at the front as a medical orderly in 1915. In the summer of 1917 he was elected a delegate to the first congress of Soviets; Tamm represented a social-democratic group that at the time was close to the Bolsheviks.

The revolutionary turmoil did not separate Tamm from his profession—it just slowed him down. He published his first paper at the age of 29, but in the following years he more than made up for this late start. By 1939 he was the author of several significant articles dealing with macroscopic electrodynamics, the quantum theory of light scattering in crystals, the relativistic quantum mechanics of electrons (inspired by Paul A. M. Dirac's work), the quantum theory of metals and the theory of the nuclear force. During 1937–39, Tamm developed with Frank the theory of radiation for an electron moving at a velocity exceeding the phase velocity of light in a given medium. The theory explained the nature of Čerenkov radiation, and won for Pavel Čerenkov, Tamm and Frank the 1958 Nobel Prize in Physics.

The volume leaves no doubt that Tamm greatly benefited at the beginning of his career and throughout the 1930s from his close friendship with Leonid Mandelstam, one of the founders of Soviet physics. Tamm was also influenced by Dirac, whom he met for the first time in Leiden in 1928. A third man greatly helped Tamm with his academic career and trips abroad—Boris Gessen, a childhood friend who became known in the 1920s as a prominent Soviet philosopher of science and follower of Nikolai Bukharin, one of the early Soviet leaders. Subsequently Gessen became dean of the School of Physics at Moscow State University and used his position to assist the careers of both Mandelstam and Tamm. During Stalin's great purge of 1937–39, Gessen was liquidated, together with other followers of Bukharin.

By the beginning of World War II Tamm had lost his most vital link to the Soviet authorities. He had to rely solely on the merits of his research and the strength of his character—and also good luck. Tamm had the good fortune to possess all three. His good luck was, of course, the Soviet atomic bomb project, in which he became one of the key figures. The creation of the Soviet H-bomb made him, in due time, a highly visible public figure whose lifestyle, tastes and attitudes—of which he made no secret—greatly influenced his Soviet contemporaries. His enthusiasm for mountain climbing, Pasternak's poetry and Shostakovich's music had a beneficial influence on post-Stalinist Soviet society. In 1964 (as we learned recently from Roald Sagdeev in *Moscow News* 1, 12, 1988) Tamm, together with Sakharov, succeeded in blocking the election to the Soviet Academy of a Lysenkoist directly supported by Nikita Khrushchev, then leader of the USSR.

Such examples of Tamm's civic courage, as well as a more detailed description of the more dramatic episodes in his life, will appear, I hope, in an expanded edition of this fine book.

MARK KUCHMENT
Russian Research Center
Harvard University

An Informal Introduction to Theoretical Fluid Mechanics

James Lighthill
Clarendon (Oxford U. P.), New York, 1986. 260 pp.
$35.00 hc ISBN 0-19-853631-3

Here is the second monograph in a new series, sponsored by the Institute of Mathematics and Its Applications (UK), that seeks to present students, both undergraduate and graduate, with short, accessible books on practical applications of mathematics. How appropriate that the first volume on fluid mechanics should be authored by such an eminent worker in the field as James Lighthill. The principal aim of the book is to demonstrate how one may integrate data from experimental studies with theoretical analyses to produce practically useful mathematical models (including manageable computer models) for a wide range of important fluid flows. The first three chapters present the basic principles of fluid mechanics and the means of characterizing fluid flows. The organizing principle of the remainder of the book is vorticity—either its absence or its concentration in thin or narrow regions. Although vorticity is present in the flows of all real fluids past solid bodies, for many practically important problems—particularly external flows about streamlined and, to a lesser extent, blunt bodies—one may consider much or most of the flow domain as being free of vorticity, that is, irrotational. The vorticity—generated by the bodies themselves and related to their lift and drag—is in these flows often confined to narrow regions about the bodies and in their wakes. At least four chapters are devoted to irrotational flows. Much of the remainder treats vorticity and its consequences in one context or another.

One will not find in this book a discussion of very-high-speed or very-low-speed flow, nor much about turbulence. On the other hand one will find a discussion of swimming and flying in nature, topics not found in other texts. More importantly, however, one will find throughout what we have come to expect from Lighthill's writings—enormously insightful comments and an instructive discussion of every topic treated. The author is a master, and takes delight in using simple dimensional and scaling arguments to extract estimates of the size and importance of various fluid mechanical phenomena. Less informal and less introductory than the title suggests, the text does fulfill the promise of the series. One could not hope for a more succinct and illuminating initiation into some of the most important and fundamental ideas of theoretical fluid mechanics.

STANLEY A. BERGER
University of California, Berkeley

Nuclear Imperatives and Public Trust: Dealing with Radioactive Waste

Luther J. Carter
Resources for the Future, Washington, D. C.
(dist. by Johns Hopkins U. P., Baltimore, Md.), 1987. 473 pp. $28.00 hc ISBN 0-915707-29-2

Nuclear Imperatives and Public Trust is an unbalanced historical account of rambling governmental efforts to bury radioactive wastes. Luther Carter, formerly with *Science*, was supported in its publication by an independent nonprofit nature-conservation organization, Resources for the Future. Based largely on interviews and Congressional testimony, the book does not have a strong technical basis, nor is it free of Carter's biases against fuel reprocessing in particular and nuclear power in general. Despite these limitations, it provides a useful consolidated history of nuclear waste disposal endeavors and draws some important lessons for policymakers.

The theme of the book is drawn from Carter's hypothesis that nuclear power is "subject to two indisputable imperatives": safeguarding potential nuclear explosives and containing radioactivity. However, he dwells on these two imperatives as though nuclear power and other power sources were not subject to additional imperatives. For example, nuclear power must entail less environmental degradation then competing sources, and it must be economically competitive.