



## **Miracles, Media and Medicine**

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This is my final lecture of the academic year, so, as Gresham's resident psychiatrist, I thought I should leave you, perhaps in the slightly killjoy way that doctors do at this time of the year, with a bit of a warning note about some problems that you may be, as a Gresham audience, particularly vulnerable to. I found an anonymous note on the web of someone suffering from a particular problem that I think many of you might be particularly vulnerable to, as people who come to Gresham lectures. I thought I would read it out because I thought it was a particularly useful warning note for many of you to reflect on. This is a first person account and the details have been changed to protect the innocent?

'It started out innocently enough. I began to think at parties now and again, just to loosen up. Inevitably though, one thought led to another, and soon I was more than just a social thinker. I began to think alone, to relax I told myself, but I knew it wasn't true. Thinking became more and more important to me and finally I was thinking all the time. That was when things began to sour at home. One evening, I turned off the TV and asked my wife about the meaning of life. She spent that night at her mother's.

I began to think on-the-job. I knew that thinking and employment don't mix, but I couldn't help myself. I began to avoid friends at lunchtime so I could read Thoreau, More, Confucius, and Kafka. I would return to the office dizzied and confused, asking, 'What is it exactly we're doing here?!' One day, the boss called me in. He said, 'Listen, I like you, and it hurts me to say this, but your thinking has become a real problem. If you don't stop thinking on-the-job, you'll have to find another job!' This gave me a lot to think about.

I came home early after my conversation with the boss. 'Honey,' I confessed, 'I've been thinking.'

'I know you've been thinking,' she said, 'and I want a divorce!'

'But honey, surely it's not that serious?'

'It is serious,' she said, lower lip aquiver. 'You think as much as a college professor, and college professors don't make any money, so if you keep on thinking, we won't have any money.'

'That's a faulty syllogism,' I said impatiently.

She exploded in tears of rage and frustration, but I was in no mood to deal with the emotional drama.

'I'm going to the library,' I snarled, as I stomped out the door.

I headed for the library, in the mood for some Nietzsche. I roared into the parking lot with a social reportage on the radio and ran up to the big glass doors. They didn't open - the library was closed.

To this day, I believe that a higher power was looking out for me that night. Leaning on the unfeeling glass, whimpering for Zarathustra, a poster caught my eye: 'Friend, is heavy thinking ruining your life?' it asked. You probably recognise that line; it comes from the standard 'Thinkers Anonymous' poster. This is why I am what I am today: a recovering thinker. I never miss a TA meeting. At each meeting, we watch a non-educational video. Last week, it was 'I'm a Celebrity, Get Me Out of Here!' Then we share experiences about how we avoided thinking since the last meeting. I still have my job and things are a lot better at home. Life just seemed easier somehow as soon as I stopped thinking. The road to recovery is now

nearly complete for me. Today, I took the final step: I joined the Republican Party!

So, I think there is a warning note there for all of you who attend Gresham and suffer from thinking, the silent disease.

We will come back to that notion a little bit later, but I am going to talk today about the way that the media reports scientific breakthroughs and medical breakthroughs, and how that might link back to this issue about how unthoughtful it is and how dangerous that might be.

I am going to start off with an example of a group of people that I meet frequently in TV studios up and down the country. What is very interesting about these people is that I have never met them in any of my clinics at the Maudsley Hospital, or at the Bethlem, but they are people who claim to have been abducted by aliens. Now, I should explain, in these troubled times, that when I use the word 'aliens', I do not mean people from another country, I mean creatures from another planet! There are wide varieties of psychological theories about why people make this claim that they have been abducted by aliens, and incidentally, this is not a small phenomenon.

Surveys in the 1980s suggested that over a million Americans had had some kind of alien abduction experience, and this had risen, by the late 1990s, to ten million Americans. I think one of the problems here is that the aliens are always abducting the wrong Americans! I think there are many people we could think of that it would be helpful if they were abducted!

So this is actually quite an amazing phenomena and it is gathering pace and becoming quite a widespread phenomenon. There are many different theories about what is going on, and some psychiatrists argue that really these are people who have not been abducted by aliens, but that they are people who are what we would call in my trade 'hysterics'. A hysteric is someone who tells a tall story in order to get attention. So, a hysteric did not just have the flu last night, they nearly died last night. Of course, the last thing you should do with a hysteric, given what they are doing is spinning a tall story to get attention, is to give them attention. If you give them lots of attention when they tell their tall story then you are just reinforcing the behaviour. Instead, what you should do with a hysteric is look mildly bored by their story. Of course, the media gives hysterics lots of attention. But really the best strategy of all, if you are dealing with a hysteric, particularly at a dinner party - and this is something they really hate - is to tell a story that tops their story. They cannot stand that!

