

The return of a beautiful mind

The film about his life won four Oscars, but mathematician **John Nash** hardly recognised the character he saw on screen. With his life still troubled by mental illness – this time his son's – the happy ending seems somewhat premature too. Nevertheless, Nash is back doing maths again. **Michael Brooks** met him at the International Centre for Theoretical Physics in Trieste, Italy, and learned about the perils of genius

An obvious question to kick off with: is there a connection between madness and genius? There's certainly a connection

tween mental illness and "thinking out of the box". If you're going to be anything like a genius you have to think out of the box. In that sense genius is something other than perfect normality, but I wouldn't say there is a strong connection.

Mathematicians are comparatively sane as a group; it's the people who study logic that are not so sane. Logical scholars like Kurt Gödel are certainly not a good example of sanity.

You're doing mathematics again, looking at aspects of relativity and presenting your research at conferences. Are you doing good work?

Well, these subjects are things I've been thinking about for a long time. In some ways I've been very amateurish in approaching them. Yes, I think I am doing good work. Maybe not great work, but good work.

Some mathematicians, notably John von Neumann, have said that a mathematician will have done all his best work by the time

he's reached 30. You're not too old to produce decent maths?

I have never said that. There are some statistics about when people do good mathematical work. It is more rare for people to do notable things at a later age, but it does occur. Part of the thing might be that a mathematician does not need a laboratory. Maybe scientists need more time to get a good laboratory running. If that delays them, they're not completing their work until a later age, whereas a mathematician gets it done earlier.

What's it like to have become famous as a mathematician through Hollywood's influence? Do you find it awkward that people now know about your personal life without knowing much about your work?

It is bit of a burden. You become quite well known, without it being the best type of reputation to have. To be considered a distinguished mathematician by mathematicians is one thing, but to be considered by the public to be a distinguished mathematician, well, that's something else. It does help that there is a lot of fiction in the movie. It's based on

John Nash was recognised by his colleagues as a genius in 1948 when he was accepted into Princeton University's graduate programme at the age of 20.

A year later he found a mathematical way for hostile parties to settle arguments to mutual advantage. Known as the Nash equilibrium, his major contribution to mathematics remains as useful today – as shown by recent auctions of bandwidth to mobile phone companies – as it was in cold war politics. It gained him a Nobel prize for economics in 1994. He now researches problems in cosmology and quantum theory

my life but there are some variations – and the other characters are more or less all fictional.

Do you even recognise yourself in *A Beautiful Mind*?

It's not me, but Russell Crowe plays the role well. I didn't meet him before the movie. Just his speech coach came to see me a few times. The idea was that Crowe would be modelling my accent and the flavour of my speech. In the end he simply used a southern accent, which is not the same as mine. I only met him when they were actually doing the movie, and at the Oscar event.

Didn't the director want you to be more involved?

Ron Howard did not want the real person to interfere with the movie person. When he made *Apollo 13*, some of the people that were cooperating with him were astronauts, and he felt there was conflict when you get the real astronauts too involved with the people in the movie. He wanted the story in *A Beautiful Mind* to move forward well, without getting into too much detail.

Were you involved in the screenplay?

