



18 October 2015
St Luke the Evangelist
Choral Evensong
Isaiah 40 vv. 21–31
John 1 vv. 1–14

God and the Big Bang

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I am sure many of us have looked up at the night sky and experienced awe and wonder before the universe. This experience made me want to be an astronomer from about age 7. As a boy I got all the books by Patrick Moore, who died in December 2012 aged 89, though I guess many people today watch the rather trendier Brian Cox.

Nowadays, because there is so much light pollution in Britain, I most often get that experience of awe and wonder when I'm on holiday, and I've been privileged to be able to travel to some interesting places abroad for holidays in recent years. A few years ago my wife and I were in Croatia, staying in a small hamlet, and on balmy nights we sat out on our balcony and gazed up at the sky, counting shooting stars. Another holiday was in Peru, where we were high up in the Andes, and saw the night sky of the Southern hemisphere for the first time, and saw it in all its glory because, as in Croatia, we were remote from light pollution.

The Psalmist in ancient Israel must have had similar experiences. 'For I will consider thy heavens, even the works of thy fingers: the moon and the stars, which thou hast ordained. What is man, that thou art mindful of him: and the son of man, that thou visitest him?' we read in Psalm 8.

The Psalmist was awestruck, although he had a much more limited view of the universe than we do now. Even without the telescope he would have realised that there were millions of stars. That is clearly true of other Biblical authors too. The writer of Genesis 15 likewise was overwhelmed by the number of stars, for in this passage God says to Abraham: 'Look towards heaven, and count the stars, if you are able to count them. So shall your descendants be.'

Frequently in Scripture God confronts humans with the vastness and magnificence of his creation. For example, in Isaiah 40:12, 26 we read: 'Who has measured the waters in the hollow of his hand and marked off the heavens with a span, enclosed the dust of the earth in a measure, and weighed the mountains in scales and the hills in a balance? ... Lift up your eyes on high and see: who created these? He who brings out their host and numbers them, calling them all by name; because he is great in strength, mighty in power, not one is missing.' This passage was written to be a great encouragement to the Hebrew exiles in Babylon, because they are reminded that their God is the all-powerful creator, as well as the one who redeemed them from Egypt of old. And they are to be comforted because he is about to do a new thing for them now.

It seems to me that our awe and wonder at the universe should be at least as great as, indeed far greater than, that of the Biblical writers, since we know so much more about the universe than they did. Sometimes it's said that when science discovers more about the universe it's pushing God further out of it, into ever narrower gaps in our knowledge. That seems to me to be profoundly mistaken; indeed the opposite is the case. When Johannes Kepler discovered the laws of planetary motion he didn't say, 'Oh, that's one less thing for God to do!' No, he considered himself to be 'thinking God's thoughts after him'. So the more we discover about the universe the more we are learning about the God who made it.

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Awe and wonder before the universe is a common emotion among scientists and indeed provides a motivation to do science. It is felt by believers and non-believers alike. This is what Charles Darwin, who struggled with faith, wrote to a devout Christian friend and colleague:

‘I cannot anyhow be contented to view this wonderful universe and especially the nature of man, and to conclude that everything is the result of brute force.’

Professor Joseph Silk, Emeritus Savilian Professor of Astronomy at Oxford, cataloguing some of the discoveries of modern cosmology, writes this:

‘The universe is a wondrous place. Its marvels surpass human imagination. Stars form and die in incredibly colourful displays. The chemical elements are cooked in the hot interiors of stars and dispersed in immense explosions. Vast numbers of stars pirouette in giant galaxies.’

Whilst this feeling of wonder is common, it seems to me that only God can explain why we should have such a feeling, or indeed why the universe should make sense to us at all. God is required to explain why science works in the first place.

We have made immense strides since the Bible was written. For example, we now know that there are something like a hundred thousand million galaxies in the observable universe and that each galaxy contains about a hundred thousand million stars. And with the Hubble Space Telescope we can look back in time and see galaxies whose light has taken 13 billion years to reach us. Our sun is a very ordinary star situated on the edge of our own Milky Way galaxy. Even, so, the sun is a giant, million mile diameter nuclear furnace radiating 400 trillion watts of power and continuing to do so over many billions of years. That’s some nuclear reactor! These facts were unknown even 100 years ago.

I must say a little now about the Big Bang, the modern theory of how the universe started. This was the brainchild of the Abbé Georges Lemaître, who was both a Roman Catholic priest and one of the greatest cosmologists of all time. Lemaître can rightly be called the Father of the Big Bang, though his term for it was the primeval atom. He solved Einstein’s equations of general relativity for the universe as a whole and found a solution in which the universe expanded from an incredibly compact initial state, evolving into the vast cosmos we see today.

Lemaître took both his scientific and theological vocations seriously and once said: ‘There were two ways of arriving at the truth. I decided to follow them both.’