I am afraid to tell you that in fact I do have an alien story that is much better than the standard alien abduction story, and the key thing is that my story is true. You see - and I have to disguise the details to again preserve confidentiality - I had a patient once who did not just claim to have been abducted by aliens, he claimed to be an alien! His story was that he was travelling in a spaceship past planet Earth when it developed a fault, and so it had to crash-land in the Atlantic Ocean off the Cornish coast. Can I just say how reassuring it is that even after we have developed faster than light travel, we might still need the RAC or the AA! So he crash-landed off the Cornish coast, swam ashore, and found a body lying on the beach, and using his alien technology, he assumed the shape of that body, which is how come he looked just like you or me and you could not tell the difference. Of course, if you go around claiming to be an alien from another planet, you will sooner or later run into trouble with the authorities, and by a long and tortuous route he ended up under a section of the Mental Health Act on my ward.

What he said to me was that all he needed was a few readily available materials that were easy to get hold of, like second hand car batteries, and he would be able to build a spaceship and return to his home planet. He was somewhat taken aback when I offered to supply these materials, which was a form of occupational therapy I felt, but he took me up on the offer. Then, one day I was walking through the hospital grounds, the lush meadows of the Bethlam Royal Hospital's grounds, when a couple of hospital managers fell into step beside me, which is always a slightly frightening moment for a consultant in the NHS.

They said, 'Raj, we want to have a quick word with you.'

I said, 'Yes - what's it about??'

'Well, we couldn't help noticing there appears to be someone in the hospital courtyard building a spaceship, and we just wondered what that was all about??'

'Oh yes, that's just a chap who says he comes from another planet, is an alien, and he just needed a few second hand car batteries to build a spaceship and return to his home planet.'

The managers exchanged a significant look with each other and said, 'Yes, yes, right, that's all very well, but we understand this is a person under a section of the Mental Health Act.'

I said, 'Yes - so?'

'Well, have you really thought through the paperwork implications?'

I said, 'I'm sorry - I'm not quite following you'

To which they replied, 'Well, when the spaceship is finished - what happens if it takes off? You know that anyone under a section of the Mental Health Act has to have the correct leave forms filled out! Now, we've got leave forms for Croydon, we've got leave forms for Central London. But we don't have leave forms for Alpha Centori, do we?!'

I had to explain to them that if the spaceship took off, we would have a damn sight few more problems than just the issue of the leave forms!

The standard alien abduction story is that people go off on a long drive, often into the remote countryside, the car stalls mysteriously and they can't restart it, then suddenly shimmering over the horizon arrives the alien spaceship. The aliens come out of the ship, they abduct you from the car, they operate on you, because they apparently have to try to understand human anatomy, and then they seal you back up and you find yourself in the car. You wake up and hours have disappeared from your life mysteriously which you cannot account for it. You carry on with your journey, but over the next few days, you become increasingly bothered by the fact that there are several hours that are unaccounted for, so in an attempt to recapture those hours and find out what happened, you go to see a hypnotist, to hypnotise you to recapture your memory for these missing hours - and for some reason, you always unerringly pick a hypnotist who believes in alien abduction. Anyway, under the hypnotic trance, he manages to extract from you this incredible story of the alien abduction - you being operated on, and so on and so forth - and this story is very attractive to TV producers - it is such a remarkable story - so a lot of these people end up in various TV studios. I am often called in to kind of give an explanation for what is going on here.

I have got a couple of problems with the standard alien abduction story. The first problem I have is, despite all these hours that these millions of people have been abducted on various spaceships and operated on, no one ever brings back any kind of physical evidence from the spaceship. So I beg of you please, if any of you find yourself on an alien spaceship, grab hold of something and bring it back with you - any kind of physical evidence, I do not really mind - it could be an alien ashtray, even - something I can turn over, look at the back of, and it says 'Made in Alpha Centori' on it!

