

St Andrew's on The Terrace Sunday 15 September 2019 Pentecost 14 Creation 3

Readings for the Gathering

Hebrew Bible

Psalm 8

1 God our God, how majestic is your name in all the earth! You have set your glory in the heavens.
 2 Through the praise of children and infants you have established a stronghold against your enemies, to silence the foe and the avenger.
 3 When I consider your heavens, the work of your fingers, the moon and the stars, which you have set in place,
 4 what is humankind that you are mindful of them, human beings that you care for them?
 5 You have made them a little lower than the angels and crowned them with glory and honour.
 6 You made them rulers over the works of your hands; you put everything under their feet:
 7 all flocks and herds, and the animals of the wild, 8 the birds in the sky, and the fish in the sea, all that swim the paths of the seas. 9 God, our God, how majestic is your name in all the earth!

Gospel

The Magi Visit the Messiah

Matthew 2:1-10

2 After Jesus was born in Bethlehem in Judea, during the time of King Herod, Magi from the east came to Jerusalem and asked, "Where is the one who has been born king of the Jews? We saw his star when it rose and have come to worship him." 3 When King Herod heard this he was disturbed, and all Jerusalem with him. 4 When he had called together all the people's chief priests and teachers of the law, he asked them where the Messiah was to be born. 5 "In Bethlehem in Judea," they replied, "for this is what the prophet has written: 6 "But you, Bethlehem, in the land of Judah, are by no means least among the rulers of Judah; for out of you will come a ruler who will shepherd my people Israel." 7 Then Herod called the Magi secretly and found out from them the exact time the star had appeared. 8 He sent them to Bethlehem and said, "Go and search carefully for the child. As soon as you find him, report to me, so that I too may go and worship him." 9 After they had heard the king, they went on their way, and the star they had seen when it rose went ahead of them until it stopped over the place where the child was. 10 When they saw the star, they were overjoyed.

Contemporary reading

Quote from Niels Bohr, in 1952,

quoted in Heisenberg, Werner (1971). *Physics and Beyond*. New York: Harper and Row. pp. 206. For those who are not shocked when they first come across quantum theory cannot possibly have understood it.

The Reflection for the Gathering

Written well over two thousand years ago, Psalm 8 (read to us earlier), expresses the awe which has always been in the human mind when we human beings have gazed up into space. From the dark night of a middle eastern desert, far away from 21st century light pollution, the heavens must have been stupendously amazing. The seemingly mysterious movement of sun and moon, the changing orientation of the skies as night drew on and as the seasons passed must have seemed to the ordinary person unintelligible and therefore supernatural. We know now that even in those ancient times, scientists, however, were observing and measuring as keenly as any modern day astrophysicist, calculating with precision, sometimes even rivalling what we can do today.

In writing about Jesus' origins, in the times in which he lived, to not have some special astronomical event heralding the birth of this increasingly special person would have been a gross oversight. Of course, someone who had proved to already be so transforming in people's lives, had a miraculous birth event! Didn't all the Great Ones have this – all the gods and goddesses, emperors and great men? All the more so, Jesus. The star in this story would have confirmed for many at the turn of the calendar into the common era, that this baby was one to watch and to follow as he grew. The story tellers made sure all the right signposts were in their narrative, including aligning the stars.

This tells us what a huge place in our psyche and in our collective unconscious has the cosmological framework of our universe. Even today many people who might never read a horoscope can tell you what birth sign they were born under. Under the stars we feel amazingly small and insignificant and yet we often dare to imagine that our lives are also linked in some mysterious way to the movement of planets and stars and solar systems.

And we are linked. The Ash Wednesday liturgy we have been using over the past few years intones the message “We are stardust and to stardust we shall return”. It is true. If everything on this planet began with a big bang, then we are descendants of that stardust exploding, multiplying and diversifying, and expanding still. We are kin to the majestic nebulae, constellations and supernovae that light up the night sky.

In much the same way as we could think of the oceans as our mother, we can regard the universe as our birth parent.

And the mystery continues. While there seemed to be a time of enormous optimism in the modern era that if science didn't have everything sussed, it soon would. I was surprised this week to see that Neils Bohr's quote, which I have known for some years, comes from 1952, the year I was born. Yet, much like niceties of biblical interpretation, quantum theory had not made it into schools by the time I was seventeen. I don't think that it is surprising as quantum theory is still baffling and shocking scientists, even those who understand it pretty well.

When you find out that a particle shot from one instrument to another changes its character several times on the journey, the stable security of Bohr's own model of the atom looks like a small home town. And, when you discover that once two sub-atomic particles get entangled, they remain entangled, echoing each other's movements exactly even when separated by more than kilometres of distance, we might well echo Einstein's conclusion that this is “spooky action at a distance”. But, this effect has been replicated and is known to be true and not due to outside influences.

It makes me wonder in a metaphorical way whether intercessory prayer is “spooky action at a distance”. If two people get entangled by love, interest, affection, concern or blood relationship, might it not be that when they are apart, the thoughts and wishes of one are echoed by, and could they be fulfilled, in the other? I love it when scientists are baffled by a difficult development. I feel it gives me all the more permission to be baffled as a theologian at how spirituality and religion work.

At the micro level, that solid atom with its protons and neutrons at the centre surrounded by spinning electrons which I was taught in school, we find now is in fact concealing a nucleus which is full of spinning, twisting, turning sub-atomic packets of energy. I sometimes wonder what the scientists have been imbibing in their laboratories when you learn that these are called ‘quarks’. There are ‘up’ quarks and ‘down’ quarks, a ‘bottom’ quark and a ‘top’ quark. Fair enough, purely descriptive so far, but there is also the ‘charm’ quark and the ‘strange’ quark! There are leptons which seemed to be observer particles, there, but not interacting in strong reactions. And there are gluons which do what their name suggests, ‘glue’ quarks together by managing the energy of the forces between them.

