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Interview Simon Singh

It would be great if politicians understood what science is

Simon Singh is a British science writer and author of the bestseller *Fermat's Last Theorem*. Julia Kuhn and Sonja Cox met him in May at the Amsterdam Science Park, where he had just presented his book *The Simpsons and Their Mathematical Secrets*.

When Simon Singh proposed the idea of a book about The Simpsons and mathematics, the response was one of shock and surprise. However, as Singh explains, many of the writers of the popular TV show are deeply fond of mathematics, some have advanced maths degrees. To keep themselves entertained, they hide references to mathematics in The Simpsons episodes to see whether their audience would pick up on them.

Evidently, Singh was one of those viewers who did. He draws our attention to many little hints to mathematical formulas that my colleague and I had missed in spite of being mathematicians and having watched a non-negligible number of Simpsons episodes. In his book, Singh uses these references to take his reader on a fun and informative journey from Euler's equation via perfect numbers to the unsolved problem of P versus NP and many other topics from number theory and other areas of maths. My personal favourite are the 'tests' he provides at the end of each chapter: a series of mathematical jokes that the reader can use to test her understanding of the subject that has been explained in the chapter. For each joke she can laugh about, she may give herself a point. If you know who Mandelbrot is, here is one for you:

Question: What does the B stand for in Benoit B Mandelbrot?
Answer: Benoit B Mandelbrot.

Singh hopes that due to the connection to the famous TV show, his book is able to draw some young readers towards maths that have not discovered their passion for it yet. On his website (simonsingh.net), he provides powerpoint slides for maths teachers who may wish to use them in class.


Simon Singh

Indeed, it is easy to imagine how the book could be used as an inspiration to design an entertaining maths lecture. And it is a book Singh must certainly have enjoyed writing: "My wife was also writing a book at the same time, spending hours and hours each day at the library doing her research. When she came home in the evening, I'd still be doing my research lying on the couch watching The Simpsons."

Singh seems to enjoy telling such little anecdotes. Interviewing him is easy; it is evident that he is a great communicator. After having completed a PhD in particle physics, he decided he would use that communication skill for the promotion of science and took on a job at the BBC science department.

During his time at the British broadcaster, Singh directed the emotionally capturing documentary *Fermat's Last Theorem*, which won a BAFTA award for Best Documentary in 1997. But Singh saw more to the story: "A picture is worth a thousand words as we know, but still, there was just so much that we had to leave out. This was the last thing I did for the BBC. I could have done this job forever,

but I was interested in trying something else."

He decided to write a book about the subject. "I just thought it would be an interesting exercise. I suppose I learned how to write from TV, which needs drama and clarity. I started writing the book the same way I would start writing a TV program. The publisher seemed to think it would be OK."

Fermat's Last Theorem — in The Netherlands published by De Arbeiderspers — turned out to be a big success. "I thought it would be great if the book would get into the science top 10. And then it got into the UK top 10, and then it reached No. 1, and then it got translated, by now in thirty languages. It's amazing!" Never before had a book about maths made it to the top of the UK bestseller list.

By now Singh has published seven books in which he covers a range of topics from different areas of science, making them accessible to a broad audience. He hopes to engage, to push more young people to pursue a scientific career. And is maths becoming sexier? Singh thinks that, luckily, it is. He praises free online resources such as XKCD, Assassin, Morning Breakfast Cereal, and Numberphile that have helped this development. Recent movies he has seen with his sons (he mentions *Mr. Peabody* and *Sherman*, *Big Hero 6*, *Cloudy with a Chance of Meatballs*, *Queen of Katwe*) teach children that nerds are cool.

The problem is not to lose those kids along the way. "In England," Singh explains, "if you are good at maths, you don't get stretched at school, it's just easy. You get really confident, you get excellent grades but you never get challenged." He tells us about a school experiment carried out in the UK: Instead of calling upon those pupils that raised their hand to answer the teacher's questions, the pupils' names were drawn at random from a bowl. "Interestingly, it was the really bright students who started skipping class because for the first time they were risking to get questions they would not know the answer to. It was embarrassing for them because they had defined themselves as the ones who get it right." Singh envisions a top-of-the-top group in which exceptionally bright students can learn to feel comfortable about being confused. In which they learn that not having succeeded yet is not equal to failure. "We don't need people who *think* they are good because they passed every test, we want people who *are* good because they have been thoroughly challenged."

People with the potential to become good scientists are an increasingly precious resource. "Science is important for society", Singh explains. "For a very long time, politicians did whatever they wanted to do according to ideology. They would tell scientists: 'Go find me the evidence that proves that I'm right.' In the UK over the last twenty years this has changed in a positive way. Now every department has its own chief scientist. And the government is slowly moving towards evidence-based policy."

While he acknowledges this development, Singh also emphasises that there is still a long way to go. "Sometimes people misunderstand what 'evidence-based policy' means. They think it means that the scientist tells the politician what to do but it is not that at all." The scientist provides the evidence but it is up to the politicians to act upon it. And, of course, many other considerations are important apart from the scientific facts. "It would be great if politicians understood what science is, what it does and what it can provide for society."

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The day before our interview, Singh tells us, he heard a radio show about the late David MacKay, author of the book *Sustainable Energy – Without the Hot Air*. "Somebody said to MacKay, 'you are pro nuclear', and he answered, 'I'm not pro nuclear, I'm pro maths, and that's it. It's about the numbers and this is what the numbers say, you can't argue with them'." Singh seems to agree. Real science is not a matter of opinion.

The battle against pseudo-science and quackery has taken up much of Singh's time in recent years. In 2012 he founded the Good Thinking Society, a non-profit organisation advocating scientific scepticism. Similar to the pioneering Dutch 'Vereniging tegen de kwakzalverij', the Good Thinking Society focusses most of its scepticism on alternative medicine. When asked how this particular subject had caught his interest, Singh tells us about a program he had watched on the BBC. "The presenter was a professor, backed by the Open University, so I thought it should be very scientific, very credible." The show talked about a woman undergoing major heart surgery in China that was carried out without a general anaesthetic, only using acupuncture. This could have changed the history of medicine, had it been true. But the story as presented was misleading: as a report of the Royal College of Anaesthetists pointed out afterwards, the woman in surgery may not have had a general anaesthetic, but she had received so many sedatives that she did not need it. Singh complained to the BBC, and eventually the broadcaster admitted to having made a mistake.

Together with Edzard Ernst, a professor of complementary medicine, Singh decided to investigate available evidence for the effectiveness of alternative medicine. The book *Trick or Treatment? Alternative Medicine on Trial* is the compilation of their conclusions. "All my other books were promoting science," says Singh, "but this was about the other side, challenging the 'bad stuff'. We tried to be as fair as possible. We just thought a parent spending € 100 a year on alternative medicine should invest € 10 in this book to find out what works and what doesn't. However, it turned out to be my least successful book."

Worse still, it is a book that brought Singh an enormous amount of stress and trauma, mainly due to a related column he wrote in April 2008 for *The Guardian* in which he accused the British Chiropractic Association of 'happily promoting bogus treatment'. The chiropractors sued for libel. It took two years, a second ruling and cost more than € 100,000 in defence costs before he was cleared on the grounds that his statements were to be treated as 'fair comment'.

The scientific community rallied and supported Singh, calling for a reform of the English libel law which they felt was stifling scientific debate. In the aftermath of the case the 'Defamation Act 2013' became law, which includes the defence of 'responsible publication on matters of public interest' and a clause that is designed to protect free speech in academic journals.