

and the patient not critically ill and critical decisions about antibiotics, sinus drainage and intracranial drainage need to be addressed. The chapter on Chiari malformations focuses on the importance of individualizing each case. Since these patients often have a heterogeneous presentation it makes sense that the type of operation may have to be tailored to each individual patient.

Vascular paediatric neurosurgery is touched by the chapters on Moyamoya disease and pediatric intracranial aneurysms. The management of cavernous angiomas and true pial vascular malformations are not mentioned.

Various spinal issues such as myelomeningoceles, lipomyelomeningoceles, tethered spinal cords, syringomyelia and intramedullary spinal cord tumors are also touched on. The chapter on myelomeningoceles mainly focuses on the controversy regarding fetal repair versus the standard postnatal repair. Since this book has been published the results of the MOMS trial has given us their results on this topic. The chapter on tethered spinal cords addresses prophylactic untethering of various conditions (fatty filum, myelomeningoceles, lipomyelomeningoceles). This chapter does a very good job in trying to decipher a complex topic. Some spinal issues that seem to be lacking include craniocervical instability and the management of traumatic injury to the lumbar spine.

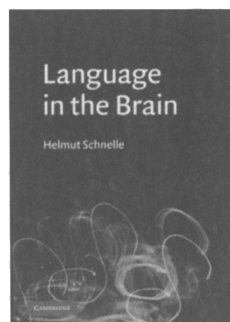
The chapter on spasticity does a nice job in enlightening the reader about the role of intrathecal baclofen and selective dorsal rhizotomy. This book is an appealing educational tool. The price point on this book, coupled with its length will make it attractive to many different readers.

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LANGUAGE IN THE BRAIN. 2010. By Helmut Schnelle. Published by Cambridge University Press. 220 pages. C\$50.00 approx.

Rated ★★★★★

This small paperback volume is an integrative, philosophical approach to neuroscience and language. In essence, Schnelle, a physicist and linguist by training and the long-time editor of "Theoretical Linguistics", takes a shot at the mind-body problem. He is an admirer of Jacobson, the granddaddy of linguists, who became interested in neuroscience and aphasiology, unlike Chomsky, who stayed aloof and remained sceptical of the possibility, or even the need for integrating formalistic linguistic analysis with neural organization. It was Jacobson who originally suggested "language and the brain" as the title. Language of course is not in the brain regardless of what anyone may tell you, no matter how refined a technology you may use to look for it. Language is the product of the brain, just like locomotion, or emotional expression,



or the Gothic Madonna, and it also exists independently outside the brain as in print and sound and image. It has rules expressed as phonology, grammar, semantics and pragmatics and there is an army of theoretical linguists explaining and debating how these rules evolved phylogenetically, historically, geographically, socially and ontogenetically.

The author takes on the integration of formal linguistics with neurobiology. He calls for taking off the blinkers of monism and dualism and for the integration of interdisciplinary knowledge—a job worthy of Sisyphus. He is undaunted, and believes explaining neuroscience to linguists and linguistics to neuroscientists with the plaster of philosophy will really place language in the brain. The duality of language and brain becomes a trinity when the mind-brain problem is considered along with the brain-language relationship. Can we think without language? Most people, like the author, have answered "yes" at some time in their lives, but he can not let go of the importance and infinite extension of complex nonverbal cognition; he embraces it all in his schema. So it is easy to draw a triangle, which the author obliges us to do, joining the indomitable crowd of diagram makers. The premise is that elements of knowledge (limited and fleeting as they are) can be dissected and analysed, and these correspond to (so far undefined) neural elements in the brain which the author (after Fuster) calls *cognits*. How to integrate several controversial systems of linguistic and cognitive structures with just as complex and evolving neurophysiological and neuroimaging representations of brain activity is the philosophical issue the author tackles with erudition. How successfully, it is for the reader to decide.

