

Problem Solving and Adaptive Logics.
A Logico-Philosophical Study

Diderik Batens

March 24, 2004

The present text is a draft. It will be changed and extended as the lectures continue. The table of contents, the preface, the bibliography, and the index are bound to change almost daily. For this reason I present the different chapters in separate files.

All comments and suggestions will be welcomed with gratitude.

Contents

1	The Problem, the Claim, and the Plan	1
1.1	On Solving Problems	1
1.2	Worries from the Philosophy of Science and from Erotetic Logic	5
1.3	Mastering Proof Heuristics	8
1.4	Unusual Logics Needed	11
1.5	The Traditional View on Logic	16
1.6	Logical Systems <i>vs.</i> Logical Procedures	18
1.7	The Plan	19
2	Prospective Dynamics: Pushing the Proof Search into the proof	21
2.1	Proofs and their Explications	21
2.2	Prospective dynamics: idea and examples	23
2.3	Prospective dynamics: characterization	26
2.4	Where went <i>Ex Falso Quodlibet</i> ?	29
2.5	The absence of <i>Ex Falso Quodlibet</i> —some comments	30
2.6	Some properties of \mathbf{CL}^-	32
2.7	Upgrading to Full Predicate Logic	38
2.8	Rules and strategies	41
2.9	Afterthought	42
3	Problem-Solving Processes	43
4	Enter Adaptive Logics	45
5	Prospective Dynamics for Adaptive Logics	47
6	Extensions, Open Problems and the Bright Side of Life	49
	Bibliography	50
	Index	56

Preface

Allow me to start with some expressions of gratitude. My first thoughts obviously go to the Faculty of Philosophy and Letters of the *Vrije Universiteit Brussel*, for inviting me to teach this Francqui chair, and to Jean Paul Van Bendegem for nominating me for this honourable job. There is, I must add, a small drawback to holding a Francqui chair. One's own university simply does not notice. Hence, one is supposed to go on doing one's job at the home university while taking on the supplementary job. Not that the amount of work is the problem here—the academic world was not created to enthrall those who long for a life that derives its gratification from being well-rewarded and quiet. Keeping concentrated on the important goals, however, is a problem.

I also want to express my gratitude with respect to the Flemish Academy of Belgium for Sciences and Arts, which enabled me to spend six nice months collaborating with Andrzej Wiśniewski from Zielona Góra (Poland) on the topic of scientific problem solving—this time with some facilities were provided at the home university. The basic insights I shall try to propagate while holding this chair derive from there.

Special thanks for comments on parts of a previous draft go to Maarten Van Dyck and Hans Lycke.

I would not be able to present the results I shall be presenting today and during the next lectures, if there was no Ghent Centre for Logic and Philosophy of Science. I have the privilege to be the oldest member of that Centre, and hence to have been enormously stimulated by the criticism, by the proposals, and even by some occasional mistakes of the younger people around. I am also indebted to colleagues and fellow researchers from other universities: Andrzej Wiśniewski from Zielona Góra, Leon Horsten from the Catholic University of Louvain, Marek Nasieniewski from Torun University, Iddo Lev (formerly) from Tel-Aviv University, and Graham Priest (presently) from Melbourne University. There are many others I should name and thank, but maybe it is wiser, were it only not to forget some, to thank the fellow logicians, philosophers, and computer scientists that have attacked and questioned my views and results in the international meetings where I lectured during the past ten years—with such opponents, who needs allies? And next there is the particular pleasure, provided by e-mail, to imagine the reaction of a known face on messages sent somewhere between Moscow, Bologna, Buenos Aires and Adelaide.