

Spirituality after Einstein

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Images in prayer

Prayer and meditation have been part of religion since very early times. The oldest documented evidence of the practice of mediation are wall arts in India dating from about 5000 BC. The oldest literary records of prayer are Sumerian temple hymns dating from about 2300 B.C. though it seems likely that prayer was practised very much earlier than that.

Since prayer and meditation often utilise concepts and images, it is inevitable that people who pray will adapt their understanding of cherished religious images which were originally framed in non-scientific or anthropomorphic language. For instance this beautiful text on the power and bounty of God is found in the Jewish Old Testament:

He determines the number of the stars,
He gives to all of them their names.
He covers the heaven with clouds,
He prepares rain for the earth,
He make grass grow upon the hills.
He gives snow like wool;
He scatters hoarfrost like ashes.

— *Psalm 147 4,8,16. RSV Catholic Edition*

It is not too difficult to read this text in the way we read poetry. Most of us who make use of it in prayer today will be content with the thought that though God's manner of acting here is not literally true, the ultimate effect is the same: directly or indirectly, God gives us stars, cloud, rain, grass, snow and frost and all the wonders of our planet. The old-fashioned language is unlikely to create a major distraction for us

The rapid development of the physical sciences from the 15th century onwards created new challenges for spirituality, which drew heavily on features and images of the created world to try to find the way to God. The discovery that the earth circled the sun, rather than the reverse, was probably the first scientific discovery to bring about a major reappraisal of biblical texts. Nevertheless, while it created a major disturbance in theology at the time, it probably had less impact on spirituality, since the images of earthly and heavenly things remained the same. St. Ignatius of Loyola, writing in about 1530, speaks of blessings and gifts as descending from above, "as the rays of light descend from the sun, and as waters flow from their fountains". For Ignatius it was probably interesting but ultimately irrelevant whether the earth went around the sun or vice-versa.

The impact of modern science

Fast forward four hundred years and enormous scientific developments were radically changing our picture of the world. Or rather, these developments were changing the scientists' picture of the world, with only limited penetration among the ordinary people. Apart, that is, from Darwin's theory of evolution, which captured the imagination of the general public, particularly the phrase "the survival of the fittest". This was understood in a much less nuanced way than Darwin intended. There was in fact a living example of evolution at work in Darwin's time, which may have helped to popularise the new theory. As the smoke of the industrial revolution began to blacken the trees and walls of Europe, the colour of the peppered moth, which had been well camouflaged from birds by its mottled brown shading, began to change to black to avoid the attention of the birds. Or, to put this in Darwinian language, the natural selection of small random variations favoured the blacker moths, which began to produce more offspring. (In this case, as in all others, this was all 'survival of the fittest' meant). Darwinism probably did have some impact on spirituality, as cherished images of the Garden of Eden, and the creation of man, and then woman, by God, began to get fuzzy. St. Ignatius's reflection of "how God dwells in creatures: in the elements giving them existence, in the plants giving them life, in the animals conferring upon them sensation, in man bestowing understanding" was

a little less obvious than it had been before Darwin. How did God coexist with random mutations?

However, it is the insights of Einstein that have changed our understanding of, not only the world, but the whole universe, more than those of any other thinker. And again, while they raise issues for theology, it is not clear that they have the potential to disturb the spirituality of ordinary people saying their prayers. Yet there are a few extraordinary puzzles raised by Einstein's theories of special and general relativity that might inspire as well as distract those whose prayer life leads them to considering the wonder of the cosmos.

For instance, the concept of 'time' has figured so centrally in traditional Jewish and Christian spirituality that it seems strange that Einstein's demolition of the concept (as traditionally understood or imagined) has not had more impact on the way we think about our world and our relationship with God.

The most striking part of Einstein's theory is the obliteration of the ordinary concept of 'now'. 'Now' is a commonly used word or concept in the Bible. Take for instance, 2 Corinthians, 2 "At the acceptable time I have listened to you, and helped you on the day of salvation. Behold, now is the acceptable time; behold, now is the day of salvation". Or, take Isaiah, 33:10: "Now I will arise", says the Lord, "now I will lift myself up; now I will be exalted". But what does 'now' mean after Einstein?

