Manuel Rebuschi
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Michel Musiol
Alain Trognon   *Editors*

Interdisciplinary Works in Logic, Epistemology, Psychology and Linguistics

Dialogue, Rationality, and Formalism

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Chapter 1
General Introduction

**Manuel Rebuschi, Martine Batt, Gerhard Heinzmann,
Franck Lihoreau, Michel Musiol, and Alain Trognon**

As witnessed by its title, the papers collected in this book aim to provide a renewed perspective on the relationships between dialogue, rationality, and formalism. More precisely, the goal of this volume is to shed light on the use of formalisms in psychological and philosophical explanations of the rationality of interactive agents. This book grew out of an interdisciplinary scientific project called DiaRaFor ("Dialogue, Rationality, Formalisms") and hosted by the MSH Lorraine (Lorraine Institute for Social Sciences and Humanities) from 2007 to 2011. The project was led by two Lorraine research teams, the *LHSP–Archives Henri Poincaré* (UMR 7117), and the *Laboratoire de Psychologie de l'Interaction et des Relations*

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Intersubjectives (InterPsy, EA 4432), in conjunction with several external researchers. Specific collaboration was implemented with a team of psychiatrists working at the *Centre Hospitalier Universitaire* (University Hospital) of Rouen.

The goal of the project was to compare recent accounts in the formalization of natural language (dynamic logics and formal semantics) with informal conceptions of interaction (dialogue, natural logic, and attribution of rationality) that had been developed in both psychology and epistemology. Like the project, the book is divided into four parts: historical and systematic studies; the formalization of context in epistemology; the formalization of reasoning in interactive contexts in psychology; the formalization of pathological conversations.

The book's chapters are partly direct products of the research conducted within the project, and partly written by international scholars working on issues adjacent to those of the DiaRaFor project. In the remainder of this introduction, we will briefly present the objectives of each part and the nature of the papers contained therein.

1.1 Part I: "Historical Context"

In the last century scientific philosophy has seen the birth of two epistemological currents, namely the better-known logical empiricism and, as a reaction against that, several continental European methodologies associated with the Erlangen School of Germany. Both have developed a logical analysis of scientific discourse and proposed to reconstruct theoretical terms on the basis of non-theoretical data. Both seek to distance themselves from German idealism and the German metaphysical tradition, and are famous for their seemingly draconian rejection of Heidegger (Lorenzen, Beth, Piaget). Recent studies on logical empiricism suggest, however, a more nuanced verdict concerning the influence of German metaphysics, and the same observation must be made with respect to the Erlangen School.

The topic of the first part of this book is motivated by the realization that the currents "around" the Erlangen School explicitly proposed a logical analysis of science—a logic of science—as well as an operational reconstruction of psychological concepts, while at the same time distinguishing themselves from their predecessors, who had been the target of Quine's celebrated 'Two Dogmas'.

The three papers in this part of the book provide insights into the difficulties of characterizing the very beginning of a conceptual reassessment of the project of rational reconstruction from a pragmatic point of view, including both the epistemological and psychological sides of the issue.

In "Phenomenology, "*Grundwissenschaft*" and "*Ideologiekritik*": Hermann Zeltner's Critique of the Erlangen School", **Christian Thiel** sheds light not only on a little-known German philosopher but, more importantly, on the intellectual circle that existed at the beginning of Kamlah and Lorenzen's collaboration in Erlangen. Following Carl Friedrich Gethmann's assertion that "constructive philosophy is phenomenology after the linguistic turn", one might conjecture that, as Kamlah

was influenced by Heidegger, so Zeltner was influenced by the supervisor of his *habilitation*, Moritz Geiger, who succeeded Husserl in Göttingen in 1932, such that both confirm Gethmann's thesis. Nevertheless, Thiel's carefully organized historic-systematic examination and testimony (Zeltner sat on the jury for his own *habilitation*) arrives at a different claim: (1) just as it is difficult to say "to what extent phenomenology was at the core of Geiger's philosophy", so it is difficult to say to what extent Zeltner "was a phenomenologist, regarding either the subjects of investigation or the methods employed"; (2) Zeltner's term "*Grundwissenschaft*" is directed as much against Plato's ontology as against Kant's epistemology. As far as geometry is concerned, it means that we must internalize (*mitvollziehen*) the meaning of geometrical norms as "prescriptions of actions in the physical world, in order to grasp the real meaning of mathematical propositions". This argument comes very near to Lorenzen's position, although his discussion of it was not in respect to a system of geometrical propositions. Nevertheless, although there were some common systematic (though non-phenomenological) features in common between the Erlangen School and its local philosophical counterparts, there was no significant discussion or exchange between the two. Thiel's paper is a precious argument against historical links hastily accepted. It is a masterpiece of "*Ideologiekritik*".

The second paper, "Geometry as a Measurement-Theoretical A Priori: Lorenzen's Defense of Relativity Against the Ontology of Its Proponents", by **Oliver Schlaudt**, describes and motivates Lorenzen's normative approach to geometrical space as an object constituted by spatial measuring operations and highlights the consequences of this approach for the interpretation of the theory of relativity. What is often conceived of as "fact" is, in the tradition of Poincaré's conventionalism, the outcome of a process of interpretation that also depends on a priori elements. In Lorenzen, "*a priori*" simply denotes the consequences of linguistic and technical methods established by convention within the reconstruction of scientific theories. In this carefully argued article, the author shows convincingly how Lorenzen transcends the customary realism/anti-realism quarrel: his pragmatic approach reflects both Helmholtz and Mach on the one hand and the neo-Kantian thinkers Kries and Cassirer on the other. His arguments thus leverage two opposing currents, a critical one and a constructive one, which respectively inherit empiricist and rationalist positions. He replaces the circles used by these modes of thought with the so-called theory of forms, i.e. the objects of a purely "basic geometry", with an operationally defined plane surface as the most fundamental form, ranging from topology to geometry strictly speaking. The originality of Lorenzen's approach is finally clarified by a confrontation with the earlier positions of Helmholtz, Russell, and especially Couturat.