One of the characteristics of science is that every step of progress gives rise to new questions. We never seem to reach a final answer; the richness of the universe seems inexhaustible. In my old field of cosmology great strides have been made, and cosmology is becoming a much more exact science. Even so, we do not know what 95% of the universe is made of! It all goes to keep cosmologists in business. If there weren’t some mysterious stuff called ‘dark matter’, then individual galaxies would break up and fly apart. And there also seems to be something called ‘dark energy’ which is stretching the fabric of space at a faster and faster rate and making the galaxies move apart faster and faster too.

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Another mystery to cosmologists is why the universe is so friendly to life, so ‘fine-tuned’ for life to arise. It seems that a lot of very special conditions are needed in order for the universe to give rise to life. And this has impressed a lot of atheist cosmologists. One physicist, Freeman Dyson, has remarked that ‘in some sense, the universe must have known we were coming’. Paul Davies writes this: ‘Like the porridge in the tale of Goldilocks and the three bears, the universe seems to be “just right” for life, in so many intriguing ways.’

One of the most remarkable discoveries in cosmology relates to the manufacture of the chemical elements. As Prof. Joe Silk said, they are cooked in the fiery interiors of stars, where hydrogen burns to form helium and the nuclei of helium atoms undergo nuclear fusion to form carbon and oxygen, and the other chemical elements.

When their nuclear fuel runs out the biggest stars explode in spectacular fashion as supernovae, spewing out the chemical elements they have made into the surrounding medium. That is how the material for newer generations of stars, with planets and ultimately life, is made available. It is almost a cliché in cosmology to say that we are made from ‘the ashes of dead stars’. Yes, we are dust, but ultimately it is stardust.

The fundamental work on all this was done in the 1950s by the famous Cambridge cosmologist, and Fellow of St John’s no less, Sir Fred Hoyle, and his collaborators, one of whom was William Fowler. Fowler got the Nobel Prize for this work, and you’ll find a letter from Fowler to Hoyle in your College Library, written ‘with a heavy heart’ and expressing incomprehension that Hoyle himself didn’t share the prize.

It was Hoyle who discovered one of the most remarkable fine-tunings that I have been speaking about, and it relates to his work on the manufacture of carbon and oxygen in stars. Unless the force which binds atomic nuclei together takes the value it does to a high degree of accuracy, either no carbon is manufactured at all, or, if it is, it all gets turned into oxygen. Either way there would be no prospect of life in the universe. It is very significant that Hoyle was an atheist; he described religion as an illusion in broadcasts he made on the BBC in the late 1940s and early 1950s. But this is what he said on making this discovery:

‘A commonsense interpretation of the facts suggests that a superintellect has monkeyed with physics, as well as with chemistry and biology, and that there are no blind forces worth speaking about in nature. The numbers one calculates from the facts seem to me so overwhelming as to put this conclusion almost beyond question.’

To many of us, all this points to God being behind the universe. No one is forced to that view but it just seems to a number of significant scientists, philosophers and theologians, to be the best explanation for why the universe is as it is.

I hope I have been able to share with you some of the awe-inspiring aspects of our universe which science is uncovering. The Biblical writers were awe-struck by the cosmos, but what struck them even more was that the majestic creator of the heavens should care for us humans. ‘What is man, that thou art mindful of him?’ says the writer of Psalm 8. This great God has crowned humans with glory and honour and given them responsibility for the earth he has put them on with all its diversity of living creatures.



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Concluding a popular survey of his cosmology, Georges Lemaître wrote this: ‘We cannot end this rapid review which we have made together of the most magnificent subject that the human mind may be tempted to explore without being proud of these splendid endeavours of Science in the conquest of the Earth, and also without expressing our gratitude to One Who has said: “I am the Truth,” One Who gave us the mind to understand Him and to recognize a glimpse of His glory in our universe which He has so wonderfully adjusted to the mental power with which He has endowed us.’

Lemaître touches here on what causes me the greatest awe of all, that is, the knowledge that God the creator of this vast cosmos – the God of the philosophers and natural scientists, whose handiwork science is exploring – is the same God who became incarnate as a human person in Jesus of Nazareth. As the prologue of John’s gospel has it (Jn 1:3): ‘All things came into being through him, and without him not one thing came into being.’ This is an astonishing passage about the exalted status of the Son of God, the Word who is the agent of creation and upholds the universe in being. But it is even more astonishing in saying that ‘the Word became flesh and lived among us’. The author becomes an actor in the play. The creator becomes a creature!

What that means is that the God of the Big Bang and the 100,000 million galaxies each with 100,000 million stars to which the Big Bang gave rise in our observable universe, became one of us. He led a perfect human life; he went about healing and preaching; he suffered with us and for us. Christ whose glory fills the skies is now glorified through being lifted up on a cross, a barbarous means of execution reserved for slaves and enemies of the state. And following his brutal execution he rose again from the dead and showed himself alive to many witnesses. And the creator of the universe did all this *for us* – who are like specs of dust in the vastness of it all. Now that really is awesome! Amen.