The other problem I have is that these aliens always seem to need to abduct people to operate on them in order to learn about human anatomy. I find that a little bit perplexing because I seem to dimly remember from when I was at medical school that human anatomy is now pretty well worked out and it is all in these things called human anatomy textbooks, so I do not understand why the aliens keep needing to abduct people to operate on them. Why don't they just get hold of a human anatomy textbook? Because it is all in there! So, another tip for you is, if ever you have to set off on a long journey in a car, take a human anatomy textbook with you, so if the alien spaceship shimmers over the horizon, you can hand it to them and say, 'Look, it is all in there - no need to do any abducting or operating!'

So in various TV studios I would come up with this sort of standard rebuttal using, I would argue, rationality for the classic alien abduction story. But one day, I was in a TV studio, and the man who had had the alien abduction experience had a slightly different story. He said that he had had back pain for twenty or thirty years that the NHS had been unable to treat effectively, and this had gone on for a long time, and then one night, he had an alien abduction experience. They abducted him, they operated on him, and lo and behold, the next day his back pain had disappeared, and this, he claimed, was definite proof that the alien abduction experience had really happened. What else could account for the fact that the back pain, that had been well-documented for twenty or thirty years, had finally disappeared?

After he had recounted the story, the TV interviewer turned to me and said, 'Well, Professor Persaud, this sounds like very good evidence for the alien abduction encounter - the man's back pain did disappear.'

It was at this moment that something inside me snapped and I finally decided that I had used rationality and rational and logical refutation for too long, and this was not working, so I went down a different route instead. I went down the sarcasm route. What I said was, 'Can I just say how appalled I am, as a doctor working in the NHS, that people are now having to wait so long for their back pain operations that they are now going to another planet to get their back pain procedure?'

I thought that went rather well as a comment, but as we were making our way from the studio, towards the Green Room, where the guests wait before being called into the studio, we were walking down a long deserted corridor, the man and myself, and he suddenly turned on me and said, 'How dare you make fun of me in front of millions of people?! How dare you make fun of me?!' He grabbed me by the lapels of my jacket, pushed me up against the wall, and he said, 'How dare you make fun of me? I'm havin' you, I am - I'm havin' you!'

Being a brilliant psychiatrist, I thought I detected signs of imminent violence to my person! Also, being a very physically courageous person, I did the thing that I always do in this situation: I called out in a loud voice, 'I say - I seem to be in a spot of trouble here!'

Various cameramen and producers came running down the corridor and separated us, and it was only when I was completely confident that we were safely separated that I developed a burst of physical courage and said, 'Yeah, come on then, yeah - you and me, come on, out in the playground - come on, you and me, come on! Where are your alien friends now, hey?!'

One of the really interesting things about the alien abduction experience and the fact that it is so common is that there is a new notion around in sociology and psychology in an attempt to understand this which says that it is becoming like a new religion. It has got a quasi-religious quality and it could be a kind of modern religion. For example, the notion of a benign, all-powerful presence keeping an eye on us and occasionally sending us signs that they are around, and that these people, if finally we make contact with them, will solve all our problems. All of this has a quasi-religious feel to it. Could it be that a modern religion is developing?

So thinking about that for a second, the thing that I find very interesting about the way that scientific and medical breakthroughs are reported in the media, is that there is a particular word that is used, which has very strong religious connotations, and this word is 'miracle'. 'It's a miracle of modern science!' the newspaper headline will say. 'It's a miracle of modern medicine' that this new finding has occurred or this new procedure.

When I speak to academics and I interview them for my radio or television programmes or for the articles that I write, and I ask them about when their findings are reported by the media as a miracle but they do not seem bothered by this; they do not seem troubled by the use of the word 'miracle'. Yet I think they should be, because I think the word 'miracle' is actually a very dangerous and problematic word in this context.

To get a sense of that point, we need to take a step back and think a little bit about what a miracle is, in the full religious sense of the word. One very interesting person to look at in terms of writings on miracles, and analysis of miracles, is the rabidly atheistic Scottish philosopher, David Hume. David Hume spent a certain amount of his writings trying to clearly and logically prove that god does not exist. He turned his attention to what miracles were, because he noticed that miracles actually are a very important part of any account of religion.

