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Introduction

Johan van Benthem · Theo Kuipers · Henk Visser

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Evert Willem Beth (Almelo, July 7, 1908—Amsterdam, April 12, 1964) was the main founder of logic and formal philosophy in The Netherlands. His remarkable research career produced ground-breaking insights in the foundations of mathematics and philosophy, and his teaching inspired a generation of gifted students. Moreover, Beth's organizational talents were instrumental in creating the Amsterdam Institute for Logic and Foundations of the Exact Sciences, the first true philosophy department in The Netherlands, and the international Division of Logic, Methodology and Philosophy of Science. This issue of *Synthese* pays tribute to the lasting influence of this remarkable person.

J. van Benthem
Amsterdam, The Netherlands

T. Kuipers (✉)
Groningen, The Netherlands
e-mail: T.a.f.Kuipers@rug.nl

H. Visser
Maastricht, The Netherlands

Beth was trained as a philosopher, mathematician and physicist. His doctoral dissertation in 1935 was on the philosophy of mathematics, and he quickly became a prominent protagonist of the international scientific philosophy of the age, with mathematical logic as its strong arm. Soon a prolific philosophical period started, resulting in original insights into the nature of scientific philosophy, the philosophy of mathematics, and the semantics of physical theories. Beth's main mathematical results were found in the 1950s, in his more advanced years (a beacon of hope to the middle-aged who have not been touched by creativity yet). His Definability Theorem, his models for intuitionistic logic, and his semantic tableaux are well-established parts of modern logic, and their impact is felt even further in computer science. But Beth's intellectual force was much broader: he was instrumental in bringing modern linguistics to The Netherlands when many doors were still closed to Chomskian ideas, his *Euratom* project pioneered computational projects in automated deduction, and he wrote a book with Piaget on logic and cognitive psychology. Indeed, one can see about every contemporary theme that animates our modern circles in his work. Even the latest fashion in research on logic and games may have been present, since there remains the mystery of 'the lost manuscript', Beth's completed book on economics in the early 1950s whose existence we know about from his own correspondence, but that has never surfaced since.

This impressive work is described in Paul van Ulsen's dissertation *E. W. Beth. A Scientific Biography* ("E.W. Beth als Logicus", Amsterdam 2000). The book also describes several editorial projects. E.g., together with Arend Heyting, Beth founded the famous series *Studies in Logic*, a gold standard in the field. Van Ulsen also records many organizational activities with likeminded colleagues, local, national, and international, that show gratifyingly modern complexities and intrigues. These eventually led to structures that many of us live in today, such as the Amsterdam Institute for Logic, Language and Computation that continues Beth's program. These organizational ambitions also reflected a broader intellectual vision, namely, that scientific philosophy had a larger role to play in society, as a way of enhancing rationality in public discourse and public decision making. It is appropriate that we are publishing in the journal *Synthese*, that was founded in the 1930s with similar aims by a group of people close to the Significs Circle, where Beth was active.

Indeed, the Circle was where he met his future wife, Ms. Cornelia Beth-Pastoor, a remarkable person in her own right to whom our community owes a lot.

After her death in 1978, Ms. Beth left a will that created the *E. W. Beth Foundation* that still acts today as a guardian of Beth's legacy in its broadest form. The activities of the Foundation can be found on its website http://www.knaw.nl/beth/. In particular, a little brochure can be downloaded there with short descriptions of Beth's life and work, as well as personal reminiscences from famous logicians and philosophers.

The brochure was produced on the occasion of a *Centenary Congress* with a follow-up Public Day, held September 15–17, 2008 at the Royal Dutch Academy and the University of Amsterdam. A broad audience gathered, from senior to junior philosophers and logicians, to remember and celebrate Beth's achievements. We were happy to have a distinguished group of speakers: Dennis Dieks, Bas van Fraassen, Dov Gabbay, Stephan Hartmann, Dick de Jongh, Hans Kamp, Barteld Kooi, Hannes Leitgeb, Rohit Parikh, Katrin Schultz, Gerhard Schurz, Dana Scott, Pieter Seuren, Sonja Smets, and Albert Visser. The audience included many people who knew Beth personally as students or colleagues, but also young colleagues eager to continue in his spirit.

The papers in this volume are taken mainly from the presentations at the Centennial Workshop and Public Day, with one newly commissioned. The editors have tried to give an impression of the depth and width of Beth's interests, though of course, we live in another intellectual climate today, and our aim is not the past but the future. Just as a light introduction, we follow one thread through the material that you have here before you. The headings are modern, but the reader will also see striking invariants with Beth's concerns.

Pieter Seuren opens with personal reminiscences showing us Beth as a real person, using some Dutch-style clair-obscur strokes. Next, we collected a number of papers on the theme of *agency, language, and computation*. Rohit Parikh analyzes the importance of language in more realistic accounts of belief revision using Craig interpolation, closely related to Beth's definability theorem, and indeed to his interests in definability as a second pillar of logic next to deduction. Cédric Dégrémont and Jonathan Zvesper present recent research on logic and games, a current fashion reflecting interactive views of logic, but as we said before, maybe closer to Beth's concerns than one might think. Indeed, semantic tableaux are close to Lorenzen dialogues, an insight that one can find in a Beth–Lorenzen correspondence of 1955. Katrin Schultz presents recent research on default logics in natural language, where computational ideas meet with linguistics, and eventually also cognitive science these days. Next we have a strand on *proof and computation*, represented by Dov Gabbay's paper on reactive tableaux, merging Beth's ideas with a radical new view of semantic structures that can change under evaluation. A next group of papers represents the *philosophy of physics*, pursued in Beth's spirit. Dennis Dieks returns to Beth's original papers on physics, and shows how he led the way toward taking real physics seriously in philosophy and logic. Alexandru Baltag and Sonja Smets show how computation meets the foundations of science, showing how dynamic logics of measurement actions give a wholly new view of quantum mechanics and quantum logic. Next, we have papers on the *general methodology of science*. Gerhard Schurz gives a logical analysis in the grand Beth–Tarski style, resulting in a correspondence theorem that justifies weak realism for scientific theories, and provides an underpinning for their convergence to the truth. Foad Dizadji-Bahmani, Roman Frigg and Stephan Hartmann reanalyze a

classical model of reduction between theories, the web that keeps science together, in probabilistic terms using Bayesian confirmation theory, linking with a methodology that reaches from the natural to the social sciences. Finally, there is a paper connecting our two main strands of *logic and philosophy of science*. Hannes Leitgeb presents a light account of the current interface between the two areas, and presents themes for joint endeavour in analyzing the foundations of science, broadly inspired by the Vienna Circle. Of course, this is a highly congenial conclusion for this volume, though to Dutch editors like us, the new confluence need not happen in Vienna (and its shape need not be a circle).

Finally, we mention one person who could not be present at the Centennial Workshop. We dedicate this volume to a colleague who just died last winter, leaving us all saddened:

Professor Joop Doorman (1928–2009)

Joop Doorman was Beth's first student assistant, a long-time teacher of scientific philosophy at Eindhoven and Delft, and a person who, more than anyone, worked to realize Beth's broader vision of logic and philosophy in Dutch society through his tireless efforts in public debate, the ethics of science, the performing arts, and even directing a public broadcasting channel.