

présentée dans le chapitre faisant suite. L'auteur y propose une conception nouvelle de la structure du stock à court-terme. Une étude de BADDELEY et HITCH de 1976, dans laquelle les auteurs présentaient à des sujets, de façon simultanée, des mots visuellement et des chiffres oralement, démontrait que l'effet de récence, lors du rappel libre des mots, n'était pas altéré par la mémorisation conjointe de 6 chiffres. Ce résultat surprenant a permis aux auteurs d'avancer l'hypothèse intéressante d'une structure dichotomique du stock à court-terme: une boucle de répétition articulée et un analyseur (processor) central.

Les deux chapitres suivants sont consacrés à la présentation des mémoires sensorielles (visuelle, auditive, kinesthésique, tactile et olfactive).

Finalement, c'est au stock à long-terme que se rapportent les trois chapitres se succédant. En premier lieu, c'est le rôle primordial de l'organisation qui y est souligné, qu'elle soit de type linguistique: la catégorisation, ou de nature visuelle: l'imagerie relationnelle. Ceci apparaît avec une particulière netteté lors de l'apprentissage de textes en prose. Un chapitre est consacré à la mémoire sémantique, à l'aide de modèles linguistiques.

Le chapitre 14 comprend le rappel de quelques méthodes mnémotechniques verbales et visuelles, ainsi que la présentation de quelques cas de sujets à mémoire supranormale.

L'auteur clot son livre en prenant position pour une psychologie expérimentale de la mémoire soucieuse de sa "validité écologique". Ce qui implique une recherche trouvant sa validation au niveau de la réalité extérieure.

Une bibliographie, ainsi qu'un index des noms d'auteur et des sujets figurent en fin d'ouvrage.

C. TZORTZIS

Neuropsychological Assessment. MURIEL D. LEZAK. Oxford University Press, New York, 1976, 549pp. £8.50

THE NUMBER of neuropsychological tests currently used by clinicians and researchers to assess their patients is about as great as the practically infinite number of manifestations of altered behaviour produced by brain lesions. In this book, Dr. LEZAK selects some of the most frequently used tests, describes their use and discusses their significance. As a result of her arduous work, we finally have a reference book on neuropsychological tests.

The first chapters of her book present a brief background of basic concepts of neuropsychology including some anatomy, psychology and pathology. General testing procedures and their rationale are then presented and discussed in some depth. The tests themselves are discussed under the following headings: (1) intellectual ability tests, (2) verbal functions, (3) perceptual functions, (4) visuopractic functions and manual dexterity, (5) memory, (6) cognitive functions, (7) orientation, attention and self-regulation. The two final chapters are on batteries and composite tests for brain damage and on tests of personal and social adjustment.

This book puts its greatest emphasis on patients' care in terms of diagnosis, prognosis and even therapy. The research aspects of neuropsychology receive relatively less attention. There is some discrepancy between the relative length of some sections. For example, generalized intellectual functions are covered in depth but language disorders are discussed in only 20 pages. Also the description of some tests is too short for the naïve reader to understand either their technique or their significance. All this is probably understandable in a book of this relatively small size.

The greatest merit of this book is probably its emphasis on the rationale for testing rather than on technical matters. The reader will, especially in the first 180 pages, get a good answer to his "why" questions. Complete technical details can certainly be found in the extensive bibliography quoted by the author. The book is well written, eminently readable with a wise use of anecdotes and clinical cases and is well presented from an editorial standpoint. The book ends with 4 useful appendices: a consolidated reference list, a name index, a test index and a subject index. Everybody who is in any way in contact with patients suffering of CNS diseases will certainly benefit from this book. We hope that the author will have the occasion of writing, in the future, new editions of her book on this rapidly changing field.

F. BOLLER

Consciousness and the Brain: A Scientific and Philosophical Inquiry. Edited by GORDON G. GLOBUS, GROVER MAXWELL and IRWIN SAVODNIK. Plenum Press, New York, 1976, 365 pp. \$24.50.

Consciousness and the Brain is an anthology whose contributors are eminent neuroscientists, philosophers, psychologists and psychiatrists attempting to illuminate the multifarious issues surrounding the "world-knot"—the problem of how consciousness is related to the brain. As a collection of essays which transcends the interests of any particular academic discipline and which reveals the complexity of the problems involved in unraveling the world-knot, a volume of this kind is to be welcomed. *Consciousness and the Brain* is brimming with stimulating ideas from a great variety of perspectives.

Aside from a round-table discussion by the contributors of the role of scientific results in theories of mind and brain, the articles fall roughly into two categories: philosophical articles, not necessarily by philosophers, which attempt to supply a conceptual framework for problems of consciousness; and articles in which philosophical positions are presented as adjuncts to empirical findings.

