mathematics" held in Nancy in 2002, which provided the materials for this book, had, speaking metaphorically, "development [which] transforms rigid classical partitions into an open playground for improvisation" as its aim. Speaking more literally, the task of particular authors consisted in showing various logical or formal devices successfully applied in various fields in which logic, widely conceived, could be useful. Pouivet's appendix offers an interpretation of the work of Louis Joly, a contemporary French painter, who was influenced by mathematics. According to Pouivet, Joly should be interpreted nominalistically rather than in the Platonic manner. This paper is an interesting application of philosophy of mathematics to the world of art.

The papers in particular sections are as follows: Part I. Mikäel Cozic, "Epistemic Models, Logical Monotony and Substructural Logics"; Jaroslav Peregrin, "Semantics as Based on Inference"; Stewart Shapiro, "Effectiveness", Joseph Vidal-Rosset, "Does Gödel's Incompleteness Theorem Prove that Truth Transcends Truth?"; Henk Visser, "Transpositions"; Part II. Jean-Yves Béziau, "Many-Valued Logic and Kripke Semantics"; Newton C. A. da Costa, Décio Krause, "The Logic of Complementarity"; Thierry Libert, "Semantics for Naïve Set Theory"; Part III. Category-Theoretic Structures. Steve Avodey, "Continuity and Logical Completeness: An Application of Sheaf Theory and Topoi"; Geoffrey Hellman, "What is Categorical Structuralism?"; Elaine Landry, "Category Theory as a Framework for an in re Interpretation of Mathematical Structuralism"; Jean-Pierre Marquis, "Categories, Sets and the Nature of Mathematical Entities"; Part IV. Independence, Evaluation Games and Imperfect Information. Jaakko Hintikka, "Truth, Negation and Other Basic Notions of Logic"; Theo M. V. Janssen, Francien Dechesne, "Signalling in IF Games: A Tricky Business"; Ahti-Veikko Pietarinen, "Independence-Friendly Logic and Games of Incomplete Information"; Manuel Rebuschi, "IF and Epistemic Action Logic"; Part V. Dialogue and Pragmatics. Gerhard Heizmann, "Naturalizing Dialogic Pragmatics"; Kuno Lorenz, "Logic as a Tool of Science versus Logic as a Scientific Subject"; Shahid Rahman, "Non-Normal Dialogics for a Wonderful World and More".

Perhaps the titles of the papers by Visser and Rahman require some explanation. Transpositions are the passing from one kind of object (for example, geometrical) to another kind (for example, arithmetical) in order to find a solution. According to Visser, the concept of transpositions enables us to see more clearly the nature of mathematical practice. Rahman presents a model-theoretic approach to derivation in non-normal modal logic and uses it in analyzing dialogues (in the sense of dialogical

logic). Although the titles of the remaining papers do indicate their content, some additional information is in order. Cozic discusses the problem of logical omniscience in epistemic logic and tries to solve the puzzle (the question of closing the set of known propositions by consequence operation) by employing substructural logic with an intuitionistic base. Peregrin defends the view that inference rules generate semantics for logical operations. Shapiro, on the basis of the fate of Hilbert's program, argues for the intensionalistic reading of the Church thesis. Vidal-Rosset distinguishes two sound (stable), in his opinion, accounts of Gödel's incompleteness theorems, namely, Platonistic and deflationist. Béziau defends the many-valued approach to intensionality as a rival to the possible-world semantics. Da Costa and Krause apply paraconsistency to the idea of complementarity in physics. The papers by Awodey, Hellman, Landry and Marquis discuss category theory as a foundational scheme of mathematics. Awodey and Marquis argue that speaking about categories does not presuppose the concept of set, formally as well as informally. Hellman's paper is fairly programmatic and investigates how structuralism in mathematics can profit from categorial ideas. Landry interprets universals in re via categories. The papers in Part IV deal with the so-called independence-friendly logic (IF logic) proposed by Hintikka. According to him, the traditional account of first-order logic does not distinguish between dependent and independent actions of quantifiers. Dispensing with this defect generates a new logic, an independence-friendly logic, which is still first-order, but its expressive power is greater than that of the orthodox system. Hintikka's own paper gives an overview of the relevant ideas. Janssen and Dechesne take a critical stance toward Hintikka's ideas and argue that IF-logic is not conservative over the classical first-order system. On the other hand, Pietarinen and Rebuschi use IF-logic in concrete investigations. Heinzmann looks for influences of pragmatics on logic and philosophy of mathematics. He conjectures that new logical tools, such as IF-logic or structuralism, can lead to essential progress. Lorenz employs dialogical logic (in the Erlangen version) for showing how representation and understanding interact. In general, all the papers nicely combine historical and systematic insights into their subjects. This collection is very valuable for anybody interested in logic and the foundations of mathematics.