The correspondence between Beth and Piaget, edited and annotated by **Gerhard Heinzmann**, **Alain Trognon**, and **Frédérick Tremblay**, was kindly made available to us by the Beth Foundation in Amsterdam. It constitutes a very exceptional document that fits perfectly into a book about the DiaRaFor project. It is, in fact, a dialogue, more precisely an epistolary dialogue, but at the same time it has all the properties of a critical discussion conducted within the framework of an

interdisciplinary scientific project. It focuses on the relationship between "natural mind" and "formal thinking", a long-standing issue in epistemology and one of the main points discussed by the members of Lorenzen's Erlangen School. The dialogue concludes with "Psychology and Epistemology of Mathematics" and a basic declaration of the separateness of research on the "laws of thought" and research on logic. The missing link that would have allowed a closer intellectual agreement between Piaget and Beth was to come much later, with the "pragmatic turn" of logic. The semantic tableaus presented by Beth during the Geneva seminar on Genetic Epistemology and then within his discussion with Lorenzen[1] hold the key to his pragmatic insights.

1.2   Part II: "Epistemology, Context, Formalism"

The second part of the book is devoted to formal epistemology. Since Hintikka's seminal 1962 work *Knowledge and Belief,* the considerable development of epistemic and doxastic logics—mainly in such areas as computer science, economy, and game theory—has led them quite far from their original core area, namely a priori conceptual reasoning (a.k.a. philosophy). Epistemology, on the other hand, has remained relatively isolated from such technical developments. Since the early 2000s, however, a strong renewed interest in philosophical issues has been expressed by a number of prominent epistemic logicians (see Benthem 2006; Hendricks 2006). All the while, dynamic epistemic logic (DEL) has incorporated (modeled) concrete features of agent actions into the abstract framework of epistemic and doxastic logic. The overall picture of formal epistemology is now that of a lively discipline attempting eagerly to account for a more realistic, cognitively plausible conception of knowledge.

The papers in Part II show the distance that has been covered by contemporary epistemology since the original formulation of doxastic and epistemic logics half a century ago. Dynamics is concerned not only with epistemic and general actions but also with changes in context, especially conversational context. In addition to formulating his own specific conception, Lewis's contextualist perspective on knowledge corroborated a view reminiscent of what cognitive scientists had already begun stressing at the time: that knowledge was no longer to be apprehended from God's perspective but rather in relation to contexts of ascription, thereby bringing epistemology back down to a more worldly arena.

Whence the direct connection between Part II and this book's overall purpose. At the frontier between epistemology and pragmatics, different agents' roles in dialogue must be taken into account in order to provide finer-grained descriptions of real-life attitude ascriptions. A number of classical puzzles can be revisited in light

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[1]This correspondence will be published in a forthcoming volume.

of this new insight. The four papers collected here all reflect this new dynamic and more "concrete" trend in epistemology.

The first chapter, "Principles of Knowledge, Belief and Conditional Belief", by **Guillaume Aucher**, offers a sharp review of different axiomatic systems for knowledge and belief which have been proposed in the epistemic logic literature. The author thereby isolates and addresses a number of nagging problems that have helped shape the modern history of the logic of knowledge. The paper also investigates the conditions for the formal interdefinability of the two notions of belief and knowledge, and establishes that certain important and intricate principles for reasoning about knowledge can be derived from a set of intuitively simple interaction axioms relating knowledge and conditional belief.

In "Procedural Information and the Dynamics of Belief", **Eric Pacuit** offers an overview of recent advances in DEL and introduces the key ideas and definitions of the operations that dynamically alter agents' beliefs during social interaction. The paper focuses on *procedural information,* that is, information about the protocol specifying which of a number of options are feasible and permissible for the agents at any given moment. It also discusses the role played by this kind of information in situations of interaction and learning.

In "Reasoning About Knowledge in Context", **Franck Lihoreau** and **Manuel Rebuschi** propose a new semantics, based on the notion of *contextual models,* that makes it possible to express and compare—within a unique formal framework— different views on the roles of various notions of context in knowledge ascriptions. Skeptical and moderate invariantism, contextualism, and subject-sensitive invariantism are thus examined. A dynamic formalism is also proposed that offers new insights into a classical skeptical puzzle.

Finally, **Tomoyuki Yamada**'s chapter, "The Epistemic Closure Principle and the Assessment Sensitivity of Knowledge Attributions", addresses the debate between relativism and contextualism over the vexed issue of the semantics of knowledge ascriptions. The interest in relativism on this issue has recently been renewed by authors who defend the idea, championed by Macfarlane, of the assessment sensitivity of epistemic attributions, i.e., that their truth is somehow relative to the context of a "judge" or assessor rather than to the attributor's context. Yamada's paper challenges this notion with an argument grounded in new, alternative formulations of the principle of epistemic closure.

1.3   Part III: Reasoning in Interactive Context

Pure logic has been built up against the psycho-sociology of thought; Frege theorized its advent at the beginning of the twentieth century. In the present volume, the Beth-Piaget correspondence (pp. 45–93) bears witness to the solidity of that construction in the 1950s.

