

Experimental theatre

Science on Stage: From Doctor Faustus to Copenhagen

by Kirsten Shepherd-Barr

Princeton University Press: 2006. 271 pp.
\$29.95, £18.95

Stuart Firestein

Copenhagen (Michael Frayn, 1998), *Proof* (David Auburn, 2001), *Wit* (Margaret Edson, 1995), *Arcadia* (Tom Stoppard, 1994) and *A Beautiful Mind* (Ron Howard, 2001): all recent winners of a Pulitzer, Tony, Olivier or Oscar, and all dramas about science and scientists. Along with the recent proliferation of television shows that feature science (the ubiquitous forensic-investigation series, for instance), these examples seem to give the lie to the Janus-faced cultural split between the humanities and sciences postulated famously by C. P. Snow in 1959. In the theatre, science is current, popular and topical. In the United States, for example, the Alfred P. Sloan Foundation, in a programme devoted to increasing public understanding of science and technology, devotes significant funds to encouraging artists and playwrights to create new works in the theatre using science themes, including financing productions as part of the First Light Festival in New York.

This intersection of research and performance is chronicled in *Science on Stage* by Kirsten Shepherd-Barr of the University of Birmingham, UK (I should disclose a connection here: Shepherd-Barr is the daughter of the Yale neuroscientist Gordon Shepherd, my postdoctoral mentor). As she points out, it is not an entirely new phenomenon: an eye-opening appendix lists 122 plays that make central use of scientific subjects, beginning with Marlowe's *Doctor Faustus* (published posthumously in 1604) and Jonson's *The Alchemist* (1610), and covering a further four centuries of theatrical literature and performance. Shepherd-Barr describes, analyses and interprets a host of theatrical scripts and performances with science as their themes. She provides important historical context and lots of interesting insights, especially regarding the most recent plays.

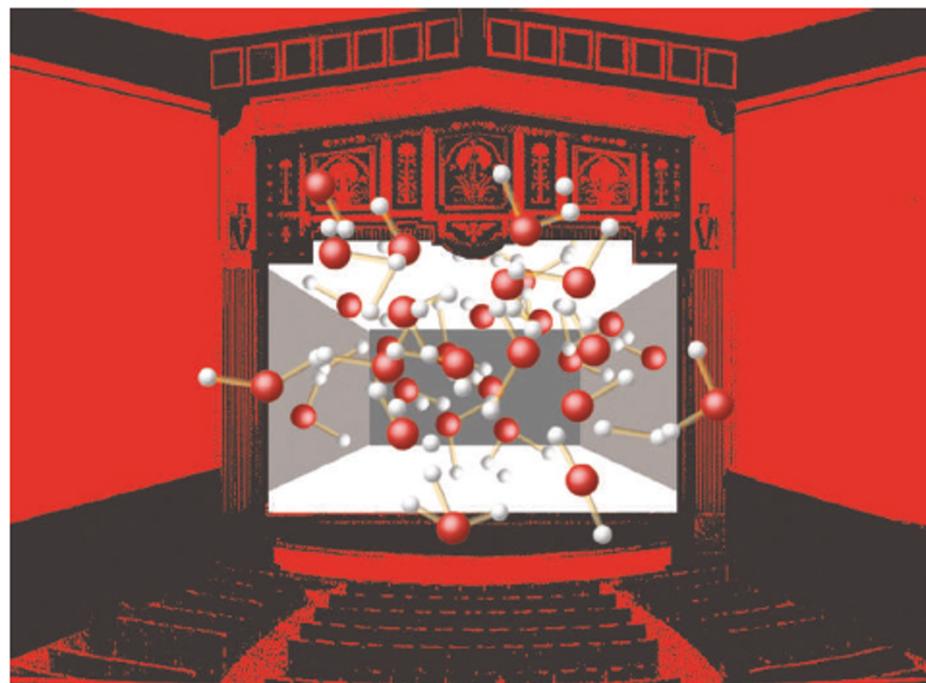
Several interesting issues come up in this book. Science is becoming more public as it insinuates itself ever further into the lives of individuals and into decisions that we must make as a society. The theatre is perhaps the most public of the arts, the prototypical forum for the portrayal of ideas and the working-out of conflicts. It is the ideal forum for a meeting of the two cultures — a venue for the transformation of science, often deemed obscure and aloof, into personal drama. There are many commonalities: both science and the theatre are engaged in describing the world, and science, according to the dramatist Peter Brook, is

the new mythology, the place to which people turn for answers. Science explores many of the eternal mysteries that have been the subject of theatre since the first performances: how we got here, what we're doing here, and where we're going.

