# PART 1 THE TWO CULTURES MEET IN THE NEW YORK SCHOOL

INTRODUCTION 3

1 THE EMERGENCE OF AN ABSTRACT SCHOOL
OF ART IN NEW YORK 9

# PART 2 A REDUCTIONIST APPROACH TO BRAIN SCIENCE

2 THE BEGINNING OF A SCIENTIFIC APPROACH
TO THE PERCEPTION OF ART 17

The Beholder's Share 17

The Inverse Optics Problem: Intrinsic Limitations of Visual Perception 20

## 3 THE BIOLOGY OF THE BEHOLDER'S SHARE: VISUAL PERCEPTION AND BOTTOM-UP PROCESSING IN ART 25

The Visual System 26

The Face-Processing Component of the Visual System 30

Other Components of the Human Nervous System 35

The Interaction of Vision and Touch and the Recruitment of Emotion 37

## 4 THE BIOLOGY OF LEARNING AND MEMORY: TOP-DOWN PROCESSING IN ART 41

A Reductionist Approach to Learning and Memory 43

Merging the Psychology and Biology of Learning and Memory 44

Where Is Memory Stored? 46

How Is Memory Stored? 47

The Formation of Short- and Long-Term Memory 52

Modifying the Functional Architecture of the Brain 55

Top-Down Processing and Art 57

## PART 3 A REDUCTIONIST APPROACH TO ART

5 REDUCTIONISM IN THE EMERGENCE
OF ABSTRACT ART 61

Turner and the Move Toward Abstraction 61

Monet and Impressionism 65

Schoenberg, Kandinsky, and the First Truly Abstract Images 71

### 6 MONDRIAN AND THE RADICAL REDUCTION OF THE FIGURATIVE IMAGE 77

7 THE NEW YORK SCHOOL OF PAINTERS 87

De Kooning and the Reduction of Figuration 88

Pollock and the Deconstruction of the Easel Painting 101

## 8 HOW THE BRAIN PROCESSES AND PERCEIVES ABSTRACT IMAGES 109

Sensation and Perception 110

Revisiting the Abstract Painting of de Kooning and Pollock 116

### 9 FROM FIGURATION TO COLOR ABSTRACTION 123

Rothko and Color Abstraction 123

Louis's Approach to Abstraction and Reduction of Color 132

The Emotional Power of Color-Field Painting 141

#### 10 COLOR AND THE BRAIN 143

Color Vision 144

Color and Emotion 147

11 A FOCUS ON LIGHT 155

Flavin and Fluorescent Light 155

Turrell and the Physical Presence of Light and Space 159

## 12 A REDUCTIONIST INFLUENCE ON FIGURATION 163

Katz and the Return to Figuration 164

Warhol and Pop Art 168

Close and Synthesis 171

# PART 4 THE EMERGING DIALOGUE BETWEEN ABSTRACT ART AND SCIENCE

13 WHY IS REDUCTIONISM SUCCESSFUL IN ART? 177

Abstract Art's New Rules for Visual Processing 178

The Beholder as Creative Viewer 182

Creativity and the Default Network: Abstract Art 183

Abstract Art and the Construal-Level Theory of Psychological Distance 185

14 A RETURN TO THE TWO CULTURES 187

Acknowledgments 191

Notes 193

References 197

Illustration Credits 209

Index 217