

Perspective on a forward-looking, fear-driven genius

Energy and Conflict: The Life and Times of Edward Teller

S. A. Blumberg, G. Owens

492 pp. G. P. Putnam's, New York, 1976.
\$9.95

Reviewed by Frederick Seitz

According to Greek mythology, the gods were once visible to human beings—an age when gods not only engaged in endless intrigues and altercations on Mount Olympus but also involved themselves in complex human undertakings.

When the American scientific community, which hitherto had been almost invisible, was raised to demi-god status by its remarkable contributions in World War II, its intrigues and altercations became more and more visible to the rest of society.

I do not know whether the Greek gods were ever put on trial by their human subjects. In a sense, however, the scientific community underwent such a trial during 1954, when J. Robert Oppenheimer was subjected to the public security review that led to the loss of his clearances. The scientific community has not been quite the same since, nor will it quickly regain the prestige it once had during the events that started in 1939, when Otto Hahn and Fritz Strassmann discovered nuclear fission.

This book deals with the life of one of the epic figures in the entire episode that began in that year, and it is a valuable and informative addition to the semi-popular literature on the subject. It is apparent that, before they actually met Edward Teller, the writers of this biography approached their study with the synthetic image of a Dr Strangelove in mind. What they found, to their edification, was a highly intricate, creatively brilliant, proud, witty, and somewhat frustrated individual in whom the human and humane qualities were clearly evident—an individual who had traveled a long and complex path from his solid, middle-class childhood in Hungary to an important position on the stage of American and international affairs. They found, in fact, an individual whose own trials had been no less difficult than those experienced by others.

Teller emerges in this book as neither villain nor unblemished hero, but rather as an unconventional genius driven by prescience and fears—fears generated by the rise of highly repressive and almost all-powerful governments in our time.

Yet even when he was deeply involved in the type of organized science that was necessary to achieve the goals he sought, Teller was not able to curb the individualistic impulses that are so often characteristic of a genius who sees a significant challenge somewhere over the horizon. He was in fact always something of a maverick. When everyone else at Los Alamos focussed attention on fission weapons, he felt compelled to face the potentialities of fusion and opened the doorway to its exploitation. When in 1946 all but a handful of the most competent scientists put weapons research out of their minds, he was haunted by the thought that the United States would lose its position of leadership in the free world through default and so leave the world open to the advance of despotic governments. In his desire to stem such a drift, he made enemies of individuals with whom he would normally have been friends, and friends of others who were allies in the causes he supported, but with whom he would not normally have been companions.

Though he fathered the theoretical approach to our national program in hydrogen weapons, it is doubtful that Teller would have been an effective director of the laboratory at Los Alamos, which successfully carried out the first practical tests of such weapons and whose leadership he criticized so severely that he brought about the creation of another weapons laboratory.

As emerges in the pages of this book, it is essentially impossible for most of the scientists in the generation that best knew Edward Teller to pass a fair judgment upon him, for two reasons. First, and probably the most critical, Teller—both through his actions and the accidents of circumstance—became the focus of much of the resentment engendered in the scientific community by the outcome of the Oppenheimer trial. Second, Teller's own judgment and instinct placed him in opposition to the attitude (which has been so strongly prevalent in the intellectual community, including the scientific one) that combines admiration for the doctrines of the Left with a deep distrust of



DIRECTOR

Energy and Environment
Division

Lawrence Berkeley Laboratory
University of California

Applications and nominations are invited for head of the Energy & Environment Division of the Lawrence Berkeley Laboratory. The division is primarily funded by the Energy Research and Development Agency and has primary activities in:

Development of hot-brine geothermal energy, fusion energy research, combustion research, conservation, solar energy development, development of environmental instrumentation, and regional studies.

Candidates should have a record of distinguished achievement in energy related or environmental research and the ability to give scientific and administrative leadership to a large and diverse division of a multi-purpose laboratory.

Applications or nominations should be submitted by March 1, 1977 to:

Professor Alexis T. Bell
Chairman of the Energy and
Environment Search Committee
Department of Chemical
Engineering
University of California
Berkeley, California 94720

Equal Opportunity Employer
Affirmative Action Employer

The future advancement of science hinges on comprehending white light. We know c (the speed of light) but we teach c is a limit for all forces from a distance & a constant to the source & all observers. Imagine a laser that operates on ONE of the 320 trillion frequencies in light. Squaring c (186,000 mps) times 10,000 equals the frequencies in white light so light is a very loose or useless constant.

Enterprise (E) & E2 travel between two inhabited planets at 0.6c. E has two powerful green lasers pointed fore & aft which Captain Kirk turns on at the halfway point. Which planet sees the green laser last the one that will see red or the one that will see violet? If both see the light at the same time how does one see red and the other violet?

E2 travels slightly above 0.6c & constantly circles E. Whenever E2 is forward or aft of E it sees green. E2 sees only 590 trillion cycles per second (tops) so how does the planet ahead see 750 tops & the planet behind see 430 tops? Green light comes to the planet ahead at 1.6c & the planet behind at 0.4c. While c is a constant to E it is neither a constant nor a limit to the planets, c is a constant ONLY to the source. Quanta is the time of sine waves or that portion able to do the job.

