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Searching for resonance: scientific patterns in Complicite’s *Mnemonic* and *A Disappearing Number*

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After the international success of *Mnemonic*, Complicite have once again brought science and drama together in a new theatre piece, *A Disappearing Number*. Both plays place scientists in the limelight, though their ‘scientific’ content is very different: *Mnemonic* was based on the discovery of a Neolithic man in the Alps, and used neurology and archeology to explore notions of memory and history; *A Disappearing Number* focuses on our fascination with infinity, and dramatises the ‘mysterious and romantic mathematical collaboration’ between G. H. Hardy and Srinivasa Ramanujan. The two pieces are, however, remarkably similar in plot and structure, and in their common exploration of the metaphorical and theatrical potential of scientific discourse. Moreover, they both use science as a narrative tool to explore our relation to time and mortality. This review presents them in parallel and examines the particular integration of ideas and aesthetics which characterises Complicite’s work: a tireless search for connections, and a constant translation of ideas between different theatrical languages, be they verbal, visual or musical.

MNEMONIC: STAGING THE LABORATORY OF MEMORY

Mnemonic is a play about memory, ‘[h]ow we remember, why we remember, what we remember’.¹ The show was first created in 1999 for the Salzburg festival, and later revived in 2002/3. Like most of Complicite’s work, it is a devised piece: the general conception came from the company’s director, Simon McBurney, but the whole team contributed to the performance text and the play then continued to evolve through the run. McBurney describes this collaborative process as a series of ‘collisions’:

This show is being made through extraordinary and intricate collisions. Collisions between the actors who have used material from their own lives and integrated it with the show. A collision with the words of John Berger, Konrad Spindler (who wrote *The Man in the Ice*), Anaïs Nin, Hans Magnus Enzensberger and Benoit Mandelbrot (the inventor of Fractal Geometry). ... Like all Theatre de Complicite shows this is a new departure. We are searching for another form to tell our stories.²

As a result, *Mnemonic* is composed of many different narrative threads which echo each other throughout the show. But two main storylines stand out, and both are enquiries into the past. The first is an archaeological investigation inspired by *The Man in the Ice*, the story of a Neolithic body which was discovered in the Alps in 1991. Scenes from this archaeological enquiry alternate with fragments from the journey of a young woman called Alice, who travels through Europe after her mother’s death to find her unknown father. While the archaeological team gradually constructs a story of violence and flight around the Iceman’s body, Alice travels through Germany, Poland, Latvia, Switzerland and Italy, and encounters

many emigrants and refugees who tell more recent stories of exile. The two main stories are thus linked by images of displacement and by the characters' attempts to find a connection between the present and the past – themes which have been a central preoccupation in *Complicite's* shows since the company was first founded. Theatrically, the two plots are linked by Alice's former companion, Virgil, who listens to her adventures on the phone but also becomes fascinated by the Iceman's story and watches, narrates, and occasionally enacts it for the audience.

How do we construct our representations of the past? *Mnemonic* answers this question by referring to biochemistry and neurology, and by progressively linking the act of individual memory to the construction of collective history. In an opening prologue, McBurney addresses the audience with a short scientific lecture. 'Modern theories of memory', he points out, 'revolve around the idea of fragmentation ... And it is not so much the cells that are important in the act of memory, but the connections between the cells, the synapses, the synaptic connections.'³ This idea is then reflected and repeated throughout the show, since 'fragmentation' is precisely the form that the rest of the play will take: short scenes follow each other in rapid succession, and connections gradually arise from their juxtaposition. With only a minimalist set – a bed, a table, chairs – *Mnemonic* does not follow a linear timeline but moves seamlessly between different times and places. Many of the scenes are in fact contained within Virgil and Alice's memories, while others become memories, repeated in voice-overs and replays through the show. The repetition and fragmentation of individual memory is thus vividly conveyed by the dramatic structure: like many other contemporary creations, *Mnemonic* uses scientific theory as a structuring metaphor as well as a theme.⁴ At times the science is explained in detail, as in the opening lecture; at others it is merely referred to in passing, for example when Virgil borrows terminology from chaos theory to describe Alice's behaviour:

Virgil ... And I suddenly realized what's happening to her ... What's going on is that she's feeding back on herself. It's feedback, turbulence. Her internal state is like the weather.⁵

Here too the scientific idea is echoed by the aesthetics of the show, since each time one of Virgil or Alice's memories is repeated it is fed back into the general structure. Fragments of these individual memories are integrated into the following scenes, and they become a part of the collective history constructed by the archeologists around the body of the Iceman. *Mnemonic* thus thoroughly integrates its scientific material, using it on both epistemological and metaphorical levels.

