#### Contents

### I. Epistemological and Methodological Foundations of Research into Life 1

- 1 Introduction 1
- Historical Review of Modification in the Concept "Physiology"
- Epistemological Foundations of the Science of Life 3
- 2.1. The Natural Philosophical or Holistic Theory of Life 5
- 2.2. The Natural Scientific or Reductionist (Teilinhaltliche) Theory of Life 10
- 2.3. Limitations of the Two Lines of Thought 13
- The Scope of the Natural Scientific Theory of Life 21
- 3.1. Methodological Foundations of Physiology as Natural Science 22
- 3.2. Natural Laws and Rules 23
- Limits of a Metrical and Mathematical Treatment of the Phenomena of Life 24
- 3.4. Mathematical Methods 26
- 3.5. Parameters 27
- 3.6. Validity of Laws 28
- 4. Special Attributes of Organisms 28
- 4.1. Cellular Organization 29
- 4.2. Chemical Constitution of Organisms 29
- 4.3. Transformation of Energy 30
- 4.4. Relations with the Environment 31
- 4.5. Evolution of Life 32
- 4.6. The Course of Life 34



4.8.	Excitability 34 Capacity for Regulation 35 Animation 35
<b>5</b> .	The Flow of Energy as the Most Important
	Principle of Scientific Biology 36
5.1.	The Energetics of Closed Physical
	Systems 36
5.2.	The Organism as an Open System 39
5.3.	General Properties of Open Systems 40
5.4.	Kinetics of Open Systems 43
5.5.	The Thermodynamics of Open Systems 44

### 6. Summary 48

Processes

5.5. 5.6.

## II. Rhythm and Polarity – Physiological Analysis and Phenomenological Interpretation 49

1. Causal Analysis of Periodic Processes 50

Provenance of the Energy for Living

46

- 1.1. Phases of Rest and Activity in Animals 50
- 1.2. Phases of Activity and Rest in Man 56
- A Critical Analysis of a Causal-Analytic Interpretation of Rhythmic Phenomena 59
- 3. Phenomenological Description of Rhythm and Polarity 64
- 4. Summary 68

# III. Bodily Movement and Exercise – Physiological Analysis and Phenomenological Interpretation 69

- 1. Phenomenological Interpretation of Bodily Movement 69
- 2. Physiological Analysis of Bodily Movements 70
- 2.1. The External Movement of the Organism in the Interplay of Muscles and Nervous System 71
- 2.1.1. The Basic Properties of Muscles 71

2.2.	The Role of the Muscle Spindles in the	
	Interplay of Muscles and Nervous System	75
2.3.	Physiological and Morphological Changes	
	in the Organism during Physical Exercise	79
2.4.	Muscular Adaptation 81	
2 =	Adoptation of Hoort Muscle 02	

- 2.5. Adaptation of Heart Muscle
- 2.6. Adaptation of the Blood
- 2.7. Functional Adaptation 86
- 2.7.1. Circulation 86
- 2.7.2. Respiration 86
- 2.7.3. Utilization 87
- 2.7.4. Autonomic Nervous System
- 3. Exercise as a Therapeutic Measure 89
- 4 Summary 90

#### IV. Human Language - Physiological Analysis and Phenomenological Interpretation

- 1. Physiological Analysis of the Sound of Speech and of Hearing
- 1.1. The Activity Cycle of Hearing and Speech
- 1.2. The Theory of Centers and Plasticity for the Explanation of Language 98.
- 1.3. Electroencephalographic Results of Excitation of the Cerebral Cortex through Optical and Acoustic Stimuli 104
- Electroencephalographic Observations during 1.4. Mental Activity 106
- A Phenomenological View of Language 2. 107
- 2.1. Soul and Spirit of Language
- 2.2. The Contrast between Linguistic Meanings and Linguistic Concepts 112
- The Difference between Meaning and 2.3. Conception Words 116
- 3. Summary 120
- 4 Postscript 122

Their	ereoscopic Vision and Color Discrimination: Typological Polarity and Relations to Pictorial tiveness 123
	Physiological Methods 124 Testing Stereoscopic Vision 124 Testing the Capacity to Discriminate Color 128
2. 2.1. 2.2. 2.3. 2.4.	The Self-Diagnosis Test 130
3.	Performance Differences in Stereoscopic Vision 131
4.	Performance Differences in Color Discrimination 132
5.	Typological and Sex Differences in the Kind of Creativity 132
6.	Stereoscopic Vision and Color Discrimination in Relation to Kind of Creativity 134
7.	The Complementary Behavior of Stereoscopic Visual Capacity and Color Discrimination Ability 136
8.	Color Discrimination, Stereoscopic Vision and

the Kind of Creativity in Relation to Color

Color Selection as a Polar Phenomenon

VII. The Essence of Health and Its Maintenance 169

138

On the Polarity of Form and Color

VI. Quantitative Thinking in the Life Research

186

195

Selection

VIII. Bibliography

X. Subject Index

IX. Author Index 193

Perception 140

Summary 146

9.

10.

11.