I would like to make some critical comments on two of the papers, namely those of Peregrin and Vidal-Rosset. Doubtless, one can explain the semantics of logical constants by reference to inference rules. On the other hand, I think that this strategy has a limitation. Assume that we have a logic L generated by a set R of inference rules. Clearly, "and", "or", etc. can be semantically explained by their inferential roles. So far, so good. However, any formal presentation of logic is given in a more or less

informal metalanguage. I see no possibility of dispensing with meanings of words used in the metalanguage. Moreover, the completeness theorem, which establishes the parity between syntax and semantics is, beyond propositional calculus, provable by non-constructive devices. This argument can be tied together with the suggestions made by Heinzmann and Lorenz that we cannot ignore pragmatics. Even if one says that the parity of syntax and semantics makes the inferential approach to the latter plausible, the priority of pragmatics via metalanguage is obvious. To some extent I can accept the diagnosis of Vidal-Rosset that Platonism and deflationism are the only stable interpretations of the incompleteness theorem. However, there is a hidden assumption there, namely, that truth is not defined. Take Gödel's view, for example. He maintained that the (transcendental) concept of truth is responsible for the incompleteness phenomena. It is plausible to interpret him as someone who did not define truth because of its transcendental character overcoming formal tools. In other words, truth is not defined because it is transcendental and thereby not subject to mathematical treatment. Clearly, this is Platonism. The deflationists do not define truth, because, according to them, we can work without this concept in logic and everywhere else. All theoretical needs in semantics are fulfilled by ideas related to the concept of proof. Well, but how will deflationism deal with the statement that arithmetical truth is not definable (Tarski's theorem)? It seems that Tarski introduced a new perspective: we can define truth in every case, but it is not definable in some cases (for example, for arithmetic in arithmetic itself). Now, since Tarski's definition is not reducible to syntax, we can say, independently of Platonism and deflationism, that truth transcends proof.

Moritz Schlick, *Über die Reflexionen des Lichtes in einer inhomogenen Schicht. Raum und Zeit in der gegenwätrigen Physik.* Herausgegeben und eingeleitet von Fynn Ole Engler, Matthias Neuber, Kritische Gesamtaussage, Abteilung I (Veröffentlichte Schriften), Band 2 Herausgegeben von Friedrich Stadler und Hans Jürgen Wendel, Wien, New York: Springer 2006, ISBN-10 3-211-29785-5, ISBN-13 978-3-211-29785-8.
Moritz Schlick, *Lebensweisheit. Versuch einer Glückseligkeitslehre. Fragen der Ethik.* Herausgegeben und eingeleitet von Matthias Iven, Kritische Gesamtaussage, Abteilung I (Veröffentlichte Schriften), Band 3 Herausgegeben von Friedrich Stadler und Hans Jürgen Wendel, Wien, New York: Springer 2006, ISBN-10 3-211-29789-8 ISBN-13 978-3-211-29789-6.

The Vienna Circle, as well as its particular representatives, has recently become the subject of very intensive historical investigations. The Institute of the Vienna Circle and Friedrich Stadler play the main role in this enterprise. The critical edition of all published writings of Moritz Schlick, his scientific Nachlass and correspondence should be considered a very important event for the study of logical empiricism. The choice of Schlick is not accidental. First of all, he was the founding father of the Vienna Circle. Secondly, his philosophical ideas seem to deserve much more attention than it was previously admitted. His scientific career represents the rise and development of logical empiricism. Moreover, Schlick's tragic death in 1936 is a memento of the dangers that emerge when political madmen step into academic life.

