

Table of Contents

Chapter I	Introduction: Man, Brain and Science	1
Chapter II	The Neuronal Machinery of the Brain	8
	Neurophysiological Events Relation to Perception	22
Chapter III	Synaptic Mechanisms Possibly Concerned in Learning and Memory	25
	Introduction	25
	Molecular Memory	26
	Synaptic Properties and Memory	28
	Frequency Potentiation	29
	Post-Tetanic Potentiation	31
	Synaptic Regression with Disuse	33
	Discussion of Growth Theory of Learning	37
	Biochemical Mechanisms in Synaptic Growth	39
	The Engram and its Readout	41
	Summary	42
Chapter IV	The Experiencing Self	44
	The Concept of Self	44
	Conscious Experience	46
	The Perceptual World	47
	The Objective-Subjective Dichotomy	52
	Perception and the Neuronal Mechanisms of the Brain	54
	Cerebral Events and Conscious Experience	58
	The Principles of Emergence	59
	Science and Reality	60
Chapter V	The Brain and the Unity of Conscious Experience	63
	The Reality of Conscious Experience	63
	Perceptual Experience	65
	The Dependence of Perception on Active Learning	66
	Anatomical and Physiological Basis of Conscious Experience	68

The Threshold of Conscious Experience	69
The Neuronal Activity Concerned in Conscious Experience	71
Unity of Conscious Experience and the Cerebral Commissures	73
Does the Uniqueness of the Experiencing Self Derive from Genetic Uniqueness?	80
General Conclusions	83
 Chapter VI Evolution and the Conscious Self	85
Introduction	85
The Modern Theory of Evolution	87
Transcendences in the Evolutionary Story	87
Human Self-Awareness or Conscious Experience	90
The Evolutionary Story of Man's Origin	92
Criteria for Self-Consciousness or Self-Awareness	93
How did Self-Consciousness Come to Man?	96
The Uniqueness of Man's Origin	97
Life Elsewhere in the Cosmos?	98
General Considerations	100
 Chapter VII The Understanding of Nature	102
Science as Conjectures and Refutations	102
Science as a Personal Endeavour	103
Personal Experiences	104
The Nature of Scientific Investigation	106
Illustrations from Neurobiological Investigations .	108
Scientific Diseases	114
General Summary	117
 Chapter VIII Man, Freedom and Creativity	118
1. Free-Will	118
The Neurophysiological Problem of Will	120
Quantitative Aspect of Spread of Activity in Neuronal Networks	120
A Neurophysiological Hypothesis of Will	123
The Physical Implications of the Hypothesis	125
General Discussion of Hypothesis of Free-Will	126
2. Freedom and Creativity	127
3. Man and Freedom	130

Chapter IX	The Necessity of Freedom for the Free Flowering of Science	135
	Science and Technology	135
	The Making of a Scientist	138
	The Discipline of Science	142
	Freedom and Science	146
Chapter X	The Brain and the Soul	151
	1. Introduction	151
	2. The Neuronal Mechanisms Involved in Percep- tion	152
	3. States of Consciousness	160
	4. The Three-World Concept of Popper	163
	5. The World of States of Consciousness	170
	6. Self Awareness and Death Awareness	172
	7. The Concept of the Soul	173
Chapter XI	Education and the World of Objective Knowledge . .	176
	1. Popper's Third World of Objective Knowledge	176
	2. Education and the Third World	179
	The Student Discontents	182
	Education for the Future	184
Chapter XII	Epilogue	188
References	191
Subject Index	201

Acknowledgments

Grateful thanks are due to the publishers and editors of the following journals for their generosity in giving permission for reproduction of figures: Acta Biologica Hungarica, Brain Research, The Clarendon Press, Experimental Brain Research, Experimental Cell Research, Journal of Comparative and Physiological Psychology, Journal of Physiology, Perspectives in Biology and Medicine, Proceedings of the National Academy of Sciences, Progress in Brain Research, Science, Scientific American.