

CONTENTS

Chapter 1

ULTIMATE EXPLANATIONS 1

1. *To Understand Understanding*
2. *The Totalitarianism of the Method*
3. *Models*
4. *Anthropic Principles and Other Universes*
5. *Creation of the Universe*

PART I

MODELS 13

Chapter 2

PROBLEMS WITH THE ETERNITY OF THE UNIVERSE 15

1. *The Eternity and Infinity of the Universe*
2. *The Thermal Death Hypothesis*
3. *Einstein's First Model*
4. *The Universe and Philosophy*
5. *An Expanding Vacuum*
6. *The Crisis of Einstein's Philosophy*

Chapter 3

A CYCLICAL UNIVERSE 23

1. *The Problem of the Beginning*
2. *An Oscillating Universe*
3. *The Recurrence Theorem*
4. *Tolman's Universes*
5. *Tipler's Theorem*
6. *Singularities*

CONTENTS

Chapter 4

A LOOPED COSMOS 33

1. *Visions of Closed Time*
2. *Kurt Gödel's Universe*
3. *Gott and Li's Suggestion*
4. *Causality and Time*
5. *Physics and Global Time*
6. *The Space-Time Foam*

Chapter 5

CONTINUOUS CREATION VERSUS A BEGINNING 43

1. *From the Static to the Steady State*
2. *A New Cosmology is Born*
3. *Bondi and Gold's Universe*
4. *Hoyle's Universe*
5. *In the Heat of Debate*
6. *The Demise of the Cosmology of the Steady State*
7. *Creation and Viscosity*

Chapter 6

SOMETHING ALMOST OUT OF NOTHING 57

1. *The Horizon Problem and the Flatness Problem*
2. *The Mechanism of Inflation*
3. *The Inflationary Scenario*
4. *Some Critical Remarks*

Chapter 7

THE QUANTUM CREATION OF THE UNIVERSE 65

1. *From Inflation to Creation*
2. *A Universe Out of the Fluctuations of a Vacuum*
3. *The Wave Function of the Universe*
4. *Path Integrals*
5. *Critical Remarks*

CONTENTS

PART II

ANTHROPIC PRINCIPLES AND OTHER UNIVERSES 75

Chapter 8

THE ANTHROPIC PRINCIPLES 77

1. *A Complex of the Margin*
2. *The Era of Man*
3. *Carter's Lecture*

Chapter 9

NATURAL SELECTION IN THE POPULATION
OF UNIVERSES 83

1. *The Multiverse*
2. *The Natural Selection of the Universes*
 3. *Situational Logic*
 4. *Critical Remarks*
5. *Is Life Cheaper Than a Low Entropy?*
 6. *Falsification*

Chapter 10

THE ANTHROPIC PRINCIPLES AND THEORIES
OF EVERYTHING 91

1. *The Search for Unity*
2. *Can the Structure of the Universe be Changed?*
 3. *Rigid Structures*
4. *Imagination and Rationalism*
5. *Our Anthropocentrism?*

Chapter 11

THE METAPHYSICS OF THE ANTHROPIC
PRINCIPLES 99

1. *Three Philosophical Attitudes*
2. *The "Participatory Universe"*
3. *Creating Our Own History*
4. *How Many Copies of Himself Does the Reader Have?*
 5. *A False Alternative*

CONTENTS

Chapter 12

TEGMARK'S EMBARRASSMENT 107

1. *Other Universes in Philosophy and Mathematical Physics*
 2. *Domains and Universes*
 3. *Juggling About with Probabilities*
 4. *An Apology for the Multiverse*

PART III

CREATION OF THE UNIVERSE 115

Chapter 13

THE DRIVE TO UNDERSTAND 117

Chapter 14

THE METAPHYSICS AND THEOLOGY
OF CREATION 123

1. *The Idea of Creation in the Old Testament*
2. *The Greek Contention With the Origin of the Universe*
 3. *The Christian Theology of Creation*
 4. *Origen*
 5. *Augustine*

Chapter 15

CREATION AND THE PERPETUITY OF THE UNIVERSE 133

1. *Crisis*
2. *A Problematic Situation*
3. *Contra Murmurantes. . .*

Chapter 16

CONTROVERSIES OVER THE OMNIPOTENCE
OF GOD 139

1. *Two-Way Questions*
2. *Dilemmas of Divine Omnipotence*
3. *From Classification to Mathematicality*

CONTENTS

Chapter 17

NEWTON'S WORLD 145

1. *Newton's Scholium*
2. *A Mathematical Plan of Creation*
3. *Physico-Theology and the Concept of Creation*
 4. *Newton's Impact*

Chapter 18

LEIBNIZ'S WORLD 151

1. *Newton and Leibniz*
2. *When God Calculates and Thinks Things Through*
 3. *Secrets of the Divine Calculation*
 4. *Time and Space*
 5. *Causality*

Chapter 19

THE INITIAL SINGULARITY AND THE CREATION OF THE
WORLD 161

1. *The Question of Evolution and its Beginning*
 2. *Time and its Beginning*
 3. *Problems with the Singularity*
 4. *Methodological Reservations*
 5. *The Great Sign*

Chapter 20

CREATION AND EVOLUTION 169

1. *Two Misappropriations*
2. *The Hyperspace of Life*
3. *Probability and Chance*
4. *God and Chance*

Chapter 21

LEIBNIZ'S QUESTION 177

1. *L. Kuhn's Catalogue of Explanations*
 2. *Leibniz's Question*
 3. *The Domino Effect*
4. *The Existence of the Universe and the Rules of Language*
 5. *The Probability of Nothing*
 6. *A Brute Fact*

CONTENTS

EPILOGUE: THE LESSON OF PSEUDO-DIONYSIUS 185

NOTES AND REFERENCES 191

INDEX 209