
CONTENTS

PREFACE xiii

INTRODUCTION 1

PART ONE THE ENVIRONMENT TO BE PERCEIVED

ONE THE ANIMAL AND THE ENVIRONMENT 7

The Mutuality of Animal and Environment 8
The Difference Between the Animal Environment and the Physical World 8
The Time Scale of the Environment: Events 10
Permanence and Change of the Layout 12
Summary 15

TWO MEDIUM, SUBSTANCES, SURFACES 16

The Medium 16
Substances 19
Surfaces and the Ecological Laws of Surfaces 22
The Qualities of Substantial Surfaces 31
Summary 32

THREE THE MEANINGFUL ENVIRONMENT 33

A Nomenclature for Surface Layout 33
What the Environment Affords the Animal 36
The Environment of One Observer and the Environment of All Observers 43
Summary 44

PART TWO THE INFORMATION FOR VISUAL PERCEPTION

FOUR THE RELATIONSHIP BETWEEN STIMULATION AND STIMULUS INFORMATION 47

The Distinction Between Luminous and Illuminated Bodies	47
The Distinction Between Radiation and Illumination	48
The Distinction Between Radiant Light and Ambient Light	50
The Structuring of Ambient Light	51
Stimulation and Stimulus Information	52
Do We Ever See Light as Such?	54
The Concept of the Stimulus as an Application of Energy	55
Ambient Energy as Available Stimulation	57
The Orthodox Theory of the Retinal Image	58
A Demonstration That the Retinal Image Is Not Necessary for Vision	61
The Concept of Optical Information	62
Summary	63

FIVE THE AMBIENT OPTIC ARRAY 65

How Is Ambient Light Structured? Preliminary Considerations	66
The Laws of Natural Perspective: The Intercept Angle	69
Optical Structure with a Moving Point of Observation	72
The Change Between Hidden and Unhidden Surfaces: Covering Edges	76
How Is Ambient Light Structured? A Theory	86
Variants and Invariants with a Moving Source of Illumination	88
Ripples and Waves on Water: A Special Case	92
Summary	92

SIX EVENTS AND THE INFORMATION FOR PERCEIVING EVENTS 93

A Classification of Terrestrial Events	94
The Optical Information for Perceiving Events	102
The Causation of Events	109
Summary	110

SEVEN THE OPTICAL INFORMATION FOR SELF-PERCEPTION 111

The Specifying of the Self by the Field of View	111
The Specifying of Limb Movements	120
The Specifying of Locomotion	121
Summary	126

EIGHT THE THEORY OF AFFORDANCES 127

The Niches of the Environment 128
Man's Alteration of the Natural Environment 129
Some Affordances of the Terrestrial Environment 130
The Origin of the Concept of Affordances: A Recent History 138
The Optical Information for Perceiving Affordances 140
Misinformation for Affordances 142
Summary 143

PART THREE VISUAL PERCEPTION

**NINE EXPERIMENTAL EVIDENCE FOR DIRECT PERCEPTION:
PERSISTING LAYOUT 147**

Evidence for the Direct Perception of Surface Layout 147
Is There Evidence Against the Direct Perception of Surface Layout? 166
Summary 168

**TEN EXPERIMENTS ON THE PERCEPTION OF MOTION IN THE
WORLD AND MOVEMENT OF THE SELF 170**

The Perception of Changing Surface Layout 170
The Coperception of One's Own Movement 182
Summary 187

**ELEVEN THE DISCOVERY OF THE OCCLUDING EDGE AND
ITS IMPLICATIONS FOR PERCEPTION 189**

Kaplan's Experiment 189
Anticipations of the Occluding Edge 190
The Theory of Reversible Occlusion 191
What Is Seen at This Moment from This Position Does Not Comprise What Is
Seen 195
Perception over Time from Paths of Observation 197
The Problem of Orientation 198
The Problem of Public Knowledge 200
The Puzzle of Egocentric Awareness 201
Hiding, Peeking, and Privacy 201
Summary 202

TWELVE LOOKING WITH THE HEAD AND EYES 203

- Looking Around and Looking At 203
- With What Does One See the World? 205
- The Awareness of the Environment and the Ego 206
- How Does the Eye-Head System Work? Outline of a New Theory 209
- The Fallacy of the Stimulus Sequence Theory 219
- The Theory of the Conversion of a Sequence into a Scene 221
- Summary 222

THIRTEEN LOCOMOTION AND MANIPULATION 223

- The Evolution of Locomotion and Manipulation 223
- The Control of Locomotion and Manipulation 225
- The Optical Information Necessary for Control of Locomotion 227
- Rules for the Visual Control of Locomotion 232
- Rules for the Visual Control of Manipulation 234
- Manipulation and the Perceiving of Interior Surfaces 236
- Summary 236

**FOURTEEN THE THEORY OF INFORMATION PICKUP AND
ITS CONSEQUENCES 238**

- What Is New About the Pickup of Information? 239
- The Traditional Theories of Perception: Input Processing 251
- The False Dichotomy Between Present and Past Experience 253
- A New Approach to Nonperceptual Awareness 255
- The Relationship Between Imagining and Perceiving 256
- A New Approach to Knowing 258
- Summary 262

PART FOUR DEPICTION

FIFTEEN PICTURES AND VISUAL AWARENESS 267

- The Showing of Drawings and the Study of Perception 267
- What Is a Picture? 270
- A Theory of Drawing and Its Development in the Child 274
- What About the Illusion of Reality? The Duality of Picture Perception 280
- The Power of Perspective in Painting 283
- Is Depiction a Form of Description? 284

The Consciousness of the Visual Field	285
What Is It to See in Perspective? Patchwork Perspective vs. Edge Perspective	286
The Principles of Line Drawing	287
Summary	291

SIXTEEN MOTION PICTURES AND VISUAL AWARENESS 292

The Changing Optic Array	293
What Can the Movies Make Available?	294
What Does a Verbal Narration Make Available?	295
A Theory of Filming and Film-Editing	297
Depiction by Film	301
Summary	302

CONCLUSION 303

APPENDICES

1. *The Principal Terms Used in Ecological Optics* 307
2. *The Concept of Invariants in Ecological Optics* 310

BIBLIOGRAPHY 313

NAME INDEX 319

SUBJECT INDEX 322