

Book Reviews

TIME AND THE NERVOUS SYSTEM. By William Goody. Published by Praeger, New York and London, 178 pages.

While studying at the National Hospital, Queen's Square in the 1960's, I used to attend William Goody's ward rounds, as much for his erudition as his clinical wisdom, as I enjoyed his comments on the coin collection in the British Museum, as well as his observations on dementia. As G.W. Bruyn comments, Goody is one of those "rare and extinction-threatened species of distinguished, lean and stern gentlemen once crowding the scene of British neurology". In those rounds Goody discussed his ideas on the relationship between the nervous system and the concepts of time, and spoke about writing a book which I watched in vain for over the years.

In the meantime, as a stimulated student, I accumulated a sizable file of literature and books on the concept of time. Imagine my delight as I prepared to select some reading for a long trip, and that day Goody's "Time and the Nervous System" came across my desk with a request to review.

On a car drive in Hampshire in 1959 Goody started with the deceptively simple idea that "the brain is the place or mechanism or medium by which time is converted into space and space into time". He honed that thought over 27 years into this tight little volume. He takes our thinking out of its conventional, learned patterns, challenging us to look at ourselves, our way of thinking and our world from a different perspective.

He suggests that our egocentric self-awareness and our definition of ourselves is a function of our fully functioning nervous system. To function in time and space, we had to develop the ideas of them and the language that defines them. Once defining something by a sound or written shape, it then takes on the aspect of being something "absolute", existing outside us and without necessary relationship to us.

He says we free ourselves from all of the neurological mechanisms required to conceptualize and act, and define them into higher concepts and principles. This frees us from preoccupation with the elements that made up the idea. We can think of music rather than all of the complex elements that go to make up music. By studying how the nervous system works, we can discover how we model or image our personal world and how it provides us with a working medium while we thrive in life, and how it disintegrates as we decline.

We yearn for a concept of an Newtonian absolute concept of time but think in terms of many different concepts of time. Goody says that if we encapsulate the concept of absolute time in uncertain or misused language, then absolute time can possess whatever properties we wish to give it. In other words, absolute time is false because human language used to encapsulate it is relative to fallible human observation and expression. Therefore he suggests that we should qualify time each time we discuss it so we know whether it is Government Time (GT), (the clocks used by society, based on astronomical observations), or Personal Time (PT), (the time we each live and feel). There is often conflict and rivalry between the different times.

Patients often have to translate symptoms and problems in personal time into government time in order to translate the concept. Haven't we all noticed the difficulty of patients during our interviews who clearly understand their own symptoms in personal (to us vague) time because we are attempting to note the temporal sequence in chronological (GT) time. Goody opens to us the concept of personal time and indicates that little attention has been paid to it, but leaves it for others to develop and research.

Both Government Time and Personal Time are the product of human nervous system activity. These are humanly imagined forms of time and are not absolute, they are abstractions, perceptions, language forms of our own creation. Life is the direction of time (personal time) which we have chosen to follow.

Einstein asked the deceptively simple question, "What is a clock?". Goody has previously written on the interesting concept of musical notation as an advance system of space-time signalling. This is another "clock" that we may use personally, as each of us may play a musical piece using the same personal musical time, finishing the final note on different chronological time. Moving from observation of the stars and their movement, to the construction of clock mechanisms, to wrist watches, to digital displays is an equation of space with time formulated by the use of our brains. Goody indicates the central concept of an escapement mechanism as central to the concept of clocks and suggests that the brain's clock-like activity is due to the function of the neuron as an escapement. The nervous system fulfills the requirements for the definition of a clock, and the neuronal system acts as a biological escapement. This gives rise to an awareness of duration and change (time sense) from which we drive personal time.

Goody hypothesises that, equipped with a sense of space and a sense of time, each of us may be considered a clock-system which is aware of itself. Second, we behave in a dynamic balance of space-time, flexibly adjusting the symbols to make best use of all dimensions of which we are aware.

The third section of the book outlines how a personal sense of time is affected by age and by neurological disease. Our personal memory from childhood, faulty and selective as it may be, is interesting to contemplate. He outlines the variations in personal time experience with age, with different emotional settings, drug addiction, epilepsy, Parkinson's Disease, and various physiological states. He ends by analyzing how neurologists use the process of time sense in the solving of problems, interlacing medical knowledge with the interpretation of the patient's reference frame and the neurologist's own reconstruction of the process in time. Finally, he places the neurological theory and approach to time (neurological cosmology) mid-way between the astronomers on the large scale and the atomic physicists and biochemists on the molecular and submolecular scale. The human subject sits at the center of all human thoughts and activities using the space-time skills derived from the nervous system.

Dr. Goody has given us a fascinating insight into our concept of time, and into ourselves. It was worth the quarter century wait.