The theatre and the laboratory are both spaces of observation, and *Complicite* highlights this connection in a series of scenes in which 'archaeologists' and 'scientists' examine the Iceman and his belongings in a forensic laboratory. In these scenes the spectator is placed in a similar position to the scientists, and the stage becomes a space of clinical observation. Science is no longer a source of concepts and images, but a discursive stance characterised by an objective, transparent language. The scientists give paratactic descriptions condensed in short, nominal sentences: 'A broken stick. Splinter of wood. Strips of leather. Scraps of hide. Fur. Tufts of twisted grass ...'.⁶ Their gaze anatomises the body, breaking it down into fragments of skin, teeth and bones, and detailing the Iceman's wounds. In contrast to Virgil, who constantly tries to imagine the Iceman's experience, the scientists seem to be applying the ideal of medical discourse which Michel Foucault describes in *The Birth of the Clinic*: a totally transparent and objective language, 'the great myth of a pure Gaze which would be pure

Language: a speaking Eye'.⁷

But *Mnemonic* also plays the theatrical gaze and the scientific gaze against each other, undermining the objectivity of the laboratory by pointing out its theatricality. The scientists' objective discourse is gradually destabilised by the presence of Virgil, who sometimes observes the Iceman with the others, and sometimes takes the Iceman's place, becoming the body under scrutiny. These inversions confuse the distinction between the subject and the object of observation, and accordingly threaten the safety and neutrality of the scientific observer/spectator. Moreover, the apparent objectivity of the process is contradicted by the variety of different interpretations which result from the autopsy, when at the end of the play delegates from different countries are brought together for 'the third international conference on the Iceman': each researcher proposes a completely different account of the Iceman's presence on the mountain, based on the same evidence. Thus, as Helen Freshwater has pointed out, "[t]he performance refuses any form of neat narrative closure".⁸ This highly comical scene highlights the fundamental uncertainty and subjectivity of such an enterprise, suggesting that observation cannot be anything else than subjective, and should in fact be grounded in empathy. This idea is confirmed by a beautifully choreographed movement in the final moments of the play, when 'one by one the members of the cast follow each other in lying in the place of the Iceman': in this final image, the subject and object of observation become indistinguishable.⁹

A DISAPPEARING NUMBER: MATHEMATICS AS A 'CREATIVE ART'

A Disappearing Number was devised in 2007, with a different cast from *Mnemonic* but the same director, the same team for sound, lighting and design, and with the collaboration of a composer, Nitin Sawhney.¹⁰ The show was inspired by the relationship between the English mathematician G. H. Hardy and his Indian protégé, Srinivasa Ramanujan. *A Disappearing Number* follows their lives from their first encounter in Cambridge in 1913 to Ramanujan's early disappearance in 1920, and the story of their collaboration is woven into an exploration of mathematical beauty and of humanity's 'relentless compulsion to understand'.

The structure of *A Disappearing Number* is remarkably similar to that of *Mnemonic*. It also starts with a lecture – a comical double act in which Ruth, a nervous university lecturer, covers a blackboard with an infinite series, while in the foreground Simon McBurney mocks her seriousness and addresses the audience with much simpler remarks involving oranges and pineapples. This double prologue allows him to dispel the audience's fear of being lectured, but he also uses it to highlight some basic similarities between mathematics and theatre, in particular the fact that they both rely on abstraction and imagination. The show then unfolds into a series of parallel stories, and different centuries overlap on stage. Episodes from Ramanujan and Hardy's collaboration between 1913 and 1919 alternate with contemporary scenes in which a widower, Alex, mourns the loss of his wife, Ruth, and tries to understand her fascination for Ramanujan's work. Mathematical scenes, in which Hardy, Ramanujan or Ruth explore infinite series and the partition function, overlap with Alex's musings on creativity and his reading of passages from Hardy's *A Mathematician's Apology*. Alex's reflections thus provide a form of commentary for the mathematics, punctuating them with considerations on the nature of creative thought.

Hardy wrote *A Mathematician's Apology* towards the end of his life, with the intention of setting out a 'rational defence' of mathematical research. His argument does not rely on the practical applications of mathematics, but on their intrinsic aesthetic value. 'A mathematician', according to Hardy, 'like a painter or a poet, is a maker of patterns' ... 'Beauty is the first test: there is no permanent place in the world for ugly mathematics.' He

thus draws a strong parallel between mathematics and other creative processes, arguing that real mathematics ‘must be justified as art if it can be justified at all’.¹¹ One can easily see why this text would appeal to a theatre practitioner, and there is another aspect of Hardy’s life which is particularly resonant with *Complicite*’s style of theatre: his most important work was done in collaboration with other mathematicians, J. E. Littlewood and Ramanujan. For Hardy, mathematics was not only a creative art, it was also a collaborative one.

