

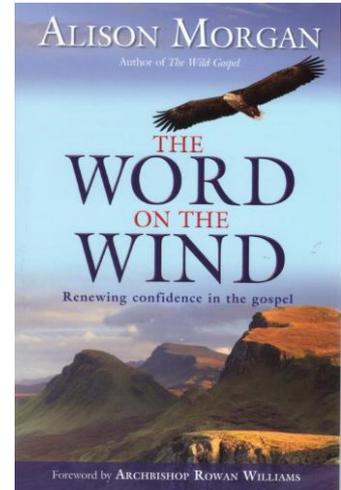
The Word on the Wind

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Roreword by Rowan Williams

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Chapter Eleven : Confidence in creation

'Ever since the creation of the world, his eternal power and divine nature, invisible though they are, have been understood and seen through the things he has made' – Romans 1.20

As we saw in Part 1, one of the factors which most undermines confidence in the gospel is the ongoing debate about the proper relationship between science and faith, and our mistaken tendency to choose either the one or the other as we seek to answer the two fundamental questions which life asks us – how do we know things, and how do we make sense of them. In recent years this debate has stretched itself primarily between the two opposing poles of evolution and creation: on the one hand we find atheist geneticists brandishing Darwin and claiming that evolution offers a complete and self-sufficient explanation for the development of life, and on the other we see creationist Christians waving Genesis and claiming that God created the world and everything in it in a single six day period less than 10,000 years ago. Many churchgoers sit bemused in the middle of all this, worried that somehow both sides are missing something, and wondering if it's really necessary to choose between them. Outside the Church, the popular misconception that Christians don't accept the theory of evolution is a major stumbling block to the gospel.

The good news, of course, is that we do not have to choose between belief in God and the theory of evolution. Science and faith, often falsely represented to us as alternatives, are in fact partners in our attempt to understand the universe and our place within it. Science is a process, a methodology which seeks to explain the properties of the physical world – the word 'science' comes from the word for knowledge, and science, as we saw in chapter two, is about what we know. Faith, on the other hand, is a framework, an attempt to look at the big picture and to explore what it all means – the word 'faith' comes from the word for trust, and it's about how we make sense of what we know. Aristotle called them by the perhaps more helpful terms of 'physics' and 'metaphysics': metaphysics is that which goes 'beyond physics'. The vast majority of scientists and theologians affirm this distinction. Owen Gingerich, professor of astronomy and history of science at Harvard University, reminds us that 'science works within a constrained framework in creating its brilliant picture of nature', but 'reality goes much deeper than this.' Theologian Wolfhart Pannenberg suggests that if we are properly to understand the natural world, we must bring our understanding of God to bear on what we discover through science.¹ For many people over the centuries accurate observation of the created world has been not an obstacle but a great stimulus to their faith, and this remains so today. Science and faith are not in competition: they have different remits.

Clearing the decks

We saw in chapter eight that the Bible is a complex text which, like God himself, uses language in many different ways. Written over a period of some two thousand years, it contains a mix of different literary forms. Within its pages we find myth, law, history, poetry, prophecy and plain ordinary correspondence. Consistent in its claim to offer truth, that truth is expressed now as fact, now as metaphor, now as dream or vision. It seems obvious that

just as today we do not read an instruction manual with the same expectations that we bring to an advertisement or a love letter, so we should not read Genesis in the same way that we read Luke's account of the Acts of the Apostles or Paul's letters to the Corinthians. We, living in a scientific age which thinks of truth in scientific terms as something simple, objective and verifiable, can easily forget this; and it is this which lies at the source of the current confusion.²

The book of Genesis was written not as history or science but as theology; in Aristotle's terms, it's a work of metaphysics, not physics. Properly speaking, it is myth – not in the popular, myths-and-legends sense of fictional writing, but in the technical sense of truth expressed in narrative or poetic form. It does help us to understand what was happening as God created the world, but it does not aim to explain how he did it. To look to Genesis for a literal account of how the universe came into being is to impose on it a mindset completely alien to those who wrote it; it is to make what is properly termed a 'category mistake'.³ Our task as Christians is to relate to the natural sciences as they actually exist; we cannot create our own sciences.

