

THE POSING OF QUESTIONS

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THE POSING OF QUESTIONS

Logical Foundations of
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TO MY DAUGHTER

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INTRODUCTION

This book is a study in the logic of questions (sometimes called *erotetic logic*). The central topics in erotetic logic have been the structure of questions and the question-answer relationship. This book doesn't neglect these problems, but much of it is focussed on other issues. The main subject is the logical analysis of certain relations between questions and the contexts of their appearance. And our aim is to elaborate the conceptual apparatus of the inferential approach to the logic of questions.

Questions are asked for many reasons and for different purposes. Yet, before a question is asked or posed, a questioner must arrive at it. In many cases arriving at a question resembles coming to a conclusion: there are some premises involved and some inferential thought processes take place. If we agree that a conclusion need not be "conclusive", we may say that sometimes questions can play the role of conclusions. But questions can also perform the role of premises: we often pass from some "initial" question to another question. In other words, there are inferential thought processes - we shall call them *erotetic inferences* - in which questions play the roles of conclusions or conclusions and premises. The inferential approach to the logic of questions focusses its attention on the analysis of erotetic inferences.

This book consists of eight chapters.

In Chapter One we argue that special attention ought to be paid to those erotetic inferences, in which questions *arise* from the premises. We also argue that the concepts "a question arises from a set of declarative sentences" and "a question arises from a question and a set of declarative sentences" can be explicated in semantic terms and then we formulate some requirements of adequacy of the explications looked for. Finally, Chapter One includes some historical notes.

In Chapter Two we introduce the basic terminology and notation used thorough the book. Chapter Two contains also a general overview of the existing logical theories of questions and answers as well as a more detailed exposition of the theories proposed by David Harrah, Lennart Åqvist, Jaakko Hintikka, Tadeusz Kubiński and Nuel D. Belnap. There are two reasons for including this presentation. First, it seems that it can make the proposals presented in the next chapter more comprehensible and less arbitrary. Second, elementary introductions to the existing theories of questions and

answers are hard to find in the literature. Yet, an impatient reader can easily skip the second part of Chapter Two.

Chapter Three contains a new proposal about the analysis of questions. Questions of formalized languages are viewed as expressions of strictly defined forms; they are not reduced to expressions of other syntactical categories. Roughly, a question of a formalized language is an expression made up of two main constituents: the sign ? and an object-language expression such that the equiform expression of the metalanguage designates the set of direct answers to the question. Questions of formalized languages represent natural-language questions; the relevant concept of representation is discussed and an analysis of some English interrogatives is provided.

In Chapter Four we propose a certain semantics for formalized languages whose meaningful expressions are both declarative formulas and questions. This semantics is basically a version of model-theoretical semantics; some new concepts are introduced for the purposes of erotetic analysis. Among them are: the concept of soundness of a question in an interpretation of the language, the concepts of relative soundness and relative informativeness of a question, different concepts of presuppositions of questions, the erotetic concepts of safety, riskiness and self-rhetoricity. Normal questions, regular questions and proper questions are also defined and the concepts of just-complete answers and partial answers are introduced. Many of the above erotetic concepts are defined by means of the concept of multiple-conclusion entailment; this concept also serves as one of the main tools of our further analysis.

In Chapter Five the semantic concept of *evocation* of a question by a set of declarative formulas is introduced. The proposed definition of evocation is an explication of the concept "a question arises from a set of declarative sentences" analyzed in Chapter One. The properties of evocation are examined in detail and examples are presented.

Chapter Six is devoted to *generation* of questions by sets of sentences. This concept is also defined in semantic terms. From the purely formal point of view generation is a special case of evocation: it is the evocation of risky questions. But the proposed definition can also be viewed as a new explication of the concept explicated previously in terms of evocation.

In Chapter Seven the concept of *erotetic implication* is introduced. Erotetic implication is a ternary relation between a question, a (possibly empty) set of declarative formulas, and a question. As in the previous cases, it is defined in semantic terms. The proposed definition of erotetic implication is

an explication of the concept "a question arises from a question and a set of declarative sentences" analyzed in Chapter One. The properties of erotetic implication are examined in detail and examples are presented. Some special cases of erotetic implication, namely, pure erotetic implication and strong erotetic implication are also analyzed. The concept of reducibility of a question to a non-empty set of questions is introduced and the connections between erotetic implication and reducibility are characterized.

In Chapter Eight the results of the previous chapters are applied in the logical analysis of erotetic inferences. Two syntactical concepts of (abstract) erotetic arguments are introduced and the concepts of *validity* of these arguments are defined in terms of evocation and erotetic implication, respectively. The concept of the logic of questions of a semantically interpreted object-language whose meaningful expressions are both declarative formulas and questions is defined and discussed.

Although this book is a study in the logic of questions, some of the problems discussed here may be of some interest to philosophers, cognitive scientists and computer scientists. This fact is reflected in the structure of the book: an attempt is made to apply the simplest possible notation and avoid excessive conciseness in presentation. Thus some parts of the book may be regarded as prolix by logicians. I do hope that they will forgive me that; after all, it is better to say too much than too little.

Some results presented here were included in my book "Stawianie pytań: logika i racjonalność" published in 1990. The present book, however, is not a simple translation of its Polish predecessor: there are differences in the ways of presentation as well as in the arrangement and, more importantly, large parts of the material included here do not occur in the Polish version. Some of the new results were already published, *int. al.*, in *Journal of Philosophical Logic* and *Erkenntnis* (cf. Bibliography), whereas the remaining ones are published here for the first time.

I owe many thanks to many people. I am indebted to my teacher in logic, Tadeusz Kubiński, for his assistance at the early stage of my work on the logic of questions. I would like to thank Leon Koj for his continuous encouragement and help. Six chapters of this book were written during my stay as a Fulbright grantee in the Department of Philosophy, University of California, Riverside. I am indebted to the Fulbright Program for support. I am especially grateful to David Harrah for his comments, criticism and linguistic assistance; without his help this book would never have been completed. I am also indebted to Sylvain Bromberger and Theo A. F. Kuipers for discussions and comments on some parts of the material. I am

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Needless to say, this is the author who is responsible for all the mistakes.

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