

peal to students, and to persons not very familiar with the quantum theory. I am compelled to doubt whether readers of that type would get very much more out of it than the general impression that many different forms of theory were tried out, of which relatively few survived to form the quantum theory of today. Even this general view is useful, however. It is through such trial and modification that science always progresses.

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The Einstein Decade (1905–1915)

C. Lanczos

230 pp. Academic, New York, 1974.
\$12.50

Adam Smith once introduced the Impartial Spectator. He is a sympathetic being who is an alter ego to the author, and who views the world very much the same way the author does.

Cornelius Lanczos was the ideal Impartial Spectator to Einstein. His interest in Einstein's personal work goes back to the time when he was working with him, during 1928 and 1929. In his present and last book, he provides a charming manifestation of these sympathies and interests. The book itself is a throwback to earlier days in style, temper and content—Lanczos has revived a now forgotten form (causeries) and adapted it to the study of scientists. It has been often used for the study of literature and art (Sainte Beuve for example), but not for the study of science. In it one discusses the temperament of the author, its consequences on the choice of topics and on his accomplishments. Then, this information is used to study the individual pieces of work. It is a sort of Baedeker through the author's *oeuvre*; illumination is provided by the guide's personal knowledge of the author, his work, and the (supposed) motivation of the author.

This well produced book deals in this manner with the most fruitful ten years of Einstein's life (1905–15). Its first half discusses Einstein, his predilections outside science, and his basic motivation, according to Lanczos, in comprehending the external world. After that, the author gives us a brief outline of statistical mechanics and relativity; he does not, however, discuss quantum theory and electrodynamics to the same extent. This is followed by a delightful fictitious interview with the young Einstein.

The second half of the book deals with 67 memoirs—Einstein's output for



ten years. Each memoir carries the original title, its translation, the reference to the original and a discussion of the content. These discussions are excellent. They vary in length and give a full understanding of the aims and achievements. If necessary, a short remark is appended to give additional information such as references.

There is a large potential audience for the book. The technical details are not too difficult for an undergraduate, and a graduate student should study it to see the range and depth that is possible for a genius in physics to achieve. Finally all physicists will benefit from it: Those who love physics as a vocation will derive pleasure; those who exploit physics as a trade will, at least, gain a different point of view.

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Advice and Dissent— Scientists in the Political Arena

J. Primack, F. von Hippel

299 pp. Basic Books, New York, 1974.
\$12.95

The avalanche of events and revelations over the last few years has tended to crowd from our memories major national issues that occurred only five years ago. Yet with only the modest reminder of a few initials—DDT, ABM, SST—we easily recollect these intense

debates, exemplifying the class of political policy controversies over the past decade with a substantial scientific/technical component.

Joel Primack and Frank von Hippel lead us once again through these and other events of their kind. They also include in their roster nuclear-reactor safety, and the use of defoliants, nerve gas and cyclamates. For each there is a chronological recounting of history, told with the pace and fascination of good journalism, yet documented and referenced with scholarly precision. For each, as well, there are the human participants—heroes, villains and dupes—so that the nonfictional tales have elements of vivid melodrama.

But of course there are lessons, and pointing us at them is the underlying purpose of Primack and von Hippel. Scientists played key roles in each of the debates and these roles are examined carefully. Some instances involved scientist advisory panels to government agencies, usually being duped by their client; in others individual scientists came out of their laboratories into citizen advocacy roles, unanimously heroic; occasionally scientists were also government bureaucrats, typically on the losing team. The lesson is the inadequacy of the traditional mechanism for interaction between science and government—the advisory panel—into whose failures or absence individual, improvisatory scientists had to step.

Primack and von Hippel call for scientists and their community to strengthen their contributions to the resolution of government policies in two ways. They urge a new participation by the learned professional societies, as a forum for the study and debate of the technical aspects of public issues. This would tend to relieve many of the past difficulties they recount, such as with secrecy, conflicts of interest, non-objectivity and misuse. The other direction they encourage is the wider acceptance of public-interest science as a career activity legitimately within the profession itself. The role of scientifically trained public advocates becomes particularly vital for issues at the state or local level, for which professional societies have an inappropriately broad constituency and where advisory panels are rudimentary or nonexistent.

Government, for its part, is also trying to improve its capabilities for comprehending the technical questions within public issues. The Office of Technology Assessment, noted by Primack and von Hippel, is a new step in that direction by the Congress. The Executive branch at this date is seriously rethinking its organization for science and technology policy. State governments are trying to cope, but at a distinct disadvantage in resources.

Scientists, collectively and individu-