At the beginning of the twenty-first century however, the so-called "Wall of Frege", to use Van Benthem's evocative metaphor (Benthem 2008), was poised to

fall. A loyal cooperation without second thoughts could now replace the "armed peace" that had prevailed between logic as a "discipline of foundations" on the one hand and the human and social sciences as the study of empirical thought on the other. This collaboration was set to perfect a reconciliation that had begun around 1980. We recently re-examined this reconciliation (Trognon and Batt 2011) by following two special editions of the journal *Synthese*. A "mild" psychologism reconciling pure logic with the human and social sciences through the concept of "rational agency", with social psychology as an interface, may take the place of what has remained the rule until recently, namely antipsychologism, as driven by Hintikka for instance. Van Benthem asserts that "logic is of course not experimental, or even theoretical, psychology and it approaches human reasoning with purposes of its own. And a logical theory is not useless if people do not quite behave according to it. But the boundary is delicate. And I think the following should be obvious: if logical theory were *totally disjoint* from actual reasoning, it would be no use at all, for whatever purpose!" (Benthem 2008, p. 69). He goes on to say that " 'human behaviour' as brought to light by psychology is not just a set of protocol sentences in simple-minded experiments, but a hierarchy of description levels, ranging from plain observable facts to sophisticated higher-order description. Viewed that way, the fit with logical theory becomes much more plausible, in both directions" (Benthem 2008, p. 80).

The third part of our volume is meant as a step in the direction in which van Benthem and other logicians want to take their colleagues: the meeting point between logic and the human and social sciences.

Martine Batt and **Alain Trognon** portray the microgenesis of the solution to an arithmetic division problem by showing two children dialoguing in order to solve it. In their chapter "From Dialogue to Calculation", they employ the method of "interlocutory logic", which involves leveraging logical knowledge "controlled" by the progression of the dialogue. This allows them to precisely locate the turning point in the children's work and illustrate the representation of the division they accomplish in their dialogue, thus bringing to light an interlocutory model of representation achieved through experimental developmental psychology.

In "Dialogue of Rationalities: A Case Study" **Marcelo Dascal** demonstrates that human rationality is not reducible to "mathematical" rationality (or "hard" rationality). Rather, it coexists peacefully with soft rationality. These two rationalities complete each other due to the very features that distinguishes them in a dialogue of rationalities. Dascal discovers this theorization in the "Preliminary Discourse on the Conformity of Faith and Reason", which opens the *Essais de Theodicée* of Leibniz, whom he calls "perhaps *the* rationalist par excellence".

Finally, **Denis Vernant**'s proposal of a "logic of veridicality" will probably be very useful in research on inter-discourse and cooperative multi-agent dialogues. This logic now allows us to examine "the combining of different agents' veridictional actions in relation to the same proposal". Its principles are presented in the chapter entitled "Pragmatics of Veridicity".

1.4 Part IV: "Conversation, Pathology, Formalization"

The fourth part of the book focuses on research at the intersection between linguistics and psychology. For cognitive psychologists, studying subjects' effective reasoning through thought patterns in conversation (non-directed dialogue) is a natural way to pinpoint possible disorders. This is particularly the case in psychopathology, where surface deviances can reflect more or less profound dysfunction. Indeed, conversations are complex human activities involving a wide array of competences. Disorders can occur at any level, from phonetic recognition or syntactic competence to social interaction and logical capability.

Some linguists, on their end, have tried to account for the pragmatic features of dialogue using formal semantic tools. Among the main developments of the past few decades, after Lewis and Montague's attempts in the 1970s at formalizing (fragments of) natural language, there have been key achievements yielded by Hans Kamp's DRT (Discourse Representation Theory) (see Kamp and Reyle 1993). This formal framework, shaped to fit the dynamic aspects of discourse, was eventually subjected to several extensions in order to account for phenomena such as underspecification or presupposition as well as rhetorical links in monologue and dialogue. This is dealt with especially closely by Nicholas Asher and Alex Lascarides's (2003) SDRT (Segmented DRT), which opens up new prospects in both pragmatics and psycholinguistics.

Two of the papers in this part focus on linguistic issues, while the other two are concerned with the use of language analysis in psychopathology.

In the first chapter, "Modeling the Dynamic Effects of Discourse: Principles and Frameworks", **Maxime Amblard** and **Sylvain Pogodalla** offer an overview of various accounts of dynamic phenomena in linguistics, more particularly in formal natural language semantics. The authors introduce several phenomena, such as presupposition, anaphora and modal subordination, that challenge traditional truth-theoretical semantics. They then present several formalisms capable of handling these phenomena: DRT and SDRT as well as dynamic predicate logic and continuation semantics.

Jean Caelen and **Anne Xuereb**'s chapter, entitled "Dialogue Analysis: Pragmatic and Rhetorical Aspects", explores the pragmatic and rhetorical aspects of dialogue and dialogue interpretation. After a conceptual survey of the issue, they offer their analysis of a real-life conversation between a doctor and a patient. According to the authors, such analyses support their conception of dialogues as strategic games, i.e., as constituting a special kind of action-oriented practice grounded in a more general praxeology.

In "Investigating Discourse Specificities in Schizophrenic Disorders", **Michel Musiol** and **Frédéric Verhaegen** present a pragmatic and psychological framework used to account for schizophrenic discourse. They offer a rational background for this, from psychological and psychiatric viewpoints to more formal studies such

as that presented in the following paper. In their approach, the authors distinguish between several types of discontinuities occurring in conversations between a psychologist and a schizophrenic patient.

In the final chapter, "Using SDRT to Analyze Pathological Conversations", **Manuel Rebuschi**, **Maxime Amblard**, and **Michel Musiol** present ongoing research into the formalization of conversations between schizophrenic individuals and ordinary speakers. This work is based on the collection and transcription of empirical data and on informal pragmatic analyses performed by psychologists. Because significant irregularities are identified, the authors propose using SDRT to analyze and discuss the specific features of the extraordinary rationality exhibited by schizophrenic speakers, from the interpreter's point of view.

