

Contents

<i>Preface</i>	<i>page</i> xi
<i>Outline of the book</i>	xix
Part I Reconciling Natural and Mental Philosophy	1
1 Mechanical intelligence	3
1.1 Mechanical philosophy	5
1.2 The great divorce	6
1.3 The awaiting reconciliation	7
2 Why mechanics?	10
2.1 Rethinking materialism	11
2.2 Characterizing rationality	22
2.3 Designing minds	42
3 Why mechanics now?	47
3.1 Impediments to understanding	47
3.2 Vital analogy	52
3.3 Physical analogy	56
3.4 Machine analogy	62
3.5 Appraisal	68
Part II Reconstructing Rational Mechanics	69
4 What is mechanics?	71
4.1 The nature of mechanics	71
4.2 The structure of modern mechanics	76
4.3 A path to a general mechanics	79
4.4 Organization of the exposition	86

viii	<i>Contents</i>	
5	Kinematics	88
5.1	Bodies	88
5.2	Events	97
5.3	Time	99
5.4	Space	105
5.5	Bodies in space	125
5.6	Motion in space	128
6	Dynamics	135
6.1	Mass	135
6.2	Momentum	147
6.3	Force	154
6.4	Force and motion	165
6.5	Energy	168
7	The character of mechanical law	173
7.1	Mechanical processes	174
7.2	Determinism	176
7.3	Continuity	187
7.4	Conservation	195
7.5	Economy	202
7.6	Reversibility	211
7.7	Locality	215
	Part III Mechanical Minds	223
8	Mental varieties	225
8.1	What is plural discrete affective cognition?	226
8.2	Why plural discrete affective cognition?	226
8.3	Are such minds mechanical?	227
8.4	An example: reason maintenance	230
9	Mind and body	241
9.1	Bodies	241
9.2	Forces	247
10	Attitudes, outlook, and memory	251
10.1	Attitudinal structure and variety	252
10.2	Discrete binary information space	253
10.3	Motion	260
10.4	Mass	263
10.5	Momentum	266
10.6	Force	268

	<i>Contents</i>	ix
10.7	Energy	272
10.8	Illustration: simple computation	273
11	Reasoning	276
11.1	Reasons	276
11.2	Reasoned positions	281
11.3	Reasoned motion	282
11.4	Reason forces	285
11.5	Reason stresses	289
12	Rationality	295
12.1	Limits on rationality	295
12.2	Inherent rationality	307
12.3	Rational motives	314
13	Learning	326
13.1	Accretion	326
13.2	Stretching	327
13.3	Shearing	328
13.4	Configurational intentions	330
13.5	Relaxation and adaptation	337
13.6	Evolution of geometry	343
14	Uncertainty	346
14.1	Measurement uncertainty	347
14.2	Probabilistic indeterminism	348
14.3	Self-measurement	356
	Part IV The Metaphysics of Mechanics	371
15	Materialism	373
15.1	What is materialism?	373
15.2	Why materialism?	374
15.3	Is materialism true?	375
15.4	New materials for materialism	376
16	Reductionism	379
16.1	What is reducibility?	379
16.2	Why reducibility?	380
16.3	Is physical reducibility true?	380
16.4	Science without reductionism	388
16.5	The end(s) of science	390

x	<i>Contents</i>	
17	Effectiveness	392
17.1	What is effective computation?	393
17.2	Why effectiveness?	394
17.3	Is computation effective?	394
18	Finitism	399
18.1	What is finitism?	399
18.2	Why finitism?	400
18.3	Is finitism true?	401
18.4	Summary	402
	Part V Conclusion of the Matter	405
19	Reflections	407
19.1	Assessment	408
19.2	Prospects	412
19.3	Perspective	418
	<i>System of Notation</i>	425
	<i>Bibliography</i>	429
	<i>Index</i>	443