

THE CRITICS | BOOKS

Mind reader

Henry Marsh

Into the Grey Zone
Adrian Owen

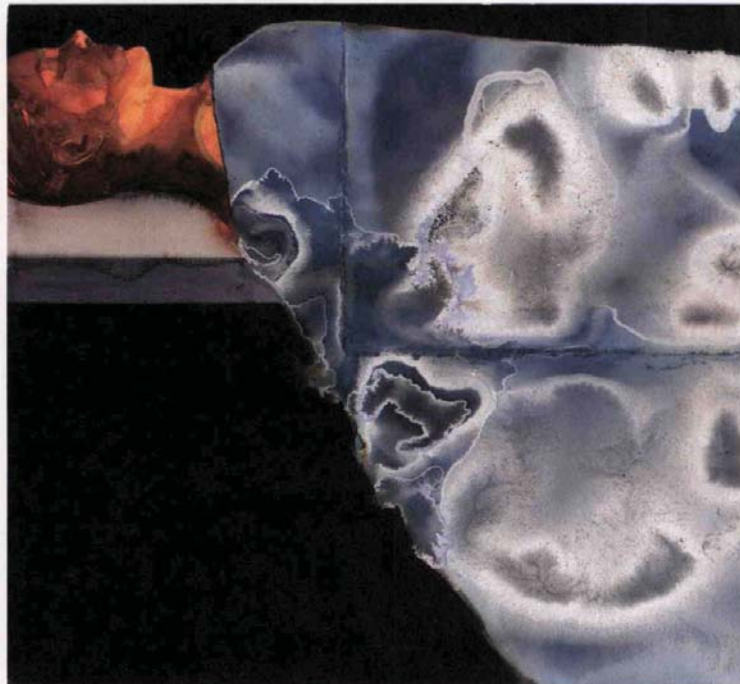
Guardian Faber, 320pp, £16.99

The physical basis of consciousness is perhaps the greatest mystery and problem in modern science. There can be little doubt that consciousness is a physical phenomenon but we cannot even begin to explain how it arises in brains. The simple – and doubtless simplistic – medical model of consciousness is that the cerebral hemispheres, where thinking and feeling goes on, are like millions of light bulbs. Consciousness is the brightness with which they shine. If you progressively damage the cerebral hemispheres, consciousness dims. Small areas of damage to the hemispheres have little effect on consciousness: many neurosurgeons have seen patients who walked into hospital with a knife or a nail, for instance, stuck in their brains, and yet who are fully conscious.

The hemispheres are powered, in ways we do not understand, by the brainstem, the part of the brain between the hemispheres and the spinal cord. In the medical model, the brainstem is equivalent to an electric cable supplying the millions of light bulbs. Small injuries to the brainstem can cause profound coma – all the light bulbs will be dimmed at once.

Many years ago, when I was still training to be a neurosurgeon, I admitted an elderly American man who had collapsed with a brainstem stroke while watching the Championships at Wimbledon. He was completely paralysed but able to move his eyes up and down in response to my speaking to him. It seemed fairly clear to me that he was “locked in” – fully conscious but trapped within his body. The next morning, I showed the poor man to my consultant on the ward round. “These are just reflexes,” he said of the patient’s eye movements. “Just reflexes,” he repeated fiercely, as he quickly walked away – meaning, I suppose, that he preferred to think that the man was not conscious or suffering.

I did not agree but nor, to my shame, did I return and talk to the patient and comfort him. I fear that my failure was even more egregious than my consultant’s denial of the obvious, but it is extraordinarily difficult to talk to an immobile body, knowing that you cannot get any response, and even more difficult to know what to say. It feels



Conscious decisions: Owen showed that some vegetative patients may still have mental activity

like talking to a corpse. It is not just that the thought of what the patient might be experiencing is too horrible to contemplate but also that it feels unnatural. It is indeed unnatural, to the extent that modern medicine can now keep people alive with profound brain damage who, in the past, would invariably have died in the first few days after the stroke or injury.