Science themes appear in other art forms as well, but Shepherd-Barr points out that the theatre has been especially hospitable to science; in particular, more so than film, which as a medium can't seem to avoid turning science into fantasy. She maintains that for creative,

of the productions to shed light on the difficulties and the opportunities that arise from turning science into theatre. *Copenhagen*, for instance, made some unprecedented demands on the actors with regard to the amount and difficulty of memorization required. Shepherd-Barr also discusses the particular problems that playwrights using science have in presenting exposition, and the inevitable tension between historical and scientific accuracy and dramatic demands.

Also considered here are scientists turned playwrights, the leading example being Carl Djerassi, emeritus professor of chemistry at Stanford University, California. His effort with Nobel-prizewinning chemist Roald Hoffman,



thoughtful writers, science opens up new territories of rich material, beyond the stale melodramas of dysfunctional families, interpersonal soap-opera plots and psychological mysteries. In her most insightful comments she shows how the best science plays, *Copenhagen* or *Arcadia* for example, use the science they deal with — atomic structure and entropy respectively — within the structure of the play.

The book begins with an overview and an essay that tackles the interesting question of the basis for the current appeal of science plays. The middle chapters document plays in the various sciences, touching on physics, evolution, medicine and mathematics. Within them there are detailed analyses of *Copenhagen* and *Arcadia* as prime examples of successful plays that are both theatrically engaging and scientifically satisfying. These are especially enjoyable chapters and, although familiarity with the plays is not required for their appreciation, for anyone who has seen them it will be fun to have the performances brought back to life. These are not simply rehashes of reviews; instead, Shepherd-Barr uses the scripts and features

Oxygen (2001), combines a wealth of scientific information in an engaging plot surrounding the discovery of the gas.

A final chapter looks at unconventional theatrical presentations, in particular collaborations involving both a scientist and a dramatist or director. Examples include innovative productions by cosmologist John Barrow of Cambridge University, UK, and director Luca Ronconi (*Infinites*, 2002; see *Nature* 416, 585; 2002); dramatist Jean-François Peyret and neurobiologist Alain Prochiantz of the National Centre for Scientific Research (CNRS) in Paris, France (*Darwin Variations*, 2004; see *Nature* 432, 445; 2004); and Peter Brook and neurologist Oliver Sacks (*The Man Who*, 1993). This is an especially lively portion of the book and leaves one, rightly, with the exciting idea that these productions are just the beginning. Appropriately, the embracing of scientific themes has motivated experimentation with theatrical form and content. The descriptions of these new performance pieces make one sorry to have missed any of them. *Infinites* and *Darwin Variations*, unaccountably, have

never been translated or performed in English.

Who will read this book? Who should read it? Scientists, playwrights, directors, humanists. It is unquestionably a scholarly work, comprehensive, utilizing many sources, thoroughly referenced and heavily annotated. Parts of it read as if they are composed of essays that could stand alone, making it occasionally repetitive. On the other hand, it is a surprisingly breezy and entertaining read.

One could hope that this book might insti-

gate university courses, perhaps taught jointly by professors in science and theatre departments. Such a course could be equally engaging to students in physics, chemistry, biology, mathematics, literature, drama, history — whoever heard of such a thing? As a working scientist I am left with only one question: why aren't there any science comedies? ■

Stuart Firestein is in the Department of Biological Sciences, Columbia University, New York, New York 10027, USA.

Sermons and straw men

The God Delusion

by Richard Dawkins

Bantam/Houghton Mifflin: 2006. 416 pp
£20/\$27

Lawrence M. Krauss

Early in *The God Delusion*, Richard Dawkins quotes Thomas Jefferson's statement: "I am satisfied, and sufficiently occupied with the things which are, without tormenting or troubling myself about those which may indeed be, but of which I have no evidence."