If creationism is indeed based on the uncritical acceptance of modern scientific assumptions about the nature of truth, we should expect to find that it is a relatively new approach to the attempt to understand how the world came into being; and this is exactly what we do find. Throughout history theologians have warned that the book of Genesis should not be taken as a literal account of how the world was created. In the first century, Jewish scholar Philo explained that its opening chapters were intended symbolically, being not literal explanations but 'modes of making ideas visible.' In the third, Origen pointed out that as there clearly could not have been morning and evening before there was a sun and a moon, the Genesis account is clearly intended to 'indicate certain mysteries through a semblance of history.'⁴ In the fifth, Augustine spluttered with prophetic wisdom that if Christians set themselves up as experts on matters of physics and biology when the biblical texts could clearly be interpreted in many different ways, no one would take them seriously when they talked about matters of faith.⁵ Throughout the Middle Ages, the Bible was held to be capable of holding any of four different levels of meaning: literal, moral, allegorical or spiritual; only in the 16th century, with the new insistence that it could be read as a stand-alone text free of the interpretive framework of the Catholic Church, was the foundation laid for a literalistic interpretation of scripture. The belief that the Earth is less than 10,000 years old is not a traditional Christian one; it was in fact proposed for the first time in the early 17th century by James Ussher and John Lightfoot, who calculated that God had created the Earth on Sunday 23rd October 4004 BC at 9 am London time, or midnight in the Garden of Eden.⁶ And what we know now as creationism was first invented in the late 19th century by the Seventh Day Adventists Ellen White and George McCready Price; its current popularity dates from 1961, and the publication of a book called *The Genesis Flood* by an engineer named Henry Morris.⁷ Not only does creationism fly in the face of undeniable evidence from geology, palaeontology, genetics, mathematics and physics, it is not, and never has been, a mainstream Christian belief.

As Theodosius Dobzhansky, a prominent scientist and member of the Russian Orthodox church, writes, 'It is a blunder to mistake the Holy Scriptures for elementary textbooks of astronomy, geology, biology and anthropology. Only if symbols are construed to mean what they are not intended to mean can there arise imaginary, insoluble conflicts.'⁸ Science and theology are not competitors, and to insist we must choose between them is to offer a false choice. The choice we do have to make is in fact a hidden one: it lies not between evolution and creation (or come to that between M-theory, the latest brainchild of theoretical physicists, and creation) but between materialism and theism – the belief that the physical world is all there is and the opposing belief that there is a God beyond it.⁹ Materialism is not a scientific process but a philosophical belief – and therefore in itself a kind of faith. Many materialists acknowledge this. Immunologist George Klein explains: 'I am an atheist. My attitude is not based on science, but rather on faith.. The absence of a Creator, the non-existence of God, is my childhood faith, my adult belief, unshakeable and holy.'¹⁰

In the beginning was the Word...

'By faith we understand that the worlds were prepared by the word of God, so that what is seen was made from things that are not visible' – Hebrews 11.3

It was our first winter in Somerset, and it snowed. I drove up into the Mendips to find a silent wonderland of soft drifts, blue and white landscapes and buried signposts. Far below, the Levels glittered green in the sunlight, and millions of starlings gathered for their pre-roost dance, ready to twist and turn above the reeds, black against an orange sky. Children laughed on new sledges, and I was filled with awe, and joy, and delight at being alive. It was hard, that afternoon, not to think of God. And it is my experience that life offers such moments regularly; moments which invite us to look beyond the demands of the everyday and connect with the bigger picture. The world we can see, and which increasingly reveals itself to be a place of astonishing complexity and improbable diversity, leads us by the hand into the world we cannot see, the world of eternal reality.

The Bible does not attempt to help us to understand the physical processes by which the universe and everything in it came into being. But it has plenty to say to us about the invisible reality on which the visible world depends. It speaks of these things in precisely the two metaphors which we have been exploring: Word and Spirit. Word and Spirit, the vehicles of our relationship with God, are also the vehicles of creation. In the beginning when God created the heavens and the earth, we read in the first verse of the book of Genesis, the Spirit of God was hovering over the waters. In the beginning when all things came into being, we read in the first verse of the gospel of John, was the Word. In the beginning, both the Old and the New Testaments proclaim, there were these two things: the Spirit and the Word. The biblical language of creation knows nothing of singularities and strings, nothing of nucleotides and mitochondria. But if scientists tell us what the words of reality are, perhaps our faith can tell us who spoke them. Our faith does not end with science; as the great Christian spiritual writers have always known, it begins there.¹¹

