A Personal View of the Limitations of Science.

In a dialogue on 'Origins', held at Oxford University in 2012 between philosopher Anthony Kenny, Archbishop of Canterbury Rowan Williams and scientist Richard Dawkins, Kenny began proceedings by saying this, "We all believe in science. That it is one of the greatest of human achievements and we all owe the scientists of many generations a great debt of gratitude for the way in which they have improved the world."

I believe that statement to be partly true. For it is surely incontrovertible that science is, in fact, a double-edged sword, capable of being directed towards good and noble ends or, alternatively, dangerous and destructive ones. And yet science remains, for many, humankind's last great hope.

I want to begin by coming clean. I am a scientist (or rather was), being paid handsomely to study chemistry for 5 years after leaving school whilst working in laboratories in some of the biggest coal-fired and nuclear power stations in the country. At that time I worshipped science (along with money, status, sport and pleasure). God never figured at all.

But gradually, God began to bring me to my senses. I remember, in particular, an incident whilst I was working at a nuclear power station in North Wales designed by Sir Basil Spence and hidden beautifully in Snowdonia National Park!

Concentrated acid had eaten through some pipe-work and leaked into the local stream which in turn fed into a river where many fish had died. I was working 12-hour night shifts at the time, so it fell to me to take samples from the stream every hour through the night to test the pH of the water.

I suppose that was my 'pigsty' moment - though quite a beautiful setting - as I sat, alone, at 4 am on the bank of the stream, surrounded by hills, trees, mountains and the twinkling stars. Surely there was more to life than science (or money, status, sport and pleasure, for that matter).

Another light bulb moment came when I was taking a Royal Institute of Chemistry examination. I remember distinctly two of the questions on the paper. One was, "If you were given a sample of moonrock, how would you analyse it without destroying it?" And the other was, "Make up your own question and answer it." Even the examiners, it seemed, had grown weary of having to set question after question after question!

But did I really want to spend the rest of my life answering questions like that or even making up questions to answer (not as easy as it may sound)?

Incidentally, if you want to know what happened to the precious moonrock, (some of it at least), I heard recently that an American guy had bought some and asked for it to be incorporated in the paint used to spray his bespoke car being made in Britain! Such are the wonders of science!

I eventually arrived at the largest coal-fired power stations in the country, all in Yorkshire, (indeed Drax is still the largest in Europe though now it has been weaned onto Bio-mass instead of coal), and it was here that someone began to ask me questions I had never even thought of, or had time for, previously.

Questions like, "Why am I here? What is the purpose of my life? Where am I going?" Important questions, but ones which fall outside the remit of science to be able to ask, never-mind to answer.

Drax Power Station

Today, however, we still tend to venerate the likes of Sir David Attenborough, Professors Brian Cox, Richard Dawkins et al. and although, for us as Christians, their TV programmes may confirm the wonder and glory of God's creation, their insights neither provide much hope in the short-term (1 million species of plants, animals and insects are currently at risk of extinction) nor any hope whatsoever for the long-term future of planet earth or for those who live on it.

According to them, what began with a Big Bang, will end with a Big Inferno. Earth will be absorbed into an expanding sun in 7.5 billion years' time. The End.

Space Exploration

And what about space exploration? As I write, there is a cornucopia of rockets, robots, rovers, orbiters and other assorted paraphernalia, hurtling out into space to faraway destinations. But Mars is currently the destination of choice.

It's worth paying a bit more attention to the fuss that is currently being made about Mars; several nations are involved. On July 19 this year, the United Arab Emirates (UAE) launched their interplanetary probe (from Japan) which will go into orbit around Mars early next year.

Scientists like to be optimistic, so they have named this probe 'Al-Amal,' which, in English, translates as 'Hope'. According to Space scientist Maggie Aderin-Pocock (who, incidentally, wants to visit Mars as part of her 'retirement plan'), the Arabs intend to colonise Mars by 2117. (1) Scientists also love to be specific!

Nasa's ***Perseverance*** rover, also destined for the red planet, will, once it arrives, give birth to a small 1.8 Kg ***Ingenuity*** helicopter which will emerge from its belly. Scientists are nothing if not persevering and ingenious!