The first category includes papers by WALTER B. WEIMER, E. M. DEWAN, WILLIAM C. WIMSATT, GORDON G. GLOBUS, GROVER MAXWELL, IRWIN SAVODNIK and perhaps C. WADE SAVAGE. Some of these papers hint at too much and explain too little. For example, GLOBUS mounts a spirited defense of panpsychism, which many would consider wildly implausible. (The awareness of a flower is a "primordial hum", p. 291.) Drawing on sources from Gödel's proof to the books by CARLOS CASTANEDA, GLOBUS invokes such a wide range of considerations that he is forced to confine himself to provocative comments rather than detailed analysis. Others of these papers presuppose a good deal of knowledge of philosophy. For example, WIMSATT's important article develops a philosophical underpinning for SPERRY's "emergent interactionism". An understanding of this ambitious project requires knowledge of the problems of theory reduction, which has been a central issue in the philosophy of science in recent years. Nonetheless, Wimsatt's work is first-rate and one of the most profound articles in the volume.

In contrast to Wimsatt, WEIMER makes use of a cumbersome technical vocabulary and cryptic allusions to a number of philosophers from Russell to Kuhn without clarifying the complexities of consciousness. This is especially unfortunate since Weimer's is the lead article. In addition, Weimer's article may contain a subtle, but important, confusion. He seeks to explain the relationship between "the mental" and "the physical" realms by postulating an underlying "neutral" substratum from which they both derive. To elucidate the notion of a neutral substratum, which is to be identified with the person, Weimer provides a model. The model, which is the prime source of plausibility for Weimer's view, consists of an analogy with transformational grammar. In transformational grammar, the surface structure of a sentence is distinguished from its deep structure. It sometimes happens that an English sentence, e.g. 'The shooting of the hunters was terrible', is ambiguous; the sentence may mean either that the hunters were poor marksmen or that it is tragic that the hunters were shot. On the Katz-Postal hypothesis, there is a different, and unambiguous, deep structure for each of these interpretations of the ambiguous surface structure. But the analogy that Weimer needs to illustrate his neutral substratum is precisely the converse of the analogy which this version of transformational grammar yields. To support his position, he needs the deep structure to be analogous to the neutral substratum and the surface structures to be analogous to the mental and physical aspects of the person (pp. 22, 23). But his examples of ambiguity from transformational grammar point to one surface structure ('The shooting of the hunters was terrible'), which is ambiguous, and to two deep structures, neither of which is ambiguous. So the only analogy Weimer is entitled to is one in which the surface structure corresponds to the neutral substratum and the (unambiguous) deep structures correspond to the mental and physical aspects of the person. The analogy that Weimer is entitled to would not advance understanding of the relationship of "the mental" and "the physical"; nor is it the analogy which Weimer draws. Rather, he illicitly takes his analogy to show how two surface structures ("the mental" and "the physical") are related to each other via a single deep structure (the neutral substratum, or person). The mistake is not apparent at first because Weimer's use of the term 'deep structure ambiguity' masks the fact that in transformational grammar the ambiguity is in the surface structure, not in any of the deep structures.

Chapters by KNAPP and SAVODNIK follow the opening statement by Weimer. In these articles the authors attempt to define the nature of structure of the mind, but also examine the origin of the mind-body problem within the context of the evolution of consciousness, both as it arises within the individual and as it developed for the human race.

Knapp uses observations from a psychoanalytic session to provide data from which he argues that the division of the human being into mind and body (or consciousness and brain) is a consequence of developmental pressures. He demonstrates that during the course of a free-association session a patient with a psychosomatic complaint gradually lost the absolute distinction between his physical complaint and the mental symbols underlying it. At this point, Knapp argues, it is possible to discern the common matrix from which the separate conscious concepts of mind and body arise. Consciousness, then, must differentiate, or rather be forced to differentiate by environmental pressures, before the problem of mind-body even exists.

Although he takes a different approach Savodnik draws on many of the same sources as Knapp (particularly the ideas of Cassirer). He describes three levels of symbolic consciousness. The expressive function is the first level. At this level "the symbol and object symbolized are experienced as one and the same" (pp. 82, 83). The second level is that of representative function in which objects are separated from their symbols. At this level objects can "point to and relate to one another" (p. 85). Finally, in the third level of symbolic consciousness, symbols do not necessarily denote any objects at all but rather can relate to each other without reference in the physical world. This is the level of the conceptual function. Savodnik considers all of these levels to be present simultaneously in the modern person, with one of the other being the dominant mode of consciousness at any given time. The level of consciousness at which an individual functions, then, determines how that individual perceives the mind-body problem, or even whether the problem is perceived at all.

Although the chapters by Knapp and Savodnik present theoretical constructs regarding the structure of the mind, and in so doing call attention to its possible unconscious or preconscious elements, these chapters do not relate these constructs to the structure or functioning of the brain. The chapters by ECCLES, SPERRY and PRIBRAM do try to explicate the relationship between the physiological workings of the brain and the phenomenon of consciousness.