Indeed, it is possible at the present time (though a little expensive) for anybody to check empirically what Einstein only intuited. You could buy two scientifically accurate timepieces (costing a few thousand euro each), and make sure they were set at exactly the same time. You could leave one in your living room and take the other on a hike up Lugnaquilla Mountain (925 metres), and leave it there in a safe place. Then you could retrieve it one month later and bring it back to your desk. And you would find that the timepiece you left on the mountain had gone 'fast' compared with the one on your desk. Just by a tiny fraction of a second, but definitely fast. Time moves faster the further you move from the centre of the earth. So what would it mean if you phone your friends on the top of Lugnaquilla and ask them that are they doing 'now'?

Conversely, time moves more slowly the nearer you come to the earth's core. The reason for this is that objects with a lot of mass, like the earth, create a strong gravitational field, and distort the spacetime continuum, in other words they 'bend' time and space. It has been calculated that the earth's core is 2.5 years younger than the surface of the earth because of the slowing down of time

at the core by the strength of the gravity there. The gravitational field gets weaker as you move away from that core, for instance by going up a mountain.¹

In short, the theory of relativity put an end to the idea of absolute time. Can you understand this? If not, you are not alone. It seems that our brains have developed to deal adequately with small ‘time’ differences affecting our lives, but not enough to understand the spacetime continuum. Most of us have grown up with the idea that time is something that ‘flows’, as if we were



St Augustine

being carried along through life by a slow river. But in fact, space and time (or spacetime as modern physicists refer to them, as a single concept) are best imagined as a kind of three-dimensional spider’s web, which pervades the entire universe, and in the midst of which we live. How we interact with this web is only dimly understood by scientists, and not at all by most other people. But it does not seem that we can say any more (in a scientific sense) that time is a ‘thing’ that ‘flows’, or ‘flies’ or whatever. Yet, time has always been a mystery. St. Augustine agonizes over it in *Confessions* (Ch.11), stating at one point:

It appears to me that time is nothing other than extendedness, but extendedness of what I do not know. This is a marvel to me. The extendedness may be of the mind itself.

The new wonders of the world?

But can we look on this new world of Einstein as a new set of Wonders of the World that can nourish our prayer and spirituality in the same way as the words of the Psalmist? To be honest, it has to be said that the great scientific revolutions of the 19th and early 20th centuries did not initially nurture people’s faith. The unpacking of the secrets of the universe by Newton, Darwin, Maxwell, Kelvin and others shook the faith of many in the biblical accounts of the creation

¹ In writing this blog, I have drawn on material in a number of excellent books, which are aimed mainly at the general reader. These include two books by Carlo Rovelli, *Reality is Not What it Seems*, Penguin Books, 2016; and *The Order of Time*, Penguin Books, 2018. Two other popular masterpieces are Stephen Hawking’s *A Brief History of Time*, Bantam Books, 1995; and Bill Bryon’s *A Short History of Everything*, Black Swan, 2016.

of the earth, and in the emergence of the human race. Matthew Arnold's *Dover Beach*, published in 1867, depicts the retreating tide of faith:

The sea of faith,
Was once, too, at the full, and round earth's shore
Lay like the folds of a bright girdle furled;
But now I only hear
Its melancholy, long, withdrawing roar,
Retreating to the breath
Of the night-wind down the vast edges drear
And naked shingles of the world.

For many, creation was gradually being transformed from a mystical experience into a mathematical and mechanical model. However, as we shall see, other forces were also at play in the construction of the model.

In a way, it is strange that scientific progress has, for many, stripped the earth of a divine presence. The evolution of species has had a curious impact in this respect. It is the main phenomenon that has inspired Dawkins and others to ridicule the notion of a divine creator, in books like *The God Delusion*. In reaction to this, I have found myself constructing a parable in my head about an old man who lived in the Appalachian Mountains in the early 20th century. His two sons had moved to New York and done well and one day the sons arrived back on a visit, in two Model-T Ford cars. The sons proudly presented the old man with one of them. They explained that this car had been created by Henry Ford. They told him that all he had to do was drive down to the nearest town from time to time and fill the car with petrol. "This is a creation of Henry Ford", they told him, "and it will go and go". And for many weeks the car went beautifully, and the old man continually praised Henry Ford, who made all this happen. But one particular day the car did not go, and the old man got out the horse and cart and drove down to the town. The man in the petrol station said that he would drive up and have a look, and when he arrived he lifted the bonnet to look at the engine. "What is that?" the old man exclaimed. "That is the engine", the mechanic said in surprise, "it is what makes the car go". "But my sons told me that it was Henry Ford!", said the old man. So Henry Ford doesn't exist after all. It is the engine that makes the car go!"

