

## **Where Things Happen That Don't: Staging the Infinite**

**John D. Barrow**

When Dr Pino Donghi of the Sigma Tau Foundation in Rome asked me to create a script for a play involving scientific ideas I thought at first he was joking. I had organised and chaired a discussion about different ways of expressing science in the public domain as part of the Spoleto Arts Festival programme in 1999. That had brought me into contact with Sergio Escobar of the Teatro Piccolo in Milan and stimulated discussions between Pino Donghi and Luca Ronconi, one of Italy's most famous directors, who had just taken over as creative director at the Piccolo. Ronconi was anxious to explore the use of scientific ideas in the theatre in new ways and the Sigma Tau Foundation were enthusiastic to bring about new ways of presenting science to the public. Although there were several successful modern plays, like Michael Frayn's *Copenhagen* or Berthold Brecht's *Galileo*, which were superficially about science, that was not really the case: scientific ideas played no essential role. They were compelling psychologically driven dramas that fed on the lives of scientists.

I shared Ronconi's aims and wanted to do something other than create a human drama with developing psychology or be didactic in the 'science-in-fiction' mode used by other scientists who have written successfully for the theatre. Others were already filling that niche. This challenge was big enough on its own but I was also going to have to write in English; the results would be translated into Italian by Bruna Tortorella and performed by Italians for Italians. No place for an English comedy of manners.

'Infinity' is an almost unique abstract idea that made it immediately appealing subject matter. Despite its intersection with all manner of deep and paradoxical matters of mathematical, philosophical, and theological significance, it is strangely familiar to all. Everyone you might meet in the street or on a theatre seat would feel comfortable with the idea. It is the acceptable face of the unintelligible, made so by our religious traditions and penchant for exaggeration. Story-telling seemed to be the way to penetrate its paradoxes so that they became familiar by the device of immersing the audience into other realities where the counter-intuitive features of the infinite loomed as large as life. Most attempts to popularise scientific ideas in the Anglo-Saxon tradition do so by means of simple explanation liberally mixed with apposite analogy. The strategy for *Infinities* was quite different.

Luca Ronconi's genius was to create on stage the extraordinary scenarios that we had planned in a series of dynamic working sessions during the two years before the opening. This exploited the unique theatrical space available to the Teatro Piccolo at the Bovista in Milan. We created a play in five separate scenarios, each produced in its own distinctive space, each spectacularly realised by Ronconi, and each exploring a different aspect of infinity. The challenge set for the actors was immense but their brilliance succeeded in turning an experiment into an almost unmanageable success with unmeetable demand for tickets.

The first scenario that greets the audience is the towering set and vast expanse of the Hotel Infinity which, even when it is full still has room for infinitely more guests, creating innumerable problems for staff and guests.

The second scenario moves to a smaller more intimate space of a rest home for those doomed to live forever. It makes us think about living forever, exploring the social, religious and human implications of infinite life for everything from life insurance, how to set punishment for crime and recompense for negligence when an infinite future is taken away, and what to make of religions that promise everlasting life. There are the divisions of society into the manically active who seek to accomplish everything and those who see the future of unending tomorrows as a good reason to do nothing today. They are described by a word like *manāna* but which lacks the same sense of urgency. There are the perils of making a decision when you can get plied with advice from every past generation of your family. The action takes place mostly above the audience with old chrones conveyed in chairs on monorails.

The third scenario is a strange universe where nothing is original. No words are spoken for the first time; no idea is new; there is no originality and no motivation to create. It is set in a spectacular labyrinth of rows and columns surrounded by mirrors where identical actors speak the same words and make the same actions to explore the strange conclusion that in an infinite universe everything that can happen, will happen, infinitely often.

The fourth scenario focuses on Georg Cantor, the German mathematician who invented our modern concept of infinity. Set in a mysterious hospital it takes the form of a dialogue and psychoanalysis of Cantor in which he talks about strangeness of the different varieties of infinity that Galileo first sensed, and the hostility he faced from other mathematicians who wanted these dangerous concepts kept out of their subject.

The fifth scenario is about the paradoxes of time travel and of where the play came from in a world where the author might have learned of it in the past from someone who learned it from him today. Time has no end but is finite. The actors march in circles with everyone behind and in front of everyone else. We see why you cannot change the past, merely participate in it, and witness a self consistent sequence of events in circular time.

The production in Milan was large, involving a cast of 15 professional actors and about 50 drama students. The audience and the actors are entwined in new ways that play upon the never-ending quality of infinity. The audience is admitted in groups of 70 every 20 minutes to see the first scene. Then when they move on to the next scenario a new audience replaces them, until there are five separate parallel audiences and each of the five scenarios are playing simultaneously. Although tickets give the time for the start of the cycle you will see, any member of the audience can see the scenes in any order. But the real heroes are the actors who also permute around the scenarios to complete a logistical tour de force that results in different actors performing small changes to the action on every occasion that any scenario is performed. Nothing is ever twice the same. During the first Milan season of 2001 it was necessary to perform ten complete performances of the five scenarios each evening to try to meet the huge demand for tickets which sold out far in advance. Some scenes were shown on RAI television and broadcast on RAI radio. In December 2002 *Infinities* received the Premi Ubu for best play in the annual Italian Theatre Awards, and their most prestigious award. Its second run the following year attracted even larger audiences and was sold out two months before the first performance. It received the Italgas Prize for contributions to Italian scientific culture later that year. One scene was performed live at the awards ceremony in the Mole Antonelliana in Turin by Giovanni Battaglia. It was also produced in Spanish,

directed by Vicente Genovés, at the Nave de Sagunto in Valencia where it inaugurated the Ciutat de les Arts Esceniques of Valencia in May last year. The Spanish production was performed more conventionally, on a single stage, although it remained close in look and feel to the Milan production at Teatro Piccolo, which is closely linked to the Valencia theatre. A number of reviews, associated websites and pictures are available on the web<sup>1</sup>.

John D. Barrow FRS is Professor of Mathematical Sciences and Director of the Millennium Mathematics Project at the Centre for Mathematical Sciences, Cambridge University.

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<sup>1</sup> See in particular the website created for the production by the Teatro Piccolo at <http://www.piccoloteatro.org/infinities/intro.html>. Descriptive reviews of the play can be found at <http://physicsweb.org/articles/review/16/7/1> and by Marcus du Sautoy at <http://www.guardian.co.uk/arts/features/story/0,11710,1077719,00.html>. The most detailed description of the gestation of the production is by the Italian journalist Sylvie Coyaud in her article in Interdisciplinary Science Reviews 27 (3), 246-7 (Sept 2002). This can be read on the website by clicking on 'Reviews' at <http://www.ingentaconnect.com/content/maney/isr/2002/00000027/00000003>. Coyaud also coauthored a review with Roald Hoffman which appeared in the Science in Culture section of Nature 416, 585-6 (11 April 2002) which is available at <http://www.nature.com/nature/journal/v416/n6881/pdf/416585a.pdf>. Some further description is available in the author's book *The Infinite Book*, published by Jonathan Cape and Pantheon 2005.