

BOOKS

esoteric, strange place in the world." Other consequences of Feynman's efforts were sustained and growing contacts between America and Tuva. A Tuvan ethnographer came with the Soviet exhibition to Los Angeles. Ralph Leighton and his wife finally succeeded in visiting Tuva a year later. Further visits and scholarly exchanges are continuing. William Shear, an American taxonomist, has named a newly discovered Tuvan millipede *Diplomaragana feynmani*.

Physicist readers of this book should be warned that it contains no physics. Friends of Feynman should be warned that it contains more Leighton than Feynman. Most of the book describes Leighton's adventures as he took the active role in carrying out the schemes that he and Feynman hatched together. As the story unfolds, Feynman's own activities are more and more frequently interrupted by visits to the hospital to fight his inexorably advancing cancer. But Feynman never lost his fighting spirit or his sense of humor. Right up to the end, he was teaching classes at Caltech and making plans for his trip to Tuva. The deeper theme of this book only emerges at the end of the story. It is a portrait of a great man slowly dying. It is a lesson to us all, showing how a great soul can defy death by living every hour with courage and style.

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Peerless Science: Peer Review and US Science Policy

Daryl E. Chubin and
Edward J. Hackett
State U. of New York P.,
Albany, N.Y., 1990. 267 pp.
\$16.95 hc ISBN 0-7914-0309-2

Scientists are often called upon to judge the work of their scientific fellows and to be judged in turn. They advise on resource allocations, referee journal papers, award honors, monitor for scientific misconduct and more generally assess scientific validity and promise. In these roles they constitute the peers whose judgmental practices form the subject of this book. As peers, they stand in contrast to others who are not directly engaged in the substantive work of science but who have an interest in what science and scientists are up to: management and funding authorities; policy analysts; science writers, historians and philosophers; politicians and other

spokespersons for the public interest; the public itself; and, of special relevance here, sociologists of science. We are being closely watched—in this case by authors with a sociological bent and considerable familiarity with the Federal science scene.

Early on in *Peerless Science* the authors announce that their perspective on the culture of science is grounded in the social studies of science literature. Their basic outlook is laid out in five axioms, which emphasize science as the work of a social community composed of individuals who, among other things, are not free of human failings. Many scientists will find this quite flattering! What will be harder to absorb—although it is apparently an outlook that has many adherents in the social-studies-of-science community—is the principle that “scientific truths are, at bottom, widely accepted social agreements about what is ‘real,’ arrived at through a distinctively ‘scientific process’ of negotiation.” On closer investigation one will presumably learn that this remarkable axiom is surrounded by satisfactory qualifications of all sorts. (How else does one understand, for example, that light waves—which departed from distant galaxies long before Maxwell and Einstein—knew how to propagate, red shift, bend in gravitational lenses and so on?)

In any case, the book is not greatly colored by this stance toward reality. For the most part it deals with solid procedural and organizational issues having to do with grant proposals, journal refereeing, scientific malpractice and the like—with the science-government relationship as a dominant theme. A fair amount of space is also devoted to science evaluation as a distinct and growing discipline in its own right, with its own history, problems and needs. This new discipline is a metascience that might reciprocally benefit from the critical attention of the sciences being evaluated. Probably unfamiliar to most scientists, and needful of their wary attention, is the subfield of “bibliometrics,” the analysis of citations as a tool for research evaluation. It is interestingly described and analyzed here.

Peer review comes in for some pretty heavy lumps in *Peerless Science*. Our pieties are unmasked and shortcomings revealed, in tones that suggest a respect for the scientific enterprise but also a great deal of exasperation with its internal governance. The authors call upon the peers themselves for evidence: They quote those whose opinions have been solicited in various surveys, as well as

