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The longest divisions

By Sarah Hemming

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One morning in 1913 the Cambridge mathematician G.H. Hardy opened an unexpected letter from India. It was crammed with wild mathematical theorems. Hardy at first dismissed it as the work of a crank, but that evening he examined the letter more closely. As he did so, he realised that he was looking into a great mathematical mind. Hardy later described his encounter with the Indian genius Srinivasa Ramanujan, as "the one romantic incident" in his life.

The collaboration between these two brilliant individuals now forms the kernel of a new show from the groundbreaking theatre director Simon McBurney. "They were utterly different," says McBurney. "But they had this extraordinary common language. Hardy was probably the only man in the world who could appreciate Ramanujan's mathematics: he could see that this was the real thing."

It's a compelling story: that of the precise, highly educated Hardy and the intuitive, scarcely tutored Ramanujan. It could, as McBurney suggests, make a satisfying Merchant-Ivory-style movie, shot in Cambridge and India amid a wealth of period detail. But that is not McBurney's style. Instead *A Disappearing Number* (which opens in London in September) is a multi-layered piece that makes the beauty of mathematics its structure, as well as its subject.

"The form of the show is based on the very simple idea of different times co-existing simultaneously," says McBurney, managing to make it sound as if that is indeed a very simple idea.

McBurney and his company, Complicite, have never been afraid of the cerebral high ground. Having first made an impact with astutely observed physical comedies, the company rose to fame during the 1990s by matching physical brio to intellectual daring. McBurney – actor, writer and artistic director of Complicite – has introduced British audiences to surrealist work by Bruno Schulz, Daniil Kharms and, most recently, Haruki Murakami (with *The Elephant Vanishes*). The company's astonishing physical eloquence means that audiences follow readily, even into subjects as challenging as, in the 1999 show *Mnemonic*, the biochemistry of memory.

Now McBurney, aged 49, has embarked on perhaps his most daunting task yet: to give physical expression to the abstract world of maths: "There is definitely what I would call a numinous aspect to mathematics," he admits, "because there is a whole world – a mathematical reality – that you can dive into as a way of escaping this one. I'm very heavily rooted in the world of the body, of the physical, and everything I see outside of me. I love being here and now. So I automatically assume I'm incredibly stupid about mathematics. To take apart your prejudices is important.

"We are all constantly doing mathematics," he adds. "And it doesn't have to be complex. I can say to you: '*Don't* think about taking four away from 10; *don't* think about the number'. Six pops into your mind and you can't stop it."

That ability to engage his audience's imagination has been at the heart of McBurney's practice. He has said that "the space of theatre is in the minds of the audience". He starts from the principle that, with a simple gesture, an actor can draw the extraordinary out of the ordinary, and that the audience will follow. This has produced moments of sheer magic on stage: moments when objects have come alive, or people have suddenly become part of the furniture. Perhaps the most moving example was in *Mnemonic*, which was inspired by the discovery of a 5,000-year-old corpse in an alpine glacier. The actors recreated the ice-man's lonely death by using a broken chair, which they walked along like a puppet – thus making every audience member work to visualise the man and so empathise with him more acutely.

But to animate the higher reaches of mathematics is a tough challenge. In his book *A Mathematician's Apology*, G.H. Hardy talks about the beauty of pure maths. I ask McBurney whether most of us really stand any chance of understanding the sort of beauty that Hardy and Ramanujan could appreciate.

"I think we can," says McBurney, and he draws a pen and paper across the table. "Here is what I consider to be a beautiful idea. When Ramanujan was about six, one of his teachers explained division: that if you have 43 fishes and 43 girls and you give a fish to each girl, everyone will have one. Ramanujan said, 'Is that true? Do all numbers go into themselves one time?' The teacher said, 'Yes.' And Ramanujan said, 'So if I have no children and no fishes, will the answer still be one?' Thereby touching on the problem: what is zero divided by zero? Is it one? Because theoretically zero is a number and zero goes into zero one time. Or does zero divided by zero give zero, which seems logical to us? Or is zero divided by zero infinity? That's a beautiful idea, I think. And anyone can understand it, provided you understand the idea of division. We tend to think of mathematics as entirely logical, but what is marvellous is that there is so much uncertainty."

"For a non-mathematician," he adds, "even if you can't appreciate entirely the mathematical pattern, you can see it. Just as I can't play a Beethoven piano concerto, but I can appreciate it. Of course music is slightly easier, but then in medieval times, people thought of music as arithmetic you could hear."

We embark on a mini maths seminar, with McBurney writing busily at the kitchen table. He sits, barefoot and tousle-haired, intent on explanation. We are in his new London apartment: a tranquil open-plan space with floor-to-ceiling bookshelves. He had to move house, he says: he was growing into his old flat "like ivy" and the books were taking over. This apartment has a wonderful little roof garden, with views as far as Hampstead Heath on one side and the North Downs on the other. It is also, very satisfyingly for the purposes of this interview, a former piano factory: a place where mathematical precision was used for aesthetic pleasure.

McBurney talks more about the concept of beauty in maths: what is key, he says, is that many great mathematicians "are principally interested in patterns, in the same way that a poet or musician is." But a poem or piece of music can move as well as please us. Can mathematics stimulate feeling, as well as intellectual satisfaction? McBurney argues that it can:

"Hardy says that all of us get a 'kick' out of intellectual activity. That's why people do crosswords or sudoku or study philosophy. And Hardy's point is that nothing gives you an intellectual kick on the same scale as mathematics. Essentially what he is talking about is a buzz – and what is a buzz? A buzz is an emotional response."

McBurney adds that he can find a moving dimension to a mathematical idea. He points to the sequence $1 + \frac{1}{2} + \frac{1}{4} + 1/8 + 1/16 + 1/32 + 1/64 \ldots$ "That is an infinite series that

eventually arrives at 2, but only in infinity. It gets closer and closer and closer but never quite meets. I tend to anthropomorphise it (Hardy would disapprove of me enormously). I see it as the mathematics of love, or the mathematics of the relationship between men and women. Because they can get closer and closer and closer, but they can't actually be each other. There will always be some separation."

Complicite's work has often touched on the loneliness of the human being. But drama, in which audience and cast conspire together to create a character, can both acknowledge and defy that loneliness.

In *Mnemonic*, that imaginative act temporarily connected us to a long-lost fellow creature. McBurney seems to have a keen sense of kinship with those who lived before us (his father was a professor of archaeology, which may have kindled this awareness). Maths perhaps offers another way of articulating that sense of continuity with the past.

"I'm interested in the past and in the absent: the dead," McBurney admits. "One of the fascinating things about mathematics is that it describes ideas, it describes the invisible. How do you describe the space of somebody not being there? It's very difficult. But you can have negative numbers."

One conundrum posed by pure maths is whether the mathematical reality that it describes exists outside of human consciousness or is a product of it. Both Hardy and Ramanujan believed that mathematical truths were there to be discovered. Indeed, Ramanujan has been quoted as saying that "an equation for me has no meaning unless it expresses a thought of God". McBurney points out that it is easy to oversimplify that remark: that Ramanujan grew up in a culture in which "mathematics played an integral and absolutely organic part" and in which the mathematical and the metaphysical were entwined.

With its partly Indian cast and interlocking stories, *A Disappearing Number* sets up a dialogue with that culture and explores what it means to be Indian now. And in the end, says McBurney, he too is making a pattern in the show: "A pattern that pleases me," he adds. "Like a mathematician."

'A Disappearing Number' runs at the Barbican Centre, London, September 5 to October 6, tel: 0845 120 7550; www.barbican.org.uk

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