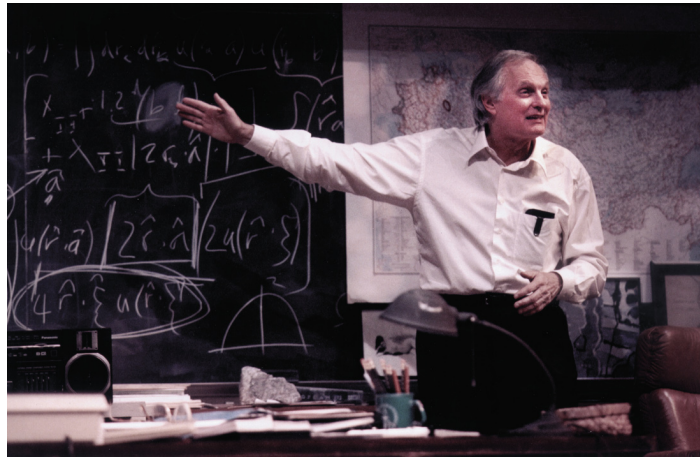


## SCIENCE ON STAGE



Alan Alda plays Richard Feynman in *QED* at the Mark Taper Forum (Caltech physicists were consulted on the blackboard.)

by Jay A. Labinger  
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*QED*, a play by Peter Parnell,  
produced by the Center Theatre  
Group at the Mark Taper Forum,  
Los Angeles,  
March 10–May 13, 2001

*Oxygen*, a play by Carl Djerassi and  
Roald Hoffmann,  
produced by the San Diego  
Repertory Theatre at the Lyceum  
Theatre, San Diego, April 2–7, 2001  
(published by John Wiley & Sons,  
2001)

The 20th century has given us a number of encounters between the spheres of science and the theater—Brecht's *Galileo* (1939) and Dürrenmatt's *The Physicists* (1962), to cite just two examples. As we transit to a new century and millennium, the frequency and impact of such plays seem to be decidedly on the increase. The most visible has certainly been Michael Frayn's *Copenhagen*, an account of a World War II meeting between Niels Bohr and Werner Heisenberg, which has enjoyed lengthy, sold-out runs in London and New York, despite (or, possibly because of, though that doesn't seem very likely) a heavy dose of dense quantum mechanics. David Auburn's *Proof*, about a mathematician's daughter, recently won the Pulitzer Prize for best drama of 2000. Tom Stoppard's *Arcadia* (my personal favorite in this genre), featuring themes of chaos theory and thermodynamics, has been a continual success, with frequent revivals, since its first appearance in 1993.

Should this surprise us?

Certainly science pervades our contemporary world, and equally certainly the theater must reflect that world to stay relevant. But it is not clear whether the aesthetic and intellectual demands of the two spheres are compatible—the encounter might be more of a collision!

At the very least, the playwright tackling a science-related theme will have problems to solve. How much of the scientific content must the audience understand, for the play to be fully effective? For example, scientists' motivations might well appear incomprehensible to an audience that doesn't appreciate the significance of their scientific work. On the other hand, one of the more basic rules of theater is "show, don't tell." How can that significance be adequately communicated, without violating that rule, and risking a complete breakdown of rapport?

Two plays with science connections have recently premiered in Southern California. The first, *QED*, features Alan Alda portraying the late Caltech physicist Richard Feynman. Apparently Alda himself was the prime initiator of the project, having been impressed by the dramatic potential of Feynman's life as depicted in

Ralph Leighton's *Tuva or Bust!*, and recruited Parnell (previously best known for his adaptation of *The Cider House Rules*) as playwright. The play consists of Feynman talking—sometimes on the telephone, with his wife, friends, colleagues, and doctors, as well as with a student (the only other character in the play), but mainly directly to the audience—during a day and evening near the end of his life.

