

ing “Yes!”, you might just stop there. If you wring your hands in despair at the impossibility of picking up the authors’ gauntlet, read on and be frustrated, as I was. Be also sore afraid: for someone, somewhere, sometime will make mischief for you with the title.

Today, eight years on from the Dutch “futures” scandal, no one makes more strenuous efforts than does the Netherlands’ RIVM to accommodate and cope with the uncertainties of environmental data and models, hence to achieve the greatest possible quality in generating environmental foresight. They had laid the foundations for so doing long before the scandal broke.

References

1. J. P. van der Sluijs, *Futures* 34, 133 (2002).
2. L. J. Konikow, J. Bredehoeft, *Adv. Water Resour.* 15, 75 (1992).
3. M. Crichton, *State of Fear* (HarperCollins, New York, 2004).
4. M. B. Beck, Ed., *Environmental Foresight and Models: A Manifesto* (Elsevier, Oxford, 2002).

10.1126/science.1140778

DANCE

From the Big Bang to the Mind

In a Barcelona theater a few weeks ago, I watched a man and his brain dance simultaneously. Across a big empty stage, the man glided between quadrants defined by a set of glowing crosshairs. Meanwhile, projected onto the wall behind him was an enormous image of a brain, a top-down cutaway view divided by similar crosshairs. Each time the man drifted to a new place on the grid, a splatter of red splotches danced across the brain into a new pattern.

The man was Cesc Gelabert, one of Spain’s most celebrated choreographers. The scene was the signature solo performance within a dance called Orion, which he created for the Barcelona festival of science. The brain was indeed Gelabert’s, and it was intimately observed by Óscar Vilarroya, a neuroscientist at the Autonomous University of Barcelona, using functional magnetic resonance imaging (fMRI). Long before the performance, Vilarroya loaded Gelabert into an fMRI magnet and played a recording of the accompanying music. The device tracked the evolving pattern of oxygen consumption by Gelabert’s hungry brain cells as

he imagined himself going through the motions—and emotions—of his dance.

This collaboration between artist and scientist is a long-standing one. About once a week for more than a year, Gelabert and Vilarroya met for an ongoing conversation. The seed of inspiration was the fact that conscious experience emerges—somehow, astoundingly—from 1.5 kilograms of wet flesh. From that starting point, they rode the reductionist roller-coaster backward in time: If the mind comes from the brain, where does the brain come from? If the brain is the result of a genetic blueprint for wiring up neurons, then where did the neurons and the blueprint come from?

For most of us, the conversation ends when someone notices the light of dawn and sighs, but Gelabert and Vilarroya never dropped the thread. Their discussion of evolutionary biology led to DNA, and thence to chemical evolution on the early Earth. And they kept right on going: from the cooling of our planet to the formation of our Sun; from the aggregation of galaxies to the first atoms, the fundamental particles, cosmic inflation, and finally, of course, the big bang. It is a measure of Gelabert’s insatiable curiosity and ambition that he set out to tell the story of this conversation in reverse, in its entirety, through dance.

The performance begins gorgeously. Lights up on seven dancers. As a solo harpsichord arpeggiates out the prelude to Handel’s Suite Number Three, the dancers create a zoo of pairwise interactions, encapsulating the behaviors of the fundamental particles. (Don’t ask which specific particles are represented by that resounding slap to the buttock of a stony-faced woman—we’re not meant to.) With the rules of play suggested, the lights go suddenly dim and bloody as the theater’s ably-equipped sound system produces what can only be described as an underground nuclear test played in ultra-slow

motion. What makes the ensuing scene work is that we’re not allowed to catch our breath. As the dancers bring the rapidly evolving universe into being, they seem to say: “There’s too much to tell, so just watch!” The effect is enhanced by a series of minimalist animations, designed by the Spanish filmmaker Paco Periñán, that provide myopic snatches of the sort of trajectory data produced by particle collisions.



From here, we dance through the history of the universe along a logarithmic scale. By the time we reach the midpoint, we’ve already seen inflation, solar systems, complex molecules, cells, and multicellular organisms, and judging by the sound of bird song in the distance, we’re past the Cretaceous by the intermission. The final act is devoted to the past few million years of human evolution, both anatomical and cognitive.

Gelabert is at his best when he keeps the concept abstract, allowing us to focus on the performance. At times he beats us over the head with literalism: During a footrace between knuckle-walking dancers, the losers curl up and play “extinct” while the survivors gradually stand erect. (And just in case you haven’t gotten it, Periñán’s increasingly distracting projections include pictures of primates, rock art, early weapons, and so forth.) Another source of frustration is that Gelabert never settles on a consistent mode of expression. What begins as dance eventually slides into mime and clowning, such as the delightful conga line of DNA dancers who replicate a series of gestures as mutation sets in. By the end, Gelabert has abandoned dance and relies on props: A woman peels herself out of a full-body condom and collapses in a melodramatic ending that is pure performance art.

These gripes aside, my main complaint about Orion is that it offers too much of a good thing. The dance is divided into thirds: “matter, life, the human being.” Once expanded, each of these sections could have formed a successful composition on its own. Gelabert’s aim was to capture the thrill and mystery of the scientific worldview. Although the overall effect left me wanting less, not more, he does pull it off in many shining moments.

—JOHN BOHANNON

10.1126/science.1141808

Orion

by Cesc Gelabert and
the Gelabert-Azzopardi
Dance Company

Teatre Lliure, Barcelona,
Spain. 22 February –
4 March 2007.
www.gelabertazzopardi.com/pagines/english/orion.htm