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Part I
Historical Context

Chapter 2
Phenomenology, "Grundwissenschaft" and "Ideologiekritik": Hermann Zeltner's Critique of the Erlangen school

Christian Thiel

This paper is visibly connected neither to relations between the Erlangen school and logical empiricism, nor to any problems of logic. I will instead be concerned with whether Wilhelm Kamlah and Paul Lorenzen were possibly influenced by the discussion of phenomenological issues by certain philosophers active in Erlangen shortly before or during the development of the so-called Erlangen school in the Mid-1960s. My claim is that there was *no* real discussion or exchange of ideas between the protagonists of constructive philosophy and those in the Erlangen Institute closer to phenomenology, neo-Kantianism, or "new ontology", although some of them were concerned with similar problems and, like Hermann Zeltner, attempted to establish a dialogue from time to time.

The topic of this local and more traditional context of the Erlangen school has, to my knowledge, not yet been taken up anywhere, and it may well turn out that this omission does not amount to a great loss. My own interest derives of course from the fact that I was once involved on both sides, which also means that I must leave an objective evaluation to others and to the future.

Let me begin with a remark on the title of my paper. Whereas I may assume some common understanding of the word "phenomenology", the two German words in quotes may need some explanation, and moreover Hermann Zeltner is likely to be unknown to the majority of my readers. I have taken the word "Grundwissenschaft" from Zeltner's paper "Philosophie als Grundwissenschaft" published posthumously in memory of Wilhelm Kamlah in 1978. I have chosen the term "Ideologiekritik" as a catch-word suggested by Zeltner's monograph *Ideologie und Wahrheit: Zur Kritik der politischen Vernunft,* published in 1966. I will come back to these terms a little

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later. Let us begin with the context in which Hermann Zeltner appears connected to the Erlangen school, a context I regard as necessary to appreciate his life as well as the thought of his later years.

Of course, philosophy at Erlangen did not start with the vague set of persons later called (by others) the "Erlangen school". When I began studying at Erlangen in 1956, there was Wilhelm Kamlah, who had taken over the only philosophy chair in 1954. There was also Rudolf Zocher, who had already accomplished his *Habilitation* (the qualification as university lecturer) in 1925 but had made almost no progress in his academic career because he had refused to comply with the demands of the Nazis. There was also Hermann Zeltner, already over 50 but only recently *habilitated*—for reasons I will present in a moment. The bulk of the teaching load was taken by Hans R.G. Günther, a pupil of Eduard Spranger, aged almost 60, who had lost his chair at the German University in Prague and held a poorly salaried position at Erlangen although he had never been a member of the Nazi party. He finally left for Freiburg in 1958 when he was asked to choose where to retire. I attended lecture courses and seminars with all of them, and later also with Wolfgang Albrecht after he had completed his *Habilitation* in 1958. This was the staff and the situation before Paul Lorenzen arrived in 1962 to fill the newly created second philosophy chair. I supplemented my philosophical schedule with lecture courses by Hans Joachim Schoeps, Hans Liermann and Ruprecht Matthaei.

Considering the small philosophy staff, phenomenology was fairly well represented. Zocher, who had published an impressive analysis and critique of Husserl's phenomenological approach in 1932 offered two graduate seminars on Husserl's *Logical Investigations.* Albrecht gave a seminar on Husserl's *Formal and Transcendental Logic,* followed by another on the *Cartesian Meditations,* and Zeltner taught an introduction to phenomenology focussing on Husserl and Heidegger. Remembering Gethmann's now famous slogan that "constructive philosophy is phenomenology after the linguistic turn" (Gethmann 1991), it is tempting to suspect that this context exerted a strong phenomenological influence on Kamlah even though he had just taken a different turn himself, offering a lecture course on "Begriff, Aussage, Wahrheit, Wissenschaft" and a graduate seminar entitled "Das Wahrheitsproblem". This suspicion would seem all the more plausible since Kamlah and Zeltner shared a common past. So I must ask the reader's patience in taking a look at their lives: rather a glimpse in the case of Kamlah who is no doubt better known, and a slightly more explicit overview in the case of Zeltner.

Wilhelm Kamlah was born the son of a Lutheran parson on September 3, 1905 in Hohendorf an der Bode. After graduating from the *Domgymnasium* in Halberstadt, he studied theology, and later also musicology, history and philosophy at Marburg, Tübingen, Heidelberg and Göttingen. Among his teachers, Kamlah specifically recalled Rudolf Bultmann and the young provocative Martin Heidegger in Marburg, as well as Hans Lipps in Göttingen. He calls Heidegger his philosophy teacher even after the renunciation of his partisanship in 1954, and mentions Hans Lipps along with Arnold Gehlen as forerunners for his own philosophical anthropology in 1982 (Kamlah 1982). For a short time, one of his fellow students was Zeltner, perhaps in musicology where Kamlah worked on his edition of Heinrich Schütz's *Geistliche*

Chormusik between 1928 and 1935, which was later incorporated into Schütz's collected works. Zeltner paid tribute to this achievement in his 1973 paper entitled "Anfang und Ausgang der Schütz-Bewegung" (Zeltner 1973).

