

The origin of the universe

Stephen Hawking's account of the origin of the universe told a story of great brilliance and clarity. The questions "Why are we here?" and "Where did we come from?" are very good ones, and we all find ourselves asking them on the day we begin to grow up. When we're children, other questions occupy us; we want to know why we can't have more ice cream, and why we have to go to bed right now, and why nothing is fair; but on the day we begin to grow up, which is usually in our early adolescence, we find Professor Hawking's questions becoming more and more interesting. Of course, some people stop growing up, and then they stop asking those questions. They ask other questions instead, such as "What's on TV tonight?" or "Where can I get the best return for my investments?"

Professor Hawking's lecture began with an account of the great god Bumba and his digestive problems, which I hadn't heard about before. According to the myths of the Boshongo people, Bumba had a belly-ache and vomited up the sun, the moon, the stars, and various animals including the first human beings. This ingenious piece of gastro-theology provides a very good account of why we're here and where we came from, with only the slight disadvantage of being untrue. Or at least unlikely. As I understand Richard Feynman's sum over histories, the great god Bumba may be busily at work somewhere, but probably not in this suburb of the universe.

As the lecture progressed, I was struck by how much more interesting Professor Hawking's account was than that of the Boshongo people. I don't only mean more likely, more persuasive, better argued, though it was all of those; I mean more interesting. It was better storytelling: I always wanted to hear what was going to happen next, and why. It was full of more interesting characters and settings. The Steady State, for example, which I couldn't help picturing as a sort of 1950s advertisement, with a pipe-smoking father sitting comfortably in his living room, next to the radiogram, with a wife knitting submissively in the background, and a small boy playing with Meccano on the carpet. The father would remove his pipe and twinkle knowledgeably as he said "Of course, I'm with Steady State Insurance," and a

caption underneath would say “You Know Where You Are With a STEADY STATE Policy.”

Then there were other fascinating characters, such as the General Theory of relativity, and the microwave radiation from the very early universe that turns up on your television screen, and the spontaneous quantum creation of little bubbles that grow, or don't grow, into universes.

Another reason that the story we heard from Professor Hawking was different from that of the Boshongo people has to do with the relationship we have with the story itself. It's to do with the way we, the audience at an academic lecture, the congregation in a church, the jury in a courtroom, the listeners around the cooking fire in the darkness of the savanna, the way we regard the stories we're hearing. Different kinds of stories *expect* different kinds of audience and certain kinds of attitude from that audience. I don't mean an attitude of liking or respect, though every storyteller would like those; what I mean is there's something in the circumstances of the telling that says "This story is to be taken literally", or "This is a metaphor. One thing stands for another."

Because in the normal course of life, we depend on knowing which attitude it's appropriate to take to the stories we hear. A witness in court might be telling the truth, or telling a lie, and the jury might believe him or not; but they don't think that he's talking in metaphor. If the prosecuting counsel says "Tell the court what you saw the accused do," and the witness says "He stuck a knife in the victim's heart," the jury isn't expected to understand this as meaning "I saw him write a savage review of the victim's latest book." The jury is there to decide whether or not the statement is true, but not what kind of statement it is. It's supposed to be a literal one.

Now we don't know whether the first people who listened to the Bumba story thought it was literally true. Maybe they did. But I think that if people have evolved to the point where they can tell stories at all, they've already got a fairly sophisticated mental world in place, in which they know the difference between what's literal and what's figurative. After all, every one of the Boshongo people must at some point have eaten a piece of dead wildebeest or something that didn't agree with them, and the consequences of that would have looked nothing like the sun, the moon, the stars and the animals and so on. So they were capable of thinking that Bumba's belly-ache and its results were like theirs in some ways but unlike them in others: they were capable of thinking in analogy or metaphor.

As long as that mental capacity persists, human beings are able to think about their world and describe it in more ways than one, and a very great gift that is. At the high point of what we might call the Bumba tendency, we find the sublime poetry of Milton's account of the creation in *Paradise Lost*. Milton pictures the angel Raphael talking to Adam and Eve and telling them what happened before they themselves were created, and does it in words that celebrate the sensuous physical beauty of the world so vividly that it's impossible, for this atheist at least, to withhold a rush of imaginative empathy. I know it isn't literally true, and yet I can enjoy it to the full. Most of us are capable of that sort of mental double vision, and that capacity can't only have evolved last week. I think it's as ancient as language and as humanity itself.