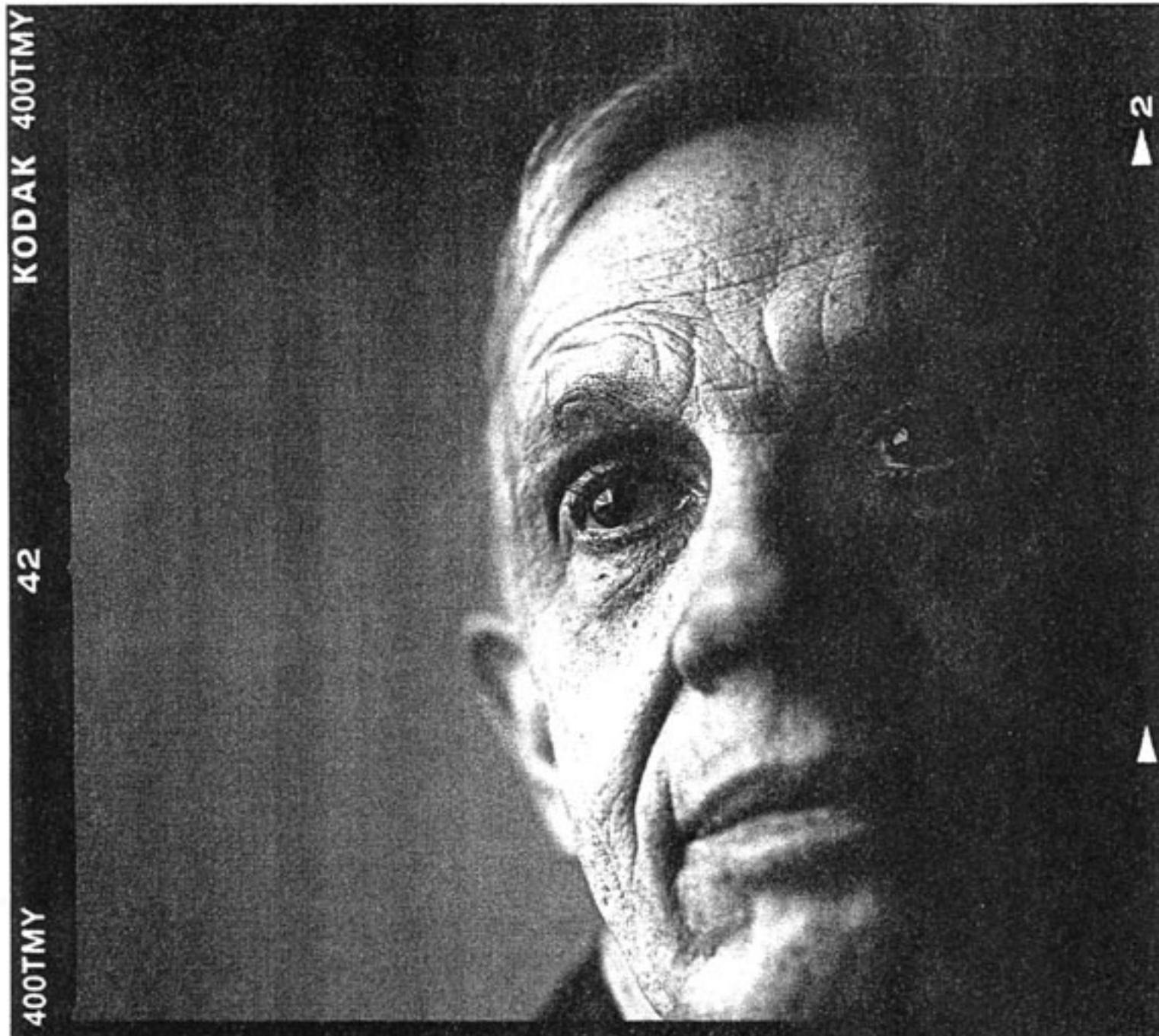
No, that wasn't the deal. The writers had complete artistic freedom. It worked out well, of course. They won Oscars.

At the end of the film, we see a happily-ever-after scenario when you have recovered from mental illness. Was that really like a second birth?

It was more of a return than a second birth. I have a son who is disturbed through mental illness. He is a mathematician. He got as far as a PhD and then he got disturbed. If he could come back it wouldn't be a rebirth, it would be like a return.

Mental illness is a major factor in your life. Have you ever been involved in campaigning about the issues it raises?

I've gotten involved in some issues, and gone to scientific meetings as a guest, but I don't take all the opportunities: some are not of the right type. Some people try to campaign against the stigma of mental illness, but you can't remove the stigma without removing the illness. It is rational to understand people as sick or not sick: to remove stigma you have to make everyone blind to the existence of the illness. ▶

**So the taint is unavoidable?**

What I'm saying is, the natural attitude is not necessarily entirely wrong: insanity is something that is undesirable. Of course, psychiatrists would like people in the care of psychiatrists not to be stigmatised. Both psychiatrists and pharmaceutical companies say people who are taking drugs for mental illness should not be stigmatised. But there are some interests involved here. There are people who think the [mentally ill] people are lazy, taking advantage of society through insanity – well, in a sense that is the truth. To say people should not think like that is to say they should favour the culture of how mental illness is dealt with now.

You don't think the current treatments merit favour? You have said that the drugs used to treat the mentally ill can be overrated, and that they haven't increased the proportion of people who recover to the

point where they don't need drugs. Is that true?

Well, I wouldn't say it in those words. There is evolution in this area: there is progress in types of drugs available. The thing I do notice is acceptance of something that is not a cure. For mental illness, a person who is dependent on drugs and gets continued attention from psychiatrists is considered OK. I think the ideal could be higher. These people do not usually function on a level corresponding to the level on which they would have functioned before their mental illness. So a quite low level of function is accepted as being good treatment. But you're not really sane if you need drugs to be sane; you haven't reached the level of rationality.