Feynman/Alda talks mostly about himself: his interests, his past life, his future—his science? We do get some, especially in the first act, but it is hardly integral to the play. We are treated to a number of platitudes about science; we are *told*, but hardly ever *shown*, how excited scientists are about their work. Alda tries to illustrate what doing Feynman's kind of physics might be like by means of an example from chess, not from science. On the occasions when real science is presented, it is at a level way over a nonphysicist's head, as when Alda starts sketching Feynman diagrams on a blackboard, explaining them in terms of virtual photons and the like.

This combination of vague generalities and arcane complexities, with little in between, has the effect (whether intended or not) of marginalizing the scientific theme. The audience is encouraged to take in what's easy and tune out what's hard, never challenged to work at making sense of unfamiliar ideas. Perhaps the clearest indication of how little is expected is that *every* time (it seemed like dozens, though I suppose it was only three or four) Alda says "quantum electrodynamics" he turns to the audience and repeats "QED." Couldn't they trust the audience to figure out the title's significance after the first time?

The net result is that Feyn-

man the character is not a scientist with a personality; he's just a personality who happens to be a scientist. *QED* may well appeal to many—it does afford the opportunity to spend some time with an entertaining persona (though how much of that is Feynman, and how much Alda, is not easy to ascertain). But the problems of dealing with a scientific theme in a play have not been solved in any way, merely evaded.

*Oxygen* is a different matter. The playwrights are two well-known chemists, Nobel laureate Roald Hoffmann and National Medal of Science awardee Carl Djerassi. (Both are also well known outside of chemistry as prolific authors of fiction, nonfiction, and poetry.) The premise of *Oxygen* is that the Nobel Foundation has decided to institute a new program of “retro-Nobels,” recognizing work done before the establishment of Nobel Prizes at the beginning of the 20th century. A committee for the retro-chemistry award quickly zeroes in on the discovery of oxygen as a worthy subject for the award. But who should receive it? Carl Wilhelm Scheele, a Swedish pharmacist, who was apparently the first to obtain a sample in the laboratory? Joseph Priestley, the first to publish his findings? An-

toine Lavoisier, the first to understand what oxygen really is? All three?

Interwoven with the contemporary action is an account of a (fictional) 1777 meeting of the three chemists, invited to Sweden by King Gustav III to decide who should get credit. Each of the three is assigned his advocate on the committee, whose arguments in favor of their candidates echo not only those made by the candidates on their own behalf but also sad stories about priority claims and professional jealousy among the advocates themselves. This resonance is nicely reinforced by having a single actor play each candidate-defender pair; temporal scene shifts are signaled by minor costume changes. Another resonant device is the inclusion of a young historian of science writing her dissertation on “Women in the lives of 18th century scientists” as secretary to the Nobel committee; the wives attend and play important roles at the 1777 meeting, especially Mme. Lavoisier.

Evading the playwright's dilemma is not an option here as it was in *QED*: the scientific content is *central* to the dramatic argument. Lavoisier was the first to understand the role of oxygen in phenomena such as combustion and rusting, thereby overthrowing the phlogiston theory in which both Scheele and Priestley devoutly believed. Unless one appreciates the significance of that, the priority dispute makes little sense. So somehow it must be explained, without squelching the drama by a descent into didacticism. Hoffmann and Djerassi try hard to steer between the two looming cliffs (at one point they interpolate a stylized masque, performed by Lavoisier and his wife, to communicate some of the

material) but their solution to the problem is not entirely satisfying.

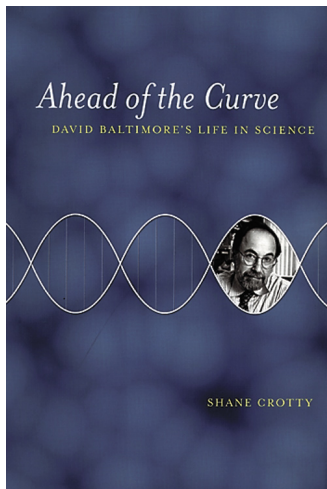
In an interview with a San Diego paper before the premiere, Djerassi claimed that their writing about “a part of our culture which we did not have to absorb” was an advantage; but it may have also been somewhat of a disadvantage, making them a bit less sensitive to the needs of an audience that is unfamiliar with that culture. Similarly, the contemporary chemists are not so compelling characters as one might wish. They are obviously meant to be seen as passionate about their science, which carries over to the positions they take during the committee's deliberation, but we aren't really shown where such passion might come from. Perhaps the authors, as passionately committed scientists themselves, thought it would be obvious?