Recently much has been made of the discovery of the mirror neurons, the phenomenology of creativity, the "theory of mind", the brain mechanisms of the "self" and the role of the prefrontal cortex (a widely-used misnomer—there is nothing in front of the frontal lobes except your nose). These are reviewed in the first half of the book and the complexity of the perception-action organization of the mind and its integration with the organism through the PFC is a recurrent theme. Much of the modeling in the last 25 years has been developed in current computer dialect, but Schnelle takes a half-hearted stand against it. Whatever the idiom, technology and neuroscience find new models for the "enchanted loom" of Sherrington, but none of them are actual representations of your grandmother or a Volkswagen or the use of the gerund, even though a hundred or so cells can be found to respond to a certain stimulus. In the first few chapters, the author provides a summary of the columnar organization of the cortex, the vertical and horizontal connectivity and functional clustering of networks, the developmental migration and myelination of neuronal systems and the discoveries that are more or less relevant for language. He rightfully warns that not only what is dealt with in linguistics but the whole of brain activity contributes to language. Certain models, such as Fuster's ladder, recur repeatedly. Buzzwords such as *mutual functionality*, *neural network binding*, or *dynamic time* are marshalled. "*The cognit complex changes into the momentary actual state of energetic executive operation. It is caused by internal interactions of the neural networks*"—Bingo, the philosophical-linguistic concept is turned into a physical state! It is still as invisible as the Emperor's new clothes. He goes on to admit that there is no one-to-one mapping of psychological or mental functions assigned to separate brain areas.

One of the grand issues, whether we are genetically programmed to produce language, as the notoriously political

Chomsky so eloquently argued, is touched upon in this book also. Arbib's reformulation is based on what is learned from aphasiology and developmental psychology. There is no doubt that if you destroy large enough strategic portions of the left hemisphere, such as Broca's and/or Wernicke's areas, in most people language is processed less efficiently or not at all, so there is some structure in the brain essential for language. However, looking at the fine structure or physiology produces not an iota of evidence of actual words or grammar residing in the brain. We have known about the need for brain structure to process language since written documents exist (the Smith papyrus mentions language loss after brain injury), but not even the most sophisticated functional image or physiological artefact can document language in the brain, but only brain activity associated with language production.

Chapter 3 has the most to do with neuroscience, and briefly presents some of the modern psychophysiological experiments updating the perceptual-action model of Meynert-Wernicke-Lichtheim from 130 years ago. Some of the more interesting and innovative ones are from Pulvermuller, showing that action words activate the upper premotor cortex, and Friederici's interesting studies of the timing of phonological and sentence processing with evoked potentials combined with FMRI activation of spatial distribution. Experiments with eye saccade measures give us an idea as to how the brain processes perception objects and written material, and this is extrapolated to how linguistic and presumably nonlinguistic organisms develop cognitive structures and labeling or other reactions to what they perceive. Particularly useful insight is provided by the studies of infants into the hierarchical neural organization of language development. The book is not up-to-date enough however, to include the latest in FMRI modeling eg. the "default condition" and its activation.

In the second half of the book, he introduces linguistics to the neuroscientists. He describes the structural analysis of syntax that generated a large amount of syntactocentric research and discusses directions such as the extensions of the importance of semantics and pragmatics, and specifically the functional- mind proposed by Jackendoff (not so fortunately abbreviated as f-mind), and the cognitive grammar of Langacker. We even learn the meaning of "Beethoven likes Schubert". Eventually we get to his ultimate diagram incorporating functions such as *hermeneutically analysed cultural integration* entitled, believe it or not, *Innate Pre-cultural Proto-self Integration*. By then it is not surprising that society, togetherness, mathematics, music and religion get mixed in with the philosophy of Hume, Kant and Leibnitz. We even get to God in the footnotes. Erudition and culture concatenated galore. At the end, a cloudy note of pessimism: "*We normally do not acknowledge that what we know consciously is necessarily only a skeletal system of what seems to exist here and there, but is supported by a much more detailed infinity of elements constituting the flow of now and then*".

In conclusion: Philosophizing about how the brain works is interesting enough, but this book is probably not everyone's cup of tea. Some might say that trying to squeeze formal linguistics onto neuroscience is a bit like making a silk purse out of a sow's ear. Some might find it an admirable effort. The book is informative, ambitious, mostly well written, but not an easy read. Few neurologists would be really into it, if my "theory of their mind" is correct.

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