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Introduction of the editors

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► **To cite this version:**

Gabriella Crocco, Eva-Maria Engelen. Introduction of the editors. Kurt Gödel: Philosopher-Scientist. Aix-en-Provence (Presses Universitaires de Provence), 488 pp. , Presses Universitaires de Provence, 2016, 978-2-85399-976-2. hal-01473411

HAL Id: hal-01473411

<https://hal.science/hal-01473411>

Submitted on 23 Feb 2017

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Introduction

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Most of the essays that are collected in this volume are the outcome of talks given at the international conference *Kurt Gödel Philosopher: From Logic to Cosmology* that was held in Aix-en-Provence (France) in summer 2013. In addition many of the authors belong to a group of scientists who have contributed to a project with the same title under the direction of Gabriella Crocco, to a larger or lesser degree.

For this reason the volume represents more than just a collection of essays on Gödel. It is in fact the product of a long and enduring international collaboration. There was a group in France that worked on the transcriptions of the *Max Phil* and its interpretations. It consisted of: Mark van Atten, Eric Audureau, Julien Bertrand, Paola Cantù, Gabriella Crocco, Eva-Maria Engelen, Amélie Mertens and Robin Rollinger. And then there was a group of experts in Gödel studies and logic to whom the results of this ongoing research were presented and with whom they were discussed every now and then. This group consisted of: John W. Dawson Jr. and Cheryl Dawson, Akihiro Kanamori, Per Martin-Löf, Göran Sundholm and Richard Tieszen. For the conference the group of experts was enlarged by Eberhard Knobloch and Massimo Mugnai as authorities on Leibniz—to whom Gödel refers quite often—and by several Gödel-enthusiasts who gave us great pleasure by reacting to our call for papers. The transcriptions of notebooks IX, X, XI, and XII were only made accessible to the experts for their lectures at the conference even though not all of the transcriptions are yet ready for circulation or for publication.

However as there is new and significant material, which the experts were able to make use of, this volume represents the beginning of a new stage of research in interpreting Kurt Gödel's philosophy that includes his natural philosophy. This was made possible in the first place by the project ANR-09-BLA-0313, under the direction of Gabriella Crocco, dedicated to investigating Gödel's *Max Phil*.

The volume is sub-divided into three parts. The first part is dedicated to descriptions of the Gödel *Nachlass* that is to be found in The Shelby White and Leon Levy Archives Center at the Institute for Advanced Study in Princeton. This part starts with an updated overview of Kurt Gödel's *Nachlass* by John W. Dawson Jr., who is the person who almost certainly knows Kurt Gödel's *Nachlass* the best because he arranged it. In his article he not only presents Gödel's *Nachlass* anew by describing the current state of research but he also gives an overview of the scientific research that has already been done which draws on the *Nachlass*.

Subsequently Gabriella Crocco and Eva-Maria Engelen describe the construction, development and content of Kurt Gödel's *Philosophical Remarks*—the *Max Phil* notebooks—for the first time in detail and give a thorough technical description of them. The *Max Phil* notebooks are part of the *Nachlass* that is handed down to us in the shorthand *Gabelsberger*. The notebooks start as an intellectual diary and then evolve to be philosophical notebooks that contain an outline of Gödel's rational metaphysics as well as some of his reflections on logic, mathematics, physics, biology, history, philology and theology. Crocco and Engelen make a first attempt to relate these reflections to Gödel's published work and to his scientific oeuvre to make it clear why they enlarge our knowledge of Gödel's thinking. They then go on to offer first insights into the content of the *Philosophical Remarks*.

This article not only gives an insight into Gödel's philosophical work that is not yet known to the academic world but it also constitutes the background to classify the publication of notebook *Max Phil X* within the context of the *Max Phil* notebooks in their entirety.

The second part of this volume is dedicated to the close reading of single remarks in the *Max Phil*. Most of the members of the “French group” have chosen to deliberate on essential topics in Gödel's thinking by interpreting single remarks in which these topics are highly remarkable. In doing so they augment our knowledge about Gödel's thinking and philosophy, and prove the high importance of the *Max Phil* for exploring the system of thought of a great thinker. The articles show the complexity of the remarks by unfolding the rich background to each of them. This circumstance renders the work of interpretation in these cases even harder than it is as a rule.

