

devices). The selection of authors, however, ensures that the material presented would be well respected amongst our peers. The amalgamation of work from many different authors inherently creates a discrepancy in the detail of presentation. The editors have crafted each chapter to follow a similar pattern highlighting patient selection, preoperative preparation, operative procedure and postoperative management. This makes reading the entire volume easier. The details of the operative procedure, however, are quite variable. Intraoperative monitoring, for example, is discussed superficially or in great depth – presumably reflecting the authors' use or avoidance of this essential adjunct technology.

This volume is advertised to be a 'comprehensive coverage of the latest techniques in functional neurosurgery' and to provide 'concise descriptions of indications and surgical approaches'. I would lean towards concise. There are a number of techniques that might be unknown to the general neurosurgeon that are well described in this volume (e.g. microelectrode recording).

This volume provides an overview of the operations performed in functional neurosurgery. Written by experts in the field, it offers an excellent description of 'how they do it'.

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HISTORY OF COGNITIVE NEUROSCIENCE. 2009. By M.R. Bennett, P.M.S. Hacker. Published by Wiley-Blackwell. 288 pages. Price C\$150 approx.

This is a volume of critical summaries of key articles and comments along with illustrative reproductions of modern neuroscience with a touch of history especially in the last chapters, where some of ancient and renaissance philosophy and science is brought in for demonstrating the oddity, yet the relevance of their thoughts. The target of the repetitive critique is the idea that the synaptic networks of the brain have psychological properties.

The book starts somewhat arbitrarily with Helmholtz. Visual perception, a favorite of philosophers is a good place to start discussing psychophilosophical issues such as what we see is not always what there is, or what is there when we don't see them. Illusions, the staples of all popular books on psychology, such as the converging lines, Rubin's vase-faces, the blind spot completion, appear to make a point that we indeed perceive things that are not there. The authors on the other hand make the point that it is not our brain, it is us that are taken in.

Helmholtz takes his deserved place, but he is not exempted from the criticism of using arbitrary language explaining that the brain creates the images according to previous experience. The authors claim the brain does no such things, only the human being does, but they do not offer an obvious alternative explanations to the problem of the duality of brain and mind. Getting down to even more basic brain functions such as the columnar organization of cells responding to certain visual stimuli even the Nobel prize winners Hubel and Wiesel are scolded for using the convenient shorthand of visual maps. The "who is who" in cognitive science and their interpretation of physiological phenomena in psychological terms follows. Mental rotation, computational representation, the binding theory and mental imagery are lined up and their interpretation is demolished as fiction. The reader gets the message quickly and begins to anticipate what is coming next.

Complex paradigms of attention, dichotic listening, arousal physiology, spatial representation underlying attentional dominance and hemineglect and blindsight are separated from their psychological interpretations and reinterpreted in a quasi nihilistic factual terminology that leaves more questions, than answers.

Language and cortical function are extensively reviewed but concepts of functional and linguistic modules in the brain such as semantic processing or cortical lexicon as brain function are declared faulty and mistaken interpretations. Wernicke's model is "confused" and "introduces the venerable empiricist confusion that ideas and concepts, indeed thoughts, are formed by linking different sense impressions"

The brunt of criticism is aimed at reductionistic, engineering concepts such as neural networks and attributing them to psychological phenomena observed in humans or animals. Particularly, terms such as processing models and cortical representations framed in engineering and computer jargon, the lingua franca of cognitive neuroscience are targeted. No wonder that the author's previous books came under attack by other neurophilosophers such as Churchland, Denett and Searle.

The authors clearly appear to be dualists, reasserting the separation of brain and mind throughout, even though they claim not to be taking sides with philosophers of the spiritual or religious sort vs the materialistic monists who claim that the mind and the brain is one without the added spirit to do its magic of perceiving, attending, thinking, deciding, planning, solving problems and speaking. According to the author's argument it is human beings who do all those things not their brains or parts of their brains. "Abilities depend on neural structures, but these structures need not and in these cases could not, contain copies of that which the abilities are abilities (sic) to do." This of course runs contrary to most materialistic interpretation of psychological phenomena. Yet paradoxically, in my opinion, they claim to be the followers of Aristotle's monism in Chapter 7. The reader will have to see for himself and decide.

If you the reader are expecting a work of history tracing the personal, professional and societal circumstances of discoveries you will be disappointed. It is not explored for instance why Wernicke drew his diagrams of human speech modules on the right side of a monkey brain (even though several historians chronicled his short, but distinguished life). The book is not so much historical at the start, but rather a compendium of research selected by the authors for reinterpretation or the taking apart of these interpretations. Chapter 6 is an exception as it covers dualism of the body and soul, one of the basic questions of philosophy beginning with the argument between Plato and Aristotle and motor function from Galen to Sherrington. Galen was of course the first who has associated the brain with sensation, perception, imagination and thought, even though he focused on the ventricles as the locus of these functions as every first year student knows (the millennium long error in interpretation of brain function). They perceive this basic error to attribute the function of the whole animal or human (such as perception or thinking to a subordinate part of the animal (the brain or ventricles or the pineal gland or the amygdala or its soul) as the original error (or is it sin?) that "runs like canker through the history of neuroscience to this day".