The process of evolution seems a far more ingenious and even miraculous mechanism for creating new species than the magical puff of smoke that the Book of Genesis conjured up in the imagination of our ancestors. Miraculous, because the mutations that drive evolution ultimately depend on the randomness created in the incredible and unimaginable world of quantum physics, the wonderful world of very small things. It is surely illogical for people

to find no place for God just because the processes that drive the created world are so amazing.

Heisenberg's indeterminacy principle is another wonder of the universe. Carlo Rovelli comments on Heisenberg's great insight about indeterminacy in 1925, inspired by the sight of the figure of a man appearing and then disappearing and then reappearing again, as he walked under the streetlamps in Copenhagen through alternating pools of light and darkness:

Electrons don't always exist. They exist only when they interact. They materialize in a place where they collide with something else. The quantum leaps from one orbit to another constitute their way of being real: an electron is a combination of leaps from one interaction to another. *When nothing disturbs it, an electron does not exist in any place.* (italics added).

—Carlo Rovelli, *Reality Is Not What It Seems*, Penguin Books, 2016, 100.

Like the disappearance of 'absolute time' described above, this phenomenon of indeterminacy at the quantum level totally defies human understanding. We can and do make wide use these concepts of quantum mechanics. They drive much of modern technology. But they can be described only by complex mathematical equations, and it seems we can no more get our mind around them than we can the mysteries of religion.

It is a commonly-held view that contemporary scientific research contributes to contemporary atheism. But does this arise as much from a pre-existing desire to deny the need for a God to explain anything, as from being the logical consequence of any discoveries that scientists have made? One illustration of this has been the obsessive interest in the search to find the Higgs boson. This subatomic particle became known colloquially as 'the God particle' after the title of a book by two physicists, Lederman and Leon, though in fact the name was widely disliked in the scientific community, and was coined by the publisher. This yet undiscovered particle was proposed as a possibility by Peter Higgs to explain why sub-atomic particles have mass. The boson was finally discovered in 2012 and matched the predicted properties of the hypothetical particle. Physicist Carlo Rovelli comments that "the fact that it has been called 'the God particle' is so stupid as to be unworthy of comment". Thomas Fleming commented at the time of the discovery:

The interest in the Higgs boson particle has little to do with the real science involved. Americans, unless they are going to be doctors or scientists, learn almost no science at school. What they learn is the new theology of how the universe began from nothing [and] how life originated in a primordial soup.

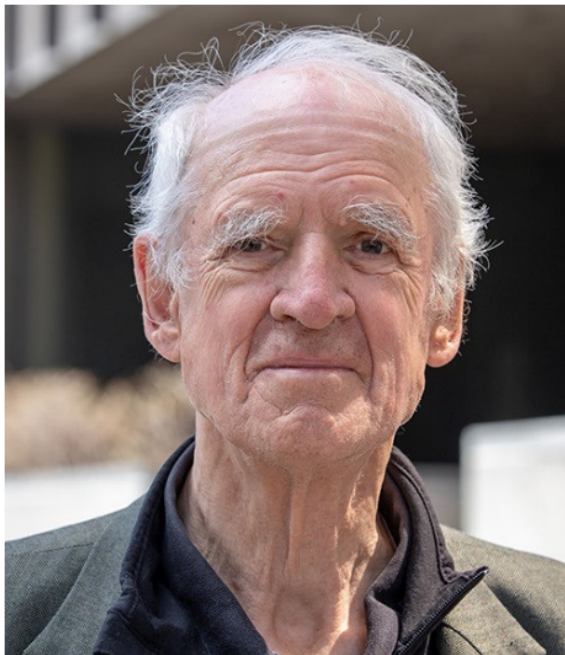
— *Daily Mail Online*, 6th July 2012

Other forces driving unbelief

However, on closer analysis it may be that the advances in science have less to do with religious decline than we thought, or at least have been less direct in their influence. One man who has explored this point of view is the Canadian philosopher, Charles Taylor. Taylor believes that deeper issues in modern culture are more influential than science in their impact on religious faith:

The thesis I'm presenting here is that by virtue of its post-revolutionary climate Western modernity is very inhospitable to the transcendent. This, of course, runs contrary to the mainline Enlightenment story, according to which religion has become less credible, thanks to the advance of science. There is, of course, something in this, but it isn't in my view, the main story. More, to the extent that it is true – that is, that people interpret science and religion as being at loggerheads – it is often because of an already felt incompatibility at the moral level... In other words... the obstacles to belief are primarily moral and spiritual, rather than epistemic².

