easier to ask than to answer, but no history should overlook it.

The book's most interesting chapter for a historian (and the longest) is the concluding one, "The Legasov Testament." It is an English translation of reflections on the Chernobyl accident by academician Valery Legasov, a nuclear scientist, and one of the principal Soviet officials in the field of atomic energy at the time; he was the head of the Soviet delegation at the first international postaccident meeting. The document was published in the central Soviet newspaper *Pravda* 20 May 1988, two years after Chernobyl and a few weeks after Valery Legasov had committed suicide at age 51.

Mould presents the Legasov text as "a valuable historical account." That may be true, but only within the real historical context of the Soviet Union's responsibility to its people in the management of science. So Legasov's account could—or maybe should—be a starting, rather than a concluding, point in a history of the Chernobyl catastrophe, if what is being built is a "definitive" history.

According to Mould, Legasov's career was ruined "in large part because [he] began to speak out about the problems—instead of keeping quiet and voicing only the Communist Party line." Actually the cause and effect might be quite the other way around: Legasov began to speak after his extremely successful career had stumbled dramatically over Chernobyl in the time of the Communist perestroika. This possibility is supported by Russian sources: The style of the wording of Legasov's "testament" in the original Russian looks more like that of a high-ranking apparatchik rather than of a scientist. It is especially clear in its full version—a transcript of a five-tape recording of Legasov's oral account that is now circulating in Russian on the Internet (http://litportal.org.ru/catalog/a-rusl). Another source is Vladimir Gubarev, the science editor of *Pravda*, who urged Legasov to write his thoughts on Chernobyl and who published a heavily abridged version.

David Holloway masterfully demonstrated the penetrability of the Soviet "enigma" in his definitive history of the Soviet atomic bomb, *Stalin and the Bomb* (Yale U. Press, 1994). The field of peaceful nuclear energy in the USSR has much weaker classification restrictions than the field of nuclear weaponry, but it is unlikely that anyone could probe its real context by relying on translators, as Mould did.

The principal issue in question is personal professional responsibility. True, Soviet society was corroded by decades of totalitarian rule. And the Soviet nuclear establishment was a part of the whole story. But the general issue of professional responsibility has quite personal dimensions. In the same society and in the same nuclear establishment, another academician with a no-less impressive career than Legasov exercised his professional responsibility more than once: Andrei Sakharov, while considering himself entirely loyal to the essential purposes of the Soviet system, personally and officially voiced his professional understanding of the problem of nuclear testing in 1958, of the nuclear moratorium in 1961, and anti ballistic-missile defense issue in 1967. And it was his feeling of personal professional responsibility that led him to break the Soviet rules and to go public in 1968—each time in order to prevent a calamity.

Musing over Chernobyl, Legasov came to the conclusion that it was "impossible to find a single culprit." Sakharov would have to have named himself a culprit, had he not taken responsibility on himself. The issue of scientists' responsibility in Chernobyl is still waiting for a definitive history.

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Introduction to Experimental Nonlinear Dynamics: A Case Study in Mechanical Vibration

Lawrence N. Virgin
Cambridge U. Press, New York, 2000. $74.95, $32.95 paper (256 pp.). ISBN 0-521-66286-9, ISBN 0-521-77931-6 paper

Lawrence N. Virgin's *Introduction to Experimental Nonlinear Dynamics* is a unique book in that it treats an extremely mathematical subject from an experimental point of view. Virgin integrates the theory and the experiments very well. Novices to the field of nonlinear dynamics and chaos theory will find the book's introduction of concepts both easy to understand and presented in a physically meaningful manner. The book will also be useful for specialists in chaos and nonlinearity in the comparison of experiments with theoretical models. Virgin was trained in theoretical and applied mechanics and uses beautiful mechanical experiments as a platform from which to investigate nonlinear behavior and mathematical models.

In chapters 1 and 2, Virgin reviews linear vibration theory, including forced oscillations and resonance. In chapter 3 he introduces the concepts of phase space, Poincaré sections, and bifurcations in the context of a simple oscillator. The mathematical model of a particle in a two-well potential and the mechanical analog of a buckled structure are presented in chapters 4 and 5. Virgin takes the reader through the world of chaotic vibrations, using his experimental model of a two-well oscillator, in chapters 6 through 10. He introduces the ideas of nonlinear free oscillations, subharmonic behavior, autocorrelation, and Lyapunov exponents, as well as beautiful experimental fractal Poincaré sections with comparisons with numerical solutions. He also discusses the idea of escape from a potential well.

In chapter 11 Virgin describes another mechanical experiment based on a hardening spring, and he discusses the Japanese attractor of Yoshisuke Ueda with a pure cubic nonlinearity. The impact oscillator under a sharp bilinear discontinuity is another experiment that is analyzed in chapter 12. Virgin ends the book with some global bifurcation issues related to quasiperiodic motions, fractal basin boundaries, Melnikov theory, and global transient motions.

Virgin does a reality check on the theory and illustrates the experimental robustness of nonlinear phenomena. At the end of his book he also describes an electrical-circuit experiment, for those who would like to explore chaos with voltages instead of mechanical motions.

Virgin's writing is clear and concise. The book contains some mathematical equations, but the general tone is toward physical explanation with visual and graphical presentations. This book is recommended for the libraries of both students and researchers in nonlinear science.

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NEW BOOKS

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