Language, as we have already seen, determines how we think. I find it fascinating that scientists often speak about the creation of a living universe in terms of words. 'What lies at the heart of every living thing is ... information, words, instructions,' Richard Dawkins has said, referring to DNA.¹² DNA is commonly referred to as an alphabet, a single 64 word code which has spelt life in all living things since the beginning of time. It is the ultimate way of storing information, information which when decoded spells not just plants, insects and animals but also you and me. Geneticists such as Francis Collins, director of the Human Genome Project, and biochemists such as Denis Alexander, formerly Chair of the Molecular Immunology Programme in Cambridge, see this language both as God-given and as finding continuously developing expression through the mechanism of evolution. Francis Collins has written a book, *The Language of God*, in which he coins the term 'BioLogos' to describe his conviction that God interacts with reality precisely *through* the process of evolution.¹³

The same inclination to talk about creation in terms of speech is found in physicists and mathematicians. Quantum physicist Paul Davies has suggested that the application of information theory to science leads us to believe that 'perhaps the universe is really a frolic of primal information, and material objects a complex secondary manifestation.' Einstein's colleague John Wheeler said that eventually we would learn to understand all of physics in the language of information. John Lennox, professor of mathematics at the university of Oxford and a specialist in the philosophy of science, observes that what needs explaining is not the origin of life but the origin of information, for it is information which is fundamental to the existence of the universe. This, he points out, is no easy task, for information is both invisible and immaterial.¹⁴

So reality, it seems, is spoken; and this, curiously, is how the people of God have always understood it. In the beginning God spoke, and the world was created. A word, as we have seen, is *dabar*, which means both word and deed. Scripture presents God's words not simply as flat and factual things, but as the active agents of life itself – so that what is seen is indeed, as the writer to the Hebrews knew, made from things that are not visible. Later that word was spoken to us directly by Jesus, its living manifestation; and his words seemed to carry within them the same creative power. Perhaps it is no coincidence that 'logos' was the word which John used to

describe Jesus; language, we believe, lies at the heart of physical reality. It lies at the heart of our reality too; for it is language which distinguishes us from all other creatures and makes us uniquely human. Perhaps this is what the Bible means when it says we are people made in the image of God, for we have minds which not only have the capacity to communicate directly with God, but which are able to engage in profound and astonishing ways with the universe he spoke. It is language, and not just logic, which makes everything possible. Reality comes in words.

And the Spirit of God was hovering over the waters...

'In him all things in heaven and on earth were created, things visible and invisible; all things have been created through him and for him. He himself is before all things, and in him all things hold together' – Colossians 1.17.

If information is a fundamental property of reality, so too is energy. Energy is fundamental to everything from the initial explosion into being of the universe to the continued existence of every individual atom. Here too we as Christians have inherited a way of thinking about these things; energy, power and life are all properties of the Spirit of God. Throughout the whole of scripture, the Spirit is identified with the power and energy which come from outside the visible world but which govern all that happens within it.¹⁵ This continues in our own experience; we saw in the last chapter that Paul describes the work of the Spirit as 'energising', and that this energy, having been newly released through the resurrection of Jesus, is available to work through us in various ways today.¹⁶

The origin of the energy which created and sustains life remains shrouded in mystery; indeed, it seems that whilst we know that it can be neither created nor destroyed, we do not know what energy actually is. We do, however, know what it does. Physicist John Polkinghorne is content to read the Genesis description of the Spirit hovering over the waters as the universe was created as perfectly consistent with the scientific theory of the Big Bang. He rewrites it like this:

'In the beginning was the big bang. As the world sprang forth from the fuzzy singularity of its origin, first the spatial order formed, as quantum fluctuations ceased seriously to perturb gravity. Then space boiled .. blowing the universe apart with incredible rapidity in the much less than 10^{-30} seconds that it lasted. ... For a while the universe was a hot soup of quarks and gluons and leptons, but by the time it was one ten-thousandth of a second old, this age of rapid transformation came to a close and the matter of the world took the familiar form of protons and neutrons and electrons. The whole cosmos was still hot enough to be the arena of nuclear reactions, and these continued until just beyond the cosmic age of 3 minutes. The gross nuclear structure of the universe was then left, as it remains today, at a quarter helium and three-quarters hydrogen. It was far too hot for atoms to form around these nuclei, and this would not occur for another half a million years or so. By then the universe had become cool enough for matter and radiation to separate. The world suddenly became transparent and a universal sea of radiation was left to continue cooling on its own until, 15 billion years later, and by then at a temperature of 3°K, it would be detected by 2 radio astronomers working outside Princeton.'¹⁷