— 'A Catholic Modernity': lecture given at the University of Dayton, January 25th, 1996.



Charles Taylor

Taylor's thesis is that Christianity (and other religions) gave rise to a dichotomy between ordinary experienced life and a higher transcendent life accessible only by faith. In the view of secularists, past and present, Christianity scorns the real, earthly good for some purely imaginary higher end, the pursuit of which can lead only to the frustration of the real, earthly good, and to suffering, mortification, repression, and so on.

For the secularists today (and to some extent for all of us), life itself, human flourishing, and driving back the frontiers of death and suffering are of supreme value. This was not always the case because of a sense, inculcated by religion, that there were higher goals. For secularists, by overcoming this kind of religion we can obtain the goals of our modern culture. (See Charles Taylor, *op.cit.*, 23 and *passim.*)

² Epistemic means relating to knowledge or to the degree of its validation.

For some readers this will immediately bring to mind John Lennon's song, 'Imagine':

Imagine there's no heaven; it's easy if you try;
No hell below us; above us only sky;
Imagine all the people living for today...
Imagine there's no countries; it isn't hard to do,
Nothing to live or die for; and no religion too...

However, Taylor is concerned at the failure of secularist and humanists to see that in turning their backs on all religious beliefs and principles they may be throwing out the baby with bathwater. Secularists are generally slow to acknowledge, or perhaps even to consider the possibility, that many of the goals of modern human flourishing are grounded in Christian principles. Even in Lennon's song, this tension is apparent:

Imagine no possessions; I wonder if you can.
No need for greed or hunger; a brotherhood of man –

which, whether intended or not, is almost a paraphrase of Jesus' Sermon on the Mount.

But to return to our main topic, Spirituality after Einstein, it may well be that certain ground-breaking physicists like Maxwell, Einstein, and Heisenberg have had little or no direct impact on religious belief or on our spirituality. Both Maxwell and Heisenberg were devout Christians; and Einstein remained enigmatic in his beliefs to the end. Darwin probably had more negative influence on religion, because, though coming from a religious background, he gradually became agnostic, and his theory of evolution seemed to come directly into conflict with the Biblical account of creation, at least in the popular mind. On the other hand, a number of 'popularisers' of modern physics are notably atheist, and some of these, like Richard Dawkins, have wandered boldly into the field of religion, and have possibly weakened the faith of some. Carlo Rovelli, another great populariser (as well a great scientist), is also an atheist, but is respectful of religious belief. However, Rovelli considers that from the days of Constantine onwards, the Church, because of its concept of absolute and infallible truth, greatly inhibited the advance of science. He sees science as being much more humble in its claims:

Science is not reliable because it provides certainty. It is reliable because it provides us with the best answers we have at present... The answers given by science, then, are not reliable because they are definitive. They are reliable because they are not definitive.... It's the awareness of our ignorance that gives science its reliability.

— Carlo Rovelli: *Reality is Not What it Seems*. Penguin, 2017, 230.

The indirect impact of science

If science has had an impact on spirituality, it is probably more through the way it has transformed our world than through its equations and its theories about the cosmos. Science drove the first industrial revolution, which, whatever its long-term merits, had a dreadful environmental impact, especially through the mining and burning of coal, and the production of coal gas and iron. Discharges from heavy industry went straight into the rivers and sewers, killing fish and wildlife. If God could formerly be glimpsed in nature, he was now invisible in large swathes of despoiled countryside and in blackened cities. For adults and children alike, there was little of transcendence to be found in the harsh life in the mills, mines and factories. Nor was home life any better, with workers and their families packed into crowded and unsanitary housing. Hopkins' great poem, *God's Grandeur*, shows the tension between the world created by God and the one despoiled by humans. When he wrote this poem Hopkins was living in a fine house high on a mountainside in rural Wales. Yet only a couple of miles below he could see the lower slopes of the mountain ripped apart for mining and quarrying, and the huddle of miners' houses:

The world is charged with the grandeur of God.
It will flame out, like shining from shook foil...

