

A strength of the book is Pigliucci's attempt to outline avenues for future research. Following a general introduction to phenotypic plasticity, he gives a broad overview of the recent contributions of genetics, molecular biology, developmental biology, ecology, behavioural biology, evolutionary biology and theory to a modern synthesis of phenotypic plasticity. He then emphasizes, using *Arabidopsis thaliana* as an example, how research on phenotypic plasticity can lead to insights into other fields of evolutionary biology. In the final chapter, he extends the scope of the book beyond 'nature and nurture' to socio-political aspects of the question of how genes and environment influence human intelligence.

Phenotypic plasticity has been a battlefield for many, sometimes semantic, controversies. Pigliucci gives a balanced presentation, separating his own from alternative opinions. Nevertheless, there remain many

anchor points for stimulating discussions. For example, he emphasizes that plasticity in morphology, physiology and behaviour share a general framework, but suggests that one should distinguish between these fields, because timing and mechanisms differ. An alternative view would be that it is exactly the interplay between these differences that creates a promising area of research.

The book demonstrates Pigliucci's unusually broad knowledge of the topic. However, it is impossible to cover all aspects of phenotypic plasticity within the publisher's page limits for a single book. Consequently, he deals with some topics only briefly. For example, the factors that favour the evolution of phenotypic plasticity (R. Tollrian and C. D. Harvell, *The Ecology and Evolution of Inducible Defenses*, Princeton University Press, 1999) would, in my opinion, have benefited from more space.

Although there is some overlap with

an earlier book on phenotypes by C. D. Schlichting and Pigliucci (*Phenotypic Evolution: A Reaction Norm Perspective*, Sinauer, 1998), *Phenotypic Plasticity* is the most comprehensive book on this topic. It provides both a solid basis for understanding the subject and an inspiring synthesis of the current state of the discipline, and so can be equally recommended for students starting their research, for experts in the field and for all scientists generally interested in phenotypic plasticity. Hardly anyone will read this book without gaining new insights or new inspirations. The book is a 'must read' in the fields of evolution and ecology, and as such is an ideal topic for seminars. I highly recommend it and look forward to the next volumes in Scheiner's series. ■

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Science in culture

Infinite ideas

A theatrical contemplation of infinity makes full use of industrial space.

Roald Hoffmann and Sylvie Coyaud

There's science in the theatre — Michael Frayn's *Copenhagen*, Peter Parnell's *Q.E.D.*, and *Oxygen* by Carl Djerassi and one of us. And now there is Luca Ronconi and John Barrow's *Infinities*. Italy's most innovative director has staged in Milan a remarkable teatro-architectonic meditation on, indeed, infinity.

Five pieces of text were written for the play by John Barrow, quoting Jorge Luis Borges, the physicist-novelist Alan Lightman and the mathematician Georg Cantor, among others. The texts are integrated by Ronconi's vision into a journey of engrossing variety. In Milan's industrial section, Bovisa, La Scala Opera company had refurbished some old buildings for its workshops. This is Ronconi's setting. Or better said, settings, for the audience moves from one space in the vast complex to another.

One begins in a bar atrium, rising eight floors: L'Albergo Infinito, or the Hilbert Hotel as mathematicians may know it, whose manager must accommodate an infinite number of guests. He rehearses different solutions and proves some theorems along the way. Next, in a windowless room, women young and old alternate between desire and dread of living forever. Elsewhere, the paradoxes of time travel are paraded around a large hangar, that has a train carriage suspended in mid-air at one end and crates of books at the other.

The actors pass through the audience, and in one effective scene, where Cantor's work and life is told, we sit at tables with students/actors from Milan Polytechnic University. Other actors walk on the tables, climb ladders, or speak



suspended upside-down from a conveyor belt. Their tight face masks, black and white costumes and moving platforms are all Ronconi's hallmark.

The most successful, indeed unforgettable, of the scenes accomplishes what we thought could not be done — it recreates on stage Borges' Library of Babel. A cavernous space, several stories high, is filled with cubicles and empty bookcases, two slanted mirrors stretching them effectively to infinity. Narrators appear on passages and bridges, making a connection not

only to Borges' dismal library, but also to Andrea Palladio's theatre at Vicenza.

The audience is admitted in groups of 60 to 80 every 15 minutes, and moves through the five sets in roughly two hours. Meanwhile the actors, a large cast, also rotate, adding to the sense of endless motion.

Do we learn any mathematics? Yes. Does it matter? Not at all. This is a theatre of space and time, and of ideas. It is abstract, for the dramatic moments come not in confrontation of human beings, in that silence between words and action where a gesture stretches time; rather, they come from the tug-of-war between hope and despair, or comic failure. To the mind bold enough to pursue it, we are shown, infinity promises unlimited freedom — and delivers madness.

The Piccolo Teatro production, sponsored by Fondazione Sigma Tau, ran for just three weeks in Milan, ending on 28 March. On 19 April it will inaugurate the "Ciutat de les Arts Escéniques", created by Spain's leading architect, Santiago Calatrava, in another former factory, the Nave de Sagunto in Valencia. Given the integration of theatre with setting, the play cannot be the same. One is curious to see how the Spanish director Vicente Genovés will translate Ronconi's vision into the soaring Nave, and whether the cast, coached by the Greek actress Irene Papas, will match the bravura of the Piccolo's performance. ■

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For details on the production, in Italian, see <http://www.piccoloteatro.org/infinities>