Attacking some of the targets, such as the computational models and processing diagrams will be received with more favor in some quarters, because the obvious use of computer jargon has not endeared this kind of model making to everyone. At times the authors' polemic appears to be too strong: "There is no such a thing as mental lexicon" (most people agree to this in a literal

sense, yet most people would use it metaphorically). Or: "The theory of Levelt is more a mythological redescription of the observed phenomena than an explanation of them" (I secretly agree, although Levelt's model is still fashionable). Encoding, directing, mapping imaging, matching by cells are not faring any better than the much reviled "engrams" of classical neurology. The authors point out the historical evolution of mechanistic models of levers and cogwheels in the brain to logogens and response buffers of the computer lingo. To paraphrase Henry Head the great British aphasiologist and debunker of the "diagram makers", the stage of explanation changes, but the gap between what is going on in the brain and what is happening when humans see or speak remains.

Functional activation paradigms are able to show what areas of the brain are involved in certain activity that can be highly specified according to a theoretical framework. The authors review some of these studies in detail, as they are the bulk of current cognitive neuroscience in humans. However the interpretations of these studies are less than straightforward and the book points out some of the fallacies. Emotions and their study and the amygdala receive prominent treatment, after all this is the area the authors work in, but Damasio's ideas (a reformulation of Jamesian psychology) is open to several objections: "There are extensive conceptual confusions involved in his somatic marker hypothesis"; "Bodily reactions are not ersatz guides to what to do and do not inform us of good and evil" etc. etc.

Chapter 7 is the philosophical conclusion, defending against the counterattacks on their attempts to demolish what they define as the "mereological fallacy". By this they mean the fallacy that function can be attributed to a part of a functional entity such as perceiving, thinking or feeling can be attributed to the brain as a part of the human being instead of the human being or the animal as a whole. Their argument is illustrated by the nonsensical science fiction of a brain kept alive outside of the body (we have all seen the movie), which they convincingly argue could not work. Yet the thought lingers: if only the movie could be made better... Well, whether the brain thinks or the man with the brain may seem a bit of hair splitting akin to other philosophical exercises to some. Everyone, even the authors, agree you need a brain to think, just like you need the engine to fly an airplane. On the other hand only airplanes fly, engines do not... (not quite the same, but a reasonable analogy).

The book is of interest to philosophers and neuroscientists and the general, albeit highly educated reader, who is interested in neuroscience and particularly in the philosophy of interpretation of empirical findings. I don't think too many lay people or even neurological clinicians will have the time or interest to digest all the content and I don't think it will replace larger reference texts that cover the field. The book is not easy reading, in fact it is hard work, rewarding though with facts as well as food for thought. It is a severe, sometimes convincing critique of the terminology used to explain the relationship of psychological phenomena to brain activity in mechanistic, engineering or computer terms. The authors' objections to jargon terminology and fancy conceptualization is far reaching and often polemical, but mostly valid. It leaves a void however, like the words of Wittgenstein: "whereof one can not speak, thereof one must be silent".

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CATASTROPHIC INJURIES IN SPORT AND RECREATION: CAUSES AND PREVENTION. A CANADIAN STUDY. FIRST EDITION. 2008. Edited by Charles H. Tator. Published by University of Toronto Press. 761 pages. Price C\$165 approx.

Dr. Tator and his research group have painstakingly collected and analyzed catastrophic injuries due to sports and recreation from the period of time 1986-1995 within Ontario. They performed this study whose results compose this book by completing four 12 month prospective surveys driven by a research team. Not only do they present their results as an overview, but they also analyze injuries within individual sports. A great deal of thought in this subject is evident, particularly when one reads the chapters examining less popular sports. All of this effort makes this work unique amongst books examining trauma, and even more unique amongst Sports Neurology volumes.

After an overview of the study parameters is presented in Chapter 1, Chapter 2 describes the results of the Ontario Study in great detail, right down to possible preventability of injuries. In some cases, the degree of detail is superfluous, such as the geographical location of some sports-related injuries (Chapter 4), but in most cases, the attention to detail is appropriate and educational. Details permit us to learn that canoeing injuries leading to fatality are much more common than would be anticipated, accounting for >4% of all sports-related fatalities.

After these overviews are provided, remaining chapters are divided into water sports, motor sports, winter sports, bicycling, air sports, field sports, racquet sports, equestrian sports, floor sports, playgrounds, missile sports, and summer sports. Overall, there is very little exclusion within Dr. Tator's work. Bowling, dancing, and cricket are a few examples of common activities not assessed. However, other activities such as paintball, ball hockey, and parachuting, frequently neglected in other works, are assessed here. Sports gaining popularity over recent years, such as mixed martial arts, are not included but information regarding their prevalence of injuries is sparse at this time and their performance is not yet permitted in Ontario.

The chapters themselves are thick in detail, and are not intended to be read leisurely. Instead, the format and layout of this book lends itself to use as a tremendous reference. In addition to Dr. Tator and group's own data, references to important literature is provided within each chapter. This is an important reference tool for all sports medicine specialists, and Neurologists, Neurosurgeons, and Physiatrists with an active interest in traumatic injuries related to sports and recreation. I commend Dr. Tator on this tremendous composition and recommend this as an important reference book for those close to the field.

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