Meanwhile the Chinese also want a piece of the pie. Their rocket took off on 23rd July this year from Hainan Island (9 years late after their first attempt fell back to earth after problems with the Russian rocket). Interestingly, they have named this new mission 'Tianwen-1' which translates as 'Heavenly Question'.

But I have some Heavenly Questions of my own.

If we can't deal with and control the relatively low level of carbon dioxide (CO2) in the earth's atmosphere (0.04%), how on Mars are we going to be able to deal with its atmosphere (such as it is) where the concentration of CO2 is 95.3%?

And how will be breathe when we have 21% Oxygen in earth's atmosphere to sustain us, but next to none in the Martian atmosphere?

And if we wilt when the temperature on earth goes above 30 degrees centigrade in Summer and freeze when it goes below zero in Winter, how will we cope with the much greater temperature fluctuations on Mars – e.g. minus 150 deg. C at the poles in Winter?

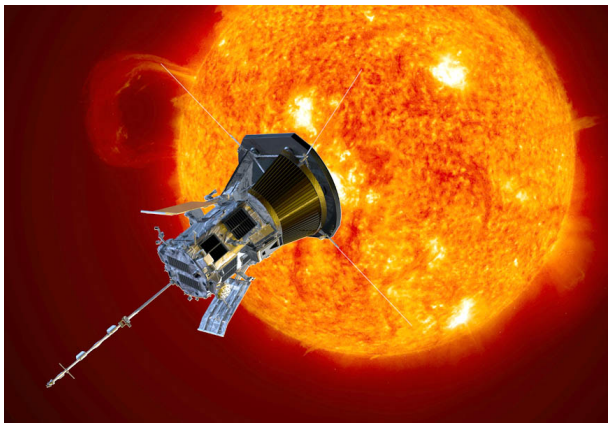
Of course, the burning question with respect to Mars is this, 'Is there, or has there ever been, life on Mars?' This question, for me, is akin to the puzzle of whether there is a monster in Loch Ness or not! Some say 'yes', some say 'no'; some have seen 'proof', the majority are sceptical. But science loves to go on debating these questions year on year, decade after decade.

In fact, some scientists believe they have seen evidence of life forms on Mars, not as a result of our going there, but through a meteorite from Mars conveniently coming to us on Earth!

Icarus and the Parker-Solar-Probe

So much for Mars, but the contraption on its way to the sun interests me most.

It reminds me of the rather forlorn Icarus, on the same trajectory, flapping his wings of feathers and wax for all he was worth, before his venture ended in failure and he plummeted, hot, bothered, melted and crestfallen, into the sea! And all because he failed to follow his father's instructions on how to use the pair of wings which he had created for him and where it was safe to fly.



Never mind, this present construction (the Parker-Solar-Probe) will get 'closer than ever before' to the sun, 'reveal things we never knew before' and may even 'tell us more about the origins of the universe'.

Personally, I'm quite happy with the Biblical account in the first two chapters of Genesis.

But I confess, there was a time when I was enthralled by the thought of space travel and all the benefits that would inevitably flow back to earth from it.

Perhaps this interest was ignited when, as a boy in the 1950's, I went to see the Blue Streak rocket engines being test-fired at Spadeadam, not many miles from where I lived. In my imagination, I can still hear the roar and see the flames!

It wasn't explained to me at the time that Blue Streak was an intermediate ballistic missile designed to reach Moscow with a nuclear warhead. Thankfully the whole project turned out to be a damp squib and came to nothing.

Later, as a young adult, and still hooked on the potential of space travel, I even drove 20 miles just to sit in the seat of an Apollo space capsule on display in Leeds. Now I'm not so sure as to what the long-term benefits of space travel are. Here on earth, things hardly seem any better and, currently, much worse.

In any case, whereas the mantra for the 20th century was 'Progress' (especially of the scientific variety), the word on everyone's lips for the 21st century is 'Survival' – can we survive here on planet earth?

As we've already seen, plans are afoot for us to up sticks and move to Mars – powered this time, not by something akin to Icarus's home-made, self-propelled, 'Birdman' invention, but maybe on the much more assured and sturdy wings of Richard Branson's Virgin Galactica!

Marie Curie and Radium

But in order to (further) illustrate that science is a double-edged sword, I'll just give another example: that of the discovery of radioactivity by Marie Curie (and her husband Pierre) in 1898.

Marie Curie was awarded 2 Nobel prizes. One for Physics in 1903 (with her husband Pierre and Henri Becquerel), and another for Chemistry in 1911.