It seems likely that *Oxygen* was influenced by *Arcadia*: the two plays exhibit certain similarities (beyond the scientific themes), most prominently the use in both of alternating time frames. If the latter is more successful as a dramatic event (which it is), there is no shame in that for Hoffmann and Djerassi—Stoppard is, after all, one of the leading playwrights of our time. But possibly there is an instructive message, that one must be wary of being *too* close to one's subject. *Oxygen*, much more than *QED*, illustrates both the potential problems and rewards of dramatizing science. Let's hope that Hoffmann and Djerassi, and others as well, will keep on trying. □

*Jay Labinger, a chemist and member of the professional staff, is coeditor of The One Culture? A Conversation About Science, which has just been published by the University of Chicago Press.*

In the San Diego Repertory Theatre production of *Oxygen*, Lou Seitchik (left) stars as Priestley, Randall Dodge (center) as Lavoisier, and Jeff Anthony Miller as Scheele.





**Ahead of the Curve:**  
**David Baltimore's Life in Science**  
270 pages  
University of California Press, 2001  
\$29.95

## A LIFE IN SCIENCE

by John Sutherland,  
Visiting Professor of Literature

What, one wonders, goes through David Baltimore's mind when, having picked up his espresso from the Red Door (as I've seen him do), he browses the Caltech Bookstore and passes a rack stacked high with two books about David Baltimore: Dan Kevles's *The Baltimore Case* (Norton, 1998) and now, three years later, Shane Crotty's biography.

Everything has happened fast in Baltimore's life. As Crotty records, he believed, in his early 20s, that if one did not make one's mark by 30, there would be no mark for posterity to admire. He got his Nobel aged (if that's the word) a prodigiously youthful 37. His career hit a wall, it seemed, in his 50s with "the case." Now, phoenixlike, he is arisen to lead Caltech into the New Millennium. "I live in the future, not in the past," he is quoted as saying. Having achieved so much, he has still, it seems, much to achieve. Nor will they be ordinary achievements. He is, he believes, "the only functioning scientist who is running a major university in

the United States." Fast and two-fisted.

Having your biography written while you are still alive, the English poet Philip Larkin said, is like being measured up (still breathing) by the undertaker. I am not a scientist (even Crotty's accessible explanations about recombinant DNA and retroviruses are sometimes a bit beyond me). But I am a biographer. And it is the problems of the biographer's craft that primarily interest me in Crotty's enterprise.

It is difficult to write "authorized" biography about the living. Baltimore evidently sanctioned this book, although the interviews he gave his biographer seem to have been singularly unrevealing. Punches have to be pulled when dealing with a living subject. If they're not, authorization and "permissions" are yanked. And the libel lawyers are in the wings (you can't, as every biographer knows, libel the dead). But for the reader the pleasure in biography is, essentially, voyeuristic. We want to see what makes the person "tick." To do that, you have to take the back off the watch and do some prying.

In Baltimore's case, biographical prying is further discouraged by the fact that he is, manifestly, someone who values and protects his privacy. Crotty has been careful not to trespass. So much so, that at times he seems to be complicit with his subject in veiling what biography normally conceives its responsibility to uncover.

This is not to say that one wants *National Enquirer* or "blackwash" revelations (not that there would be any here). One can respect Crotty's decision not to press on personal but (in this context) irrelevant aspects of his subject's life. Baltimore's first marriage and divorce, for example, are dealt with in a

sentence. His second marriage is recorded, but without any close-up detail.

Nonetheless, there are areas of private life that are relevant to the personal evolution of someone so extraordinarily distinguished as Baltimore. Most careers, even "a life in science," follow the rule As the twig is bent, so grows the tree. Childhood—the formative years—is important. Baltimore's first 20 years are summarized here in three pages. Crotty gives us a luxuriant and protracted word picture of the Swarthmore campus ("the dogwood trees and a thousand rhododendrons bloomed, carpeting the campus with red, cream, and pink petals") but nothing about the Baltimore home or even whether there were siblings other than a brother briefly mentioned. What did his parents do for a living?

