



The Lizard Man Speaks.

Review Author[s]:
Kurt Schwenk

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he wants to convey, a number that for many young physicians will seem old fashioned. I'm not entirely certain he is right, nor am I convinced he is wrong. Times change, and there is much from the "good old days" that was not good, but a lot that was—the author is trying to do a little winnowing of good from bad. Whether you agree with Hurst about all aspects of medical care or not, I believe there is enough in this little book to make it worth a few hours of pleasant if not profound reading. It certainly is worth opening the cover for.

FREDERICK MILLER, *Pathology, State University of New York, Stony Brook, New York*

SUFFERING MADE REAL: AMERICAN SCIENCE AND THE SURVIVORS AT HIROSHIMA.

By M. Susan Lindee. *The University of Chicago Press, Chicago (Illinois)*. \$29.95. xi + 287 p. + 26 pl.; index. ISBN: 0-226-48237-5. 1994.

The study by the Atomic Bomb Casualty Commission (ABCC) of the genetic effects in survivors of the atomic bombs that fell on Japan was perhaps the first Big Science epidemiological study. In the dawning nuclear age this work was inevitably in the public eye. ABCC's main genetic finding was that survivable exposures did not produce the feared spectrum of deleterious germ-line mutations. Nevertheless, sample sizes were marginal for detecting rare events, so a negative result could easily be misinterpreted by the various interests, pro and con, that scrutinized work on nuclear dangers. In fact, the ABCC *has* documented a substantial risk of cancer, due to somatic rather than germinal mutations, which was not the major original fear.

M. Susan Lindee reviews the history of the ABCC genetic studies in their sociopolitical and biological contexts. She explains the thought behind important issues like the choice of anomalies to study, the operational definition of "mutation," and the presentation of negative findings to the politically charged public. But Lindee repeatedly disrupts this nicely readable history with "analysis," usually to expose the clay feet of the scientists or the ABCC.

As an example, Lindee deals with the decision by the ABCC not to provide medical treatment to the exposed cohort they were created to study. To offer treatment might mean acknowledging financial responsibility for subjects' care, or moral responsibility for the bombing itself. Lindee documents the extensive discussion of this decision, and the diverse efforts to rationalize or criticize this policy. She notes that in fact ABCC physicians unofficially provided both diagnostic and therapeutic help to many subjects.

The simplest explanation is that the usual panoply of legitimate and opportunistic interests, and the institutional conservatism associated with ma-

nor decisions of this type, were to be found in the ABCC history. Instead, Lindee portrays the ABCC's decision as a profound parable of the moral dilemma of the nuclear age, a decision reflecting the cold-hearted American view that science should be disengaged from its social context.

It is fashionable these days to castigate figures and institutions in power, and to credit innocence and rectitude to their critics. This point of view is reflected in Lindee's journalistic and wholly unwarranted title. To her credit, she is not strident. She presents all sides, and acknowledges that the major players do not agree with her analysis; Neel and Schull's 1991 work (*The Children of Atomic Bomb Survivors: A Genetic Study*, National Academy of Sciences, Washington, DC) is worth reading as a counterbalance. Good history need not be a matter of whitewash, but Lindee intrudes too much and overinterprets. The history itself is good, well written, and informative. But it was not improved by her editorials.

KENNETH M. WEISS, *Anthropology, Pennsylvania State University, University Park, Pennsylvania*

ERRATUM

The reviewer of *Higher Superstition: The Academic Left and Its Quarrels with Science*, by Paul R. Gross and Norman Levitt (*Q. Rev. Biol.*, 70:211-212), was Robert Pollack, not Roger Pollack.



GENERAL BIOLOGY

THE LIZARD MAN SPEAKS.

By Eric R. Pianka. *University of Texas Press, Austin (Texas)*. \$24.95. xi + 179 p. + 16 pl.; ill.; index. ISBN: 0-292-76552-5. 1994.

This is a strange and interesting book by the well-known ecologist, Eric Pianka. As an episodic treatment of Pianka's early life and extensive fieldwork in Australia and Africa, it combines childhood experiences, travelogue, lizard biology, field anecdote, social commentary and the occasional rant. Its style is abrupt as it ricochets from topic to topic. It is seldom boring, but I am left wondering what motivated Pianka to write this highly personal book, and for whom it was intended. Pianka notes that his intent was "certainly not to give [the reader] an autobiography." Yet autobiographical it is, starting with Pianka's childhood in Yreka, California and moving to accounts of his many field experiences, dwelling particularly on his years in the outback

of Australia. "The Field" is an almost mystical place to many biologists, and its spirit is clearly at the core of Eric Pianka, a self-confessed hater of "objects and noises of human origin." Long periods of self-imposed isolation in the outback of Australia are "a sort of religious pilgrimage" to Pianka. This book is an exploration of this pilgrimage.