What about you? Do you still hear voices?

I was a long way into mental illness before I heard any voices. Ultimately I realised I am generating these voices in my own mind: this is dreaming, this is

not communication. This is coming from an internal source, not from the cosmos. And simply to understand that is to escape from the thing in principle. After understanding that, the voices died out. My son hears voices, but I haven't heard any for a long time.

So was there an element of rational decision-making involved in dealing with your symptoms?

There's a lot of choice in this, I think. I know this is not the standard point of view. The standard doctrine is that we are supposed to be non-stigmatic in terms of these people: they are constitutionally, necessarily, schizophrenic. But I think there is an element of choice. A person doesn't pass into insanity when their situations are good. If their personal life is successful, people don't become insane. When they're not so happy, when things aren't so good, then they may become clinically depressed, and then maybe schizophrenic. Wealthy people are less likely to become schizophrenic than people who are not wealthy.

Are you saying that some people simply choose to opt out of a difficult reality?

It provides an escape. In another way, a person might choose a monastic life; become a monk or a nun. There are various forms of escape in human societies, leading to another life where you do not face the same challenges, the same burdens.

So is it a rational choice to come back?

Being sane is like being a computer that is properly programmed to do useful things. Being insane is like being a computer that is not programmed to do anything useful. You have to come back to where you are expected to work. I can see that in my son. He does not appreciate work. We can't get him to do anything around the house. If he could be given small chores and do them, he would be more ready to come out of it. I don't know whether he'll come out of schizophrenia or not now. He has reached an advanced stage now because it's gone on so long.

Your work on bargaining solutions – the Nash equilibrium – still has broad impact. It was used to design the recent auctions of microwave spectrum bandwidths for mobile

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phones, for instance. Are you surprised by the importance of your work?

It is remarkable the way it has been applied in auctions. It is now a big-money, billion-dollar industry. I did see the application possibilities right from the start: some of my earliest publications were in econometrics.

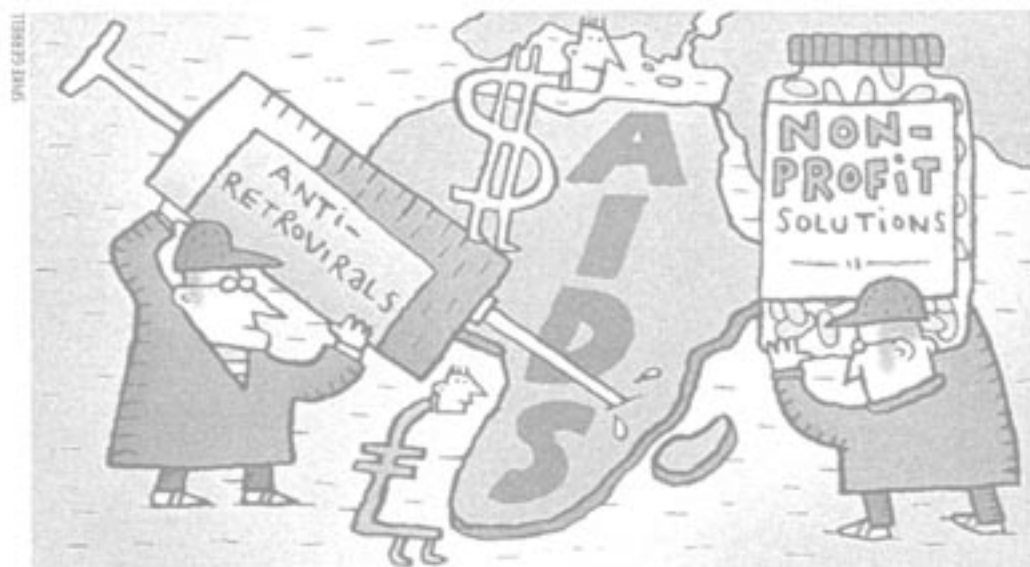
When you came up with the Nash equilibrium, the United Nations had just for a world government. Your colleagues were thinking only about optimistic bargaining situations involving mutual cooperation. You solved the problem of finding bargaining solutions for situations where people won't cooperate. Is that why your work seemed so radical – because it ran contrary to the zeitgeist and exposed the fact that there's always a way to get by without cooperation?

At the time my idea was offbeat or radical, but in a sense it was classical. After all, economics works this way. I know that von Neumann and Einstein thought that there could be some sort of coordinating world leadership. It's easy to say there should not be any war. When the Pope talks about war and peace, you know without listening what he will say. But war is not in the ideal world, it's in the real world. It happen.