So the mathematical creativity represented in *A Disappearing Number* contains two very different models: on the one hand the solitary genius embodied by Ramanujan, a deeply religious man who had almost no formal training in mathematics and whose ‘wild theorems’ fascinated his fellow mathematicians; on the other, the collaborative work and rigorous proof favoured by Hardy. The play constantly underlines the contrast between the two mathematicians. While Hardy is shown living the well-ordered life of a Cambridge don, working in the mornings, playing tennis in the afternoons, and covering neat sheets of paper with equations in his college surroundings, Ramanujan’s wild creativity is conveyed through tabla music and dance movements, and his character is sometimes divided into two actors, one of whom writes down equations while the other dances out the thought process. The choice of tabla (Indian drums) for Nitin Sawhney’s score also integrates the idea of mathematical creativity into the music, since the patterns of tabla music are themselves mathematical and involve precise calculations. In fact, numbers seem to surround the characters in all possible ways: in the music; in frequent projections of equations and mathematical symbols onto surrounding screens and onto the actors; and in the stories themselves, which combine the most sophisticated use of numbers with the most mundane. Perhaps the most comical one is provided by Alex’s increasingly desperate attempts to change the name associated with his telephone number, in a series of lengthy telephone calls to a BT employee in India.

The passing of time is a central concern in *A Disappearing Number*, as it was in *Mnemonic*, and here too the scientific content of the show is used to conceptualise our relation to time. The reality of death and loss frequently intrudes into the characters’ abstract considerations of infinity. Four different deaths echo each other throughout the show: Hardy’s, Ramanujan’s, Ruth’s while she was travelling round India, and the earlier stillbirth of Alex and Ruth’s child. These images of mortality provide a cruel counterpoint to Ruth and Ramanujan’s work on infinity and to Hardy’s musings on intellectual permanence. But the play also suggests that mathematics can become a source of patterns with which we can relate to time and to the absent. Alex, whose family name is Chronos, gradually comes to terms with his wife’s death by exploring the mathematical ideas she used to work on: he undertakes a journey, both literally and metaphorically, into the world that Ruth inhabited. His travels take him to India, but also to the other reality of numbers and equations: the leap into mathematics, the show suggests, is in itself a ‘going elsewhere’. And as we travel further into mathematical reality, it provides patterns, metaphorical structures for the human relationships in the show. Convergent infinite series (such as $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots = 2$) become a metaphor for the impossible union of human beings – as McBurney describes it, the science is ‘anthropomorphised’ and becomes ‘the mathematics of love, or the mathematics of the relationship between men and women’.¹²

As for the partition function developed by Ramanujan, it is echoed by many images of division. Partition concerns the number of ways a whole number can be divided into whole number parts, and this idea seems to provide the main aesthetic principle of the show, since the stage is divided by multiple screens which frequently shift up and down and revolve around the characters. It is also a strong metaphor in the play, highlighting the cultural clashes and separations endured by the characters. Ramanujan is parted from his country, Alex is separated from Ruth, and throughout the show many images of contemporary life in

airports and hotels emphasise the isolation and loneliness of modern society. The scenography underlines these cultural and physical divisions by isolating characters in different areas of the stage, cutting them off from one another by screens and lighting effects. Numbers, it seems, are a metaphor for both the loneliness and the chance connections of contemporary life. But they are also a source of patterns, and this theatre, following Hardy's vision of creative art, is simply searching for patterns with which to understand the isolation it portrays.

THEATRICAL TRANSLATIONS

Comparing *Mnemonic* and *A Disappearing Number* reveals striking similarities, but it also shows that Complicite's interest in science has evolved. In their most recent production science is not only a source of concepts and metaphors, it is also a creative adventure which the company sets out to explore, a form of travel which echoes the many other journeys contained in the play. Science is thus considered as a *process* rather than the finished product of research, and this point of view is particularly resonant in a style of theatre which is itself a constant work in progress.

The movement of travel is in many ways the key element of Complicite's creations. Not only do their pieces consistently explore themes of exile and displacement, they also turn travel and translation into a basic aesthetic principle, insofar as the ideas of the show are ceaselessly translated from one medium into another. Initial ideas such as fragmentation or partition are repeated and transformed in the dialogue, but also in the physical language of the actors, in the visual text of objects and projections, and even in the music of the performance. Each show is a multilayered piece in which different languages coexist, producing effects of resonance and dissonance. Video and audio recordings, for instance, are central to both shows and often echo other elements of the performance: a striking example of this resonance can be found in *A Disappearing Number*, when numbers are projected around dancing actors accompanied by tabla music. But they can also work against the physical and verbal texts of the play, creating effects of discontinuity within the show.¹³ These gaps between different layers of the performance text are a fundamental aspect of Complicite's work, because they produce a space in which the audience must provide the necessary links. As McBurney pointed out when he described the act of memory, 'these connections are being made and remade. Constantly.'¹⁴