The centrepiece of Eric Audureau's paper is a reconstruction of Gödel's contribution to the theory of relativity in due consideration of philosophical issues and a detailed reconstruction of the history of the reception given to Gödel's cosmological ideas. But since cosmological notions such as force, inertia, motion, time, etc. are philosophical concepts for Gödel, Audureau also sheds light on the bilateral synergy of physics and philosophy in Kurt Gödel's thinking. Audureau not only discloses insights into Gödel's philosophy as a systematic enterprise but also interprets Gödel's work on the theory of relativity as being mainly addressed to his friend Albert Einstein. Audureau therefore reads these writings as representing some of Gödel's conversations with Einstein about which we otherwise know very little.

Julien Bernard concentrates on Gödel's remarks on matter physics in the notebook *Max Phil X*. He highlights the philosophical issues that are of major importance for Gödel when he reflects on physics and thereby adds new insights into the way Gödel's philosophical thinking is joined to his views on physics. What is especially interesting about Bernard's article is that he shows to what extent Gödel's considerations have their origins in Leibniz's natural philosophy as well as in how far Gödel's solutions to these issues are nonetheless specific and only partly Leibnizian.

Paola Cantù's purpose is to show that Gödel studied Giuseppe Peano's writings quite closely in order to find a solution for the question of definite descriptions as well as for a development of logic as a general theory of concepts in the Leibnizian tradition. In doing so she analyses several of Gödel's remarks in the *Max Phil X* in which he refers explicitly or implicitly to Peano's writings.

In her paper “Sinn/Bedeutung and Intension/Extension in Gödel’s *Max Phil IX*” Gabriella Crocco deals with Gödel’s realism about concepts and the question of what Gödel means by a concept. It may be read as the continuation of earlier work by her on this topic as well as a self-contained contribution. Analysing two remarks of *Max Phil IX*, she tries to evaluate the role of the traditional notions of intension and extension in respect to the Fregean notions of *Sinn* and *Bedeutung* that Gödel discusses in *Max Phil IX* as well as in *Max Phil X*. Her conclusions strengthen the view that Leibniz was very influential on Gödel in this period and might be related to the paper of Amélie Mertens.

The following article by Gabriella Crocco and Julien Bernard also deals with the notion of concept. They discuss a remark in *Max Phil X* and show the parallels between this remark and certain statements in Gödel’s *Russell paper*. The remark in *Max Phil X* presents a valuable amendment to the *Russell paper* because Gödel expresses himself more distinctly in the remark. Gödel proposes a new solution to Russell’s paradox in this remark of *Max Phil X* that is based on the Zig Zag strategy adapted to the context of Dmitry Mirimanoff’s work.

Eva-Maria Engelen interprets a remark by Gödel on Aristotle’s philosophy of mind in *Max Phil VI*. The remark is not only appropriate to show how Gödel links a crucial passage in Aristotle’s *De anima* to his own reflections on the iterative conception of set, his incompleteness theorems and the notion of God but it is also appropriate to show how far a single philosophical remark by Gödel comprises some of the most important aspects of his thinking. Engelen calls Gödel’s *Philosophical Remarks* therefore an opus that pictures Leibniz’s *Monadology* via its form.

Gödel’s conceptual realism is once more the topic of a paper which closes the second part of this volume. The article “Gödel’s distinction between objective and subjective concepts, taken from the analysis of the remark on page 16 in the *Max Phil XI*” by Amélie Mertens also deals with this subject. In interpreting a particularly interesting remark on concepts by Gödel, Mertens expounds upon how far concepts have a triple existence for Gödel. They exist in God’s consciousness, in human consciousness, and in the real world, and the things that exist have a correspondence to each of these three stages.

The third part of this volume brings together a variety of papers by experts in Gödel studies, logic, and Leibniz as well as by some enthusiasts for Gödel. These papers are all (with the exception of one that will be explained) written for this volume and represent new research in Gödelian studies. As already revealed above, some of the researchers were able to refer to the transcriptions of some of the *Max Phil* notebooks.

The third part starts with a paper by Mark van Atten that was first published in a Festschrift for Göran Sundholm and might therefore not have been noticed by scholars who are particularly interested in Gödel’s philosophy. This might already be a good reason to reprint this paper but the main reason for doing so is that it is referred to in many of the other papers, and so it might thus be convenient for the reader to have it at hand.