For example a large part of the New Testament, if not the majority of it, is devoted to an account of miracles - the miracles that Jesus performs. Hume argued that, in any religion which has the notion of an omnipotent god or a supernatural being with omnipotent powers, you have to have miracle stories, as he would put it, because a miracle, if you define it according to David Hume, is an event that violates the laws of nature; and you have to have a god that is not bound by the laws of nature, because if god is bound by the laws of nature in the way that you and I are, then this is a rather weedy god, and what is the point of worshiping a god like that? God, by definition, cannot be bounded by the laws of nature; therefore god performs miracles, and a miracle is an event that violates the laws of nature. Therefore miracles become intrinsically important because miracles are direct evidence of god's power in our world. So at the heart of all religions that believe in an omnipotent god, you will find miracle stories. They are intrinsic, in a fundamental sense, to the religious sensibility.

Hume therefore turned his attack on whether miracles can actually exist. So Hume's definition of a miracle is an event which violates the laws of nature. So let us say you observe such an event. Now, what Hume says is really occurring, when you observe what you think is a miracle, is an event which only appears to violate the laws of nature. This is because you cannot be confident it has violated the laws of nature unless you believe you have a full and complete understanding of the laws of nature, but can anyone really claim that? Science is trying to understand the laws of nature all the time, but we are surely on a never-ending quest to understand the laws of nature. So to believe that you have seen an event which definitely violates the laws of nature, you have to be completely confident you have a full and complete

understanding of laws of nature. But how confident can you be about your scientific laws? Is it not more likely that what you have observed is an event which appears to violate the laws of nature, but that is because your understanding of the laws of nature are incomplete and vestigial, and as they deepen and deepen, you then come to be able to see the event is fully compatible with the laws of nature? So when you see an event that appears to violate the laws of nature, all you are seeing is something that illuminates your ignorance of the laws of nature. So that is why Hume was sceptical as to whether miracles could ever really exist, because for you to definitely say a miracle had occurred, you would have to, at that moment, believe you had a full and complete understanding of the laws of nature.

But he also made what, some people say is a deeper and more logical point, which that if you think you have seen a miracle, you have not understood the full force of the word 'law' in terms of its meaning. If you understand the full force of the word 'law' in the phrase 'A law of nature', then it can have no exceptions. If there is an exception to the law, then it is not a law and you need to rewrite the law to incorporate the exceptions. If laws have no exceptions, then there can be no events that violate the laws of nature, therefore there can be no miracles, therefore god does not exist. Hume, in a matter of a few paragraphs, imperiously dismisses the idea that god can exist.

If we step aside from Hume's argument for the moment, from a psychological or anthropological standpoint, miracle stories are still incredibly important, whether you believe Hume's argument or not. This is because it is clear that for religions to continue to exist as systems of ideas religion is a bit like a virus, if you think about an idea like a virus. A virus has to be spread; if it is going to be successful, it has got to be spread horizontally, it has got to be spread across people alive at the same time, and if it is going to exist for generations into the future, it has to have vertical transmission, future generations have got to catch the virus. Ideas are also like this. For systems of ideas to succeed, they have to spread horizontally. Your neighbours and their neighbours and so on have to subscribe to the idea, but they also have to spread vertically. You have got convert your kids, and your kids have to convert their kids, and so on and so on.

So miracles seem to be at the heart of the current anthropological understanding of the success of religion, because miracle stories seem to be the powerful way by which religions spread. Miracle stories, first of all, arrest your attention and you want to find out more. - A man walks on water! A man is raised from the dead after three days! - These are very arresting stories that grab your attention, you want to find out more, and if you believe in the miracle, these are very persuasive stories. So there are two things that miracles do: they grab your attention, they pull you away from whatever you are doing to hear the story; and then they persuade you of the underlying theological idea that god exists. So miracle stories are at the heart of the success of religion, if we think about them as being successful in terms of spread of their ideas.

There is a really interesting psychological point about miracle stories, whoever devised them, whether they were devised or they are exaggerations of events. If we think about a man who walks on water, or a man who is raised from the dead after three days - these stories arose 2,000 years ago. For these stories to arrest your attention and to convert you, they have, in a sense, to have an implicit understanding of what the listeners' understanding of the laws of nature are. Let us say, from where these stories arose, 2,000 years ago the writer had no idea who would be hearing the stories in 2,000 years' time, or which cultures would hear them. So implicit within the story, for it to impress you and grab your attention and convert you, is an implicit understanding of your understanding of the laws of nature. If your understanding of the laws of nature is that it is perfectly possible for a man to walk on water, or for a man to be raised from the dead after three days, then this is not an impressive story - it will not convert you.

