



Q&A Michael Frayn

The playful dramatist

Author and playwright Michael Frayn explores the wellsprings of creativity through farce, philosophy and the history of science. His eclectic output ranges from non-fiction books such as *The Human Touch* (2006) to plays including *Noises Off* (1982) and *Copenhagen* (1998) — which explores the 1941 meeting between quantum physicists Niels Bohr and Werner Heisenberg, with Frayn imagining their discussions on the morality of working on nuclear weapons. With his latest novel, *Skios*, coming out next month, he talks about determinism and the paradox of existence.

What is *Skios* about?

It is a farce about an institute on a Greek island that has invited a lecturer to talk about the organization of science. The wrong lecturer shows up. I light-heartedly touch on determinism — the old question of whether human contributions to events are predetermined or whether they can't be understood in the context of causality. My view is the latter. There are two interesting things about farce. One is seeing human beings reduced to the level of machines, unable to control situations. The other is seeing people desperately thinking of ways to cope with difficult situations, inventing lies that they hope will get them out of the difficulties they're in, and of course making their difficulties worse.

Are you poking fun at the idea that human thought can be organized?

A tiny bit. People are endlessly surprised by the imagination. I'm struck by something that comes into *Copenhagen*: how physicists Otto Frisch and Rudolf Peierls came to understand how little fissile material you need to make a

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nuclear chain reaction. It was because they were messing around. Everyone assumed that you would need tonnes, and there wasn't a chance of producing enough. One of the pair realized that fission had been observed only with slow neutrons, but we might want a formula that covered neutrons of all speeds. And he worked one out. Then the other one said, supposing we did have as much fissile material as we wanted, how much would be needed? And he applied the formula and discovered that it would be a matter of kilograms. These researchers weren't addressing the specific problem of building a bomb — they were working off the tops of their heads.

Why did you start writing about science?

I studied philosophy at university, and couldn't help but come across scientific questions, particularly in connection with



Skios
MICHAEL FRAYN
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quantum mechanics. I had always had a faint idea of Heisenberg and Bohr's work, but never thought of writing about it until I read *Heisenberg's War* by Thomas Powers. Why did Heisenberg go to Copenhagen in 1941, and what were his motives in working on the German nuclear programme? Was he actually trying to build a bomb? Although there is obviously no parallel between this uncertainty and Heisenberg's uncertainty principle in quantum mechanics, there is a similar impossibility of ever reaching beyond a certain point. The result was *Copenhagen* — a play about epistemology that happens to be played out in terms of science.

Can drama teach science?

I don't think the theatre is a very good medium for explaining complex ideas. No one ignorant of nuclear physics would come out of *Copenhagen* thinking that they understood it.

In *The Human Touch*, you write about how the mind constrains our understanding of the world.

It is a paradox: we know perfectly well that we're irrelevant to the process of the ▶

A. DALLMAU/EPH/CORBIS

► Universe — but there is nothing we can say about the Universe except in terms of what we see and think. I'm not suggesting that we make it all up arbitrarily. We're constrained by something, but it is extremely difficult to say what it is.

Some scientists would argue with that.

I can see how resistant scientists are to that side of the paradox. I was invited to CERN near Geneva, Switzerland, to talk about *The Human Touch*, and it was really daunting. They had appointed a jury that asked detailed questions. One of the jury members said beforehand: "We're going to haul you over the coals." It seemed to me — although they were all very charming and friendly about it — that they were unreconstructed Platonists. They believed that numbers and the laws of science are objective entities, whereas I think that they are constructs that we place on the world to understand it.

As a non-scientist, are you confident in writing about science?

Fortunately, professional science writers and scientists have made enormous efforts to get through to lay audiences. But people like the physicist Richard Feynman insist that if you haven't got mathematics you're never really going to understand physics — it is like trying to explain music to the tone-deaf. I made a lot of mistakes writing *Copenhagen*, in spite of getting the text read. I got letters from scientists pointing out basic errors. But I was struck by their generous tone.