If the existence of the invisible atoms within you which make up your body blows your mind, then imagine a whole world of buzzing energy deeper within that atom, making everything work.

When you attempt to read about quarks and gluons and leptons you can't avoid the now ‘old’ news that the matter in our world is constantly changing between being particles and being waves of energy. It may be a case of our language being not fine enough to capture the reality, but there are many experiments which have documented the way so-called particles sometimes show particle

characteristics and sometimes behave as if they were waves. And it is not that Wednesday is wave day and Friday is particle day. These entities change from one mode to another within real time within the same experiment. It is as if there is a third reality beyond the concepts of particle and wave for which we have no language; in fact, this third reality is the way the world has always been even if we could not and cannot still describe it.

I love the idea of such a challenge to human arrogance, the world carrying on in its own sweet way whether or not we understand it, can describe it, or can see it.

And when these tiny particles are accelerated to massive speeds and made to collide, we find the resulting pictures are as beautiful in their own way as those Hubble helps us see in the heavens. Whether what was discovered under the streets of Geneva in the Large Hadron Collider was a God particle is more about media hype than anything, though it is an amazing story of human scientific patience. Peter Higgs, with others, proposed the Higgs effect in 1964 but had to wait until 2012 to see evidence of it. The Higgs boson effect is due to what is called the Higgs field, a field of energy which when excited by the Higgs boson, transfers that energy to particles in the form of mass. Naming it the God particle is a misnomer as the mass is not created out of nothing but out of energy. The beauty of these collisions at sub-atomic level echoes the beauty of the galaxies and solar systems at the extra macro level. The same beauty at either end of the universe's continuum.

In the way movies and TV programmes can do, let's now emerge from the spinning energy of the subatomic world, out to the Bohr atom with its nucleus and halo of electrons, further out to the human body, and further out again into space and study it closely.

So far we have been talking about what we can see in space – planets, suns, moons, stars, nebulae and supernovae. There is, however, much which is important to the universe which we cannot see and is still largely unknown. Study of this began relatively recently in the 1990s. Here is a piece from the NASA website which explains the history and the meaning of this discovery:

In the early 1990s, one thing was fairly certain about the expansion of the universe. It might have enough energy density to stop its expansion and re-collapse, it might have so little energy density that it would never stop expanding, but gravity was certain to slow the expansion as time went on. Granted, the slowing had not been observed, but, theoretically, the universe had to slow. The universe is full of matter and the attractive force of gravity pulls all matter together. Then came 1998 and the Hubble Space Telescope (HST) observations of very distant supernovae that showed that, a long time ago, the universe was actually expanding more slowly than it is today... No one expected this, no one knew how to explain it. But something was causing it.

Eventually theorists came up with three sorts of explanations. Maybe it was a result of a long-discarded version of Einstein's theory of gravity, one that contained what was called a "cosmological constant." Maybe there was some strange kind of energy-fluid that filled space. Maybe there is something wrong with Einstein's theory of gravity and a new theory could include some kind of field that creates this cosmic acceleration. Theorists still don't know what the correct explanation is, but they have given the solution a name. It is called dark energy.

The Nasa article then asks the question *What Is Dark Energy?* Listen carefully to the way in which they answer their own question:

More is unknown than is known. We know how much dark energy there is because we know how it affects the universe's expansion. Other than that, it is a complete mystery. But it is an important mystery. It turns out that roughly 68% of the universe is dark energy. Dark matter makes up about 27%. The rest - everything on Earth, everything ever observed with all of our instruments,

all normal matter - adds up to less than 5% of the universe. Come to think of it, maybe it shouldn't be called "normal" matter at all, since it is such a small fraction of the universe.¹

This final paragraph makes me feel so much better about being a minister and theologian. If the brightest scientific minds in our planet can say about the world "More is unknown than is known...it is a complete mystery. But it is an important mystery" then *we* can continue to talk with pride and dignity about the mystery we call God.

The Hubble telescope which began this investigation is the same one which brought us the beautiful images earlier in the Gathering.

I remember the news of this breaking. I thought at the time: "Well now, let me think, something invisible, full of energy, which holds the world together but we don't understand it, can't see, touch or measure it apart from its effect on the world? Sounds like something I might in fact say about the divine, the sacred, the numinous, about God however you might describe it.... something invisible, full of energy, which holds the world together but we don't understand it... Hmmm"

The ultimate metaphor for God might be that God is the dark matter which holds us. We sang it in the first hymn: "And deep inside where human eye can't follow are gluons, quarks, so small we can't see. Black holes create mysterious deep dark hollows, We're held by matter dark, invisibly"

Just as we continue to search and seek, to enquire and question the reality or non-reality of God, scientists continue to probe the mysteries of dark matter. Some are trying to find evidence of a particle which they have theorised might exist in dark matter. These they have called Weakly Interacting Massive Particles, or WIMPs for short. WIMPS are "hypothetical particles which may be the main (or only) component of Dark Matter"² Even wimps may be being rehabilitated! Good news for anyone whose been called a wimp at school!

Don't ever let yourself be put down by scientists who rubbish the non-empirical nature of your trust in something spiritual. The scientific world has a deep a mystery at its heart too.

In the meantime we all have the security of knowing dark matter holds our universe together, that mystery is officially now a scientific concept and that even wimps like us might be the key to the universe!

So let us confidently continue enquiring after the mystery which is God.

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¹ <https://science.nasa.gov/astrophysics/focus-areas/what-is-dark-energy>

² <https://www.universetoday.com/41878/wimps/>