Terry Pratchett is easier to follow, but says essentially the same thing: 'The current state of knowledge can be summarised thus: In the beginning, there was nothing, which exploded.'¹⁸ What was nothing like, how could it explode, and what came before it (for physicists now suggest there may have been a 'pre-bangian' universe)?¹⁹ We do not know, and we may never know. But what we do know can be talked about in the biblical language of the Spirit as well as in the specialist language of physics; and indeed the Spirit himself can be seen as an adequate theological explanation for a physical conundrum, for the energy which set the whole thing in motion, the source which lies outside the physical reality within which we are confined, cannot by its very nature be explained from within this reality. Astrophysicist Robert Jastrow suggests that 'the essential elements of the astronomical and biblical accounts of Genesis are the same; the chain of events leading to man commenced suddenly and sharply at a definite moment in time, in a flash of light and energy.'²⁰ The trail of that explosion is still evident all around us: astonishing amounts of energy are locked up not just within the nuclei of uranium

atoms but even inside our own bodies: within the frame of a single adult lurks as much energy as would be released in the explosion of thirty large hydrogen bombs.²¹

From this singular beginning, life developed. How, again we do not know. DNA, the vehicle of life, is not itself alive – it's just a natty zip-like structure of amino acids, and the odds against their arrangement into the hundreds of thousands of proteins needed for life is apparently $10^{400,000}$ to 1. Fred Hoyle famously compared this to the likelihood of a tornado sweeping through a junkyard and producing a jumbo jet.²² As for life itself, Paul Davies describes it as 'the most astonishing phenomenon in nature.'²³ It can be recognised but not defined, and certainly cannot be reduced to a property of an organism's constituent parts; at best, we exist not in our physical components, for those constantly change, but in the patterns between them.²⁴ There is more to life than can be explained by physics or genetics. 'What is it that breathes fire into the equations and makes a universe for them to describe?', Stephen Hawking once asked.²⁵ It's not a physical question but a metaphysical one. Theologians answer it by talking about the Holy Spirit, the *ruach* or breath of God. What makes you alive? Breath is in fact as good a definition as anyone has yet come up with.

Once we have DNA, evolution can begin. Whilst the evidence for evolution is overwhelming, it too carries its conundrums. In particular, it seems that mathematically there has not been time for it, and it's been suggested that this means it should be seen as a process with an inbuilt 'bias' of some kind.²⁶ Nonetheless, develop it did; through a gradual evolution of forms, each more complex than the last, in a remarkable unfolding of the diversification of species. Francis Collins, head of the Human Genome project and as eloquent and informed an evolutionist as you will find, suggests that that evolution can only be fully understood as a process instigated by God.²⁷

If the origin of the universe and the development of life within it remain something of a mystery, so too does the continued existence of the complex system which is life on Earth. James Lovelock was one of the first scientists to think about how the whole thing keeps going. His research led him to conclude that 'the only feasible explanation of the Earth's highly improbable atmosphere was that it was being manipulated on a day-to-day basis from the surface, and that the manipulator was life itself.'²⁸ Theologians, who over the centuries have wondered whether not just the original creation of the universe but also its continued existence can be thought about in spiritual terms, have with good biblical authority referred to this 'manipulator' as the Spirit of God. Reflecting on passages such as Psalm 104, Ambrose wrote in the 4th century: 'If it were possible to remove the Spirit from creation, all beings would become confused and the life in them would appear to have no law, no structure, no ordered purpose whatsoever. Without the Spirit, the entire creation would be unable to continue in being.'²⁹ Sir Thomas Browne remarked in the 17th that 'ther may be (for ought I know) an universall and common Spirit to the whole world ... I am sure there is a common Spirit that playes within us, yet makes no part of us, and that is the spirit of God, the fire and scintillation of that noble and mighty Essence, which is the life and radially heat of spirits. This is that gentle heate that brooded on the waters, and in six days hatched the world... whosoever feels not the warme gale and gentle ventilation of this Spirit (though I feel his pulse) I dare not say he lives.' In the 19th century philosopher Georg Hegel suggested that the whole of reality is the continued manifestation of one universal Spirit, and in the 20th, theologians Teilhard de Chardin and Paul Tillich both wrote of the Spirit as the power directing the processes of life.³⁰ But the person who has perhaps made the most thorough contribution to our understanding of the role of the Spirit within creation is Wolfhart Pannenberg. For Pannenberg, the divine Spirit is the power of life that both transcends the living organism and yet is intimately present in each individual. The Spirit's presence is what sustains that individual and keeps him alive, so that the act of creation not only occurs in the beginning but is repeated at every moment. Perhaps, Pannenberg says longingly, 'a renewed doctrine of the Trinity would combine the Logos doctrine of the ancient church with contemporary information theory and recognize the activity of the divine spirit in the self-transcendence of life and its evolution.'³¹

