

Contributors viii

Introduction xxvi

1. **How Did Modern Human Cognition Evolve?** 3
Ian Tattersall
 Our large brain: does size matter? 5
 Tools, decoration and art 7
 Where did modern human consciousness come from? 12
 Conclusion 17
2. **Taking Up Arms** 19
Michael Corballis
 Thinking big 19
 The question of language 20
 Language is a hand-me-down! 21
 Convincing myself 21
 Book for sale 22
 Objections 22
 When did autonomous speech emerge? 23
 Not with a bang, but with a whimper 26
3. **Celebrating 300 Million Years of the Mind: A Bird's Eye View** 29
Peter J. Snyder
 What do we mean by 'the mind'? 30
 Flying without frontal lobes 31
 What is intelligence, and how can this be measured in birds? 31
 Birds, like humans, learn from careful observation 33
 How is this possible with so little neocortical tissue? 34
 From stories to controlled experiments 35
 Talking with Alex 38
 Bird play 39
 If my bird looks happy, is she really happy? 40
 Anthropomorphism 41
 Conclusion 42
4. **Was Medieval Cell Doctrine More Modern Than We Thought?** 45
Harry Whitaker
 A brief historical sketch – the standard view 45

Contents

- New version – it was in the brain all along 46
- Early studies of patients with brain damage 47
- A little Latin to help sort out the puzzle 48
- Information flow – making the model dynamic 48
- The brain's control of movement 50
- A summary and outline 51

- 5. **Can Evolution Produce Robots?** 53
Manfred Hild and Brigitte Stemmer
 - Artificial intelligence 53
 - How does artificial evolution work? 56
 - How artificial neurons work 58
 - How to get robots to behave 58
 - What artificial neural nets can do 59
 - A useful application: getting rid of trash 61
 - Learning and evolution 61
 - What is the current state of things? 62
 - Of what importance is evolutionary robotics? 64
 - Future visions 64
- 6. **The Thought-Translation Device** 69
Niels Birbaumer & Frank Appletree Rodden
 - Using brain-computer interfaces (BCIs) to translate thoughts into action 70
 - Communicating with slow cortical potentials 71
 - The origin of slow cortical potentials in the human brain 72
 - The TTD in a nutshell 72
 - Setting up and using the TTD 74
 - How the language support program works 74
 - The training procedure 76
 - The training of patient E.M. 77
 - TTD – visions for the future 80
- 7. **Babes in Arms: Studies in Laterality** 83
Lauren Julius Harris
 - The left side rules 83
 - A bias rediscovered 85

Is the bias just a matter of handedness?	88
Some things to know about handedness	89
What handedness could explain about the holding-side bias	90
Problems for a handedness explanation	91
Is the bias a matter of posture?	93
What's the difference between babies and books?	95
Types of holds and their functions	97
States of 'action-approach'	97
The anatomy of emotion	101
Emotions, attention, and side of holding	102
Can the attention hypothesis account for other details of the holding-side bias?	103
An exception to the left-side rule	105
Why don't left-hand prohibitions decrease left-side holding?	107
In Sum	108

8. **Why a Creative Brain? Evolutionary Setups for Off-Line Planning of Coherent Stages** 115

William H. Calvin

Creativity is an evolutionary newcomer	115
Creativity for language instead?	116
When an advance plan is needed	117
Innovation during get-set	118
The Darwinian process	119
Speeding up the Darwinian process	120
New uses for old things	121
Long sentences and coherence	122
Creating new levels of organization	123

9. **Creativity: Method or Magic?** 127

Stevan Harnad

What is not creative?	128
Creative trait or creative state?	131
Underlying mechanisms	131
Conclusions	137

10. **The Cross-Cultural Brain** 139

Eran Zaidel and Jonas Kaplan

Alexithymia	140
The laterality hypothesis of alexithymia	141
A 'flashy' way to do experiments	141
The experiments	143
An invitation to participate in our online experiments	146

- 11. Where's the Missing Body? A Puzzle for Cognitive Science 149**
Raymond W. Gibbs, Jr.
Act I 149
Act II 151
Act III 153
Act IV 157
- 12. Whose Free Will is it Anyway? or, The Illusion of Determinism 163**
Sidney J. Segalowitz
Is free will more than a feeling? 163
Neuroscience, neural reductionism and determinism 164
The implications of reductionism and determinism for society and psychology 165
Psychology and materialism of the mind 166
Modern neuroscience and non-determinism: radical changes of the late twentieth century 167
The crux of the free-will debate: is brain activity predictable? 168
Future perspectives 170
- 13. Affective Neuroscience and the Ancestral Sources of Human Feelings 173**
Jaak Panksepp
Some personal lessons and LESSNS about the evolved nature of emotions 173
Archaeology of mind: the affective sources of consciousness 175
Five distinctions between affective consciousness and cognitive consciousness 177
The emotional underpinnings of human nature – toward a neuroevolutionary psychobiology 179
Learning in emotional systems and more on the pervasive emotion-cognition interactions 182
Development of new psychiatric medications 183
Mind views: emotional states and cognitive information processing 184
In sum 185
- 14. The Funny Meat Behind Our Eyes 191**
Frank Appletree Rodden
Humor and laughter for fun and (maybe) health 193
Humor and laughter from a biological perspective 194

The functional cognitive anatomy of a
joke 200
Where do we go from here? 202

- 15. Practicing Safe Stress: A Selective Overview
of the Neuroscience Research 205**
Cheryl M. McCormick
Stress and stressors 205
Acute stress and memory 210
Chronic stress, brain structure, and
function 213
Stress and mental health 215
How stress sculpts the developing
brain 218
Gender, stress, and the brain 220
Coping with stress 221

- 16. Petrol Sniffing, the Brain, and Aboriginal culture: Between Sorcery and Neuroscience 225**
Sheree Cairney and Paul Maruff
Petrol sniffing 225
Aboriginal culture 228
Neuroscience 231
Both ways 238
Conclusion 242
- 17. Chatting with Noam Chomsky 245**
Noam Chomsky
- Index 255**