In 1932, Kamlah married Kläre Nohl (1908–1988), one of four daughters of the pedagogue Herman Nohl. After the Nazis came to power, the Nohl family was considered "jüdisch versippt" (i.e., related by marriage or ancestry to jews). Kamlah lost his post as assistant in the historical seminar in 1936, and 1 year later also that of director of the academic orchestra. A difficult period for the family followed, their only income being that from Kläre Kamlah's violin lessons (one of her pupils was Margarethe Zeltner, Hermann Zeltner's wife). Although Kamlah was drafted in 1939, sent to the front and severely wounded, he managed to win the support of sociologist Eduard Baumgarten at the University of Königsberg and to obtain his *Habilitation* in the winter semester of 1941–1942. In 1945 he was able to transfer to Göttingen as *Privatdozent,* was promoted to university reader in 1950, and in 1951 became associate professor at the Technical University of Hannover. He began to engage in logic and in a philosophical critique of language, perhaps based on a lingering stimulus from Hans Lipps (killed in action in 1941), but in my opinion more likely due to discussions with Paul Lorenzen, whom he had met and come to know just in those years. Kamlah accepted a call to become chair of philosophy at Erlangen in 1954, and later developments are well documented. For an excellent biographical and intellectual survey I refer the reader to Martin Langanke's paper "Fundamentalphilosophie und philosophische Anthropologie im Werk Wilhelm Kamlahs" (Langanke 2003).

Hermann Zeltner was born on July 5, 1903 in Nürnberg to the physician Dr. Edwin Zeltner and his wife Maria, née Altmann. He graduated from the Melanchthon-Gymnasium with his *Abitur* in 1922 and studied theology, philosophy and musicology in Erlangen, Munich, Tübingen, Göttingen and Münster. He first prepared for a theological profession, entering the *Predigerseminar* in Nürnberg, but decided to add three semesters in philosophy from 1928 to 1929 in Göttingen. There, he obtained his doctorate *summa cum laude* with a dissertation entitled "Schellings philosophische Idee und das Identitätssystem" (Zeltner 1929), supervised by the phenomenologist Moritz Geiger, who accepted Zeltner as a candidate for *Habilitation* early in 1933.

Geiger, who was Jewish, and moreover had involved himself in a fight over the Göttingen International Office with Hans Lipps, who was an ardent national socialist, was removed from his professorship at the end of 1933. Georg Misch was willing to step in for Geiger as far as Zeltner's *Habilitation* was concerned, but he was likewise dismissed in 1934. Zeltner nevertheless applied for the *venia legendi* in 1935, presenting his work "Studien zur Logik der existentiellen Reflexion" to Herman Nohl, who would have awarded him the desired qualification. But Nohl was also considered politically unreliable (in fact he was discharged in 1937), and so Hans Lipps (who was at that time filling Misch's chair) was asked to assess Zeltner's *Habilitationsschrift.* Lipps told Zeltner that he was by no means willing to accept the thesis, and that he considered a revision of it useless. Zeltner was forced to withdraw his thesis and his application. It is not without irony that, in the same

year, Karl Jaspers recommended Zeltner's appointment to the philosophy chair at the University of Frankfurt despite his still lacking the *venia legendi,* and that this chair was finally filled by none other than Hans Lipps.

After this failure at a university career, Zeltner became a librarian and was in the Prussian library service at Halle-Wittenberg from 1935 to 1945, including military service from 1939 to 1945, when he was discharged by the Soviet military administration. A difficult time followed. Zeltner had married in 1931 and had four children. He had to eke out a living as a piano teacher, chorus leader, synodal secretary and teacher at an ecclesiastical girls school in Frankonia. Finally, he was accepted into the Bavarian library service in 1948, and promoted to vice-director of the university library of Erlangen in 1949. He was entrusted with teaching philosophy courses at the University in 1951, wrote a second habilitation thesis and finally got his *venia legendi* in 1955 at the age of 52. Zeltner quit the library service and was appointed to an unsalaried professorship in 1961. He spent the winter semester of 1966–1967 as visiting professor at the University of Bern in Switzerland, substituting for Wilhelm Kamlah at Erlangen twice, before and after this foreign appointment. Zeltner retired in 1968 and died in Erlangen in 1975.

Zeltner is not widely known today, and wasn't either during his life-time. The only philosophical dictionary with a short entry on him is Kröner's *Philosophisches Wörterbuch,* since its 19th edition published in 1974 (Schischkoff 1974). This neglect may be due to his position outside of any philosophical movement, and to the fact that he did not produce a pioneering or epoch-making *opus magnum,* probably as a consequence of his broad field of activities. I remember his colloquium for advanced students on information theory, half of the participants in which were staff members from philosophy or related disciplines. I regret having missed another colloquium that he conducted jointly with Finnish physiologist and philosopher Yrjö Reenpää, nuclear physicist Wolfgang Finkelnburg and bio-cybernetics-pioneer Wolf-Dieter Keidel. Even the formal sciences cast a spell on him, as shown by an unpublished manuscript of 75 pages, quoted in Zeltner's CV and entitled "Logik und Mathematik" that I have tried to re-discover, so far without success. Most significant perhaps, Zeltner was for many years a highly competent reviewer and critic of concerts and other music performances for local newspapers and journals, his contributions to which number in the hundreds.

A survey of his work in philosophy proper is somewhat easier, since among numerous contributions there are two clear foci. The first is Zeltner's research on Schelling and his presentation of it to the educated public. Manfred Schröter, the pope of Schelling scholarship, as it were, praised Zeltner's book on Schelling (Zeltner 1954) as "the best introduction to Schelling in existence".[1] Zeltner used it (I assume on Kamlah's advice) as his *Habilitationsschrift* in Erlangen. He was involved in the critical Academy edition of Schelling's works, the first volume of which he co-edited. Volume II is dedicated to the memory of Hermann Zeltner.

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[1]Closing statement of the short description as a blurb for Zeltner's book, printed on its dust-cover: "die beste Einführung in Schelling, die wir besitzen."

The second focus is social philosophy, with emphasis on the theory and critique of ideology. It is not only expounded in the monograph *Ideologie und Wahrheit* (Zeltner 1966), but also developed in several papers, and last but not least in Zeltner's contribution to the *Festschrift* for Paul Lorenzen, published only posthumously in 1978. Like Zeltner's contribution to the volume *Vernünftiges Denken* (Zeltner 1978b), originally intended as a *Festschrift* for Wilhelm Kamlah, but transformed into a memorial volume by the vicissitudes of life.

