

Contents

<i>Preface</i>	v
<i>List of Illustrations</i>	xi
1. From Reduction to Emergence	1
The rise and fall of reductionism	2
The concept of emergence	3
The pre-history of the emergence concept	7
Weak and strong emergence	9
Strong emergence: C. D. Broad	11
Emergent evolution: C. L. Morgan	13
Strong emergence since 1960	17
Weak emergence: Samuel Alexander	25
The challenge of weak emergence	31
Conclusion	32
Notes	33
2. Defining Emergence	38
Introduction	38
The problem of definitions	38
Five different meanings of emergence	40
An example: emergence at the fourth level	42
Doubts about emergence	44
Diverging approaches to the science and philosophy of emergence	47
Downward causation	49
Emergence and physicalism	54
Conclusion: eight characteristics of emergence	60
Notes	62
3. Emergence in the Natural Sciences	65
Introduction	65
Physics to chemistry	66
Artificial systems	69
Biochemistry	73

The transition to biology	78
Emergence in evolution	84
Toward an emergentist philosophy of biology	93
Conclusion	100
Notes	101
4. Emergence and Mind	107
The transition from biology	107
The three levels of emergence	108
Introducing the problem of consciousness	110
The neural correlates of consciousness	112
Can studies of neural correlates solve the problem of consciousness?	117
Why consciousness remains the 'hard problem'	120
Weak supervenience and the emergence of mental properties	124
Toward an emergentist theory of mind	128
Assumptions and a wager	139
The science and phenomenology of agent causation	140
Person-based explanations and the social sciences	144
Conclusion	148
Notes	149
5. Emergence and Transcendence	156
Introduction	156
Mind and metaphysics	157
Four metaphysical responses to the emergence of mind	159
The presumption of naturalism	163
Is there an emergent level after mind?	165
The limits to possible scientific enquiry	169
What naturalistic explanations leave unexplained	172
Going beyond emergence	179
Trading mind-body dualism for theological dualism	185
Rethinking divine action	187
Integrating personhood and divine action	193
Closing objections	199
Conclusion	203
Notes	206
<i>Bibliography</i>	214
<i>Index</i>	231