

TABLE OF CONTENTS

EDITORIAL PREFACE	v
PREFACE	xv
ABSTRACT	xix
NOTATION AND ABBREVIATIONS	xxi
CHAPTER 1 / INTRODUCTION: METHODOLOGY, IDE- OLOGY, AND SCIENTIFIC REVOLUTIONS	1
CHAPTER 2 / EPISTEMIC STRUCTURALISM: THE LIMIT TO RADICAL ALTERNATIVES TO TRADI- TIONAL EPISTEMOLOGY	16
2.1. INTRODUCTION: THE PROBLEM	16
2.2. EPISTEMIC STRUCTURALISM	17
2.3. THE TRADITIONAL PROBLEM OF EPISTEMIC STRUC- TURE: WHAT IS KNOWLEDGE?	19
2.4. PSYCHOLOGISM: THE IDEOLOGY OF SUBJECTIVISM IN TRADITIONAL EPISTEMOLOGY	24
2.5. FOUNDATIONS OF HUMAN KNOWLEDGE: THE TRA- DITIONAL PROBLEM OF RATIONALITY	27
2.6. POST-DARWINIAN EPISTEMOLOGY: THE RADICAL- ISM OF POPPER AND QUINE	29
2.7. EPISTEMIC STRUCTURALISM IN RETROSPECT	38
CHAPTER 3 / PROBLEMS OF STRUCTURE AND GROWTH: TOWARDS AN INTERACTIVE MODEL OF THE GROWTH OF SCIENTIFIC KNOWLEDGE	40
3.1. THE FRAME OF REFERENCE FOR AN OBJECTIVISTIC EPISTEMOLOGY	40
3.1.1. <i>On the Method of Evaluating an Epistemological Theory</i>	40
3.1.2. <i>The Problem of the Growth of Scientific Knowledge</i>	42

3.2.	METHODOLOGIES OF EPISTEMIC APPRAISAL AS EMBEDDED IN THE MODELS OF EPISTEMIC STRUCTURE	44
3.2.1.	<i>The Unit of Epistemic Appraisal as a Unit of Diachronic Analysis</i>	44
3.2.2.	<i>From a Unicellular Model of Epistemic Structure to a Cumulative Model of the Growth of Knowledge: Another Look at Inductivism</i>	46
3.3.	THE CONCEPT OF A GROWING SYSTEM: TOWARDS A GENERAL INTERACTION THEORY	48
3.3.1.	<i>The Problem-Situation</i>	48
3.3.2.	<i>The Conditions of Significant Interaction</i>	54
3.4.	INDUCTIVISM AND BEYOND	75
3.4.1.	<i>The Inherent Inadequacy of the Inductivist Models of Epistemic Structure and Growth of Knowledge</i>	75
3.4.2.	<i>Empirical Science as a Negative-Feedback Controlled Problem-Solving System</i>	77
3.5.	THEORY-PROBLEM INTERACTION: THE RESOLVING POWER OF SCIENTIFIC THEORY	81
3.5.1.	<i>Explanatory Power of Scientific Theory as a Basis of Epistemic Appraisal</i>	81
3.5.2.	<i>The Resolving Power of Scientific Theory as a Basis of Epistemic Appraisal</i>	85
3.5.3.	<i>Ideal-Type Generalizations: Their Unique Resolving Power</i>	98
3.5.4.	<i>The Resolving Power of Physical Theory: A Dynamical Case Study</i>	102
3.6.	THE STRUCTURE AND THE INTERACTIVE MODEL OF THE GROWTH OF SCIENTIFIC KNOWLEDGE	108
3.6.1.	<i>The Epistemic Structures as Type-Distinct Developmental Structures</i>	108
3.6.2.	<i>The Interactive Pattern of the Growth of Scientific Knowledge</i>	109
CHAPTER 4 / CONSEQUENCES AND ALTERNATIVE METHODOLOGIES		111
4.1.	DUHEM, POPPER AND THE METHODOLOGY OF THEORY-PROBLEM INTERACTIVE SYSTEMS	111

4.2. THE METHODOLOGY OF SCIENTIFIC RESEARCH PROGRAMMES: CRITICISM	114
4.3. PROBLEMS, THEORIES, AND PARADIGM-APPRAISALS	124
4.3.1. <i>The Method of Elucidating and Appraising a Paradigm: The Wittgensteinian Way</i>	124
4.3.2. <i>The Doctrine of Revolutionary Debates and Incommensurable Paradigms</i>	126
4.3.3. <i>Radical Translation and Incompatible Theories</i>	136
 CHAPTER 5 / THE NATURE OF METHODOLOGICAL VARIANCE: FROM COMMENSURABLE CANONS TO INCOMMENSURABLE STRATEGIES	 144
5.1. PROBLEMS OF THE CANON AND THE STRATEGY	144
5.2. THE NATURE OF STRATEGY IN SCIENCE	151
5.2.1. <i>Models as Reduction-Strategies</i>	151
5.2.2. <i>The Classical Perceptibility Requirement and the Problem of a Permissible CSD</i>	158
5.2.3. <i>The Perceptibility Requirement as a Pragmatical Imperative</i>	163
5.3. PHYSICAL THEORY WITHOUT PRAGMATICAL IMPERATIVES	168
5.3.1. <i>The Structure of Modern Physical Theory: Operationism and Empiricism</i>	168
5.3.2. <i>Threefold Variance in Science: Invariance and Theoretical Universals</i>	178
 NOTES	 184
 BIBLIOGRAPHY	 208
 NAME INDEX	 215
 SUBJECT INDEX	 218