

CONTENT

Foreword.....	11
PART I	15
1 The Central Nervous System as an Integrated Self-Organizing Process... 17	
1.1 Basic Principles of Self-Organizing Processes.....	17
1.2 Synergetic Aspects in the Organization of the Central Nervous System	19
1.3 Chaos and Order in Self-Organizing Systems	22
1.4 Emergence as a Fundamental Property of Self-Organizing Systems	23
2 Attractors as Models for the Self-Organization Processes of	
 Living Systems	25
2.1 Mathematical Basics	25
2.2 Chaos and Strange Attractors.....	29
2.3 Attractors and Fractals in the Organism.....	31
2.4 Disease and Self-Organizing Processes: An Introduction	32
3 On the Concept of Information in the Context of Self-Organizing	
 Systems of Life.....	35
3.1 Semantic Aspect of Information	40
3.2 On the Concept of Biological Information	42
4 The Central Nervous System as a Self-Organizing System can be	
 Modeled as a System of Hierarchically Structured Attractors.....	47
4.1 Limit Cycle Oscillations at the Level of Basic Performances of	
Living Systems	47
4.2 Neurons as Basic Models of Attractors	48
4.3 Neurons as Operationally Closed Systems	50
4.4 Nonspecificity of Neuronal Activity	54
4.5 Attractors as Models for Grouping Neurons into Neuronal Associations ..	55
5 Cursory Notes on the Anatomy of the Brain	59

6	Attractors as Mathematical Models of the Selforganization Processes of the Central Nervous System.....	61
6.1	Interconnected Systems of Hierarchically Structured Attractors in the Diencephalon.....	61
6.2	Thalamocortical Attractor as Central Attractor System.....	63
6.3	Attractor Models in the Hypothalamus Region.....	65
7	The Cortex as a System of Articulated Attractor Associations	67
7.1	Trajectories between Cerebral Cortex and Limbic System Build an Attractor.....	69
7.2	Attractors in the Area of the Parietal Cortex.....	71
7.3	Attractors in the Area of the Temporal Cortex.....	72
8	Attractors as Models of the Performance of Sensory and Motor Systems	73
8.1	Visual Perception as Self-Organizational Construction of a Constant Reality.....	73
8.2	Self-Organization Processes in the Function of the Visual System.....	76
8.3	Color Vision.....	79
8.4	Hearing as a Self-Organization Process	81
8.5	Attractors Model Functions of the Motor System	84
9	Reality and Perception.....	87
9.1	Sensory Perceptions are Companied by Structural Changes in the CNS Area: Introductory Remarks	87
9.2	Perception and Assignment of Meaning.....	87
9.3	Computing Processes in Signal Transmission.....	88
9.4	Correlations between Reality and Perception	90
9.5	On the Question of Representation of Perceptions in Maps and Patterns of the Brain.	95
9.6	Sensory Perception and Reality Reference: Information Concept as Central Metaphor	99
9.7	Experiment and Reality: Ways of Gaining Knowledge in Science	101
10	Notes on the Term Emotion	105
10.1	Historical and Conceptual.....	105
10.2	Neurobiological Correlates of Emotional Events.....	108
10.3	Tightly Woven Context between Emotion and Cognition.....	110

11	Freedom of the Will(?) or Freedom between Determinism and Indeterminism: An Interjection	113
11.1	The Libet Experiments: Experimental Setup	114
11.2	Possible Interpretations of the Libet- Experiments.....	115
11.3	Question of Systems-Theoretical Approaches to the Concept of Will	119
12	Consciousness as a Holistic Self-Organizing Process.....	127
12.1	Introduction to the Topic: How can Matter Think?	127
12.2	Different Conceptual Classifications of States of Consciousness	131
12.3	The Ego and its Consciousness: Question of Reducibility in Physics and Chemistry.....	133
12.4	Spatial and Temporal Integration Processes in the Development of Consciousness and Wakefulness.....	135
12.5	Importance of Attractor Models for Understanding Consciousness Processes: Example Formatio Reticularis.....	138
12.6	Thalamocortical Attractor System as a Central Operator of Consciousness Processes	141
12.7	Reflections on the Analysis of the Concept of Consciousness in Connection with the Concept of Information: Meaning of the Concept of Free Information.....	145
12.8	Consciousness: Basic Relational Structure and Interpretation Towards the Field Concept	147
12.9	Disorders of Wakefulness and Consciousness: Clinical Pictures or Findings	149
12.10	The Diversity of his States of Consciousness Establishes the Individuality of the Human Being	152
12.11	Self-Awareness as an Evolutionary new Self-Organizational Process	153
12.12	“Embodiment of Mind” in Neural Networks from a Systems Theory Perspective.....	156
12.13	States of Consciousness are Inexpressible in Terms of their Intellectual Depth	157
13	Models of Conscious Perception and Cognition.....	159
14	The Brain-Mind Problem.....	163
14.1	Opening Remarks: On the Current Entanthropomorphization of Scientific Knowledge of Nature in the Context of the Brain-Mind Problem.....	163