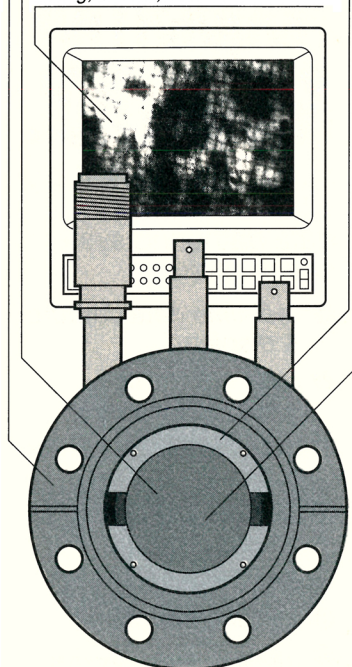
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others who have written on the subject of peer review—including Rustum Roy. Selecting from among some of the harsher judgments on peer review, we read about the theft of ideas; the unwillingness of scientists to take risks; discrimination against those who have no scientific-political connections (the Old Boy network); priority score inflation; promotion of mediocrity; stifling of innovative research; faddishness; the sheer inefficiency and wastefulness of peer review; the lack of accountability to the public; and so on. It is a merit of the book that although the authors share and articulate some of these dark views, they present their opinions analytically and do not hesitate to take the critics to task when they think it necessary. This combination of criticism of peer review and criticism of the critics makes for some vigorous writing.

What is insufficiently pursued in the book are flesh-and-blood examples of great scientific or policy failures that might plausibly be attributed to our practices of peer review. The careful, detailed analysis of a handful of real historic episodes—consequential ones—might well teach us more than reams of survey questionnaires and citation counts.

It comes as something of a surprise toward the end of the book, after all that slashing away at peer review, when the authors come out with their own reform proposals, which are in fact quite modest. The general framework of peer review should be preserved, they state, but with greater provision for rejoinders, the removal of referee anonymity and greater rewards and professional recognition for dedicated refereeing.

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Instabilities and Fronts in Extended Systems

Pierre Collet and
Jean-Pierre Eckmann
Princeton U. P., Princeton,
N. J., 1990. 196 pp. \$29.50 hc
ISBN 0-691-08568

The formation of patterns and instabilities in dissipative systems that live on an infinitely extended space domain poses a number of important and challenging problems. In particular, for the theoretically inclined physicist who seeks to understand on a mathematical basis, most of the central questions are far from solved. In general these systems exhibit bifurcations, where a continuum of modes becomes unstable, and thus the

process of new length scale generation is no longer discrete. Multiple scaling methods lead in a formal way to the Ginzburg-Landau equations, which have had a remarkable impact on our understanding of the transition to chaos. However, their justification on a rigorous basis can only be expected on a finite but large interval of time, as recent investigations have shown.

The declared purpose of this book, by Pierre Collet and Jean-Pierre Eckmann, is to tackle some significant problems and to treat bifurcation and dynamics of dissipative systems in extended domains over all times. In contrast to the many *ad hoc* solutions of special problems, the authors try to stress a more general and systematic point of view. In fact throughout the book this intention is distinctly felt. The examples are well chosen and reflect the general structure without succumbing to the temptation of a too general or too technical presentation. The book gives a fine overview of the present state of the subject, not in the sense of a comprehensive monograph, but rather as a quick, professional picture of the main advances and the actual questions to be answered. It contains a short introduction to the now classical aspects of bifurcation and the local dynamics in the neighborhood of critical states. At the same time it is a guide to the new boundaries, eager to inform about the most recent relevant literature.

A few remarks on the content may be in order. The general theme is played by the Swift-Hohenberg equation, which is of fourth order in the space variable, has a translational and reflectional symmetry in space and models some real dissipative systems, such as the Taylor-Couette system in hydrodynamics. The reflectional symmetry can be broken in a moving coordinate system, which again can cause convective instabilities and new types of bifurcation. While these bifurcations can be studied in the context of perturbed reversible systems, the analysis of the nearby dynamics requires new methods. In the case of bifurcated space-periodic solutions, a nonlinear version of Bloch or Floquet theory is developed to describe their time behavior—in particular, their stability.

The book is most interesting when analyzing the dynamics of fronts. These fronts are solutions that connect a stable equilibrium to an unstable one and propagate into the latter region. The analysis given for the Swift-Hohenberg equation is independent of any type of maximum