This multilayered performance text distinguishes Complicite's theatre from the more traditional science plays of contemporary writers such as Tom Stoppard or Michael Frayn. As Kirsten Shepherd-Barr has pointed out, *Mnemonic*'s metaphorical use of science is similar to *Arcadia*'s, and Complicite's concern with 'the unrecoverability of the past' is very close to Stoppard's.¹⁵ But whereas in *Arcadia* or *Copenhagen* each dimension of the performance text corresponds to all the others, Complicite is constantly testing its ideas on every level and making us conscious of the coexistence of different languages on stage. Kirsten Shepherd-Barr has compared this increased theatricality and density of signs to the work of directors Luca Ronconi (*Infinites*, *Biblioetica*) and Jean-François Peyret (*Les Variations Darwin*, *Le Cas de Sophie K.*) – theatrical experiments which can be described as "postdramatic".¹⁶ Indeed Complicite's work shares many features with Hans-Thies Lehmann's definition of the postdramatic: it is 'more presence than representation, more shared than communicated experience, more process than product'. But unlike postdramatic theatre, which no longer relies on a central plot and avoids 'a narrative, fabulating description of the world by means of mimesis',¹⁷ Complicite's creations clearly centre on storytelling, and their structure revolves around main characters and strong narrative lines. In *Mnemonic* and *A Disappearing Number*, science is a source both of stories and of the forms with which to tell these stories. It

even seems that the company is attracted to scientific theories, from neurological images of fragmentation to the endless divisions of number theory, first and foremost because of their narrative potential. And so Complicite's work is neither conventionally dramatic nor entirely postdramatic, and this is where their originality lies: in the combination of a strong focus on storytelling with a style of theatre which clearly departs from traditional forms, and always emphasises the multilingualism of the stage.

NOTES

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- ¹. Complicite: *Mnemonic*, p. 3; 1999, London, Methuen.
 - ². S. McBurney: 'Collisions', in Complicite: *Mnemonic* (see Note 1).
 - ³. Complicite: *Mnemonic*, p. 3 (see Note 1).
 - ⁴. For an in-depth analysis of this trend, see K. Shepherd-Barr: *Science on Stage: From Doctor Faustus to Copenhagen*; 2006, Princeton, NJ, Princeton University Press.
 - ⁵. Complicite: *Mnemonic*, pp. 14–15 (see Note 1).
 - ⁶. Complicite: *Mnemonic*, p. 37 (see Note 1).
 - ⁷. '... le grand mythe d'un pur Regard qui serait pur Langage: Œil qui parlerait'; see M. Foucault: *Naissance de la clinique. Une archéologie du regard médical*, pp. 115–116; 1963, Paris, Presses Universitaires de France.
 - ⁸. H. Freshwater: 'The Ethics of Indeterminacy: Theatre de Complicite's 'Mnemonic'', *New Theatre Quarterly* 67, August 2001, 217–218.
 - ⁹. Complicite: *Mnemonic*, p. 72 (see Note 1). Further discussion of this physicality can be found in K. Shepherd-Barr: *Science on Stage*, chapter 6 and conclusion (see Note 4).
 - ¹⁰. Performance of *A Disappearing Number* seen by the author at the Warwick Arts Centre, Warwick, UK on 28 April 2007.
 - ¹¹. G. H. Hardy: *A Mathematician's Apology*, pp. 65, 84–85, 139; 2006, Cambridge, Cambridge University Press (first published 1940).
 - ¹². Simon McBurney in an interview with S. Hemming, 'The longest divisions', *Financial Times*, 28 July 2007.
 - ¹³. In his notes on *Mnemonic*, assistant director Stephen Canny points out that '[f]rom the earliest rehearsals it became apparent that the contrast between the spoken word and the visual image would be vital' (*Mnemonic: A Work in Progress*; 1999, London, Theatre de Complicite). Simon McBurney makes similar comments about *A Disappearing Number* in an interview posted on Complicite's website, www.complicite.org.
 - ¹⁴. Complicite: *Mnemonic*, p. 3 (see Note 1).
 - ¹⁵. K. Shepherd-Barr: *Science on Stage*, p. 147 (see Note 4).
 - ¹⁶. See K. Shepherd-Barr: *Science on Stage*, conclusion (see Note 4), and L. Campos and K. Shepherd-Barr: 'Science and theatre in open dialogue: *Biblioetica*, *Le Cas de Sophie K.* and the postdramatic science play', *Interdisciplinary Science Reviews*, 2006, **31**, 245–253.
 - ¹⁷. H.-T. Lehmann: *Postdramatic Theatre*, (trans. K. Jürs-Munby), pp. 85, 69; 2006, Abingdon/New York, NY, Routledge.