Contents

Acknowledgments 9

Preface by Ernest Nagel 11

General Introduction 15

PART ONE

SCIENCE, LANGUAGE, AND EXPERIENCE

Introduction 21

1. TWO KINDS OF PROPERTIES: *Galileo Galilei* 27
2. THE RELATION OF SENSE-DATA TO PHYSICS: *Bertrand Russell* 33
3. RUSSELL'S PHILOSOPHY OF SCIENCE: *Ernest Nagel* 55
4. "FURNITURE OF THE EARTH": *L. Susan Stebbing* 69
5. LANGUAGE AND EXPERIENCE: *R. L. Goodstein* 82
6. OPERATIONISM, OBSERVATION, AND SCIENTIFIC TERMS: *Carl G. Hempel* 101
7. MEASUREMENT: *Ernest Nagel* 121

8. ON THE THEORY OF SCALES OF MEASUREMENT: *S. S. Stevens* 141

9. ELEMENTARY AND ABSTRACT TERMS: *Rudolf Carnap* 150

10. THEORETICAL TERMS AND A MODEST EMPIRICISM: *Israel Scheffler* 159

PART TWO

LAWS AND THEORIES

Introduction 177

1. PHYSICAL LAW: *Pierre Duhem* 182

2. PROBLEMS OF THE CONCEPT OF GENERAL LAW: *Carl G. Hempel and P. Oppenheim* 198

3. LAWS AND THEORIES IN THE PHYSICAL SCIENCES: *C. F. Presley* 205

4. ON METHODS OF REPRESENTATION: *W. H. Watson* 226

5. THEORIES AS REPRESENTATIONS: *Ludwig Boltzmann* 245

6. PROBABILITY AND DEGREE OF CONFIRMATION: *Ernest Nagel* 253

7. THE SIGNIFICANCE AND PURPOSE OF NATURAL LAWS: *Ernst Mach* 266

8. EXPLANATION, PREDICTION, AND ABSTRACTION: *Israel Scheffler* 274

9. THE MEANING OF REDUCTION IN THE NATURAL SCIENCES: *Ernest Nagel* 288

PART THREE

SPACE, TIME, AND CAUSALITY

Introduction 315

1. ABSOLUTE AND RELATIVE SPACE, TIME, AND MOTION: *Isaac Newton* 322

2. CRITICISM OF NEWTON'S DOCTRINES ON SPACE: *George Berkeley* 330

3. NEWTON'S VIEWS ON TIME, SPACE, AND MOTION: *Ernst Mach* 335

4. TWO SYSTEMS OF MECHANICS: *Heinrich Hertz* 349

5. HERTZ ON CLASSICAL MECHANICS: *Henri Poincaré* 366

6. GEOMETRY AND SPACE: *Henri Poincaré* 374

7. COORDINATIVE DEFINITIONS, RIGID BODIES, AND THE RELATIVITY OF SPACE: *Hans Reichenbach* 383

8. LOGICAL AND PHILOSOPHICAL FOUNDATIONS OF THE SPECIAL THEORY OF RELATIVITY: *Adolf Grünbaum* 399

9. MEANING AND SCIENTIFIC STATUS OF CAUSALITY: *Henry Margenau* 435

10. THE COPENHAGEN INTERPRETATION OF QUANTUM THEORY: *Norwood Russell Hanson* 450

Selected Bibliography 471