What does this mean for us? Vincent Donovan summed the whole thing up in personal terms, offering the Spirit as the explanation for everything from our ability to get up in the morning to the fact that the television

continues to work: 'We Christians profess to believe in a continuing creation. We believe that God is continuing to create and to hold in existence the world and everything in it: the atom, and the molecule, the mountain and the chair, the rocket hurtling through space, the television set, my finger and my mind: that if God ceased to create, took away his creative presence, all these things, and we ourselves, would cease to exist on the instant. This creative power is acting now and here.'³² He is echoed by biochemist Arthur Peacocke: 'the continuing creative power which is manifest ... at all levels of existence ... is, in the Christian tradition, God as "Holy Spirit".'³³

So for the Christian, it seems that the 'who' behind the universe, the Word and Spirit who spoke and animated it, still speaks and animates today. Metaphysics is not an alternative to physics or biology, but rather their completion; a perspective which helps us to make sense of the information we have discovered and continue to discover. Our faith enables us to put a framework of meaning round the picture of material reality; it both completes the picture and gives us another way of looking at it. It enables us to do something which scientists cannot: to look at things from the outside.

But it does more than that too. In giving us a wider perspective on life than the purely material, faith opens up avenues of thought that lie outside the province of science. Through the language of faith we find that it is possible to think not just about creation and evolution, but about purpose and eternity, about what it means not simply to be alive but to be a human being with all the joys and sorrows, memories and ambitions which materialists wish to limit to the pre-determined behaviour of an assembly of nerve cells and molecules. In insisting that nothing can be known which cannot be known through science, materialists seem to slam shut the door on half of life.³⁴ As Christians we find that it is indeed possible to think constructively about who we are and where we are going. We find that we can smile at what we know and do not know, and entrust ourselves to a God to whom we can actually speak, and to whom we may clearly listen. This is the living world of faith; this is the framework within which we do our science. It's a bit like being in a room full of immensely complex and interesting things, and then opening the window to find yourself gazing in astonishment at a whole new realm outside it.

Good news for John Ruskin

John Ruskin was the foremost art critic of the 19th century. In his book *Modern Painters* he describes his awareness of the spiritual dimension which lies within and beyond the created world:

'There was a continual perception of Sanctity in the whole of nature, from the slightest thing to the vastest; an instinctive awe, mixed with delight; an indefinable thrill, such as we sometimes imagine to indicate the presence of a disembodied spirit. I could only feel this perfectly when I was alone; and then it would often make me shiver from head to foot with the joy and fear of it, when after being some time away from hills I first got to the shore of a mountain river, where the brown water circled among the pebbles, or when I first saw the swell of distant land against the sunset, or the first low broken wall, covered with mountain moss... If we had to explain even the sense of bodily hunger to a person who had never felt it, we should be hard put to it for words; and the joy in nature seemed to me to come of a sort of heart-hunger, satisfied with the presence of a Great and Holy Spirit.'³⁵

For reflection and discussion

Everywhere, in all the heavens you will find his footprints,
all regions are filled with his mysterious letters,
all heights and depths with his handwriting that only he can decipher.
All-powerful one, why do you not teach us to read your book?
Why do you not move your finger along the letters
and teach us to piece them together and understand like children?

But no, that you do not do. You are no schoolmaster,
You let things be as they are, incomprehensible as they are.
Then, one day in the evening of time, will you delete them all again,
let everything become darkness, as it was before you arose from your thoughts
and wandered off to set them down while on your way with the burning coal in your hand?

Par Lagerkvist

1. Do you identify with Ruskin and Lagerkvist in their awareness of the spiritual dimension which lies beyond the world we can see?
2. 'Living in an urban area feels to me a bit like being covered with a paving stone, but I'm always secretly pleased when I see paving stones being cracked by the roots of trees – I am all on the side of the tree. Paving stones do crack and life goes on and I might not get what I wanted, but there are so many things I never imagined and didn't know how to want that now I am eternally grateful for' – Anna Farago. Do you find, like Anna, that God can speak to you through even the most ordinary details of the world around you? How can you make the space and time for him to do this more easily?
3. 'Either half my colleagues are enormously stupid, or else the science of Darwinism is fully compatible with conventional religious beliefs – and equally compatible with atheism' – Stephen Jay Gould.³⁶ Do you find that there is tension between the theory of evolution and faith in God? What about people you know outside the Church? How can we help them to think clearly about the relationship between faith and science – do you see this as a ministry opportunity?
4. 'Ever since the creation of the world, his eternal power and divine nature, invisible though they are, have been understood and seen through the things he has made' – Romans 1.20. Meditate on this verse.

