Contents

Ackı		edgements ion	xvii 1
Part		Philosophical Problems in Neuroscience: Their Historical and Conceptual Roots	9
1		Early Growth of Neuroscientific Knowledge: Integrative Action of the Nervous System	11
	1.1	Aristotle, Galen and Nemesius: The Origins of the Ventricular Doctrine . Fernel and Descartes: The Demise of the Ventricular Doctrine	12 23
	1.3	The Cortical Doctrine of Willis and its Aftermath	30
	1.4	The Concept of a Reflex: Bell, Magendie and Marshall Hall Localizing Function in the Cortex: Broca, Fritsch and Hitzig	33 38
	1.6	The Integrative Action of the Nervous System: Sherrington	41
2		Cortex and the Mind in the Work of Sherrington	12
	and	his Protégés	43
	2.1	Charles Sherrington: The Continuing Cartesian Impact	43
	2.2	Edgar Adrian: Hesitant Cartesianism	47
	2.3	John Eccles and the 'Liaison Brain' Wilder Penfield and the 'Highest Brain Mechanism'	49 57
	4.4	white remed and the riighest brain Mechanism	37
3	The	Mereological Fallacy in Neuroscience	68
	3.1	Mereological Confusions in Cognitive Neuroscience (Crick, Edelman, Blakemore, Young, Damasio, Frisby, Gregory, Marr, Johnson-Laird)	68

	3.2	(Ullman, Blakemore, Zeki, Young, Milner, Squire and Kandel, Marr, Frisby, Sperry)	/4
	3.3	On the Grounds for Ascribing Psychological Predicates to a Being	81
	3.4	On the Grounds for Misascribing Psychological Predicates to an Inner Entity	85
		(Damasio, Edelman and Tononi, Kosslyn and Ochsner, Searle, James, Libet, Humphrey, Blakemore, Crick)	03
	3.5	The Inner	88
		(Damasio)	
	3.6	Introspection	90
	3.7	(Humphrey, Johnson-Laird, Weiskrantz) Privileged Access: Direct and Indirect	92
		(Blakemore)	
	3.8	Privacy or Subjectivity (Searle)	94
	3.9	The Meaning of Psychological Predicates and How they are Learnt	97
	3.10	Of the Mind and its Nature	103
		(Gazzaniga, Doty)	
Part		Human Faculties and Contemporary Neuroscience: An Analysis	109
Prel	iminar	ies	111
		rain–Body Dualism	111
	2 Tl	he Project	114
	3 Tl	he Category of the Psychological	117
4	Sensa	ation and Perception	121
	4.1	Sensation	121
		(Searle, Libet, Geldard and Sherrick)	
	4.2	Perception	125
		(Crick)	
	4.2.1	Perception as the causation of sensations: primary and	4.00
		secondary qualities	128
	122	(Kandel, Schwartz and Jessell, Rock) Perception as hypothesis formation: Helmholtz	135
	4.2.2	(Helmholtz, Gregory, Glynn, Young)	133
	4.2.3	Visual images and the binding problem	137
	1.2.0	(Sherrington, Damasio, Edelman, Crick, Kandel and Wurtz,	,
		Gray and Singer, Barlow)	
	4.2.4	Perception as information processing: Marr's theory of vision	143
		(Marr, Frisby, Crick, Ullman)	

Contents

ix

5	The (Cognitive Powers	148
	5.1	Knowledge and its Kinship with Ability	148
	5.1.1	Being able to and Knowing how to	149
	5.1.2	Possessing Knowledge and Containing Knowledge (LeDoux, Young, Zeki, Blakemore, Crick, Gazzaniga)	151
	5.2	Memory (Milner Squire and Kandel)	154
	5.2.1	Declarative and non-declarative memory (Milner, Squire and Kandel)	155
	5.2.2	Storage, retention and memory traces (LeDoux, Squire and Kandel; Gazzaniga, Mangun and Ivry; James, Köhler, Glynn; Bennett Gibson, and Robinson;	158
		Damasio)	
6	The (Cogitative Powers	172
	6.1	Belief (Crick)	172
	6.2	Thinking	175
	6.3	Imagination and Mental Images (Blakemore, Posner and Raichle, Shepard)	180
	6.3.1	The logical features of mental imagery (Galton, Richardson, Kosslyn and Ochsner, Finke, Luria, Shepard, Meudell, Betts, Marks, Shepard and Metzler, Cooper and Shepard, Posner and Raichle)	187
7	Emotion		
	7.1	Affections (Rolls, Damasio)	199
	7.2	The Emotions: A Preliminary Analytical Survey	203
	7.2.1	Neuroscientists' confusions (LeDoux, Damasio, James)	207
	7.2.2	Analysis of the emotions	216
8	Volition and Voluntary Movement		
	8.1	Volition	224
	8.2	Libet's Theory of Voluntary Movement (Libet, Frith et al.)	228
		Taking Stock	231

