

The Cognitive Neurosciences. Michael S. Gazzaniga (ed.). The MIT Press, 55 Hayward Street, Cambridge, MA 02142, USA. 2009. Fourth edn, 1376 pp. Price: US\$ 175.

It was in 1976 that Michael Gazzaniga and George Miller coined the term Cognitive Neuroscience to refer to a new discipline that attempted to encompass, at that time, largely disparate lines of enquiry at the interface of systems neuroscience, computational and cognitive psychology, to understand how the mind of man emerges from the interaction of networks that make up our brains. One of the earliest attempts to grow and institutionalize this new field was a programme, that was initiated by the James S. McDonnell foundation and later the Pew Trusts, to launch a Summer Institute in Cognitive Neuroscience. The first meeting of the institute was organized by Steve Kosslyn in 1988 at Harvard, but the meeting has since been run by Gazzaniga. Then Gazzaniga has religiously brought together a group of distinguished scientists/practioners to review and update this nascent field every five years to produce an opus, the Cognitive Neurosciences, that summarized the state of cognitive neuroscience at the time, presenting chapters that reviewed both progress made in the last four years and highlighting outstanding questions that remained for the future. This volume, coming 20 years after the first initiative, is the fourth such volume.

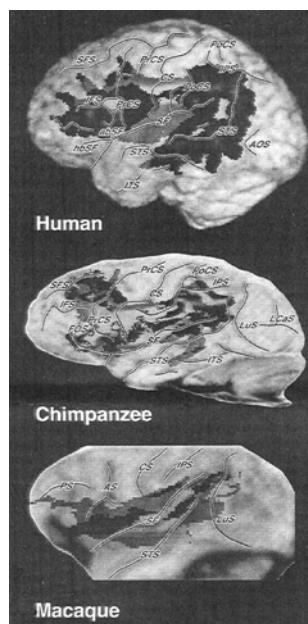
Since the publication of the third edition, the field of cognitive neuroscience has made rapid and dramatic advances. Accordingly, many of these changes are also reflected in the content of the new volume. In particular, it is heartening to see the introduction of genetics integrated with the study of cognitive neuro-

science, particularly in the area of functional imaging. The power of genetics and molecular biology is well known and their application, although still in its infancy, can only enrich our understanding of how genes shape the human mind. The extensive use of Bayesian modelling in a number of chapters to understand both sensory (visual) and motor systems suggests that the same framework that has been successfully used to understand 'higher' cognitive function such as decision making can also be made applicable to understand functions/systems that have not been traditionally considered in the domain of cognition. Taken together, this body of work suggests the emergence of a new theoretical framework to understand how the brain can perform diverse functions from a set of similar canonical circuits that perform, what might be essentially, similar computations, applied in different domains. Another area that has sparked much interest in the community in recent years is the application of principles of economics to understand how the brain computes the values of actions that lead to particular choices. The gaining popularity of neuroeconomics as a method to study higher cognition is probably a good example of the importance that social sciences will come to play in the years to come. In anticipation of such approaches the book devotes considerable space to studies that attempt to understand the neural basis of abstract constructs such as empa-

thy and moral judgement. Up until five years ago it would be highly unlikely that such issues would find mention in a mainstream cognitive neuroscience book. The inclusion of such material is not only testament to the rapid advances made in the field but portend the time where the study of cognitive neuroscience comes to encompass not only the study of the relation of brain and mind but the interaction between other brains and minds as well. In a larger context, these efforts will be at the forefront of integrating social sciences with biological sciences in much the same manner as chemistry did to integrate biology and physics.

On a more specific note, the new volume differs from the previous volume in a number of ways. The most obvious is the change in the list of contributing authors. These changes include a number of new names and omits some of the more well established 'elders' comprising the older guard, and implicitly marks the change of the baton to the next generation. The introductory chapters are also new features and serve the reader well by encapsulating the chapters in themes. There are also some changes in the sections themselves. Evolution and development that were previously separate are now joined. This joining probably reflects the new trend to consider development in the context of evolution ('evo-devo'). The section on Emotion has been expanded to include social aspects of brain function such as moral judgement, empathy, and as previously mentioned, reflects a relatively new and extremely promising approach. There is a new section on Perspectives that attempts to provide a temporal roadmap of the cognitive neuroscience agenda as well.

In all, given the challenges in putting together a volume of this scale I would say without hesitation that Gazzaniga and his team of editors, including the MIT press have done a fantastic job. I am confident that as in the previous issues this effort will be duly recognized by the community at large and will be a valuable resource to students, teachers and researchers. Having said that there are a few downsides. The first concerns the new section on Perspectives. Given the length of this book, this section, which is rather heterogenous in content, could well be dispensed with. Second, the organization of the themes could be better served by having the Attention sec-

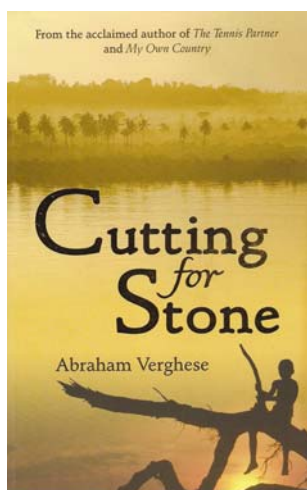


Evolution of the human arcuate fasciculus.