Before taking up, or rather digging up, Zeltner's relations to Kamlah and Lorenzen, let me return for a moment to his Göttingen period and to the role of his academic teacher and *Doktorvater* Moritz Geiger (1880–1937). Zeltner held him in highest esteem. He owned all or nearly all of his writings, and in his office one could see a portrait of Geiger, marked on the back side as Zeltner's property. And he published an unusually long commemorative paper on Geiger in the *Zeitschrift für philosophische Forschung* in 1960 (Zeltner 1960). Geiger had studied in Munich with Alexander Pfänder and Theodor Lipps (who supervised his dissertation). He was co-editor of Husserl's *Jahrbuch für Philosophie und phänomenologische Forschung* and succeeded Husserl as chair in Göttingen in 1932. One would expect his relevance to the philosophy of mathematics as well as to constructive philosophy because of two of his writings. First, the monograph *Systematische Axiomatik der Euklidischen Geometrie* (Geiger 1924), summarized in a lecture before the *Göttinger Mathematische Gesellschaft* 1 year later (Geiger 1926). Geiger is claiming here that Hilbert's axioms of geometry are perfect for the derivation of geometry as a discipline, but lack the perspicuity and simple internal structure of our intuition of space, which one would expect them to represent as nicely as Peano's axioms represent the calculatory basis of arithmetic.[2] The second pertinent text is a very detailed review of Oskar Becker's *Mathematische Existenz* (Becker 1927) in the *Göttingische gelehrte Anzeigen* of 1928 (Geiger 1928), prompting a similarly detailed defensive reply from Becker (Becker 1929). But Geiger did not pursue these studies any further, moving instead towards phenomenological aesthetics and beyond. Herbert Spiegelberg, in his well-known survey on *The Phenomenological Movement* (Spiegelberg 1961), could give the paragraph on Geiger the heading "From Phenomenological Esthetics toward Metaphysics". He found it difficult "to tell how far phenomenology was and remained the core of Geiger's philosophy" (*op. cit.* I 206). I would not have gone into so much detail myself if I had not felt obliged to ask the same question about Zeltner: to what extent was he a phenomenologist, either regarding the subject of his investigations, or regarding the methods employed?

At the beginning of his paper "Philosophie als Grundwissenschaft" (Zeltner 1978b), Zeltner explains that he is far from claiming any foundational role for philosophy in the realm of science *as such,* but will investigate whether philosophy can supply foundations or justifications for *specific* disciplines. Hugo Dingler

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[2]Bernays, in his short notice of the book in the *Jahrbuch über die Fortschritte der Mathematik,* saw in it "...the first undertaking to motivate a significant axiom system from internal reasons" ("...das erste Unternehmen [...], ein bedeutendes Axiomensystem aus inneren Gründen zu motivieren.")

believed that this could be done for geometry, and Kant, in his *Prolegomena,* was convinced that pure mathematics and pure natural science would get a philosophical foundation by exhibiting the conditions of their possibility. The question of whether a similar procedure might be effective in the humanities, say for law or for social philosophy, alerts us to the problem that an attempted foundation might turn out to be no more than an ideological underpinning, and therefore something that would bear the name of *foundation* unjustly. Closer analysis shows that a "Grundwissenschaft", which may be translated approximately as "basic science" or "foundational knowledge", cannot take the form of an *ontology* as in Plato's doctrine of ideas, nor the form of an *epistemology* like Kant's in the case of, say, ethics or anthropology. Zeltner's proposal is a third way, based on an elucidation (but also a critique) of Lorenzen's foundation of geometry. He aims to show that in following the prescriptions of geometrical norms, we must internalize ("mitvollziehen") their meaning as prescriptions of *actions* in the physical world, in order to grasp the real meaning of mathematical propositions. Zeltner thinks that Lorenzen's approach is valuable but still insufficient, since it may well lead to practical geometry as we find it already with the ancient Egyptians, but not yet to a well-founded structure or system of mathematical propositions. As Zeltner does not elaborate this argument any further, I will not delve into this question either. Zeltner's point is that we need a kind of reciprocity between a discipline and the co-ordinated part of "Grundwissenschaft". In reflecting e.g., on geometry, we pick the *philosophically* relevant aspects of the geometer's actions, remembering with Kant that space is not a concept but pure intuition. I do not know whether Zeltner and Lorenzen ever made any attempt to discuss these particular foundational questions.

It is a great pity that Zeltner's unexpected death at the end of 1975 prevented a discussion of his paper published posthumously in the *Festschrift* for Lorenzen in 1978–1979 (Zeltner 1979). Zeltner cites, analyzes and cautiously criticizes passages from Lorenzen's "Rules of Reasonable Argumentation" (Lorenzen 1974) (in the 1974 version of *Konstruktive Wissenschaftstheorie*) and from Lorenzen and Schwemmer's *Konstruktive Logik, Ethik und Wissenschaftstheorie,* published in 1973. Although we have not yet reached Lorenzen's late political philosophy here, I would find it fascinating to see the early struggles for a consistent and fertile concept of "*normative genesis*" confronted with Zeltner's historically underpinned proposals for exposing, dismantling and finally overcoming *ideologies.* It is true that the terminologies of these would-be dialogue partners are light-years apart from each other, and Zeltner's argumentation is complex and often terse. But in my view the two philosophers have nowhere else been closer to a bulk of common questions (and therefore to each other). Already, the title is significative and promising: "Klopfzeichen. Normative Genese und Ideologiekritik—Ferneres zum Kallikles-Gespräch (Platon, Gorgias 481 C ff.)" (Zeltner 1979).