Spiritually, Marie had turned away from God after her mother died in 1878 but maintained a life-long interest in the occult, attending seances, sometimes with her husband.

By separating pitchblende (an ore of Uranium) into its chemical components, she and her husband discovered two new elements, Polonium (named after Poland where Marie was originally from) and Radium (from the Latin word 'radius' meaning 'rays').

It was these energy 'rays' from radium that interested them (especially as the metal gave off a rather attractive blue light) and Marie was the first to coin the words 'radiation' and 'radioactivity'.

Unfortunately, no one at the time realised how dangerous these radioactive rays were to the human body, (radium is a million times more radioactive than uranium).

Partial scientific knowledge can be a very dangerous thing.

Chocolate and Condoms

Because the rays from radium were thought to impart energy and vitality, it was added to a range of products. It was mixed with chocolate (manufactured by Burk & Braun in Germany), it was added to water used in baking bread, it was incorporated into lipstick and face powders to bring youth to your complexion and even added to toothpaste in order to bring a shine to your smile. A 'Radium-scope' children's toy was sold until 1942.

But perhaps its most surprising (and frightening) application was that radium was thought to aid virility on the one hand and prevent the transmission of sexually transmitted diseases on the other, so it was used in the manufacture of condoms!

Tragic, but this is where science can lead us if we are not careful. Marie Curie herself died in 1934 from a type of blood disease due to her exposure to radiation.

My mind goes back to the times when I was kitted up with full protective gear as I occasionally went into areas of relatively high radiation, with the Geiger counters pinging away; and all to keep the lights burning in the north of England and Wales. But I don't remember anyone ever coming out to applaud us!

However, after the Curies', worse was to follow. Once we discovered that the atom could be split with the release of unimaginable energy, why not develop weapons of mass destruction? The mushroom cloud, and the rest, are well known and were remembered last month with the 75th anniversary of the first atomic bombs being dropped on Hiroshima and Nagasaki.

Today of course we use radiation as a form of therapy to treat cancers. The rays kill the rogue cells, and all others in their path, and then we hope and pray that the good cells will recover from the bombardment.

And, thankfully, we have the Marie Curie Charity and Limited Company with their honourable mission:

'To help people and their families living with a terminal illness make the most of the time they have together by delivering expert care, emotional support, research and guidance.'

And so it is, we always have to weigh the positives and negatives of scientific discovery, the benefits and the drawbacks, the blessings and the curses.

Cryonics and Cyborgs – the Road to Eternal Life?

Meanwhile, the folks I feel most sorry for are those who had died, yet gone in for cryopreservation. Their super-cooled bodies are now suspended in containers of liquid nitrogen, awaiting a time when scientific knowledge will have advanced so far that death itself will have been vanquished (presumably no one told them that it already has been).

They are hoping that, one day, they can be brought back to life, repaired, restored and buffed up, rather like an old vintage car, before being sent out again on the road of life with a brand-new MOT certificate!

Personally, I am more inclined to believe in the death and resurrection of Christ and his offer of eternal life which, unlike cryopreservation, is free at the point of delivery.

But there is another really up to date and futuristic way of helping us prolong life and even cheat death; let's become a race of cyborgs - i.e. people who are half human and half machine! Using radical surgery, artificially intelligent computers and robotics technology, we will be a new breed the like of which has never been seen before!

Personally, I would rather wait for my completely new, Spirit empowered, perfected and eternal body, fashioned after Jesus' new resurrection prototype.

Which brings me to a final question. "Has scientific medical imperialism led us astray into a world of excessive over-treatment for the ill and dying, to the detriment of spiritual and family matters?"

Of course, it would be wrong to underestimate the enormous benefits of modern medicine and technology and the often selfless, loving care of those who work in this noble profession. But, nevertheless, this is a question which needs to be asked and more medics themselves are now asking it.

At the beginning of the 20th century, 85% of people died at home surrounded by family and friends. Today, according to Public Health England figures, roughly 55% of people die in hospitals surrounded by impersonal machinery and anonymous professionals, and only 20% will die at home. (18% will die in care homes, and 7% in a hospice). These are pre-pandemic figures.

I have accompanied many folks through long and arduous treatments, clinging to life and the NHS at all costs. There is no doubt that in most cases they were given an extra quantity of life, but whether it meant extra quality was debatable.