So, what is really amazing about these stories is their psychological sophistication, because, no matter where you are, what generation you are, even millennia from the time the story originated, the story retains its ability to powerfully convert because it makes an amazing predictive statement about your, and millions of other people's, commonsense understanding of the laws of nature. This is because it is a story that will tell you there is an event that violates your understanding of the laws of nature. If you try to think of a story now that would still be considered a miracle in 2,000 years' time, no matter what people believe the laws of nature in 2,000 years' time, you can see how difficult that might be.

Therefore, implicit within a miracle story is an understanding of people's understanding of the laws of nature and violation thereof. Newspaper editors, in a sense, are like that person who comes up with a miracle story when they report and write newspaper articles which have the word 'miracle' in it. When they say things like 'It's a miracle - we've put a man on the Moon!' what they are doing is having an implicit understanding of the ordinary lay readers' understanding of the laws of nature. For the ordinary lay reader, who does not understand, let us say, the laws of physics or mathematics that got a man to the Moon, it

does indeed appear a miracle, it does indeed appear an event that has violated the laws of nature. But to the mathematicians and physicists working in NASA that put a man on the Moon, it is not a miracle. To them it is perfectly explainable and understandable using the laws of physics and mathematics. So, implicit within the use of the word 'miracle' - 'It's a miracle of modern science', 'It's a miracle of modern medicine' - that you see in newspaper articles, is already an implicit understanding of the ignorance of the reader and, to some extent, an exploitation of that.

If you say to a scientist, 'A man has walked on water,' a scientist immediately says, 'I wonder how he did it? I wonder what the mechanism is in play here? Let me find out more. Tell me a bit more about the event.' But this is where science and religion collide. This is because the religious account ends at the headline grabbing statement, 'A man walks on water'. But the scientist says, 'Tell me more - how did he do it?' The religious account says 'God made it happen,' and that is the end of the mechanism of explanation: we are not going any further because we can go no further - the account of mechanism has to end and begin at 'God made it happen'. Scientists are fundamentally dissatisfied with that account of mechanism; they want to know more. For a scientist, the story 'A man walks on water' is just the beginning of the story. They want to go further and they want to find out how it happened. For the religious account, it is the beginning and the end of the story - all you need to know is that the man walked on water, and we are not going any further into how it happened.

Again, that is exactly what you see in newspaper articles, TV, films and magazine articles today about scientific breakthroughs. There is the headline-grabbing event and then there is no account of mechanism. None of these articles or stories about scientific breakthroughs deepens the readers' understanding of mechanism, which actually is implicitly what science is actually about. It is not about the headline-grabbing event; it is about how did it happen.

So, if you accept this analysis I am putting forward, the bad news is that we have not moved a step further on than where we were 2,000 years ago when people said to one another, 'A man walked on water - it's a miracle!' because 2,000 years ago, people heard that story and they were often converted by it, but they did not take any steps to ask questions about mechanism, and the same thing is happening on a daily basis today in our papers. You see an account of 'a miracle breakthrough' and there is no account of mechanism, and that, I want to argue, is a very dangerous state of affairs in terms of deepening our understanding of what is going on in science.

I will illustrate that problem with another personal experience I had of working in the media. There is a man - and he shall remain nameless for the purpose of this talk - who has become very famous in the media for his claim that he can read minds. His production team contacted me because they wanted to record his demonstration that he could read minds using me. I accepted the invitation, on the proviso, given that my current understanding of neuroscience is that minds cannot be read, that I would be allowed to test him, and the production team agreed to that.

So I met this man and it was recorded, and he did what I would call a series of very simple magic tricks of the nature of 'pick a card, any card,' and then there was an apparent attempt, indicated by the successful deployment of the magic trick, that indicated he could read my mind, but I felt these were just very simple and mundane magic tricks.

So, after he did his tricks, I said, 'If you really can read minds, then you will be able to tell me the picture I drew on a bit of paper that I folded and put in a sealed envelope in my breast pocket here. I drew this picture this morning. I have also handed this picture, in the sealed envelope, to various members of the production team - they have been carrying it around with them. You say that you can read people's body language and you can read people's minds as a result: you should be able from there, reading off their body language and my body language, to be able to tell me what the picture is of.?'

What I thought was very interesting was that, if I were him, I would have backed out. I would have said, 'I can't work under these conditions: you have sprung this on me; I wasn't expecting this; I cannot work this way; we'll devise another test on another occasion,' etc. But he said he would tell me what the picture was, which I was really rather taken aback by.