x Contents

Part		Consciousness and Contemporary Neuroscience: An Analysis	237
9	Intra	nsitive and Transitive Consciousness	239
	9.1	Consciousness and the Brain	239
	(Albright, Jessell, Kandel and Posner, Edelman and Tononi; Glynn, Greenfield, Llinás, Gazzaniga, Searle, Johnson-Laird, Chalmers,	239
		Dennett, Gregory, Crick and Koch, Frisby)	
		Intransitive Consciousness	244
		(Searle, Dennett)	
		Transitive Consciousness and its Forms	248
	9.4	Γransitive Consciousness: A Partial Analysis	253
10	Cons	cious Experience, Mental States and Qualia	261
	10.1	Extending the Concept of Consciousness	261
	40.0	(Libet, Baars, Crick, Edelman, Searle, Chalmers)	
	10.2	Conscious Experience and Conscious Mental States	263
	10.2.1		2/0
		activities of the brain	268
	10.3	(Searle, Baars) Qualia	271
	10.5	(Searle, Chalmers, Glynn, Damasio, Edelman and Tononi,	2/1
	10.3.1	Nagel, Dennett)	27.4
	10.5.1	'How it feels' to have an experience (Searle, Edelman and Tononi, Chalmers)	274
	10.3.2		277
	10.3.2	(Nagel)	211
	10.3.3		281
	10.3.4	*	282
		(Chalmers, Crick)	
	10.3.5		284
11	Puzz	es about Consciousness	293
	11.1 11.2	A Budget of Puzzles On Reconciling Consciousness or Subjectivity with our	293
		Conception of an Objective Reality	294
		(Searle, Chalmers, Dennett, Penrose)	
	11.3	On the Question of how Physical Processes can give rise to	
		Conscious Experience	302
		(Huxley, Tyndall, Humphrey, Glynn, Edelman, Damasio)	

Contents xi

	11.4	Of the Evolutionary Value of Consciousness (Chalmers, Barlow, Penrose, Humphrey, Searle)	307
	11.5	The Problem of Awareness	314
	11.5	(Johnson-Laird, Blakemore)	311
	11.6	Other Minds and Other Animals	316
		(Crick, Edelman, Weiskrantz, Baars)	
12	Self-C	Consciousness	323
	12.1	Self-Consciousness and the Self	323
	12.2	Historical Stage Setting: Descartes, Locke, Hume and James	324
	12.3	Current Scientific and Neuroscientific Reflections on the	
		Nature of Self-Consciousness	328
		(Damasio, Edelman, Humphrey, Blakemore, Johnson-Laird)	
	12.4	The Illusion of a 'Self'	331
		(Damasio, Humphrey, Blakemore)	
	12.5	The Horizon of Thought, Will and Affection	334
	12.5.1		337
		(Damasio, Edelman and Tononi, Galton, Penrose)	
	12.6	Self-Consciousness	346
		(Edelman, Penrose)	
Part	IV	On Method	353
13	Redu	ctionism	355
	13.1	Ontological and Explanatory Reductionism	355
		(Crick, Blakemore)	
	13.2	Reduction by Elimination	366
		(P. M. and P. S. Churchland)	
	13.2.1	Are our ordinary psychological concepts theoretical?	367
		(P. M. Churchland)	
	13.2.2	Are everyday generalizations about human psychology	
		laws of a theory?	370
		(P. M. Churchland)	
	13.2.3	Eliminating all that is human	372
		(P. M. and P. S. Churchland, Dawkins)	
	13.2.4	Sawing off the branch on which one sits	376
14	Meth	odological Reflections	378
			270
	14.1	Linguistic Inertia and Conceptual Innovation	379
	14.2	(P. S. Churchland) The 'Powerty of English' Argument	207
	14.2	The 'Poverty of English' Argument	386
		(Blakemore)	

xii Contents

	14.3	From Nonsense to Sense: The Proper Description of the	
		Results of Commissurotomy	388
		(Crick, Sperry, Gazzaniga, Wolford Miller and Gazzaniga, Doty)	
Q.	14.3.1	The case of blind-sight: misdescription and illusory explanation (Weiskrantz)	393
1	14.4	Philosophy and Neuroscience (Glynn, Edelman, Edelman and Tononi, Crick, Zeki)	396
	14.4.1	What philosophy can and what it cannot do	399
	14.4.2	What neuroscience can and what it cannot do	405
		(Crick, Edelman, Zeki)	
	14.5	Why it Matters	408
App	endices		411
App	endix 1	Daniel Dennett	413
1 I	Dennett's	Methodology and Presuppositions	415
		ntional Stance	419
3 I	Heteroph	enomenological Method	427
4 (Consciou	sness	431
App	endix 2	John Searle	436
1 1	Philosoph	y and Science	436
		hilosophy of Mind	443
		itional Mind–Body Problem	449
r1			450
Inde	ex		453