"Klopfzeichen" are rapping sounds or signs exchanged by prisoners in neighbouring cells, aiming at establishing communication, or to send each other messages later on. Zeltner obviously wanted to indicate that he felt, in the Erlangen institute, like a prisoner deprived of contact with his fellow sufferers. At the same time he intended to send a signal that he wished to change this situation. It was no doubt

an invitation to an exchange of ideas, and the pairing of the terms "Normative Genese" and "Ideologiekritik" shows clearly where Zeltner located the common ground. The second title refers back to Zeltner's paper "Ideologie und Idee: Zum Kallikles-Gespräch" in *Zeitschrift für philosophische Forschung* 1974 (reprinted, like Zeltner 1979, in Zeltner 1978a). Kallikles is one of Socrates' dialogue partners in Plato's dialogue *Gorgias,* and in Zeltner's view the first literary person to express a suspicion of ideology *(Ideologieverdacht)* at work in his discussion of the needs of individuals and of the polis, and of the appropriate kind of order for an ideal social community. The older text was originally written for a *Festschrift* for Helmut Berve (one of the great historians of ancient Greece), and uses a historical background to reflect theoretically on the normative questions hidden in traditional ways of thinking. By contrast, the "Klopfzeichen" explicitly compare the argumentation in the *Gorgias* with Lorenzen's proposals for finding justified norms for people living together in a community, by constructing a normative genesis in contradistinction to the factual genesis we find in actual history. Implicitly, contemporary debates on "freedom from repression" in such a common endeavour are taken into account, and Zeltner's doubt about the possibility of an "herrschaftsfreier Diskurs" goes nicely with reflections in the Erlangen school on the equity of rights in a rational dialogue, the necessity of expert advice, and the consideration of the interests of non-participants. A lively discussion between these "locked-in" philosophers would indeed have been a great event, perhaps with a valuable outcome. That Lorenzen, in turn, read Zeltner's writings carefully, is documented by his annotations in the nine offprints he received from Zeltner, most of them with short but friendly dedications (among which "dem treuen Erlanger" on the first page of a 1966 paper probably refers to Lorenzen's decision to stay at Erlangen and decline three nearly simultaneous calls to other universities).

Little is known about the personal relations of Zeltner to Kamlah and Lorenzen. About the relations between Zeltner and Kamlah I do not know anything. Andreas Kamlah (one of Wilhelm Kamlah's two sons) stated in a letter to me dated 6 November, 2008, that his parents had not had any personal relationships with Hermann Zeltner, and that he did not recall ever having seen him in the Kamlah family's house. Admittedly, I know almost as little about Zeltner and Lorenzen. The friendly dedications mentioned above point to good relations but nothing is known about a closer relationship, say, in the form of mutual private invitations or discussions, as between Kamlah and Lorenzen in their "untroubled" time.

Correspondence is lacking, small wonder between persons living in the same town and seeing each other often in their shared place of study. I do not interpret Zeltner's outspoken protest against my definition of "foundational debate" and "foundational crisis" in my Habilitationsschrift—he had been asked to be the second referee of it—as an attack on Lorenzen or on myself, even though it led to a request for two further assessments by Kamlah and the sociologist Werner Mangold.

A last word on Gethmann's description of methodical constructivism as "phenomenology after the linguistic turn". I have, earlier in this paper, supported the judgment that Geiger was no full-blooded phenomenologist, while Misch, as forceful defender of Wilhelm Dilthey's philosophy of life against Husserl and Heidegger, should be counted rather as what he is: a proponent of *Lebensphilosophie.*

Gethmann, as an expert both on phenomenology and on Lebensphilosophie, cannot have mixed them up, not even by misinterpreting the title of Misch's book *Phänomenologie und Lebensphilosophie* (Misch 1931). Only Wilhelm Kamlah, who has some superb phenomenological analyses of *Lebenswelt* and the general *condition humaine* in his book *Der Mensch in der Profanität* of 1949, probably wrote under the impression of Heidegger's *Sein und Zeit*. Yet even here, we do not find a *dependence* on Heidegger if we focus our attention on the concept of "Lebenswelt" and its role in the oft-quoted formulation of scientific thought as a "refining stylization of that which has always constituted the practical life of men and women."[3] Returning to the situation at Erlangen, the information so far available seems to corroborate my claim (in answer to the question posed at the beginning of this paper) of the absence of any significant discussion or exchange between the constructivists and the more traditional thinkers in this potential market-place of philosophical ideas.

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[3]Paul Lorenzen, (1974, 5): "...eine Hochstilisierung dessen, was man im praktischen Leben immer schon tut".

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Chapter 3
Geometry as a Measurement-Theoretical A Priori: Lorenzen's Defense of Relativity Against the Ontology of Its Proponents

Oliver Schlaudt

3.1 Introduction

In the 1970s Paul Lorenzen presented several papers in which he rejected major parts of the interpretation usually given to the geometric basic concepts both of special relativity (length contraction, time dilatation) and general relativity (curved space) (Lorenzen 1976, 1977, 1979). These papers give expression to an original point of view which challenges a lot of things usually taken for granted in the interpretation of relativity. The argument briefly reads like this:

Already Poincaré in his analysis of applied geometry showed that geometric statements do not simply represent "facts" but on the contrary essentially depend on conventions. In particular the development of non-Euclidean geometries and relativity theories strongly sensitised us to the role of conventions. These conventions cannot be subtracted from the statements in order to achieve pure reality, for one simply cannot speak about reality without using a "language". Poincaré's analysis thus shows that there is no way to defend the point of view that geometry somehow describes space, the latter being understood as an object of empirical research. This is the basic anti-realist attitude Lorenzen essentially shared. However there is more in Lorenzen's approach: Lorenzen, interested in operationalizing the basic concepts of physics, thought of geometry as a normative theory of measurement. According to this point of view, geometry does not deal with nature, but with how to do spatial measurements; it is normative, not descriptive. If there is any sense in speaking about space as an entity or as an object, this entity must be thought of as constituted by the measuring operations.

