Robert Kentridge

In my view, it's a question of wiring

John Dowling's aim in *Creating Mind* is to summarise neuroscience and explain how processes in the brain might give rise to mind. It is a pretty tough assignment. The quantity of research in neuroscience is enormous, ranging from biochemical minutiae of the operation of nerve cells and the embryonic development of brains, to the study of visual illusions in brain-damaged patients and questions about the physical basis of consciousness. As it turns out, Dowling has done a fine job covering all this and more.

Creating Mind does not assume any prior knowledge of neuroscience. Each chapter begins with a real-life vignette to illustrate the issues. It introduces the cells that make up the brain, outlining what is meant by electrical charge, before dealing with the way in which signals are transmitted within and between nerve cells.

Dowling then explains how drugs act by influencing the biochemistry of these processes. Having seen the basic operation of nerve cells in the brain, we explore how the pattern of wiring between cells affects the way the brain responds to signals from the outside world. It is too much to hope that we will be able to understand how we reason or read or love in these terms, but he shows how neuroscientists have made considerable progress in uncovering basic cellular mechanisms of vision and learning, often taking advantage of the simple nervous systems of invertebrate animals to do so.

Creating Mind: How the Brain Works

By John E. Dowling

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In mammals, the same basic mechanisms operate, but these feed into more specialised areas in the cortex of our brains. For example, damage to one particular area of the cortex can result in a patient being unable to see colour, even though his ability to see brightness and shape is undiminished. As the wiring of the brain is so important to its function, Dowling devotes a chapter to mechanisms of brain development.

The final three chapters deal with more psychological matters — language and memory, emotion and consciousness — but still from a strictly neuroscientific perspective. We learn about the areas of the brain involved in language, what happens when they are damaged, how memories so vivid they are hard to distinguish from reality can be elicited by electrical stimulation of the brain, how changes in the way signals pass between brain cells may underlie memory, and the relationship between the control of our bodies' internal states and our emotions.

Any overview of such a broad area as neuroscience faces the danger of being shallow, but *Creating Mind* certainly is not. I found much in it to interest me. Some chapters introduced me to areas I knew little about, while others on familiar areas contained unexpected surprises. The only areas I found weak were my own specialities — perhaps any specialist would find the same. But the book is not intended for specialists, it is intended for the layperson. It makes a fine introduction to courses on neuroscience or physiological psychology. The experimental details could be filled in later.

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Anthony Campbell

With an eye to pain

HULTON GETTY

Richard Cooper

How conscious are your qualia?

Consciousness used to be a taboo subject among scientists. Now every man and his dog seems to have a theory of consciousness, and to be willing to put that theory in print. In this brief and speculative volume, Alexander Cairns-Smith presents a variant of the "it must be something to do with quan-

rather astonishing claims: that monamine neurotransmitters are associated with qualia production and that there may be one neuropeptide for each possible sensation. It is at this point that one counter-intuitive and incomplete scientific theory (quantum theory) is wheeled in to "explain"