

# Foreword: Does the Brain Dream?

by J. Allan Hobson, M.D.

**O**h no! Not another book about the brain! Well, yes, and what of it? Certainly we can never learn enough about that very special lump of flesh that sits between our ears, whose 100 billion cells pulsate in such a way as to make us think, feel, and act.

This is not just another book about the brain. It is a very special book about the brain for three reasons. First, this book focuses on the relevance of modern brain science to dreaming. It helps us to understand that seemingly mysterious nocturnal experience. Second, it shows the scientific study of dreaming to be a foundational structure in the construction of a brain-based theory of human consciousness. At last, the obdurate mind-body problem may be solved. Third, and perhaps most special, the book's author is Jonathan Leonard, a first-class science writer who has steeped himself deeply in sleep, dream, and brain science for the past 10 years and who is uniquely qualified to tell this story. In *Dreamworld*, he now shares his insight and wisdom with us.

Let us first consider the importance of brain science to human knowledge. It is only since 1953 that we have learned anything of much use about the brain. 1953 was truly an *annus mirabilis* in the history of both biology and brain science. James Watson and Francis Crick created their famous double helix model of DNA in 1953; Eugene Aserinsky and Nathaniel Kleitman discovered the periodic activation of the brain in sleep and suggested its correlation with dreaming in 1953; and Aserinsky's scientific mentor, Ralph Gerard, succeeded in recording the electrical activity of individual neurons for the first time in 1953.

How do these three discoveries fit together? The answer is still incomplete; but, as Leonard points out, the evidence is sufficiently clear to make their integration totally transformative of our notions of ourselves, our minds, and our dreams. Via Leonard's skillful and eloquent literary midwifery, we can thus be present at the creation of an entirely new and unexpected theory of what it means to be human. We, our minds, and our dreams are brain functions!

Is sleep and brain science one of the humanities then? Yes, it most assuredly is. That should not surprise us given the incorporation of Freudian psychoanalysis into the humanities. Freud, after all, won the Goethe Prize for literature, not the Nobel Prize for science. But as Leonard notes, the new science of dreaming is not Freudian. Rather than being literary it is truly and deeply scientific. As such, it constitutes a solid base for other endeavors.

The devil is in the details. In 1895, Freud knew that brain science was essential to his Project for a Scientific Psychology. And he also knew that brain science was not sufficiently advanced to be useful. Now it is. Not only do we know a lot about DNA, a lot about REM, and a lot about neurons, but we know how to study dreaming quantitatively and rigorously. And thanks to the recent advent of brain imaging techniques, we also know how to study human sleep and dreaming objectively.

The result is a fast-moving advance in our knowledge of the brain basis of dreaming that will, within the course of the 21st century, firmly connect with the molecular biology derived from Watson and Crick's DNA model and with Gerard's recognition of the electrical activity of individual nerve cells. As we speak, sleep and dream science is rapidly becoming mainstream. "Extra, extra, read all about it!" Read Jonathan Leonard's *Dreamworld*.

That's good news for science; but the best news may be that this book is about you! Your brain is a part of yourself that is as unconscious as Freud's famous id. But that the brain is you is a far more tangible, far more exact, and far more versatile concept! Your brain is really there, in your head, where you think your self and mind are located. Your conscious experience leads you to overlook its physical basis. Sleep and dream science should convince you of that. Leonard may not agree with me entirely, but I actually suppose my self and my mind to be brain functions. This book will help you get ready for the possible validity of this idea.

To understand the scientific program that might test this hypothesis,

we need to consider a redefinition of what constitutes an experiment. As classically defined, an experiment is an intervention designed to test a hypothesis. The scientist endeavors to hold all variables constant except one which is systematically varied to expose its effect on the system under study. But our transitions from waking to dreaming are natural changes in state that reveal the systematic inconsistency of the brain-mind. This inconsistency is constant. So in this case, as a first step, the scientist must hold himself as constant as possible and thus not interfere with the brain-mind's constant inconstancy. The sleep-dream scientist then collects correlation data from the objective (physiological) and subjective (psychological) realms and lines up his observations as a prelude to making experiments as classically defined.

Consider the faculty of memory, to which Leonard devotes a fascinating chapter. When cognitive neuroscientists study memory, they give subjects a learning task, and then vary some condition to see if and in what way the subject's recall is altered. But the sleep-dream scientist had better not limit himself to this paradigm. He had better consider the more fundamental and potentially more important possibility that, say, our difficulty in recalling dreams is due to changes in brain chemistry (like the demodulation of REM sleep) or changes in regional blood flow (like the persistent inactivation of the dorsolateral prefrontal cortex in REM sleep) before he turns to test the hypotheses emerging from such provocative correlations.

What could be more natural than considering sleep and dreaming as experiments of Nature (designed by evolutionary mutation, not by divine intervention). In that case, the time is ripe for revealing the underlying mechanisms and functional significance of sleeping and dreaming. Whatever your position may be on this point, there can no longer be any real question that sleep and dream science can profitably be approached this way.

The result is more than a paradigm shift (a new way of looking at old questions). What is sleep? What are dreams? How are they engineered? What are they for? Sleep and dreams can instead be viewed as natural conditions that contain, within themselves, two sets of unexpected revelations about how the brain relates to the mind—one set dealing with consciousness, the other set dealing with mental faculties such as perception, attention, emotions, and memory. Far from being a quirky and narrow science of relevance only to sleep disorders medicine, the science of waking, sleeping, and dreaming is a key to understanding the most general and significant aspects of philosophy, psychology, and physiology.

The title *Dreamworld* is at first glance simply cute and catchy. But on reflection, the title points clearly to the virtual reality aspect of dream consciousness. When we dream, we are in a world of our own creation. We are in our own dreamworld. Could it be that this internal simulacrum of the “real” outside world, to which waking consciousness relates, is a guaranteed and automatic product of the REM sleeping brain?

Could it be that the dreamworld is created early in life so as to provide a template for skill development by the infant (who enjoys 8 hours of REM sleep every day)? As we mature, that amount decreases 400%, but we still enjoy 1-1/2 to 2 hours of REM dreaming every night throughout our lives. Our continuing development as instinctual and enlightened creatures may somehow depend upon it. Let *Dreamworld* awaken and refine your awareness of these intriguing possibilities.