The trouble comes when the fundamentalists insist that there is no such thing as analogy or metaphor, or else that they are wicked or Satanic, and that there must only be a literal understanding of stories. The Bible is literally true. The world was created in six days. The Kansas Board of Education says so. The worshippers of Bumba, as far as we know, haven't developed this modern perversion, this modern limitation on the meaning of narrative; it's only the worshippers of Yahweh and Allah who are as silly as that.

The delight for me in the account Professor Hawking gave us tonight, and has given us in his marvellous book *A Brief History of Time*, is that we can both listen to it with wonder *and* take it literally. It's a tale of heroic endeavour, of intellectual daring and imaginative brilliance without parallel, and those people like me who are in the business of playing variations on the Bumba story, and trying to get as close to the Milton end of the spectrum as our talent will let us, can only take off our hats and salute the storytelling of those like Professor Hawking – those who not only tell the story, but who themselves played a part in the events: who uncovered a corner of the mystery, who shone a light into the darkness and revealed something that no-one had ever seen before.

The sort of story that these great heroes (and I'm using the word carefully and accurately) – that these great heroes of modern science tell does have one thing in common, and I mean in a technical, structural sense, with stories of the Bumba sort. And that has to do with how they end. Most stories that we read in novels or fairy tales, or see in films and plays, are shaped with a conclusion in mind. The events are all arranged to lead up to “And they lived happily ever after.” Or “Reader, I married him.” Or the last sentence of George Orwell's *Animal Farm*: “The creatures outside looked from pig to man, and from man to pig, and from pig to man again; but already it was impossible to say which was which.”

Stories of that kind take us on a journey through harmonies and tensions and releases and discords and finally we come to a resolution. The story's done; all the ends are tied up; there's no more to be said.

But the stories that both religion and science tell us about our origins don't do that. There isn't that sense of cadence and finality that we have at the end of a play or novel, or the aesthetic and moral closure we feel at the end of one of the classic fairy tales. Stories about origins don't have that sort of determined ending. The religious kind of origin-story might tell us that we were brought forth by a great father in the sky, or in the case of Bumba by a great gurgitator, and they usually go on to put us in some kind of relationship with our creator. We are his children. We owe him gratitude and worship and obedience. The other kind of origin-story, the scientific kind, tells us about the development of matter from the first moments of the universe, the formation of atoms, the way atoms join with other atoms to form more complex structures that eventually give rise to life, and how life itself evolves by means of natural selection. We are the children of the sky-god, or we are made of the same material as the stars.

Either way, stories like this tell us how we got here: but then they say, in effect, “The story continues, and the rest is up to you.”

And whether or not we know this, whether or not we like it, that puts us in a moral relationship with the thing we came from, too, whether that’s God or whether it’s nature. The God stories go on to make this quite explicit: *do this, believe that*. The stories of science have moral consequences too, but they convey them more subtly, by implication; we might say more democratically. They depend on our contribution, on our making the effort to understand and concur.

The implication is that true stories are worth telling, and worth getting right, and we have to behave honestly towards them and to the process of doing science in the first place. It’s only through honesty and courage that science can work at all. The Ptolemaic understanding of the solar system was undermined and corrected by the constant pressure of more and more honest reporting: “Yes, we know the planets are supposed to go round the earth in perfect circles, but really, if you look, you don’t see that. You see *this* instead. Now why do you think that could be? What’s actually going on up there?”

So we have the courage of such as Galileo and the other victims of persecution and fearful closed-mindedness. I was very glad to hear that Professor Hawking escaped the clutches of the Inquisition during his visit to the Vatican; four hundred years ago, he would not have done, and in the context of the time scales we’ve been hearing about tonight, four hundred years is the merest flicker of an instant. We sometimes forget how lucky we are to live in this little bubble of time which is still warmed, you could say, by the background radiation from the Enlightenment. We’re privileged today to be able to hear the words of Professor Hawking without having to meet in secret, without having to depend on passwords and disguises, without the danger of betrayal and arrest and torture; and that is not only because of the intellectual brilliance of the great heroes of science, both past and present, but because of their valour too.

Professor Hawking ended his lecture with a survey of the current state of cosmology, and the prediction that we are getting close to answering the age-old questions “Why are we here? Where did we come from?” Some people are rather afraid of thinking that there might be a final answer to those questions; they think it will take all the mystery and delight out of the universe. I think they could hardly be more wrong. The more we discover, the more wondrous the universe seems to be, and if we are here to observe it and wonder at it, then we are very much part of what it is. And there is no shortage of important questions. Once we know where we come from, we might find that our attention turns to questions like “Where are we going? What shall we do?”

The story continues, and the rest is up to us. I’m immensely grateful to science, and to Stephen Hawking in particular, for illuminating our path to the present day with such brilliant clarity, such intellectual daring, and such wit.