Jean-Yves Béziau
Stamatis Gerogiorgakis (Editors)
New Dimensions of the Square of Opposition
Analytica
Investigations
in Logic, Ontology and the Philosophy of Language

Editors:
Ignacio Angelelli, Austin (Texas / USA)
Joseph M. Bocheński †
Christian Thiel, Erlangen (D)

Managing Editor:
Stamatos Gerogiorgakis, Basel (CH)
New Dimensions
of the Square of Opposition

Edited by Jean-Yves Béziau
and Stamatios Gerogiorgakis

Philosophia
Table of Contents

Jean-Yves Béziau / Stamatios Gerogiorgakis
The Many Dimensions of the Square of Opposition
Introduction 9

1 HISTORICAL AND CRITICAL ASPECTS OF THE SQUARE

Paul J.E. Dekker
Heraclitean Oppositions 19

Juliette Lemaire
Is Aristotle the Father of the Square of Opposition? 33

Stamatios Gerogiorgakis
A Vindication of a secundum-quid-et-simpliciter Solution of the Paradox of Epimenides by Way of Mereological Hexagons 71

Enrique Alvarez and Manuel Correia
Conversion and Opposition: Traditional and Theoretical Formulations 87

Régis Angot-Pellissier
Taoist Logical Hexagon. The Philosophical Meaning of 3-opposition and Weak 2-opposition in Cosmology 107
2 THE SQUARE OF OPPOSITION AND NON-CLASSICAL LOGICS

Ka-fat Chow
Opposition Inferences and Generalized Quantifiers | 155

Claudio Pizzi
Contingency Logics and Modal Squares of Opposition | 201

Christian de Ronde, Hector Freytes and Graciela Domenech
Quantum Mechanics and the Interpretation of the Orthomodular Square of Opposition | 221

Luca Tranchini and Michael Arndt
A Constructive View of the Square of Oppositions | 241

Fatemah Ayatollah Zadeh Shirazi
2ⁿ-polygon of Opposition and 2ⁿ-tuples Satisfying It | 275

3 APPLICATIONS OF THE SQUARE OF OPPOSITION

François Nicolas
The Hexagon of Opposition in Music | 299

Jean-Yves Béziau
Opposition and Order | 321
Jonas R. Becker Arenhart and Décio Krause
Oppositions and Quantum Mechanics: Superposition and Identity | 337

Katarzyna Gan-Krzywoszyńska and Piotr Leśniewski
An Erotetic Hexagon: Oppositions as a Basis for the Logic of Questions | 355

Fabio Tfouni
Interdiction and Silence: A Traditional Reading of the Square of Opposition | 377

Index | 391

Abstracts / Authors’ Short Biographies | 399
Jean-Yves Béziau  
Stamatiou Gerogiorgakis

The Many Dimensions  
of the Square of Opposition  
Introduction

The square of opposition is a two-dimensional diagram that can be extended in various ways: as a polygon (hexagon, octagon, decagon, etc.) or as a polyhedron (cube, cuboctahedron, bi-simplex, etc). Some of these geometrical extensions are discussed in this book, in particular Blanché’s hexagon which undoubtedly was a major improvement of the square and a decisive step for the development of new directions in the theory of logical opposition.

The idea of Blanché’s hexagon, fully presented in his book Intellectual Structures (1966), is not a straightforward geometrical generalization of the square such as a cube of opposition. It is a clever reconstruction of the square solving many problems related to the theory of opposition as systematized and depicted by Boethius in a square diagram based on Aristotle’s ideas about opposition, concept and quantification. Moreover, Blanché has shown how the hexagon can be used to articulate the understanding of many notions, promoting this figure as a basic tool for conceptual analysis. This hexagon built as a contradictory entanglement of a triangle of contrariety and a triangle of subcontrariety is a powerful structure that can generate more abstract geometrical objects and can be applied to the most various notions, ranging from music to economy, from religion to mathematics, quantum physics to psychoanalysis (see Béziau 2012a). Such a figure of opposition reflects and unifies the many dimensions of human mind in connection with reality.
The *square of opposition* can be understood in two different ways:

(1) as a diagram,
(2) as a theory of opposition.

The relation between these two meanings varies quite a lot and there is also an interaction between the theory and the diagram. There is a theory very close to Aristotelian notions of logic and Boethius’s diagram. This theory is based on the four types of categorical propositions and described by the following version of the square:

![Square of Opposition Diagram]

The four corners of this square are traditionally abbreviated by the four letters A, E, I, O. This leads to a more abstract picture:

---

1. About the meaning of these abbreviations and some interesting details about the history of the square, see Seuren (2010).