Logic and **L**ogical **P**hilosophy
Volume 14 (2005), 3–5
DOI: 10.12775/LLP.2005.001

Erik Weber

PATTERNS OF SCIENTIFIC REASONING: An Introduction

From December 2001 till December 2004, the Science, Innovation and Media Department of the Ministry of the Flemish Community (Belgium) and the State Committee for Scientific Research of the Republic of Poland funded a cooperation project (Bilateral Scientific and Technological Cooperation Project BIL01/80) between two Flemish and two Polish research centres. The Flemish partners were the Centre for Logic and Philosophy of Science of Ghent University and the centre with the same name of the Free University of Brussels. The Polish partners were the Chair of Logic and Philosophy of Science of the University of Zielona Góra and the Group of Logic and Cognitive Science of N. Copernicus University (Toruń).

The purpose of the project was the logical and historical analysis of some issues in the philosophy of science (such as: causation, induction, theory building, ...) and the theory of knowledge (such as: ampliative reasoning, the presuppositions of assertions, problem solving, the issue of how questions arise, ...). Most of the logical results will be published in a special issue of *Logique et Analyse*. This issue of *Logic and Logical Philosophy* is mainly dedicated to the results of the historical analyses.

In order to achieve their aims, the partners in the cooperation project organised four workshops: VlaPoLo6 (*The Dynamics of Reasoning in the Sciences: Adaptive and Interrogative Perspectives*, Ghent, 17–19 October 2002), VlaPoLo7 (*Problem Solving in the Sciences: Adaptive and Interrogative Perspectives*, Brussels, 8–10 May 2003), VlaPoLo8 (*Flemish-Polish Workshop on Adaptive and Erotetic Logics and their Application to the Philosophy of*

 ISSN: 1425-3305

Science, Zielona Gora, 20–22 November 2003) and VlaPoLo9 (*Patterns of Scientific Reasoning: Adaptive and Interrogative Perspectives*, Ghent, 6–8 May 2004).

In "The Collatz Conjecture. A Case Study in Mathematical Problem Solving", Jean Paul Van Bendegem starts form the idea that mathematicians spend lots of time proving theorems, but also spend lots of time preparing the ground to construct a proof. The other aspects of the daily life of the mathematician include (1) informal proofs, (2) career induction, (3) mathematical experiments, (4) probabilistic considerations, (5) computer proofs, and (6) meta-mathematical considerations. He argues that in the case of the Collatz conjecture, all but the first of these "extras" are present.

In "The Discovery of the Law of Gravitation from the Logical Point of View", Wojciech Sady discusses Popper's arguments against the logic of scientific discovery. He argues that Popper's case study (Newton's discovery of the law of gravitation) does not support the claim that there is no such logic.

In "The Modes of Physical Properties in the Logical Foundations of Physics", Sonja Smets presents a conceptual analysis of the notions of actual physical property and potential physical property as used by theoretical physicsits/mathematicians in the operational quantum logic. She analyses how these notions are used today, what role they play and how much of the Aristotelian connotations are embedded in their contemporary use.

In "The Causes and Cures of Scurvy. How Modern Was James Lind's Methodology?", Erik Weber and Leen De Vreese criticize the traditional view that the Scottish surgeon James Lind was very innovative in his research on the cures of scurvy (his experiments are usually regarded as the first randomised experiments in biomedical science) and rather old fashioned in his research on the causes of scurvy. They qualify both the idea of Lind as a modern therapist and of Lind as old fashioned in his investigation of the causes of diseases.

In "Tales of the Unexpected. Incongruity-Resolution in Humor Comprehension, Scientific Discovery and Thought Experimentation", Tim De Mey starts from the suggestion (made by some scholars) that thought experiments have something in common with jokes and from Thomas Kuhn's suggestion that what happens to someone who thinks through a thought experiment is very similar to what happens to a scientist who must assimilate the result of a new unexpected experimental discovery. He tries to pinpoint the presumed commonalities and identifies what cognitive linguists call "incongruity-resolution" as the problem-solving process not only

involved in humour comprehension, but in scientific discovery and thought experimentation as well.

In "Coping with Inconsistencies: Examples From the Social Sciences", Erik Weber and Jeroen Van Bouwel present two case studies on inconsistencies in the social sciences. The first is devoted to sociologist George Caspar Homans and his exchange theory. They argue that his account of how he arrived at his theory is highly misleading, because it ignores the inconsistencies he had to cope with. In the second case study they analyse how John Maynard Keynes coped with the inconsistency between classical economic theory and real economic conditions in developing his path-breaking theory.

Finally, in "Some Remarks on Axiomatizations of Logical Consequence Operations", Jacek Malinowski investigates the relation between the axiomatization of a given logical consequence operation and axiom systems defining the class of algebras related to that consequence operation. He shows that, in general, there are no natural relations between both ways of axiomatization.

Erik Weber
Centre for Logic and Philosophy of Science
Ghent University
Blandijnberg 2
B-9000 Gent, Belgium
Erik.Weber@UGent.be