Van Atten discusses the embedding of Cantorian set theory in a Leibnizian metaphysics and then turns to an attempt by Gödel to justify the reflection principle in set theory by drawing an analogy to the monadology. Van Atten then indicates that

the attempt fails and that it provides no clues that can be used in justifying set-theoretical principles. The second article by Mark van Atten that is published here shows that Leibniz was a source of inspiration for Gödel's revision of the *Dialectica* Interpretation. The reception of Leibniz by Gödel is a topic that is also dealt with in the papers by Julien Bernard, Eberhard Knobloch, Massimo Mugnai and Richard Tieszen.

Van Atten's sequence of papers is followed by a chapter on Kurt Gödel and Bertrand Russell. Juliet Floyd and Akihiro Kanamori present comprehensive research about Gödel's reception of Bertrand Russell. Their main focus is on Gödel's reflection on the theory of truth that Russell presented in the *Principia Mathematica* and in other writings. However they also explore other fascinating topics such as Russell's theory of types and Gödel's incompleteness theorems, for example.

As it is well known that Leibniz was one of Gödel's favorite philosophers it might not come as too much of a surprise that specialists on Leibniz were invited to join the phalanx of researchers on Gödel. Eberhard Knobloch is one of them. He dedicates his contribution to a classical topic on Leibniz. Knobloch elaborates the similarities between Leibniz's conception of an *ars characteristic generalis* and *ars combinatorial* with some of Gödel's remarks that are to be found in *Max Phil* X and XI.

Drawing on published material from Gödel's oeuvre, Montgomery Link argues that one can observe an intellectual development in Gödel's thinking. He notices distinct phases in Gödel's reasoning about conceptual realism and argues that these are reflected in an argumentative strategy that is supposed to get the reader to accept a minimal form of Platonism, and then to show that more extreme forms are warranted. Link describes how Gödel presents his increasing objectivism and Platonism in accordance with the familiar idea that infinity is at the heart of mathematics through "jumps".

The article by Oran Magal is focused on the relationship between logic and mathematics. It is well known that Gödel argued against Rudolf Carnap's thesis that mathematics is syntax of language because this account lacks a contentual, conceptual element that is required for a full account of what mathematics is. What is new about Magal's analysis is that he also argues for a strong affinity between Gödel's arguments against Rudolf Carnap and Paul Bernays' ideas about the nature of the mathematical, as well as David Hilbert's remarks on the 'extralogical' presupposed by logical reasoning. The reader who is especially interested in the intension / extension distinction in Gödel's conception of logic and mathematics may furthermore compare Magal's article with that of Gabriella Crocco because Magal finishes his paper with some reflections on Gödel's notion of a theory of concepts and his division of formal theories into intensional and extensional ones.

Massimo Mugnai—the other eminent specialist on Leibniz—investigates to what extent Gödel was a reliable interpreter of Leibniz philosophy. The touch-stone for this investigation is the question of whether human beings need symbols and language in order to grasp concepts and ideas. Both thinkers—Leibniz as well as Gödel—have dealt with it. Mugnai shows the close affinity between Leibniz and Gödel with respect to this question but also with respect to their ideas about the need of primitive concepts that we may gain by an act of intuition. In doing so, Mugnai likewise gives a hint as to why Gödel received Husserl's phenomenology.

Introduction

Claudio Ternullo displays some of the most prominent conceptual intersections between Georg Cantor's and Kurt Gödel's ways of thinking. Ternullo regards the comparison to be an important one because it leads to meaningful interpretations of some of Gödel's positions which would otherwise remain difficult to understand.

A comparison of the reception of Leibniz's monadology by Gödel and Husserl is the topic of Richard Tieszen's contribution to this volume. Tieszen shows the parallels and differences between the two approaches and then goes on to elucidate Gödel's motives in taking on Husserl's phenomenology. It may be interesting for the reader to compare Tieszen's paper especially with that of Mugnai because Tieszen also touches upon Leibniz's position that human beings need symbols and language in order to grasp concepts and ideas.

The volume is completed with a paper by Paul Weingartner and Silvia Haring. Weingartner and Haring explore value statements, a subject of certain relevance to Gödel's famous ontological proof of God's existence. They then continue to analyze the necessary conditions of free will and free decision as well as the compatibility of evil and freedom.

The remarks from the *Max Phil* are quoted and used with permission from the Institute for Advanced Study from the Kurt Gödel Papers, The Shelby White and Leon Levy Archives Center, Institute for Advanced Study, Princeton, NJ, USA, on deposit at Princeton University.