

Contents

Preface	<i>page xi</i>
Part 1: Foundations	1
1 Naturalism and teleology	3
1.1 Basics	3
1.2 Spencer and Dewey	5
1.3 Outline of the book	9
1.4 Thought and act	11
1.5 Two concepts of function	14
1.6 Teleonomic and instrumental views of cognition	21
1.7 A simple concept of complexity	24
2 Externalism and internalism	30
2.1 Some basic explanatory forms	30
2.2 A fast tour	31
2.3 Internalism	37
2.4 The larger landscape	42
2.5 Contesting the explanandum	45
2.6 The location of the internal/external divide	48
2.7 Problems of adjudication	50
2.8 C-externalist explanations	57
2.9 Cognition as organic complexity	59
3 Spencer's version	66
3.1 Spencer's place	66
3.2 Life and mind	69

Contents

3.3	Continuities	72
3.4	Homeostasis and cognition	76
3.5	Spencer's explanatory program	79
3.6	Direct/indirect; instructive/selective	86
3.7	James' interests	90
4	Dewey's version	100
4.1	Meetings and departures	100
4.2	Dewey on life	102
4.3	Dewey on continuity	104
4.4	Indeterminacy and complexity	106
4.5	Past and present	108
4.6	Selection and the pattern of inquiry	113
4.7	Pragmatism and reliabilism	116
4.8	A simulation	121
4.9	A summary of progress made so far	124
5	On construction	131
5.1	Asymmetric externalism	131
5.2	Two lines of dissent	135
5.3	Biological constructivism	141
5.4	Varieties of construction	145
5.5	What environments contain	148
5.6	Other views	151
5.7	The status of complexity	153
5.8	Construction and realism	157
5.9	Constructivist philosophies of science	161
6	The question of correspondence	166
6.1	The division	166
6.2	Some false dichotomies	168
6.3	A fuel for success	171
6.4	Explaining representation	175
6.5	Success-linked theories	178
6.6	Millikan's maps	184
6.7	A stock-take	187
6.8	A flurry over fitness	188
6.9	Significance of the two trends	192
6.10	Summary of Part I	195

Contents

Part II Models	205
7 Adaptive plasticity	207
7.1 The question	207
7.2 Biological background to the basic model	208
7.3 The basic model	209
7.4 The inducible defense case, part I	214
7.5 The precarious and stable, revisited	216
7.6 Comparison to a Bayesian model of experimentation	217
7.7 Another model using regularity and change	220
7.8 Extensions of the basic model: geometric means	221
7.9 Variation within and between trials	224
8 The signal detection model	232
8.1 The next question	232
8.2 Signal detection and the inducible defense case	232
8.3 Optimal cues and acceptable cues	237
8.4 The costs of plasticity	238
8.5 Paying for perception	244
8.6 On reliability	247
9 Complex individuals, complex populations	255
9.1 Another kind of complexity	255
9.2 Polymorphism	256
9.3 Individual homeostasis	258
9.4 Homeostasis and the population	262
9.5 Levene's theme	264
9.6 The rhythm method	268
9.7 Levins' machinery	271
9.8 The coarse and the fine	277
9.9 A counter-example	278
9.10 The group-selectionist structure of Levins' model	281
9.11 Quasi-homeostasis	284
9.12 Summary of Part II	286
References	291
Index	309