The science is lackluster; too advanced for non-specialists and too superficial for experts, it seems out of place in this book. It has annoyances, such as inconsistent use of old and new taxonomies and lack of a phylogenetic perspective. On the other hand, the book is deeply compelling when it recounts Pianka's unusual childhood. His strangely disinterested account of losing most of one leg when a salvaged bazooka shell exploded at his feet is horrific. This event must have molded Pianka's psyche profoundly, but we are left to speculate about this. Also engaging are anecdotes from the field which provide the kind of information and natural history that seldom reaches the primary literature, making this book essential reading for anyone contemplating fieldwork in Australia.

As it turns out, Eric Pianka is the interesting story here, not the lizards he studies. Autobiographical or not, we are given tantalizing glimpses into what makes this field ecologist tick, and it is this that keeps us reading. Ultimately, it is not the text of this book that fascinates, but the subtext.

KURT SCHWENK, *Ecology & Evolutionary Biology, University of Connecticut, Storrs, Connecticut*

REGULATION AND CONTROL MECHANISMS IN BIOLOGICAL SYSTEMS. *Prentice Hall Biophysics and Bioengineering Series.*

By Vishnampet S. Vaidhyanathan; Series Editor: Abraham Noordergraaf. P T R Prentice Hall, Englewood Cliffs (New Jersey). \$75.00. x + 294 p.; ill.; author and subject indexes. ISBN: 0-13-771262-6. 1993.

Schrödinger (*What is Life?*, Cambridge University Press, 1944) worried about the consistency between the second law of thermodynamics and the apparent decrease in entropy in life. The answer was that a living system is open, that entropy production is exceeded by entropy export, and that life should be discussed in terms of (metabolic) free energy (Westerhoff, H. V., and K. Van Dam, *Free-Energy Transduction in Biology*, Elsevier, 1987). It was stunning that in 1944 the point could be an issue, since in 1931 Onsager had described coupling between processes costing and yielding free energy (*Phys. Rev.*, 37:405-426, 1931). Perhaps more often physicists address questions about biology that have already been answered by biologists. This is the feeling I got when reading Dr. Vishnampet Vaidhyanathan's otherwise charming and lucid book about the regulation and control mechanisms in biological

systems. Vaidhyanathan takes us through a number of homeostatic control characteristics of biological systems, (non)equilibrium thermodynamics, system behavior, and some theory of rhythmic behavior. His clarity and readability have their price: Often the book does not transcend common knowledge and intuition. This approach can be good, but only if the important assertions are documented by footnotes or references to pertinent literature. In this case, they are not.

The sorest point, however, is that the book negates almost entirely the enormous progress of the past 30 years. Although the author briefly mentions the key paper of Kacser and Burns (*Symp. Soc. Exp. Biol.*, 7:65-104, 1973), the enormous impact Metabolic Control Analysis has had is left unnoticed. One should not look for the *rate-limiting step* (pace p. 125); control tends to be distributed among the enzymes in the same pathway and at other levels in the control hierarchy. Discussing efficiency in biology in terms of energy rather than free energy, the book foregoes the important developments in measurement and understanding of the free-energy efficiency of biological systems. As is done too often, the book passes from equilibrium through the Onsager domain to oscillations and instabilities. Yes, from a mathematical point of view the latter region is most interesting. However, the region that is important is in between where the flow-force relations are neither symmetrical nor proportional, but where the system is still steady and describable in terms of modern non-equilibrium thermodynamics and kinetics (Westerhoff and Van Dam, 1987). Recent work on proton and electron pumping, on ion channels, and oncogene products has expanded biology to become the greatest science.

In short, I think that the book by Dr. Vaidhyanathan is a nice introduction, but that its readers are well advised to continue reading books that deal with the developments over the last 20 years in biophysics and biochemistry.

HANS V. WESTERHOFF, *Microbial Physiology and Mathematical Biochemistry, University of Amsterdam, Amsterdam, The Netherlands*

THEORETICAL MODELS IN BIOLOGY: THE ORIGIN OF LIFE, THE IMMUNE SYSTEM, AND THE BRAIN. *Oxford Science Publications.*

By Glenn Rowe. Clarendon Press (Oxford University Press), Oxford and New York. \$52.50. xvi + 420 p.; ill.; index. ISBN: 0-19-859688-X. 1994.

I recommend this book to anyone meeting the author's background requirements: among other things, an "acquaintance with vectors and matrices up to some basic facts on eigenvalues and eigenvectors . . . are all expected" (Preface, p. v).