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The challenging point in this approach is that for reasons of uniqueness and reproducibility geometry, now understood as a theory of measurement, is confined to Euclidean geometry. At face value it seems that Lorenzen's thus conflicts with general relativity, based on non-Euclidean geometry. But, as Lorenzen stressed, this is only true if one presupposes that relativistic phenomena have to be accounted for in geometric terms. The language of curved space-time however is only an interpretation of the data, replacing the dynamical interpretation dominating Newtonian mechanics. In so far as the geometric interpretation is ruled out by Lorenzen's approach, there is still the alternative of pursuing the dynamical interpretation.

I will not engage in a discussion of Lorenzen's alternative account of relativistic effects—this is a topic for experts on relativity. Instead, I will focus on two topics which constitute the originality of Lorenzen's approach: First, Lorenzen's idea of space as an object constituted by the spatial measuring operations. This approach offers an interesting way to give an account of the role of measuring instruments, neglected in most philosophical investigations of geometry. Moreover, it challenges the distinction between pure and applied geometry. Secondly, Lorenzen's approach stresses the point that what is conceived as a "fact" in empirical science is in reality the outcome of a process of interpretation. This process, as one may put it, is governed by tacit interpretation principles, which themselves are interrelated with other methodological basic concepts such as *understanding*, *explanation*, *causality* etc. Both points transcend the customary realism-antirealism quarrel in an original way. As a restriction however it should be stated that Lorenzen's approach is bound up with the way the problem of non-Euclidean geometry was put in the tradition of Riemann, von Helmholtz, and also Carnap in his famous study *Der Raum* of 1922, who focussed on space in the traditional meaning, whereas General Relativity involves four-dimension space-time where space and time depend on each other. Poincaré already in 1912 broached the issue of space-time, (cf. Walter 2009 and Poincaré 1912), but anyhow, as can be seen in Carnap's *Der Raum*, the traditional approach persisted. Put in Lorenzen's terms, to attack the problem of space-time would involve a theory of indirect measurement, for it is dealing with different frames of reference which can be linked with each other only by the way of indirect measurement.

In this paper, I will first give a sketch of some basic characteristics of Lorenzen's philosophy in order to show that interpretation is indeed an important issue in his philosophy of science, though it is usually not set out in terms of interpretation (Sect. 3.2). Next I will present Lorenzen's idea of a "measurement-theoretical a priori" (*messtheoretisches Apriori* (Lorenzen 1980), English (Lorenzen 1987)) which gives sense to his constitutional theory of space. I will cite two historical examples in order to motivate the idea of a priori elements in science (Sect. 3.3). Finally, I will show how Lorenzen applied this to geometry (Sect. 3.4).

3.2   Truth, Facts, and Interpretation in Lorenzen

One might wonder whether it is just to reframe Lorenzen's thought in terms of interpretative principles, a notion which admittedly is not prominent in Lorenzen's methodological basic writings. In relation to the Lorentz transformation however he indeed explicitly spoke of an "*Interpretationsproblem*":

> Lorentz-contraction and Einstein-dilatation raise the problem of interpretation: Do physical objects contract or is the measurement of length modified by motion? Do processes decelerate or is the measurement of time modified by motion? This interpretational problem of the Lorentz-Einstein algorithm (*Formelapparat*) already was debated by Lorentz and Einstein. Lorentz interpreted the alterations as real effects, whereas Einstein interpreted them as effects caused by the measuring procedure. (Lorenzen 1976, p. 386)

Elsewhere Lorenzen emphasised that between both interpretations there is no empirical difference and thus no empirical way to bring about a decision (Lorenzen 1979, p. 1); however a decision can be made and has to be made for methodological reasons:

> One might get the impression that the question whether length contraction is to be understood in geometrical or mechanical terms is a mere quarrel about words. This is wrong, for it makes a difference whether empirical physics (= mechanics) must be preceded by non-empirical Protophysics (= geometry and kinematics) in order to comprehend measurement *adequately*. (Lorenzen 1979, p. 3)

The issue of interpretation thus can indeed be found in Lorenzen's more specialised writings on relativity. I furthermore hold that the problem of interpretation is in fact an important issue of his epistemological thought as sketched in *Logical Propaedeutic. Pre-School of Reasonable Discourse* (Kamlah and Lorenzen 1967). In this book, a sort of founding document of the Erlangen School written in collaboration with Wilhelm Kamlah, Lorenzen rejected the opinion that sentences or propositions somehow represent existing facts the world is thought to be made up of. The reason for this rejection essentially repeats the Kantian argument that cognition cannot be immediately compared to its object:

> Truth, it is said, consists in the agreement of cognition with its object. [. . .] Now I can compare the object with my cognition, however, only by cognizing it. Hence my cognition is supposed to confirm itself, which is far short of being sufficient for truth. For since the object is outside me, the cognition in me, all I can ever pass judgement on is whether my cognition of the object agrees with my cognition of the object. (Kant 1992, pp. 557–558)

Lorenzen's argument has the very same structure apart from the fact that he replaced cognitions by sentences, i.e., mentalistic by linguistic entities. Kant's argument then reads like this: We cannot refer to facts in order to justify statements about the world, because we could do so only by referring to these facts linguistically, i.e., in the form of the statement we want to justify. Lorenzen finally put the argument in the following way: The word "fact" does not denote an existing entity we can