



"QED", a play by Peter Parnell, produced by the Center Theatre Group at the Mark Taper Forum, Los Angeles, March 10-May 13, 2001

and

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

Unedited version of review published in:
Engineering & Science, 2001, 65 (1), 33-4.

The 20th century has given us a number of encounters between the spheres of science and the theatre— Brecht's *Galileo* (1939) and Dürrenmatt's *The Physicists* (1962), to cite just two examples. As we transit to a new century and millennium, their frequency and impact seem to be decidedly on the increase. The most visible has certainly been Michael Frayn's *Copenhagen*, an account of a WWII 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 theatre 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, a scientist's motivations might well appear incomprehensible to an audience that doesn't

appreciate the significance of her scientific work. On the other hand, one of the more basic rules of theatre 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 non-physicist'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 Feynman 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? Antoine 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 then-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 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. Hopefully Hoffmann and Djerassi, and others as well, will keep on trying.