CAUTION: This gedanken experiment can drive the lone scientist or student up the wall. You best discuss it in bull sessions. Should science students study old texts or write new ones?

If E has to go through a stationary dust cloud the crew would see violet reflections from ahead & red from behind, this points out a Doppler error embraced by Einstein. E's laser emits green light regardless of E's speed. We continue to spend time and the taxpayers dollars to more accurately determine c . We'll get far more mileage from our tax dollars determining what c is a constant to.

Relativity allows E energy from the STATIC field of a magnet. Patent 3879622 relates keepers, interrupting the magnet's field making magnetic waves. We know of no wave phenomena from which we can't extract energy. Send this to scientist friends outside the area. Send a SASE for patent to—JW Ecklin, 6143K Edsall Rd., Alexandria, Va. 22304



Circle No. 29 on Reader Service Card

the so-called "establishment"—the combination of beliefs that Raymond Aron has designated "the opium of the intellectual."

The position Teller will occupy in history is probably beyond our ken for a variety of reasons, mainly because the revolutionary social forces that have been at work in our century are far from played out. Moreover, the United States appears at the moment, through wisdom or folly, to be in a state of indecision concerning the role it should henceforth play in maintaining what remains of what Niels Bohr termed the "open world." Indeed, there are those in our country who question severely what is being spent at present for national defense. Teller's national reputation will be deeply intertwined with the resolution of this quandary—presumably between now and the end of the century, as international events develop.

In addition, Teller's image may suffer from the fact that there is a strong tendency (not apparent in this book) for both popular and textbook historians to develop stereotypes of prominent figures that bear only superficial resemblance to real people. It now seems amply clear that Teller's basic concerns regarding both the intentions and capabilities of the Soviet Union with respect to the development of modern weapons in the period just after World War II were substantially correct. It appears certain that the Soviet leaders used all the information passed on by Klaus Fuchs (and perhaps others), in conjunction with the best talent and resources available to them, in order to develop fission and fusion weapons as fast as they possibly could. The authors of this book propose, in fact, that the Soviet Union actually tested a primitive fusion weapon successfully as early as 1950, while we were still struggling to develop the basic concepts concerning such weapons.

Perhaps the most serious objection one can now offer concerning the type of pressure Teller exerted in support of the development of hydrogen weapons—all based on his sense of urgency—is that the Soviet leaders might have abandoned their own program, or placed it on ice, had we not gone ahead with our tests and developments. Although this viewpoint is popular in some scientific circles, it is one that must be accepted primarily on faith; it is not necessarily obvious to all intelligent people. There is little tangible evidence to indicate that, in the past 30 years, the Soviet Union has slowed its overall efforts to gain military ascendancy over the rest of the world.

I feel a personal sense of gratitude to the authors for this volume. Although it is not in any way an official history prepared with the techniques of scholarly research, but rather is a popularization of history, *Energy and Conflict* does fill an important vacuum in the available liter-

ature in a reasonably impartial way. I have known Edward Teller himself for more than 40 years—and most of the other prominent individuals described in the book for a comparable period of time—and find that the picture painted of him in the volume is quite close to the image gained through my own experience.

* * *

Frederick Seitz, President of Rockefeller University and a past president of both the NAS and the APS, has headed the Defense Science Board and is now a member of the Institute for Defense Analyses.

Symmetry Principles in Elementary Particle Physics

W. M. Gibson, B. R. Pollard

380 pp. Cambridge U. P., New York, 1976.
\$39.50

Symmetry is not only a beautiful concept; it also offers a unifying theme to many areas of physics, and this nowhere more strikingly than in particle physics. Indeed, it would not be unwise at all for a student to begin tackling the field by studying symmetry principles. The subject is often accorded a central role in textbooks on particle physics; nevertheless it should prove rather useful to students to have the entire subject presented coherently in one book.

The book by W. M. Gibson and B. R. Pollard naturally invites comparison with an earlier work, Sakurai's *Invariance Principles and Elementary Particles*, a book widely regarded as beautifully written and one of the best on particle physics. I must report that, having made such a comparison, I found the present book much the paler. Somewhat miraculously, Sakurai managed to convey some of the feel and texture—and more importantly, the excitement—of the subject, as actually used by research physicists.

It is perhaps inappropriate to compare two books virtually a generation apart. Sakurai's work closes on the eve of the establishment of SU(3), a symmetry thought of, by now, as one of the outstanding achievements of classical antiquity. With this in mind, I turned to the chapter treating SU(3) in Gibson and Pollard. I was unhappy because firstly, the treatment is perhaps not comprehensive enough for such an important subject (as a specific example, a table of *dijk* symbols is not included) and secondly, the authors do not use the matrix and tensor approach. In the heated blackboard discussions on symmetry that are the daily lot of particle theorists, I have never witnessed anybody doing anything other than attempting to manipulate some 3-by-3 matrices. Some of