

## Book Review

*Physiology, Promiscuity and Prophecy at the Millennium: A Tale of Tails*  
Studies of Nonlinear Phenomena in Life Sciences, Vol. 7  
by Bruce J. West  
Published by World Scientific, Singapore (1999)

Reviewed by: Ralf Metzler,  
*Physics Department, MIT*  
*Cambridge MA, USA*

Taking stock at the turn of the millennium — this might be called the main objective of the above-titled monograph. Fifty-five years after Erwin Schrödinger's book *What is Life* appeared, which certainly instigated the breakthrough of what we now call biological physics, West takes the reader on a journey through the socio-economical-biological and physics world as seen by a physicist. A bit like Johannes Kepler's Sisyphean task of ordering and interpreting the flood of astronomical data about the constellation of the planets, West advocates the principles of allometry, power-laws in essence, as superordinate behavior to complex systems of an almost obscure variety, from teenage birth patterns via time series of human heartbeat to creep in viscoelastic materials. It is meanwhile well known that fractal behavior in time, i.e. the nonexistence of a particular time scale, is characteristic for a diversity of phenomena in physical and chemical systems. This book spans the arch to living systems.

The strategies applied range from well-known tools like Weierstrass functions, scaling or those from nonlinear dynamics and chaos, to the lesser known such as Lévy stable laws and fractional differential equations. Throughout this apparent maze, it is the inherent red line of power-law tails which ties all these different aspects together, to produce an organic whole which wets the appetite to start work on these topics for the physicist or mathematician, or to start to rethink the classical approach for the biologist or engineer. At the same time, West points out the preliminary status of these tools, lacking of a complete theoretical framework to deal with these complicated systems.

The book is intended for a rather broad audience and introduces the basic vocabulary of classical stochastic analysis. With this broad scope, it combines trivialities and treasures for the physicist reader but avoids too much of secondary literature for the reader not acquainted with statistical analysis. Selecting out the raisins, it is well worth studying the different lectures.

Such a broad endeavor unavoidably has shortcomings. In particular, a reference to the phenomenon of stochastic resonance might have been desirable, as might have been a more detailed list of references, especially for the physics reader who might feel a lack of precision

in the statements intended for the broad audience in mind. Finally, the publisher should have undertaken the effort of some careful proofreading.

Having said this, I nevertheless warmly recommend the book, as it is a very interesting compilation of the state of the art in a broadness which I do not know from other works available. It is a valuable introduction for the interested as well as a white paper for those working in the field. As the author concludes: "In any event the tale continues."