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Pribram states that "certain brain states result in consciousness" (p. 300). This statement might lead one to infer that Pribram is an epiphenomenalist. However, Pribram also indicates that "consciousness describes a property by which organisms achieve a special relationship with their environment" (p. 299). This statement, and much of the remainder of the chapter, indicate that Dr. Pribram believes that consciousness has a function. It is also evident that he does not separate consciousness from the structures which produce it. The question then becomes "not how brain and consciousness interact but how the organization of interaction of the basic brain elements differs in the states characterized by automatisms and those characterized by consciousness" (p. 303).

By adopting this view Pribram avoids the problem inherent in the views of Eccles and Sperry. Both of these scientists can be considered dualists in their philosophical viewpoints (despite Sperry's declarations that he is not) and their arguments are beset by the same difficulties that have beleaguered dualists throughout history. These difficulties would seem to be, first, the precise identity of that which constitutes the conscious mind, and, secondly, the mechanism of interaction through which the conscious mind exerts its influence upon the physical brain.

Moreover, the articles by Sperry and Eccles demonstrate the difficulty, or perhaps even the impossibility, of attempting to use data from the empirical neurosciences to unravel the conceptual problems of the "world-knot". For example, Dr. Sperry discusses one of his early experiments in nervous system plasticity in which the left sciatic nerve is surgically crossed to the right leg of four week old rats. The left foot is thereafter insensitive to pain, but the animal may favor this denervated left foot if the right foot develops trophic sores. Sperry then argues that "the animal's responses in protectively holding up the wrong foot and in yipping and licking the wrong foot are caused directly in brain function by the subjective pain property itself, rather than by the physiology of the nerve impulses or by the chemical, atomistic or other subunit features of the brain processes" (p. 169). Sperry appears to disregard the possibility that the animal is simply "wired" incorrectly as a consequence of the operation and that his results can be explained entirely by reference to altered physical systems without recourse to the concept of consciousness as a causal agent.

In his chapter Eccles constructs an interesting model of the function of the cerebral neocortex as it relates to the production of volitional movement. He bases this model upon the columnar organization of the cortex and, while he may not be placing sufficient emphasis on the laminar structure of the neocortex, this portion of his article presents a potentially useful review of cortical structure and function as it relates to movement. However, Professor Eccles would also like to persuade us that in some way the "conscious self" wills the action which is then carried out by the cortical elements. As evidence for this hypothesis Eccles discusses cortical readiness potential studied by Kornhuber. While this negative electrical potential does seem to be a correlate of brain processes which precede willed action, Eccles is yet unable to demonstrate the mechanism whereby an independent conscious self could activate this system, or even, for that matter, the necessity of postulating such an entity. The weaknesses of Professor Eccles' argument are discussed by Savage in the chapter which follows that of Eccles.

In conclusion, what is new about this book as a whole, and what is a contribution to the area, is the bringing together of so many different viewpoints into one volume. In so doing, this volume serves to stimulate thought about both concepts and data which are relevant to the neurosciences and the philosophy of mind. Given the present level of our knowledge concerning the functioning of the brain, it is not surprising that no putative solution to the problem of the "world-knot" emerges. Nor is it surprising that such a variety of viewpoints as are expressed in this volume are held so adamantly. We should be encouraged by such evidence of concern over this problem by such outstanding scholars and perhaps remember the suggestion of William James in his essay *The Will to Believe*: "For the purposes of discovery such indifference is to be less highly recommended, and science would be far less advanced than she as if the passionate desires of individuals to get their own faiths confirmed had been kept out of the game."

LYNNE RUDDER BAKER and MICHAEL L. WOODRUFF

Coordination et Prevalence Manuelle chez le Nourrisson. F. FLAMENT Edition du C.N.R.S., Marseille, 1975, 278pp.

SI LES études sur le développement de la prévalence manuelle chez le nourrisson foisonnent à l'heure actuelle, rares sont celles qui replacent ce problème à l'intérieur du développement de la coordination bi-manuelle et du développement de l'intelligence perceptivo-motrice du nourrisson. Cette mise en perspective apporte des informations indispensables à notre compréhension des relations entre l'émergence, chez l'homme, d'habiletés manuelles particulières et celle d'une latéralisation stable des fonctions manuelles. C'est le mérite de cet ouvrage que d'étudier le développement de la coordination des deux mains et de la latéralisation des fonctions de chacune des mains dans ses relations avec le développement de l'intelligence sensori-motrice et avec les modifications neuromotrices (en particulier la modification de l'inhibition homo et controlatérale). L'étude est minutieuse et méthodologiquement solide. Dans le premier chapitre on trouve d'abord une discussion des conceptions de Gesell et de Piaget sur le développement. Cette discussion à

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