

tials, discussion of hemisphere asymmetries and laterality, and an excellent presentation of the brain areas that may be implicated in schizophrenia by Zec and Weinberger. Interestingly, the conclusions that these authors reached were not dissimilar from those reached by Kraepelin at the turn of the century, although foundations for now recognising schizophrenia to be a disorder based on the limbic system, especially prefrontal cortex, pathology are very much clearer. This chapter deserves to be read by all those interested in the condition.

Other chapters review the CT, MRI, and cerebral blood flow findings, including positron emission tomography; anatomical neuropathology; virology and neuro-immunology. The final chapter is an attempt by Weinberger to present a neuro-developmental theory of schizophrenia based on the findings reviewed in the book.

This excellent handbook should be available in libraries for all those doing research in schizophrenia and is recommended for personal collections as well. The fact that all of the contributors come from the United States is disappointing, since much good work is going on in schizophrenia in Europe. Although European authors' are readily referenced, the failure of the editors to ask transatlantic colleagues to contribute is somewhat startling. This is not least because the underlying "neurology of schizophrenia" has been most persistently sought in Europe, while only recently again attracting a great deal of interest in the United States. It is hoped that this omission will be remedied in future editions of the handbook.

MR TRIMBLE

Blindsight: a case study and implications. *Oxford Psychology Series No 12.* By L Weiskrantz. (Pp 187; £19.50.) Oxford: Oxford University Press, 1986.

During the 1970s, I taught a biophysics course to third year physics students at Imperial College. At the end of a lecture dealing with the visual pathways, a student enquired whether I wished to examine his brother, GY who, following a traffic accident some ten years earlier, suffered a hemianopic field loss. Although it seemed to me that little new could be learned by studying such cases, I agreed to see him, and was as astonished as he was to discover that he could detect and locate transient lights presented within his "blind" hemifield. I

knew that de-striate monkeys exhibit extensive visual capacity (Weiskrantz,¹ Pasik and Pasik²), but was unaware of the then recent reports of related responses in humans suffering damage to the striate cortex.^{3,4} This gap in my knowledge was rectified by a lecture given in London by Prof Weiskrantz and in the book under review, he is concerned with the investigation and analysis of such cases.

The book is divided into three sections; following a brief description of the historical background, the second and principal section deals with DB, the subject of the original study by Weiskrantz *et al.*⁴ The term "blindsight" was coined to reflect the ability of patients such as DB to discriminate between different light stimuli in the absence of conscious perception. Many of the experimental data presented here are previously unpublished and contribute significantly to the characterisation of blindsight. It is intriguing to read DB's attempts to articulate the basis of his "blindsight" discriminations, and in the main, his verbal reports relate tenuously, if at all, to the sensations experienced by those with normal vision.

In the final section, the author reviews related studies on other subjects, and the meticulous treatment of the various researches is a particularly admirable feature of this book. There are significant differences between individuals in the richness of visual sensation and the range of discrimination associated with stimulation of the "blind" hemifield. Some, such as subject GY, experience a clear sensation, localised within the scotomata, whilst others, such as DB, usually report no conscious awareness of the stimulus. It seems highly probable that these various expressions of residual vision are related, but the differences have yet to be explained. Identification of the underlying mechanisms is critical to our understanding of the phenomena, and the author shows that there are many similarities between the functional organisation of the retinal projections via the superior colliculus, and that of "blindsight". One specific difficulty associated with all psychophysical investigations of "blindsight" is the possible contribution of light scattered out of the "blind" into normal regions of the field. Light scatter external to the eye can be all but eliminated by the use of Maxwellian view optics for production of light stimuli, but intra-ocular scatter is unavoidable. Strong objections both to the methodology and data analysis applied in "blindsight" studies were raised by Campion *et al.*,⁵ and they attributed all reported phenomena to scattered light effects. Although the experi-

ments on which they based their criticisms were, in my view, inadequate, they did succeed in stimulating a variety of new investigations. As well as disproving the scattered light interpretation, these in some cases revealed new properties of the "blindsight" response system, and the author devotes some effort to the assessment of his own and other contributions to this debate.

The book is clearly written and well illustrated, and the organisation of the material leads to a particularly clear exposition. Over the last 25 years, anatomical, electrophysiological and psychophysical investigations of vertebrate vision have revealed many new and some quite unexpected phenomena. The sensory mechanisms which generate internal representation and classification of external objects remain, however, relatively unexplored. Detailed investigations of human subjects such as DB appear to offer special insight into these higher processes, and Prof Weiskrantz's book provides an important model for such investigations. It is essential reading not only for neurologists, neuro-ophthalmologists and vision researchers, but also for all those concerned with the nature of conscious experience.

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References

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- 4 Weiskrantz L, Warrington EK, Sanders MD, Marshall J. Visual capacity in the hemianopic field following a restricted occipital ablation. *Brain* 1974;97:709-28.
- 5 Campion J, Latto R, Smith YM. Is blindsight an effect of scattered light, spared cortex and near-threshold vision? *Behav Brain Sci* 1983; 6:423-8.

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