Schlick's *Gesamtausgabe* is divided into four divisions. The first (6 volumes) covers all of his published works. The second division will include unpublished works. Schlick's correspondence is planned to be included in the third division. Finally, a volume with documents for Schlick's biography and registers is being prepared as the fourth part. The whole enterprise reveals much attention to detail. Particular volumes compare all published books or papers and indicate changes, also in the bibliographies. Every volume is equipped with the overall plan of the *Gesamtausgabe*, a glossary (related to the given volume), an explanation of the principles used to prepare the text, several bibliographies, including Schlick's bibliography, items quoted by him (in works printed in the given volume) and works cited by the editors, as well as indexes. However, it is unclear whether all translations of Schlick into foreign languages and the full bibliography about him will also be included; perhaps it is planned for the last division. For example, some of Schlick's books and papers have been translated into Polish. Similarly, we have some material about Schlick in Polish. Independently of this remark, Schlick's *Gesamtausgabe* is very impressive from the point of view of editorial art.

The whole enterprise started off with the publication of volumes 2 and 3 of the first division; volume 1 (*Allgemeine Erkenntnislehre*) will be available in November 2008. The second volume consists of Schlick's two books about physics. The first (*Über die Reflexionen des Lichtes in einer inhomogenen Schicht*) is Schlick's PhD dissertation, prepared under the supervision of Max Planck and published in 1904. This is a very technical work belonging to "hard" theoretical physics, which shows Schlick's very high competence in exact science. The second part of volume 2 is filled by Schlick's very successful contribution concerning space and time in contemporary physics. This work appeared for the first time in 1917 and had three further editions until 1922, each of them expanded and improved; the English translation was published by Oxford University Press in 1920. In contrast to Schlick's PhD dissertation, *Raum und Zeit in*

der gegenwärtigen Physik, although related to physics, is more philosophical. Its main feature is some very strong argumentation in support of relativistic ideas, which were not very well known to philosophers at that time. Doubtless, this book had enormous influence on the philosophy of physics.

Logical empiricism is principally known as a philosophical current attributing great importance to studies related to mathematics and physics, but lesser to other issues, such as ethics, aesthetics, etc. Hence, the content of volume 3 of Schlick's *Gesamtausgabe* may be surprising for people guided by this popular picture of the Vienna Circle, as it reveals Schlick's very serious interest in philosophical anthropology. *Lebensweisheit. Versuch einer Glückseligkeitslehre* is a very extensive book (more than 300 pages). It appeared in 1908 and can be seen as an important step toward philosophy on Schlick's part, although, as the editor informs, it had been preceded by several smaller pieces devoted to ethical questions. In general, the book investigates the concept of happiness from various perspectives, psychological, social, etc. Doubtless—Schlick was influenced by German Lebensphilosophie, but he wanted to offer a universal basis for speaking about anthropological matters. It seems that *Lebensweisheit* remained unnoticed by most authors dealing with the concept of happiness. For example, this book is not mentioned by Władysław Tatarkiewicz in his very extensive Analysis of Happiness (1947; Eng. trans. 1976), although it is mentioned in Maria Ossowska's preface to the Polish edition (1960) of *Fragen der Ethik*. The fate of Schlick's second ethical book (published in 1930) was completely different from that of *Lebensweisheit*. However, *Fragen der Ethik* was never regarded as a manifesto of the Vienna Circle on the subject of ethics. Although Schlick in this work strongly emphasizes the contrast between normative ethics and ethics as investigating moral facts, he does not propose emotivism. Simply speaking, the question of the semiotic status of norms and value statements does not exist for him. Schlick's analysis of moral facts is mostly directed at the problem of motivation. He admits a plurality of motives and shows that none of them can serve as an exhaustive explanation of human moral decisions.

The beginning of Schlick's *Gesamtausgabe* is very promising. There is every reason to think that the whole enterprise will satisfy everybody interested in the history of contemporary philosophy.

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