He then started to ask me a lot of questions. He said, 'What time of day was it when you drew the picture? Did you use your right hand or your left hand? What part of your desk were you using? Was it your desk here or was it your desk at your study at home?'

It was apparent to me that what was happening now was an attempt to glean information from me that might help him take a good guess at what the picture was. So, I did this very irritating thing that

psychiatrists often do: when he said to me, 'What hand did you use - right hand or left hand?' I said, 'Well, you read minds - you tell me which hands I used!' So whenever he asked a question, I would come back with this response, 'You read minds - you tell me!'

He began to get a bit irritated with this after a while, but eventually he said, 'Okay, I will draw the picture.' So he drew a picture. It was a picture of a house, with a tree beside it. Then he drew some vases in the windows, and soon enough there was an increasing amount of stuff going into this picture. Again, I think the tactic here was: the more things you put in the picture, the more likely, by sheer random chance, one of these objects resemble the object in my picture in my envelope! So this thing was beginning to resemble the Sistine Chapel in its intricateness, and eventually I said, 'Have you finished?'

He said, 'Yes.' It was a picture with lots of objects around it and this house.

So I produced my envelope, opened the envelope, opened the picture, and my picture that I had drawn that morning was a picture of a piano. Nothing in this man's picture resembled a piano!

But he did say, rather lamely, 'What I drew looks like a piano!' which I thought was very sad indeed. Anyway, I thought he had really gone down in flames rather badly. But as I was leaving the studio, the producer comes up to me and says, 'I'm afraid we are not going to be able to use that.'

I said, 'But why?!'

They said, 'Well, you didn't come over very well, Dr Persaud. You looked rather aggressive. You kept saying, 'You read minds - you tell me!' and we think we are doing you a favour by pulling the item.'

Looking back on it, I was actually a trifle naïve to assume, having demonstrated he could not read minds, that that would end up in the media, because actually it is not a story to the media, is it? 'Man cannot read minds!' It does not really grab your attention! However, the story could have been 'Man stuns Professor of Psychiatry by reading his mind!' That's a story, isn't it? That is a miracle! So I was naïve in assuming the item could ever appear under the circumstances of him not reading. If he had drawn a piano, then the story would appear. I did make the point to the producer I felt this was a trifle unfair experiment - if the result goes one way, it gets broadcast; if it goes another way, it does not get broadcast.

I want to conclude with a thought: what the programme reveals is that maybe we have a hunger for miracles, and that is part of the reason why miracle stories exist, and scientists are often a little bit naïve about that. Maybe there is something about the world which means that we often find it mundane and we are interested in the possibility of the mysterious and the miraculous, and maybe miracle stories and newspaper headlines feed this appetite.

This is very interesting, because taking a step back and just thinking about the aesthetics of looking at the universe, and thinking of it as either a place where there are mysterious things that happen that violate laws of nature and that are fundamentally beyond our grasp of understanding because they are beyond the grasp of incorporating these events into our understanding of mechanism. Comparing that to the scientific vision of the universe, which is that, whatever event we observe, whatever phenomenon we observe, we can make an attempt to incorporate it and understand it in our body of knowledge, and therefore use it in some way. So, scientists believe, at an aesthetic level, there is something truly wondrous about the idea, for example, that the force that is holding us all to our seats tonight at Gresham is the same force, roughly speaking, that makes stars revolve around each other in a galaxy millions of light years away. So the scientific account is no less wondrous than the religious account of the universe, and so therefore scientists are concerned in a way about our need for miracles.

I am going to make a startling confession, but I think I have seen miraculous-like events in my lifetime, and one miraculous-like event I saw on repeated occasions was when I was at medical school, and it was - perhaps this may sound rather odd and rather simple - it was the birth of a baby. When I did obstetrics, we got to deliver babies as they were being born, and I do not know how many of you have been present at the birth of a baby, but there is something truly miracle-like about the birth of a baby. The scientific account of birth is also something miracle-like, the thought that, at one point, billions of years ago, we were in a cold, lifeless universe, and through laws of physics and chemistry that we can, to some extent, get a sense of, eventually life evolved and eventually we have things like babies.

So there is something about the scientific account of the universe that still, to me, is exciting and should fill us with awe and wonder. I think that was Thomas Gresham's feelings about the universe, which is why he founded Gresham College and why he wanted the public of London to be acquainted with the new learning. This was about the idea that we live in a wondrous universe and it becomes even more wondrous the more that we understand it.

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