So there is now a group of people who are mute and immobile and require 24-hour nursing care. They are categorised as being in a persistent vegetative state (PVS) if they show no reactions whatsoever, and as being in a minimally conscious state (MCS) if they respond to stimulation to some extent. Some, like the patient in Wimbledon, are fully aware and “locked in” (as was Jean-Dominique Bauby, the author of *The Diving-Bell and the Butterfly*).

Adrian Owen is a neuropsychologist who has devoted his life to working with these patients. In *Into the Grey Zone*, he describes how, almost by chance, he became involved in putting PVS patients in scanners that show brain activity rather than just brain anatomy. He demonstrated that some PVS patients, despite being completely mute and immobile, show evidence of mental activity and are possibly conscious. We must say “possibly”, because consciousness is an entirely subjective phenomenon and cannot

be measured or directly observed from outside. It can only be inferred.

The method Owen developed was to ask PVS patients to imagine that they were playing tennis. In some of these patients – but only a minority – the functional scans showed activity in the parts of the brain that light up in normal volunteers’ brains when they are asked to imagine playing tennis. He concluded that the PVS patients whose scans show this same activity must be conscious. Not everybody who works in this field agrees – it can be argued that awareness, which these patients certainly show, is not the same as having a conscious sense of self. There is much room for philosophical speculation and argument.

Owen was able to establish communication of a sort with some of these patients, by asking questions to which the patients could reply yes (by imagining a game of tennis) or no (by imagining walking around their home), but the communication was very limited.

There was tremendous media excitement about this groundbreaking work, as Owen recounts in some detail. But what does his discovery mean? Do PVS patients think and feel? Are they in hell, or perhaps even in heaven? Is the law right in permitting PVS patients to be allowed to die – withdrawing food and water so that they slowly starve to

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death? All that is clear is that some patients who have previously been diagnosed as being in PVS have some kind of inner, mental life. What this life might be like is impossible to know. It is, in many ways, a deeply disturbing thought, above all for the patients' families.

This is a fascinating and highly readable book, written with evangelical fervour, but it needs to be read with some care. Owen has made a remarkable discovery and is right to be proud of it. He describes in gripping and moving detail – and there is no doubting his deep compassion for the patients and their families – how his work evolved, but only towards the end of the book does he start to admit how complicated the problem is.

There are many causes of PVS and MCS. Carol, his first subject, who made a remarkable (but incomplete) recovery, having been written off as being in PVS, had suffered from an inflammatory condition of the brain that was entirely different from what many of the other patients he describes suffered: head injuries with extensive structural brain damage. Patients who become clearly conscious after severe head injuries often have terrible personality changes and disabilities, and the same would probably apply to many of the PVS and MCS patients if they are conscious, albeit mute and immobile. As it is, many of the PVS patients Owen studied showed no brain activation when asked to imagine playing tennis. Finally, consciousness is a complex grey-scale phenomenon, not simply a matter of on or off. In places, Owen comes close to making it sound as though all PVS patients were potentially wide awake but locked in.

We cannot know what these patients are experiencing but what we do know is that the suffering of their families is terrible, as I have seen in my life as a neurosurgeon. Anybody who has read Cathy Rentzenbrink's beautiful book *The Last Act of Love* will know this, too. Owen's work raises many more questions than it answers. The complicated problems of how to look after PVS patients and how their families should see them have become a lot more difficult.

Owen is now working in Canada, trying to use electroencephalography to detect awareness and possible consciousness in comatose patients – a less complex method than using brain scanners. It is not yet clear whether this will work. "Emerging technologies will undoubtedly one day allow us to read the minds of others," he states. I am not so sure, but time will tell. ●

Henry Marsh is a consultant neurosurgeon and the author of "Admissions: A Life in Brain Surgery" (Weidenfeld & Nicolson)