

# CONTENTS

Preface	xiii
Chapter One: From New Wave Reduction to New Wave Metascience	1
1. Why Cellular and Molecular Neuroscience?	1
2. Background: The Intertheoretic Reduction Reformulation of the Mind-Body Problem	6
3. Revolts Against Nagel's Account	10
3.1 "Radical" Empiricism (and Patrick Suppes)	10
3.2 Schaffner's General Reduction (-Replacement) Paradigm	15
3.3 Hooker's General Theory of Reduction	16
4. Extending Hooker's Insight: New Wave Reduction	21
4.1 Handling Multiple Realizability	21
4.2 New Wave Reduction	26
5. WWSD? (What Would Socrates Do?)	29
5.1 Problems for New Wave Reductionism	29
5.2 New Wave Metascience	31
Notes	40
Chapter Two: Reduction-in-Practice in Current Mainstream Neuroscience	43
1. A Proposed "Psychoneural Link"	44
2. Two Psychological Features of Memory Consolidation	46
3. LTP is Discovered	52
3.1 From Hebb's Neuropsychological Speculations, 1949, to Norway, 1973	52
3.2 Some Basic Cellular Neuroscience	53
3.3 Back to Norway, 1973	61
4. Molecular Mechanisms of LTP: One Current Model	62
4.1 Early Phase LTP	63
4.2 Late Phase LTP	67
5. But is This Really Memory (Consolidation)?	75
5.1 Declarative Memory	76
5.2 Biotechnology Solves a Long-Standing Methodological Problem in LTP-Memory Research	81
5.3 An Experimental Link Between Molecules and Behavior: PKA, CREB, and Declarative Long-Term Memory Consolidation	88
6. The Nature of "Psychoneural Reduction" at Work in Current Mainstream (Cellular and Molecular) Neuroscience	95
Notes	102

Chapter Three: Mental Causation, Cognitive Neuroscience, and Multiple Realization	107
1. The Problem of Mental Causation	107
2. Letting Neuroscientific Practice be Our Guide	111
3. What About Cognitive Neuroscience?	115
3.1 “Levels” Questions Within Neuroscience	115
3.2 Searching For the Cellular Mechanisms of the Sequential Features of Higher Cognition	117
3.3 Cognitive Neuroscientific Resources to the Rescue: Biological Modeling and Functional Neuroimaging	121
3.4 Philosophical Lessons From Transdisciplinary Neuroscience	128
4. Putnam’s Challenge and the Multiple Realization Orthodoxy	131
5. Molecular Mechanisms of Nondeclarative Memory Consolidation in Invertebrates	136
5.1 Single-Gene Fly Mutants for Associative Learning	136
5.2 Consolidating Nondeclarative Memory in the Sea Slug	141
6. Evolutionary Conservatism at the Molecular Level: The Expected Scope of Shared Molecular Mechanisms	149
7. Consequences For Current Philosophy of Mind	157
Notes	158
Chapter Four: Consciousness	163
1. Prefrontal Neurons Possess Working Memory Fields	165
2. Construction and Modulation of Memory Fields: From Circuit Connectivities to Receptor Proteins	171
3. Explicit Attention and Its Unremarkable Effects on Individual Neuron Activity	178
4. Single-Cell Neurophysiology and the “Hard Problem”	189
4.1 Chalmers on Easy Versus Hard Problems of Consciousness	189
4.2 Neuroscientific Background: Wilder Penfield’s Pioneering Use of Cortical Stimulation	190
5. Inducing Phenomenology From Visual Motion to Somatosensory Flutter ... And Beyond?	194
5.1 Results from William Newsome’s Lab	194
5.2 Results from Kenneth Britten’s Lab	200
5.3 Results from Ranulfo Romo’s Lab	203
6. The Strange Case of Phenomenal Externalism	206
7. The “Hard Problem” and the Society for Neuroscience Crowd	212
Notes	213
Bibliography	217
Index	229



<http://www.springer.com/978-1-4020-7394-6>

Philosophy and Neuroscience  
A Ruthlessly Reductive Account

Bickle, J.

2003, XVI, 235 p., Hardcover

ISBN: 978-1-4020-7394-6