Do you see world politics as an experimental lab for the mathematics of game theory? It could be seen that way. But if you consider game theory from a more general point of view, it doesn't need to be mathematical. My personal view is that Machiavelli was really a great game theorist, and he's not mathematical at all.

Did the Nobel prize change anything for you? It changed everything for me. Before the Nobel I wasn't recognised at all. I was quoted and cited in economics and game theory, but beyond that I didn't have any recognition. And without the Nobel prize, of course, there wouldn't have been any movie.

What about the success of the movie – has that changed anything? Well, there is a certain amount of money for authorising a movie. I'm still living in the same house in Princeton. I still don't have enough money to buy a mansion. ●



Westminster diary

Tam Dalyell on the battle to overcome the disaster that plagues sub-Saharan Africa

HUGO SWIRE, the MP for East Devon, did well to initiate a recent Westminster Hall debate on anti-retroviral drugs. Figures provided in a 2004 UNAIDS report expose the crisis: for Africa, AIDS is now the number one overall cause of death. Rates of HIV infection continue to rise in sub-Saharan Africa, where in 2003 alone, an estimated 3 million people became newly infected, he said. Many MPs consider this an underestimate.

Even after a decade of international effort to stem the worldwide AIDS epidemic there is no known cure. However, treatment with anti-retrovirals has reduced rates of mortality, revitalised communities and significantly improved the quality of life of many

AIDS sufferers, Swire said. Because of these drugs, AIDS is sometimes considered to be a manageable chronic illness rather than a plague.

Sadly though, few African countries can share that view. A non-profit-making solution to the AIDS crisis in Africa is urgently needed, Swire asserted. There are other considerations apart from the cost of drugs: for example, the Brazilian government estimates that anti-retroviral drugs have made savings of \$2.2 billion in the hospital care that treating people living with HIV would otherwise have needed.

Invariably it falls to a junior minister to reply to Westminster Hall debates but at this one Hilary Benn, the secretary of state for international development, took

the opportunity to tell MPs about some of the more hopeful developments in Africa. In South Africa, he said, Aspen Pharmacare is already producing anti-retroviral drugs under voluntary licences from GlaxoSmithKline and Bristol-Myers Squibb. In Ethiopia, Bethlehem Pharmaceuticals is preparing production under licence, working with an African non-governmental organisation, the Initiative for Pharmaceutical Technology Transfer. In the Democratic Republic of the Congo, there is a partnership between Pharmakina, a German-French company, and the German technical development agency GTZ. Zambia hopes eventually to sell anti-retrovirals to 13 neighbouring countries. And Brazil is giving \$100,000 in technology transfer grants to various African countries.

The UK is second only to the US in the long-term funds it sets aside for African countries to identify solutions and use them against AIDS. The UK has earmarked £250 million up to 2008, and will increase its spending and continue its support for the global fund set up by the G8 nations to tackle AIDS. "We have a moral obligation to ensure that the collective will, money, resources and effort are used to the best effect to help the greatest number of people in tackling this dreadful epidemic," the secretary of state said.

Clearly, all is not doom and gloom for the future in tackling the AIDS pandemic, as some accounts would have us believe. ●

ENIGMA 1320

Around the tree

Susan Denham

Six gifts are arranged in a circle around the Christmas tree. There is one each for Gail, Simon, Rachel, Bob, Yvonne and Will. The six wrappings are gold, silver, red, blue, yellow and white. The six ribbons are also those colours. But if you look at any two adjacent gifts then the initials of their recipients, the colours of their wrappings and the colours of

their ribbons give six different letters.

The white-wrapped gift is between the yellow-wrapped and the green-wrapped ones. The next gift clockwise from Rachel's has a ribbon of the same colour (not green) as the wrapping of Yvonne's gift. The next gift clockwise from the one with green ribbon has a wrapper the same colour as the ribbon on the white-wrapped gift. The next gift clockwise from the blue-wrapped gift has a ribbon which is the same colour as the wrapping on Simon's gift.

List the recipients of the gifts in clockwise order starting with Rachel.

£15 will be awarded to the sender of the first correct answer opened on Thursday 27 January. The Editor's decision is final. Send entries to Enigma 1320, New Scientist, Lacon House, 84 Theobald's Road, London WC1X 8NS, or to enigma@newscientist.com (include your postal address). The winner of Enigma 1314 is Sheila Ferguson of Duxford, Cambridge, UK.

Answer to 1314 Times table
The four horizontal dominoes are 1-2, 2-2, 3-4, 4-4