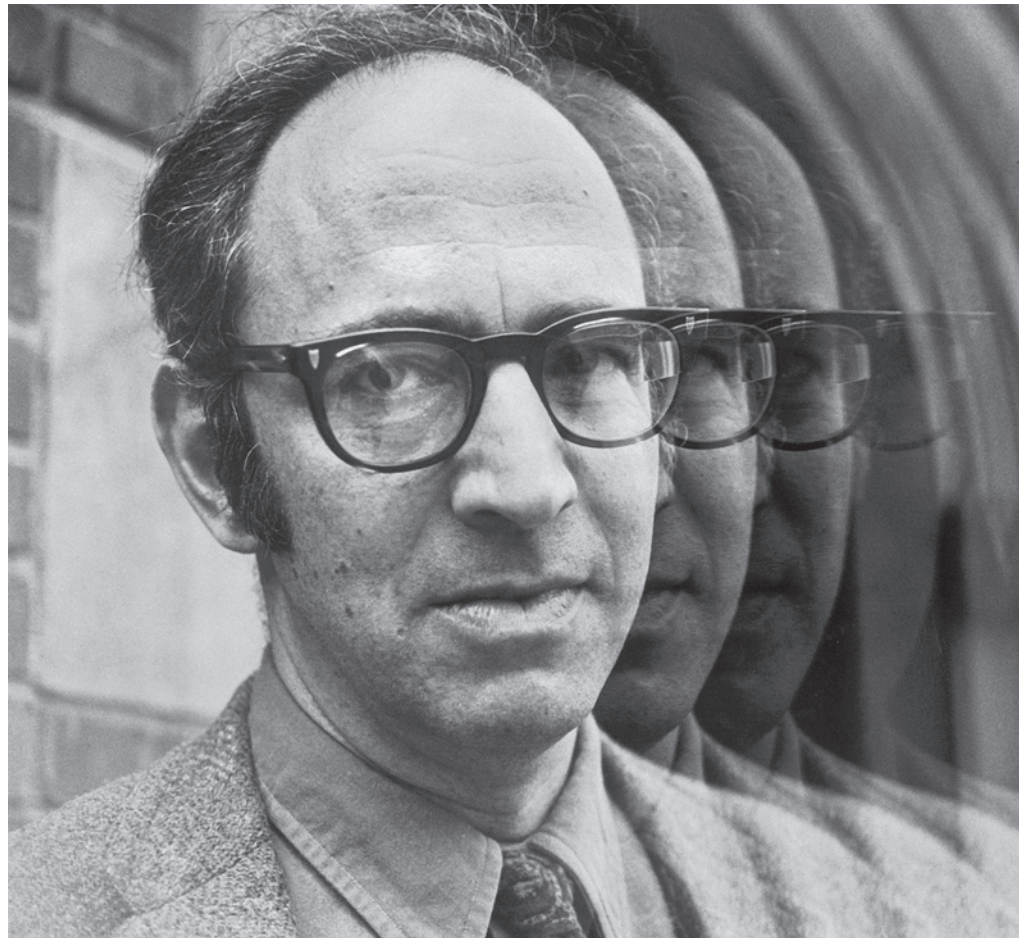
How do you approach writing?

As a writer, you can't think, "I'd like to write a play about stem-cell research and there will be these characters." It doesn't work like that: ideas just seem to fall into your head out of nowhere, and develop of their own accord. So there is resonance with the case of Peierls and Frisch, or the chemist August Kekulé dreaming about the structure of the benzene ring. There is an unconscious leap, a synthesis, that goes on, even though much science is about trying to find a specific answer to a specific problem.

So playwrights run experiments too?

Plays are called plays for a good reason. As a playwright, you are saying, what if we had enough uranium-235, or what if somebody discovered that their brother was their father, and you take over from these fictitious situations. It is messing around, but messing around often has serious results. ■

INTERVIEW BY RICHARD VAN NOORDEN



Thomas Kuhn recognized the importance of revolutionary changes, or 'paradigm shifts', in science.

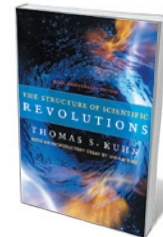
IN RETROSPECT

The Structure of Scientific Revolutions

David Kaiser marks the 50th anniversary of an exemplary account of the cycles of scientific progress.

Fifty years ago, a short book appeared under the intriguing title *The Structure of Scientific Revolutions*. Its author, Thomas Kuhn (1922–1996), had begun his academic life as a physicist but had migrated to the history and philosophy of science. His main argument in the book — his second work, following a study of the Copernican revolution in astronomy — was that scientific activity unfolds according to a repeating pattern, which we can discern by studying its history.

Kuhn was not at all confident about how *Structure* would be received. He had been



The Structure of Scientific Revolutions: 50th Anniversary Edition

THOMAS S. KUHN (WITH AN INTRODUCTION BY IAN HACKING)
Univ. Chicago Press: 2012.
264 pp. \$45, £29

B. PIERCE/TIME LIFE/GETTY

denied tenure at Harvard University in Cambridge, Massachusetts, a few years before, and he wrote to several correspondents after the book was published that he felt he had stuck his neck "very far out". Within months,