14.2	Cursory Presentation of Opposing Scientific and Philosophical Positions.....	166
14.3	On the Question of a Commonality of Conceptual Approaches between Natural Science and Philosophy.....	169
14.4	Possible Role of Free Information in the Context of the Brain-Mind Problem.....	170
14.5	How Groups of Continuous Alternatives Could Build Thoughts.....	172
15	Search for Traces of the Mind in the Theories of Physics	175
15.1	Introductory Remarks: How can Matter Think?.....	175
15.2	Basic Concepts and Standard Models in the Field of Physics.....	175
15.3	Why the Brain-Mind Problem can only be Understood as a Whole	177
15.4	Unity and Diversity of Physical Theories in the Interpretation of the Brain-Mind Problem: A Cautious Attempt	181
16	Systemstheoretical or Biocybernetic Approaches to the Brain-Mind Problem	187
16.1	Introductory Remarks on Basic Connections between Self-Referentiality and Cognition in Biological Systems	187
16.2	Biological Cognition Theory and the Observer Problem in Self-Organizing Systems	192
16.3	The Central Nervous System can be Understood as a System of Articulated Contexts	193
16.4	Summary Conclusions on Systems Theory Approaches and Models of Central Nervous System Functions	196
17	On the Question of the Relationship between Neuronal and Mental Activity	201
17.1	Divergent Natural Philosophical Positions	201
17.2	Entropy Concept as Missing Link between Conscious Mind and Neuronal Matter of the Brain	205
18	The Unity of Nature in the Conscious Mind	213
18.1	Traces of a Conscious Mind from an Evolutionary-Biological Point of View.....	213
18.2	Traces of the Mind in the Structure of the World from a Physical Point of View	215

18.3	An Immaterial Existential as Foundation and Original Substance of the World.....	217
18.4	Transforming Reality in the Conscious Mind.....	218
18.4	Evolution as an Integrated Self-Organization Process of the Generation of Information.....	220
18.5	The Concept of Spirit as a Fundamental Potential.....	221
18.6	Concept of Matter beyond the Material.....	222
19	Consciousness and Spirit Move Matter	227
PART II	233
1	Representation of Diseases in the Neural Networks.....	235
1.1	Introduction	235
1.2	The Self and its Maps in the Brain	238
1.3	Mapping of Body States in the Brain	241
1.4	Diseases Model Patterns of Attractors in the Brain	242
1.5	Diseases and Perceptual Processes.....	245
2	Maps and Attractors in Selected Diseases of the Brain	247
2.1	Epilepsy	247
2.2	Schizophrenia.....	247
3	Diseases and their Relations to the Emotional System	249
4	Representation of Malignancies in Neural Network Maps.....	253
4.1	Immuno-Oncological Basis of Neuronal Mapping Processes.....	253
4.2	Attractor Models of Cytokine Systems in their Relational Networks to the Brain in Malignant Tumors	254
4.3	Malignancies and Immune Surveillance	259
4.4	Tumor Microenvironment and Autonomic Nervous System.....	260
4.5	Large-Scale Neural Networks of Relationships between Malignancies and Stress.....	262
4.6	Relationship between Malignancies and Cognitive System	264
5	Stress-Related Changes in Macro- and Micro Structures in the Brain... 271	

6	Attractor Models Related to Neurobiological Bases of Pain	275
6.1	Somatoform Pain: Models of Attractors	279
6.2	Somatoform Pain and Neurobiological Correlates of Placebo Effects.....	280
6.3	Phantom Pain and Cortical Reorganization Processes	284
6.4	Imbalances of the Cytokine System in Chronic Pain	287
6.5	Tumor Pain	290
6.6	Neuropathic Pain and Pain Memory	291
7	Traumatic Stress Response: Systems Theory Approaches	295
8	On the Constitutive Effect of Cognitive Activity on Neuronal Activity ..	299
9	Embodiment Processes or How Mental Processes Influence Motor Behavior	303
10	Cursory Remarks on Selected Diseases with a Psychosomatic Component.....	307
10.1	Inflammatory Bowel Disease (CE).....	307
10.2	Irritable Bowel Syndrome	309
10.3	Skin as a Mirror of the Soul.....	311
11	Spirit and Time	315
	Literature Part I	319
	Literature Part II	337