We learn that Baltimore and Francis Ford Coppola "were the two-man tuba section in the Great Neck High School Marching Band" (a curious fact for which one is profoundly grateful). But I can find nothing in this biography about Baltimore's father. His mother is credited with being his lifelong inspiration. But she has no index entry, nor does she make any real presence in the narrative.

There is nothing, apart from one throwaway reference, to Baltimore's Jewishness. As someone born in 1938, he may conceivably as a young man have encountered prejudice. He is now, we learn, "unreligious." Was his upbringing secular, or did he lose his faith?

The lack of personal background is tantalizing. More so, since there are fleeting allusions to important aspects of his adult personality passed down from his family. There is, for example, a parenthetical reference to the Baltimores sympathizing with, for two

generations before David, “leftists and socialists.” In his thirties, we learn, Baltimore “hated Nixon,” and thought his “War on Cancer” a sham. At this period of his life (when he was doing his most exciting scientific work) Baltimore “disdained capitalist society” and declared himself “an anticapitalist.” When did his views change? Or have they?

One of the more interesting human subplots to the narrative is Baltimore’s impassioned resistance to the Vietnam War (had he been born five years later, Canada might have been able to claim him as its most distinguished scientist). Baltimore’s truly eloquent and idealistic outburst against the ineffable John Dingell during “the case” reminds one of nothing so much as those gallant dissidents who stood up publicly to denounce HUAC and McCarthyist purges, 40 years earlier. (Crotty, incidentally, handles this episode very effectively.)

The aspect of Baltimore’s intellectual character that emerges most clearly is that he is a loner. As a young scientist he was a self-made man. His alma mater will take no pleasure in Crotty’s book. Baltimore, perhaps its most famous living alumnus, is quoted as saying: “At Swarthmore the teaching of biology was poor—at best. The courses were really generally *bad*.” But perhaps genius needs to be left alone, to grow at its own rate in its own peculiar way. For students like David Baltimore, bad courses are the best courses. Would undergraduate education at Cambridge, MIT, or Caltech have crushed the original genius out of him?

Late-20th-century, laboratory-based science cannot be done at the highest level by “loners.” It costs too much. Few biologists are born

billionaires. Accommodations must be made: with institutions, with the state, and with “capital.” As a young scientist, Baltimore apparently believed that if funds were needed for his kind of science it should ideally be from the taxpayer (“the only way to do research was on government money”).

But when he made his pact with a large institution (with the ultracapitalist name, Rockefeller) did he have any twinges of “radical, leftist” conscience?

What went through Baltimore’s mind, in August 1980, when Jack Whitehead offered Baltimore a research institute? He who sups with the devil should use a long spoon? Or, this is the only way forward for research, such as that into molecular biology, which needs unimaginably large sums of money? These are questions that the reader (legitimately, I think) asks. This biography gives hints, but no answers.

There is much to applaud in Crotty’s book. I found his expositions of Baltimore’s research for the layman (as a layman) admirably comprehensible. Crotty is good on the ethical problems raised by gene research, and Baltimore’s (sensible, one apprehends) thinking on the

Pandora’s box his genius has opened.

This is an interesting study of a fascinating and important man. But, as biography, Crotty’s book stimulates an appetite it signally fails to satisfy. There remain enigmas. For instance: the best prose in the book is Baltimore’s (I would point to the witty summary of his “education in irrationality,” in his inauguration address at Caltech, quoted here as epilogue). Baltimore is a brilliant scientist, yes. But he is also a highly cultivated man, with a love of theater, jazz, art, and literature. We do not learn from this book how he became that unusual man. The posthumous biography will doubtless tell us. And, by the time it comes along, there will, for a certainty, be much, much more for the biographer to record. □

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## JEFFREY SCOT BANKS 1958–2000