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CONTROL OF HEAD MOVEMENT 1988. By Barry W. Peterson and Frances J. Richmond. Published by Oxford University Press. 322 pages. \$71.95.

This book is the result of a satellite symposium of the XXX Congress of the International Union of Physiological Sciences held in 1986. However, the editors rightly point out in the Preface that this book is not merely a collection of symposium proceedings. The book has been well and exhaustively edited, so that the twenty chapters, mainly written by authorities in the field, form a harmonious and relatively comprehensive volume. Most of the chapters are reviews on single topics related to the control of head movement. Early chapters in the book deal with basic structures underlying the control of head movement, including chapters on the joints and muscles of the neck, on the cervical motoneurons, and on the sensory receptors in cervical muscles and joints. These are followed by, among others, chapters on the cervicocollic and cervicocular reflexes, the tonic neck reflex, and the cerebellar pathways contributing to head movement. Finally, the book concludes with more integrative chapters, as for example, chapters on control of head movement during visual orientation, on head movement models, and on clinical disorders of head movement.

This book has a very definite basic science orientation, and is directed primarily at the question "How does the CNS control head movements?" Only a few chapters deal with clinical material, and these are relatively superficial with regards to descriptions of clinical syndromes. With 42 pages of references, however, this book is an exceptionally well organized and well referenced multi-author discussion of the control of head movements. Those interested in motor control research will find it a very useful reference that deals not only with head movement, but also touches upon many basic and new concepts in motor control.

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NONINVASIVE IMAGING OF CEREBROVASCULAR DISEASE, Volume 5, First Edition. Edited by Jesse Weinberger. Published by Alan R. Liss, Inc. 202 pages. \$72 Cdn.

This book is Volume 5 in the series "Frontiers of Clinical Neuroscience" and includes contributions from 16 contributors. The editor states in his preface that the "purpose of this volume is to provide the clinician caring for stroke patients with a working knowledge of current noninvasive techniques employed to visualize the pathophysiology of cerebral ischemia without exposing the patient to risk." In general terms, this book has been successful in accomplishing this goal.

The book is well-organized, concentrating on evaluation of extracranial causes of ischemia, in the first 4 chapters. The next 4 chapters deal with noninvasive evaluation of the intracranial

vessels and structures. The final chapter deals with intraoperative monitoring of cerebral blood flow and EEG during carotid endarterectomy.

With the exception of the chapters of CW Doppler sonography and transcranial doppler, the text is concise, well-written and readable. Generally, a brief introduction to the basic principles is presented at the beginning of each chapter as a basis for understanding that particular imaging modality. Subsequently, normal and pathologic findings are presented, described and illustrated. The images included are of good quality, illustrative and well-labelled. Unfortunately, the color images from several modalities are included together in a Color Figure Section. These figures would have been more helpful had they been placed in the particular section where the modality was discussed, to save checking back or forth to the Color Figure Section.

The chapters on CW and transcranial doppler sonography are lengthy and difficult to read and follow. The level of technical expertise required to perform these examinations is obviously considerable and is described in detail in these chapters. This detail about technical features of the examination is important to recognize, as is the potential for misinterpretation of the studies related to technical factors, but the level of detail about the technique itself is not necessary in an overview such as this and leads to boredom in the reader. The important clinical aspects of the techniques are overshadowed by the technical explanations.

Each chapter concludes with an extensive list of references, giving the reader a good opportunity to do further reading should he (she) wish.

I would recommend this book to physicians, both those in training and those who are fully qualified, who are involved in the diagnosis and treatment of patients with cerebrovascular disease. Nurses and technicians working in the field of noninvasive testing for cerebrovascular disease will also find this volume interesting.

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CEREBROVASCULAR DISEASE. First edition. By Masakuni Kameyama, Masanori Tomonaga and Tadashi Aiba. Published by Igaku-Shoin Ltd. 178 pages. \$88.50. Cdn.

Japanese contributions to the literature on stroke have increased steadily both in quantity and in quality. Three distinguished investigators, a neurologist, a neuropathologist and a neurosurgeon have edited a volume on cerebrovascular diseases especially as they relate to Japan and to geriatric populations. The chapters include an historical survey, criteria for cerebrovascular disease, the collateral circulation, cerebrovascular disease in the elderly, etiology, cerebrovascular syndromes, rare forms of cerebrovascular disease, diagnostic modalities, prognosis and therapy.

Cerebrovascular disease no longer is the most common cause of death in Japan, having been superseded by cancer and cardiac diseases. However, it remains a leading cause of mortality and morbidity and likely to remain so, given the marked prolongation in life expectancy in Japan and the sharp rise in the incidence of stroke with increasing age. An advantage of this book is that it brings together major studies in cerebrovascular