This eminently scientific sentiment was echoed two centuries later by the physicist Steven Weinberg, who, like Dawkins, is an outspoken critic of religion, but who has nevertheless suggested that most scientists simply don't spend enough time even thinking about God or religion to merit the label atheist.

But Richard Dawkins is a man on a mission. This new book is the culmination of his recent campaign, which has included a two-part television documentary, aired in Britain, to help humanity rid itself of what he surely views as one of its most vile creations: God.

Before I proceed further, I should, in the interests of full disclosure, confess that I have written exactly one fan letter that I can remember to an author. That letter was written to Richard Dawkins after the publication of a small book, *River Out of Eden* (Weidenfeld & Nicolson, 1995), which I felt was perhaps the most concise and cogent science writing, as well as the clearest discussion of the nature of evolution, I had yet read.

I wish that Dawkins, who has a gift for making science — in particular, evolutionary biology — both exciting and understandable to a broad audience, had continued to play to his strengths, which are desperately needed now more than ever as we confront growing attacks on the teaching of evolution, not just in the United States but in the UK and Europe.

Dawkins the preacher is less seductive. And make no mistake: this book is, for the most part, a well-referenced sermon. I just have no idea who the intended parishioners might be. In his preface, Dawkins claims he hopes to reach religious people who might have misgivings, either about the teachings of their

faith or about the negative impact of religion in the modern world. For these people, Dawkins wants to demonstrate that atheism is "something to stand tall and be proud of".

I found this slightly puzzling. I don't believe in Santa Claus, but I am not particularly proud of it. Indeed, I am rarely, if ever, proud of not believing in things. More generally, I think the strategy of focusing on telling people what not to believe is less compelling than positively demonstrating how the wonders of nature can suggest a world without God that is nevertheless both complete and wonderful — an argument that Dawkins reserves for the final few pages of the book.

And while there is a lot to complain about in the ubiquitous facile piety so prevalent today, complaining can nevertheless start to get tiresome. Carl Sagan's *The Demon-Haunted World* (Headline, 1996) likewise too often mirrored Sagan's frustration at all those who over many years have continued to confront him with their superstitions, but it also conveyed his sense of awe and wonder about nature in a way that Dawkins elsewhere has so craftily displayed.

A less sympathetic reader than the author's wife (who apparently read the entire manuscript aloud to Dawkins for him to review) might have provided a more useful foil. Several indulgences detract from the flow, but more importantly,

I was struck at how Dawkins' presentation, particularly in the early chapters where he builds his case against God, might offend those who, like myself, are quite sympathetic to his central thesis. I suspect that few thinking people of faith are unaware of the remarkable evil that has been done in the name of God, or the possibility that, although most cultures worship some god, this could be a mere reflection of the workings of the human brain rather than definitive evidence for God's reality. Yet Dawkins seems to suggest early on that even agnostics might never confront these issues and that he needs to "raise their consciousness", as he puts it. At the very least I find it doubtful that constantly questioning the intelligence of 'true believers' will be helpful in inducing any such reader to accept Dawkins' strongly argued thesis that both God and religion are nonsensical and harmful.

While I usually tend to begin a review with praise and end with reservations, the reverse order here reflects the progression of my own reading of *The God Delusion*. There are gems in the book, as one might expect from a writer as powerful as Dawkins, but most of them are in the second half of the volume. He ends the first half with what I found to be a less than compelling probabilistic argument against God. (Incidentally,

I couldn't help wondering, somewhat facetiously, when

Dawkins used an anthropic argument from cosmology to argue against God, that, although indeed only very rare universes may harbour life, if an infinite number of universes exist, could not at least one then harbour what might pass for a divine being?)

But after this Dawkins proceeds to brilliantly review the

roots of modern morality and the changing moral 'zeitgeist', as he calls it. With authority and wit, he marvelously dissects the absurdity, hypocrisy and selectivity that is inherent in so much of modern biblical morality. Perhaps there can be no higher praise than to say that I am certain I will remember