But Hopkins goes on:

Generations have trod, have trod;
And all is seared with trade, bleared, smeared with toil,
And wears man's smudge and shares man's smell...

Yet, for those with a certain cast of mind, there is as much wonder to be found in the behaviour of sub-atomic particles as there is in the beauty of mountains, lakes, flowers, and other natural wonders. A meditation on the difference in the 'movement' of time on Lugnaquilla, and in your home or office, could be as powerful as any Zen koan for contemplating the mysteries of the created world.

Perhaps the biggest challenge that modern particle physics has given to our traditional faith and spirituality is that it has given indeterminacy and randomness a central place in our model of the universe. Randomness first appears in a major way in Darwin's theory of evolution, since Darwin established that this process is driven by random mutations, the most useful of which are inevitably selected to build up succeeding generations. At first sight, this seems to run counter to the traditional image of God controlling and planning everything in the world down to the last detail – "Every hair of your head is numbered". The discovery by Heisenberg, more than 80 years after Darwin's insight, that a radical indeterminacy seemed to pervade the sub-

atomic world, gave further credence to an emerging view that we live in a universe that behaves in a totally random fashion.³

God as mystery

Spirituality is a very wide concept, and we have focussed on just some aspects of it, in particular the hope of a personal encounter with God in prayer and meditation, and the openness to finding God in all things. The question we are asking here is whether the world examined through the lens of modern science is more blurred than it was in simpler times, with traces of the divine now less obvious and, for those inclined to do so, easier to explain away.

It is unlikely that many people have had their faith in God, or their spirituality, destroyed by scientific discoveries alone. But science has been a major force in fashioning a world where we are now more conscious of the presence of man than of the presence of God, where silence and stillness and even darkness, the traditional places in which we encounter the gentle breeze of the Spirit, are harder to find.

Yet, the strength and vigour of our spirituality is personal to each one of us. Our spirituality has roots. It is rooted in the communities we have been born into, both secular and religious; in the temperaments and sensitivities we have acquired through nature and nurture; in the beauty or ugliness of the environment we have grown up in; in our education, including our religious education; in our experience of health and suffering and love; in the joy, or perhaps in the misery, of being alive; in our moral weaknesses and strengths; in our experience of sin and grace; in our beliefs, and in the image we have of God.

The last-mentioned two – beliefs, and our image of God - are crucial. First, beliefs. Notwithstanding the impulses of divine grace in our lives, we tend to believe what we want to believe. People believe things because it suits them to believe. And they stop believing in them because it does not suit them anymore. It is possible that our earliest ancestors believed in gods because it rescued them from the feeling of being lost and alone in a chaotic world, and even gave them hope that these capricious gods could be appeased by sacrifice. Later on, as humans learned how to have more control over their environment, and particularly as they began to resent the use of religious laws as a means of social control, many began to want *not* to believe in gods, and found it surprisingly easy to do. The clamour surrounding the effort to find the Higgs boson (the ‘God particle’), has been mentioned already. For many, its discovery was seen and welcomed as finally proving that the physical world was self-explanatory and

³ For a fuller discussion of this point see B. Toner, S.J., ‘Evolution: Does God Interfere?’ Blog – In All Things, August 2020

that 'God' could be consigned to history. Charles Taylor has rightly identified and described the cultural milieu in which God is an unwelcome guest.

Yet, we are not completely at the mercy of this milieu. Perhaps what leaves us most vulnerable (or invulnerable) to its insidious influence resides in the image we have of God. The great Indian spiritual writer, Tony de Mello, believed that most people remain trapped in the image they form of God. This, he says, is the greatest obstacle to meeting God. "The first step to reaching God [is] understanding that ideas about God are all inadequate"⁴ People who strive to encounter God in their heart, as mystery, rather than in their brain, as an intellectual construct, are less likely to be shaken by the ever-changing picture of the universe painted by science.

⁴ Anthony de Mello, *Walking on Water*, Columba Classics, p.12.