

Contents

| | |
|---|------|
| <i>Acknowledgments</i> | vi |
| <i>Introduction</i> FRANCISCO J. AYALA | vii |
| <i>List of participants</i> | xvii |
| 1 Introductory Remarks THEODOSIUS DOBZHANSKY | 1 |
| 2 From Aristotle to Democritus via Darwin G. MONTALENTI | 3 |
| 3 Evolutionary Theories after Lamarck and Darwin ERNEST BOESIGER | 21 |
| 4 The Problem of Molecular Recognition by a Selective System GERALD M. EDELMAN | 45 |
| ✓ 5 A Geometric Model of Reduction and Emergence PETER MEDAWAR | 57 |
| 6 Changing Strategies: a Comparison of Reductionist Attitudes in Biological and Medical Research in the Nineteenth and Twentieth Centuries JUNE GOODFIELD | 65 |
| 7 Cerebral Activity and Consciousness JOHN C. ECCLES | 87 |
| 8 Reductionism in Biology WILLIAM H. THORPE | 109 |
| 9 Unjustified Variation and Selective Retention in Scientific Discovery DONALD T. CAMPBELL | 139 |
| × 10 Reduction, Hierarchies and Organicism MORTON BECKNER | 163 |
| × 11 'Downward Causation' in Hierarchically Organised Biological Systems DONALD T. CAMPBELL | 179 |
| 12 On the Relations Between Compositional and Evolutionary Theories DUDLEY SHAPER | 187 |
| ∧ 13 Problems of Rationality in Biology HENRYK SKOLIMOWSKI | 205 |
| ∨ 14 Chance, Necessity and Purpose CHARLES BIRCH | 225 |
| 15 Polynomistic Determination of Biological Processes BERNHARD RENSCH | 241 |
| 16 Scientific Reduction and the Essential Incompleteness of All Science KARL R. POPPER | 259 |
| 17 Adaptive Shifts and Evolutionary Novelty: a Compositionist Approach G. LEDYARD STEBBINS | 285 |

| | | | |
|----|------------------------------------|-----------------------|-----|
| 18 | Chance and Creativity in Evolution | THEODOSIUS DOBZHANSKY | 307 |
| 19 | The Concept of Biological Progress | FRANCISCO J. AYALA | 339 |
| 20 | On <i>Chance and Necessity</i> | JACQUES MONOD | 357 |
| | <i>Index</i> | | 377 |