

double helix rather than retelling the real story himself, and the chapter called "How to Live with a Golden Helix," which contains the following charming passage: "Finally one should perhaps ask... am I glad that it happened as it did? I can only answer that I enjoyed every moment of it, the downs as well as the ups.... But to convey my own feelings, I cannot do better than quote from a brilliant and perceptive lecture I heard years ago in Cambridge by the painter John Minton in which he said of his own artistic creations, 'The important thing is to be there when the picture is painted.'"

And this: "There was in the early fifties a small, somewhat exclusive biophysics club at Cambridge, called the Hardy Club.... The list of those early members now has an illustrious ring... but in those days we were all fairly young.... Jim was asked to give an evening talk to this select gathering. The speaker was customarily given dinner first at Peterhouse. The food there was always good but the speaker was also plied with sherry before dinner, wine with it, and, if he was so rash as to accept them, drinks after dinner as well. I have seen more than one speaker struggling to find his way into his topic through a haze of alcohol. Jim was no exception. In spite of it all he managed to give a fairly adequate description... but when he came to sum up he was quite overcome and at a loss for words. He gazed at the model, slightly bleary-eyed. All he could manage to say was 'It's so beautiful, you see, so beautiful!' But then, of course, it was."

PHILIP W. ANDERSON
Princeton University

Nuclear Fear: A History of Images

Spencer R. Weart
Harvard U. P., Cambridge,
Mass., 1988. 535 pp.
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Nuclear Fear is a superb account of the images that have dominated the atomic age. Spencer Weart traces such images as mushroom clouds, mysterious rays, desolate postwar worlds and "white cities" of the future from their often obscure origins in the past. Weart examines the symbols that scientists, publicists and ordinary citizens have used to describe the brave new world nuclear fission helped create. In a landmark study, he helps us understand the power of those symbols in our own lives.

Weart is admirably suited to his

task. He received a doctorate in astrophysics and worked on a solar space telescope at Caltech before turning to the study of history. He is now director of the Center for History of Physics at AIP. Bridging the humanities and sciences, his prose is as easy to read on the experiments of Ernest Rutherford as it is on the dream interpretations of Carl Jung. (See Weart's article in *PHYSICS TODAY*, June 1988, page 28.)

Nuclear Fear is based on prodigious research. Weart has worked on his project for the past 15 years, and his efforts show. He delves into books, films, songs and other art forms. Even Spider-Man and the mighty Hulk—the Marvel Comics creations of Stan Lee—appear in Weart's account. He analyzes *On the Beach*, the gloomy novel about the end of the world by Nevil Shute; he assesses the black humor of Stanley Kubrick's extraordinary film *Dr. Strangelove*; and he touches on many more such items of popular culture. Throughout his book, Weart is able to summarize such diverse sources in a few sentences or paragraphs and to explain persuasively how they fit into the larger pattern of our response to nuclear issues.

Weart argues that "modern thinking about nuclear energy employs imagery that can be traced back to a time long before the discovery of radioactivity." Decades before the successful experiments with nuclear fission, people speculated about the concept he calls "transmutation—the passage through destruction to rebirth." He observes how the Hiroshima bomb simply defined more clearly the hopeful and frightening images that already existed. By the early 1960s, with the development of bigger and better bombs, fears came to outweigh hopes. But then, weary from war scares and anxious to ignore the ever-present threat, people turned away from bombs and focused instead on nuclear reactors. In the 1980s the real fears of weapons surfaced again as arsenals grew larger and the likelihood of a nuclear holocaust appeared greater than ever before.

As he traces these cycles, Weart shows how images from the distant past can merge and how they can become entangled with emotions. He speculates about how they help determine events. "The effects of imagery," he writes, "were strongest where they joined with the laws of physics," for myth then had the force of hardware to back it up.

Weart has broken new ground in *Nuclear Fear*. Drawing on the findings of psychology, sociology and an-

thropology, as well as physics and history, he has crafted a lucid and compelling account of our conscious—and unconscious—efforts to understand our nuclear world.

ALLAN M. WINKLER
Miami University
Oxford, Ohio

The QCD Vacuum, Hadrons and the Superdense Matter

E. V. Shuryak
World Scientific, Singapore
(Teaneck, N. J.), 1988. 401 pp.
\$78.00 hc ISBN 9971-978-32-6;
\$36.00 pb ISBN 9971-978-33-4

Much progress has been made in the understanding of quantum chromodynamics during the past 15 years. The discovery of asymptotic freedom has led to the development of detailed predictions about many properties of high-energy collisions. The successful comparison of these perturbative predictions with experiment underlies the near-universal acceptance of QCD as the correct theory of strong interactions.

Understanding the low-energy, or nonperturbative, dynamics of QCD has been much more difficult. However, a variety of approaches ranging from semiclassical analysis of instanton effects to numerical simulations of lattice discretizations have provided qualitative (or semiquantitative) understanding of several fundamental nonperturbative properties. Among these are the confinement of quarks into mesons and baryons, spontaneous breaking of chiral symmetry, and the transition to a quark-gluon plasma at high temperature.

Edouard Shuryak's book attempts to convey the fruit of 15 years' study of nonperturbative QCD and to serve as a guide to both past and present work. It is neither a textbook nor a research monograph; as the preface states, it is better described as "one hundred lectures on modern strong-interaction physics." The first quarter of the book is devoted to the vacuum structure of QCD. It begins with brief expositions on topics such as the meaning of color confinement and chiral symmetry breaking, topological classification of gauge fields, and numerical simulations of statistical systems. Instantons and their effects are then covered in some detail, beginning with the semiclassical treatment of a dilute gas of instantons and ending with models of interacting-instanton "liquids."

The second quarter of the book