homeostasis. Thus, the book describes the neurobiology of fundamental behaviours which are a combination of drives (a need state indicative of the presence of a regulatory imbalance) and emotions (raw feeling states).

Panksepp reviews the animal data for each of these emotional and drive systems starting with the relevant neuroanatomy and neurochemistry. Behavioral correlations are intermeshed. These descriptions are followed by attempts to link disturbances in each system to clinical psychiatric conditions. For the clinician, some of Panksepp's clinical inferences, although plausible, will simply not ring true. Each chapter concludes with an afterthought containing speculative leaps as well as philosophical and sociopolitical musings. These afterthoughts and clinical correlations are provocative and are stimulating grist for the intellectual mill.

Panksepp concludes his book by taking a stab at consciousness. In the end what he describes is not subjective self-awareness (the ultimate mystery) but rather a primitive and primordial site of behavioural coherence and body awareness centered around the periaqueductal gray matter in the brainstem. This localized region serves as a central polysynaptic multimodal multi-option reflex center that integrates sensory and affective input to initiate coherent goal directed complex motor programs so as to achieve the goals of resource acquisition, reproduction and avoidance of harm in a competitive interorganismic world. Swimming upstream against contemporary intellectual trends, Panksepp believes in the presence of a central processor that must underpin any description of consciousness. Panksepp does not suggest that the brainstem region has the capacity to observe itself, only that such a region must be incorporated into any higher form of consciousness. Self-awareness, the highest level of consciousness remains unexplained, reasserting its claim to be one of the most, if not the most, perplexing, challenging and irresistible questions in neuroscience.

Affective Neuroscience is not an easy read. Nonetheless it synthesizes the most important animal work relating to the basic building blocks of behaviour. Mastering the information is worth the intellectual effort. It is an invaluable reference for any neuroscientist interested in understanding the neurobiological basis of drives and emotions where the best information is contained in the animal literature. This is the strength of Panksepp's book which summarises and references these data around clinically recognizable concepts making the information highly relevant to practising clinicians.

Trevor A. Hurwitz
Vancouver, British Columbia

MOLECULAR AND CELLULAR NEUROBIOLOGY; CORTICAL PLASTICITY LTP AND LTD. 1998. Edited by M.S. Fazeli and G.L. Collingridge, Ontario: Oxford University Press Canada. 253 pages. ill. C$108.00

This book includes 25 contributors, the majority of which are from the United Kingdom. The book reviews the current concepts of molecular biology in cortical plasticity in 11 chapters. The emphasis is on studies in long term potentiation (LTP) and long term depression (LTD). These processes are believed to modify synaptic properties in the cerebral cortex and contribute to learning of new patterns of behavior.

The reader needs to be equipped with background knowledge on the mechanisms of various neurotransmitters at a synaptic level, as well as secondary messengers and gene expression. Chapter 2 lists the amino acid receptors of interest for LTP and LTD, including glutamate and GABA receptors. There is no summary at the end of the chapter to help readers develop a clearer concept, and it is likely that they will be left with a platter of loose data with no conclusions drawn as to the relative significance of these receptors. A similar comment may be applied to the chapter on secondary messengers. A conclusion similar to that in Chapter 4, would be much appreciated. Chapters 5 and 6 are somewhat repetitive and would have been better combined into one chapter. The clinical applications of such knowledge has been linked to epileptogenesis. There is, however, no direct implications for human learning processes and behavioral modeling despite the abundant data on synaptic plasticity in the hippocampus, visual cortex, and neocortical areas. Chapter 11 attempts to propose models of learning and association with mathematical expressions. These models are embryonic in their development and are far from being validated.

In summary, this book is well written with helpful illustrations. It contains valuable information on research carried out over the past 25 years and is very focused in the subjects of LTPand LTD. It is an important source of references for basic neuroscientists interested in studying the mechanisms of learning and behavior.

Joseph Tsui
Vancouver, British Columbia.

THE CNS IN ACTION THE GUSTATORY SYSTEM #4. 1999 By Dr. Louise Charron, Dr. Jean-Marie Peyronnard. Published by SSB Multimedia Health Sciences. CD ROM media C$133.00 approx.

This is an excellent learning aid to the study of the anatomy, gross and detailed, as well as the neurobiology of taste. Although the anatomy is supposed to be "functional" it is presented in sufficient detail to more than satisfy the basic needs of most neuroanatomy professors. In fact, for practicing neurologists, the detail provided here is more than would ever be desired or needed. It would be a great learning resource for housestaff in neurology, neurosurgery or ENT specialties. Skull based surgeons may find parts of it useful as a good review although this is not surgical anatomy. The neuroanatomy of gustation is complex and difficult to learn but can be rewarding if understood, and this multimedia presentation makes it easy to follow and learn.

The neurobiology is well presented, from cellular events to a detailed analysis of receptor cell types and their functions, along with the local and central connections for gustation. Our gustatory systems are very interesting and highly evolved and this is an ongoing area of study for biomedical research. It is informative to learn how "unique sensory receptors" turn "feeding activities" into "gastronomical feasts!", as the authors point out in the booklet that accompanies the CD.

It is an easy CD to use, it boots up quickly on computers with the newer faster processors, and it has an intuitive interface, a good index and help section. It presents the topics in small "video movies" which is accompanied by a verbal commentary. The voice can be shut off as it simply reiterates the text. Some of the movies could be shorter or there should be an advance