And to talk about death itself, still seems to be taboo among some medics, patients and relatives. John Wyatt (Professor of Neonatal Paediatrics at University College, London) gives some ideas as to why this might be and writes:

“Sometimes doctors, patients and relatives enter into a joint deception to avoid discussing the likelihood of death. The doctors do not want to discuss the possibility of ‘failure’; the relatives do not want to destroy the patient’s hope; and the patient is clinging on to the possibility of a medical miracle. Instead of open and honest discussion about the likelihood that death is approaching, there is a strange and ultimately damaging game of pretence.” (2)

Theologian Allen Verhey writes: - “The body of the dying person has become the battlefield where heroic doctors and nurses wage their war against death.” (3)

But ultimately, it is a war that is going to be lost; 100% of us still die - and dying on a battlefield, even if it is a hospital battlefield, is unlikely to be the best location. The questions ‘how’ and ‘where’ we die are surely as important as ‘when’.

The Limitations of Science

Surely doctors and health professionals (and all scientists) must recognise the limitations of their knowledge, technology and abilities, and that these limitations come, not from their own inadequacies and incompetence, but from the ongoing limitations of science and from the nature of our humanity – that we are all fragile, fallible, dependent human beings who are all subject to disease, ageing and death.

Only then, and with this mindset, I believe, are we likely to see more clearly the uniqueness of each person and give thanks for their history, their joys, their accomplishments and sorrows as they breathe their last; anything else amounts to a deception. And death itself should always be regarded as a spiritual event, not just a medical one.

And to those scientific people who believe only in a materialistic world which banishes God and the spiritual dimension, I would ask you to ponder this:

If you say that science provides no basis for God, you are also saying that science provides no basis for anything else central to human life: hope, fear, love, hate, envy, honour, striving, suffering, sacrifice, forgiveness, virtue etc.

You will have to believe, with the atheistic French biologist Jacques Monod, that 'man at last knows that he is alone in the unfeeling immensity of the universe, out of which he emerged only by chance.'

God or No God?

But we do have a choice. We can either believe that 'In the beginning God created the heavens and the earth' or we can believe that 'In the beginning the heavens and earth created themselves.'

These, it seems to me, are the only two options, and both of them are statements of faith. One believes, by faith, that we are here by choice (God's), the other believes, also by faith, that we are here by chance.

In the dialogue I mentioned at the beginning of this article, Richard Dawkins, who is an atheist, said, "The Laws of Physics have combined to produce all life, working through the process of natural selection." And, "The Laws of Physics have produced the illusion of design."

However, one of the problems is that if we leave God out, then science itself becomes a 'god' and we begin to look to science to provide the things which only God can. And that, ultimately, leads to disappointment and a false hope.

We see this being played out in the current pandemic crisis. Whereas down through history people have generally looked to God for help and deliverance in times of crisis, today many are looking to science instead.

But 'Houston we have a problem!' Whilst our politicians have sought to be 'guided by the science', scientists have been disagreeing amongst themselves about the best courses of action. Science is not speaking with one voice! It very rarely does!

And if it is true that there are millions and millions of viruses that are just waiting for an opportunity to jump from animal species to humans, will science be able to save us?

However, to conclude: I do myself (despite what I've written here!), believe in the validity of all genuine scientific exploration as a means of attempting to discover and understand what God has created; so long may it continue. And, most importantly, we need God's wisdom to know how to apply that knowledge for good and not for evil.

Today's scientists who are also Christians, follow in the distinguished line of Copernicus, Kepler, Pascal, Galileo, Boyle, Newton, Lavoisier, Faraday, Mendel, Pasteur, Joule, Kelvin, Marconi, Heisenberg, Collins, McGrath, Lennox etc.

As the words over the doors of the Cavendish Physics laboratory in Cambridge remind us: "Great are the works of the Lord; they are studied by all who delight in them." (Psalm 111:2).

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<u>References:</u>

(1) Aderin-Pocock, Maggie, *'Earth to Mars'* (Radio Times, 8-14 Aug. 2020).

(2) Wyatt, John, '*Dying Well*', (IVP,2018).

(3) Verhey, Allen, '*The Christian Art of Dying, Learning from Jesus'*, (Eerdmans, 2011)