

# Author's Preface

If you want to see what science can now tell us about the brain and dreams, this is the book for you.

Some students of dreams may prefer to ignore the brain. But the brain generates our dreams and acts them out. So trying to understand the nature, meaning, and strangeness of dreams while ignoring the brain may delightfully deepen the mystery but will not solve it.

Conversely, dreams provide a useful window on the sleeping brain and on brain functions like memory, thought, and emotion. The sleeping brain is a good study subject because there are few outside distractions. When the brain is awake it is receiving lots of external signals from the world outside, and it's often hard to disentangle brain activities tied to these signals from brain activities that would happen otherwise. In contrast, hardly any external signals enter the sleeping brain. So the sleeping brain's activities are mostly self-generated, providing brain researchers with a simpler situation.

The problem for students of the sleeping brain is outputs. The sleeper appears unconscious. One can get EEG readings by attaching electrodes to the sleeper's head in a sleep lab, but that's hardly the same as dealing with an awake person. It is possible, however, to awaken sleepers and ask about their sleep experiences as reflected in their dreams.

This fact did not escape brain scientists, who in the days before brain imaging did a lot of work on dreams. They found dreams to be less than "the royal road to the unconscious" that Freud envisaged. But they also amassed a trove of information and discovered a great deal about how brain activities relate to dreams. So if we are going to examine what current science has discovered about the sleeping brain and how it works, it makes sense to give the results of our examination an assignment by applying it to the ancient mystery of dreams. That, in essence, is what *Dreamworld* is all about.

Over 20 years ago, in 1988, Harvard neuroscientist Allan Hobson wrote

a book called *The Dreaming Brain*. Besides being readable, it set down much of what brain science had discovered about the sleeping brain up to then. It revealed a lot about what the brain could tell us about dreams, as well as what dreams could tell us of the brain; and it became a classic that has remained the leading general source on brain science and dreams ever since.

But since 1988 the march of science has added new information. Imaging that allowed us to look inside the living brain emerged in 1989. Medical research focused its attention on a wide range of sleep disorders. And a lot of progress was made in other areas: on how memory works, how emotions and more logical thought processes interact, and even how some of the mechanisms supporting consciousness operate.

This new information has a lot to tell about the sleeping brain, and also about the world of dreams the brain creates. So the time has come for a book that supplements *The Dreaming Brain* by including this fresh information and expanding our reach into these new areas of knowledge.

I am not a scientific researcher, but rather a medical editor and science reporter first acquainted with and then immersed in brain science. For many years I ran an international medical journal and served as a contributing editor to *Harvard Magazine*—in which latter capacity I wrote science stories on subjects ranging from fern spores to nuclear war. In the 1990s I became seriously interested in brain science and wound up writing a book called *Out of Its Mind* with Allan Hobson about the need to reform psychiatry (Perseus Publishing, 2001). I began working on *Dreamworld* in 2004.

This work has involved an extensive review of brain science literature and the assistance of many investigators. I am especially grateful for the guidance of Allan Hobson, who did me the honor of writing *Dreamworld's* foreword. Thanks are also due to many other experts who provided interviews and guidance—including Deirdre Barrett, Rosalind Cartwright, G. William Domhoff, Ramon Greenberg, Ernest Hartmann, Rodolfo Llinás, Howard Roffwarg, Mircea Steriade, and Robert Stickgold. I am also indebted to Lydia Lake for reviewing portions of Chapter 2 dealing with classical Greece and Rome, and to my wife Jeanne for her assistance and support throughout this project.

I of course hold no one but myself responsible for anything said on these pages, but there should be no doubt about who has done the heavy lifting. I have examined, assessed, and organized the work not merely of those mentioned above but also the work of a multitude of other scientists; and it is they who deserve credit for making the advances in our knowledge of the brain and dreams that is reported here.