tion after the themes on Sensory and Motor systems, where the student could get a better grasp of the issues being discussed. The same could be said of the section on Plasticity. The third negative concerns the size and weight of the book that makes it a difficult read. This issue can be easily rectified in future editions by the authors and MIT press by allowing for at least two volumes. Fourth, the colour figures shown separately do not facilitate efficient reading. They need to be integrated within the appropriate text. I hope that MIT press can rectify this as well. As for the bigger picture, this book, while a valuable resource for the researcher, must necessarily be considered a work in progress reflecting the personal biases of the contributing authors. In this regard, I would caution academics from blindly treating this book as a text book of sorts. However, at the same time it could still serve as a template to organize courses and plan workshops in cognitive neuroscience, which was the original intention of this enterprise to begin with.

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Cutting for Stone. Abraham Verghese. Random House, 2009. 541 pp. Price: Rs 595.

In *Cutting for Stone*, Abraham Verghese returns to what he terms his 'first love' –

writing fiction. It is, however, his first novel as his earlier two ventures were non-fiction books. How then, does this novel fare in comparison to *My Own Country* and *The Tennis Partner*? *Cutting for Stone* is the story of the twin brothers Shiva and Marion Stone, their foster parents, Dr Kalpana Hemlatha (Hema) and Dr Abhi Ghosh (Ghosh). Their birth is the result of a most unexpected union of a surgeon, Dr Thomas Stone and a nun, Sister Mary Joseph Praise. The sister is from Kerala and meets Dr Stone on a ship from Madras to Africa. Their paths cross again and she is his assistant in 'Missing' hospital (native-speak for Mission hospital), Ethiopia. When the nun dies during delivery, Dr Stone flees the scene, unable to accept reality. Hema and Ghosh then bring up the children and in-still life, wisdom and love for the practice of medicine. The twins are initially inseparable – indeed, they are conjoint twins who are separated after birth – until a deep rift develops between them. They become physicians – with a background of Missing hospital as home and with parents devoted to the practice of medicine, is there any other profession that they could embrace? The only thing missing in their lives, however, is their biological father; however, his presence fills the book in many ways. For instance, Stone has written a book *The Expedient Operator: A Short Practice of Tropical Medicine* – which is obviously inspired by Bailey and Love's *A Short Practice of Surgery*, as Verghese admits in the Acknowledgements Section of the book. Aphorisms from Stone's textbook – and references to his superb surgical skills – crop up repeatedly. Stone, we learn, 'was a real surgeon . . . passion for his craft . . . and skill, dexterity . . . he had no wasted movements, no dramatic gestures. . . '.

And yet, a crucial part of the plot after the exhilarating buildup of the story disappoints. Two unexpected twists in the plot towards the end are unconvincing but I shall not reveal more. I would accept one coincidence but two coincidences are perhaps too many, though. However, admittedly, they do link up all the events in the book and were perhaps unavoidable to complete the story. After all, as Verghese states in an interview to Tracie White on the Stanford School of Medicine website, 'To paraphrase Dorothy Allison, fiction is the great lie that tells the truth about how the world really

lives'. Would I recommend this book despite the surprising end? Undoubtedly. Verghese's turn of language is unparalleled as one has come to expect from his earlier works. His descriptions of Ethiopia of the 1950s – and his obvious love for his own country, if you will pardon my expression – are vivid and clear; I could easily picture the scenes in my mind's eye and indeed, suggest that the book would quite easily be made into a movie. Mira Nair has made a movie of *My Own Country* and certainly this one, if made, should be as interesting. (For those who are not aware of Verghese's background, he is of Indian origin but was born and raised in Ethiopia. He did his medical training at Madras Medical College in the 1970s and then went to the USA. In the USA, he worked in Tennessee and Texas (the sites of his first two books) and is currently an internist at Stanford University.)

The characters in the book – the twin brothers, Hema and the others seem like real people with flesh and blood and whims and fancies and likes and dislikes. As for Ghosh – what a man he is! In Ghosh, the physician-turned-surgeon, Verghese crafts a wonderful human being and compassionate doctor, one who should be a role model for all doctors. Indeed, Ghosh is strikingly Oslerian in his approach to life in general and medicine in particular. He is a wonderful, caring father and husband, a compassionate human being and a skilled diagnostician. His sense of fairplay and justice is seen in his letters to the editor of the *New England Journal of Medicine* arguing for the inclusion of an eponymous sign for relapsing fever: Ghosh's plea is that it should be named Adam's sign after the humble, one-eyed compounder in Missing hospital who first brought it to Ghosh's attention. ' . . . there is a Chvostek's sign, a Boas's sign, a Courvoisier's sign, a Quinckes sign – no limit it seems to white men naming things after themselves. Surely the world is ready for an eponym honoring a humble compounder who has seen more relapsing fever with one eye than you or I will ever see with two.'

Most of all, what comes from Ghosh is Verghese's love for medicine. That medicine is a field which is intellectually satisfying and offers the physician to express his compassion and do something about it is obvious as ' . . . if you had an innate interest in the welfare of