Endnotes

¹ Owen Gingerich, *God's Universe*, p.6. Wolfhart Pannenberg, *Toward a Theology of Nature*, p.48. See also Francis Collins, head of the Human Genome Project: 'There is no conflict in being a rigorous scientist and a person who believes in a God who takes a personal interest in each one of us. Science's domain is to explore nature. God's domain is in the spiritual world, a realm not possible to explore with the tools and language of science. It must be examined with the heart, the mind, and the soul – and the mind must find a way to embrace both realms.' *The Language of God*, p.6.

² Viewing Genesis as a scientific text leads to some remarkable results. In 2007 a 27 million dollar Creation Museum opened in Kentucky. It sets out to demonstrate that the universe was created in 6 consecutive 24 hour periods, that the earth is 6,000 years old, and that all human beings are descended from two individuals named Adam and Eve. It has a special effects theatre, complete with vibrating seats, where you can watch a video of the Great Flood and learn how dinosaurs survived on board the Ark. See www.creationmuseum.org and the related www.answersingenesis.org, which asserts that 'The Bible – the history book of the universe – provides a reliable, eye-witness account of the beginning of all things' – though they don't explain exactly *whose* eyes witnessed these things (certainly not those of Moses, supposed author of the book, or those of the person or persons who centuries later wrote it down).

³ A category mistake is one which uses the information at hand (scriptural, scientific) to answer the wrong question. In this instance, scriptural information cannot be used to tell us how, and scientific information cannot tell us why. Mary Midgley comments: 'with the largest, most puzzling questions, we have no choice but to proceed in mythical language which cannot be explained in detail at all, but which serves.. to indicate what sort of spiritual universe we perceive ourselves to be living in. This is the province of religion. Adding God is not, as Dawkins thinks, adding an illicit extra item to the cosmos, it is perceiving the whole thing differently' - *New Scientist*, 7th October 2006. Creationism is at least in part a reaction against the so-called 'social Darwinism' of the early 20th century, which coined the term 'survival of the fittest' and taught that it can be applied not just to biological species but to whole people groups – thus paving the way for racist philosophies such as Nazism. Many Christians felt that if this was what evolution taught, they wanted nothing to do with it; but it does illustrate the dangers of building a philosophy out of a scientific theory.

⁴ See Nick Spencer & Denis Alexander, *Rescuing Darwin – God and evolution in Britain today*, pp.46-48 'Genesis in history'.

⁵ 'Usually, even a non-Christian knows something about the earth, the heavens, and the other elements of this world, about the motion and orbit of the stars and even their size and relative positions, about the predictable eclipses of the sun and moon, the cycles of the years and the seasons, about the kinds of animals, shrubs, stones, and so forth, and this knowledge he holds to as being certain from reason and

experience. Now, it is a disgraceful and dangerous thing for an infidel to hear a Christian, presumably giving the meaning of Holy Scripture, talking nonsense on these topics; and we should take all means to prevent such an embarrassing situation, in which people show a vast ignorance in a Christian and laugh it to scorn. The shame is not so much that an ignorant individual is derided, but the people outside the household of the faith think our sacred writers held such opinions, and, to the great loss of those for whose salvation we toil, the writers of our Scripture are criticized and rejected as unlearned men. If they find a Christian mistaken in a field which they themselves know well and hear him maintaining his foolish opinions about our books, how are they going to believe those books and matters concerning the resurrection of the dead, the hope of eternal life, and the kingdom of heaven, when they think their pages are full of falsehoods on facts which they themselves have learned from experience in the light of reason?' From *On the Literal Meaning of Genesis*, quoted by Francis Collins, *The Language of God*, p.156.

⁶ See Adam Nicholson, *Power and Glory - Jacobean England and the making of the King James Bible*, p.149. Nick Spencer points out that even Darwin only realised in 1861 that the marginal notation in standard Bible editions claiming the world began in 4004 BC was derived from James Ussher, and not from the Bible itself - Nick Spencer, *Darwin and God*, p.42.

⁷ For the rise in creationism in the 20th century see Nick Spencer & Denis Alexander, *Rescuing Darwin*, pp.26-27.

⁸ Collins, *The Language of God*, p.206.

⁹ Stephen Hawking, having previously thrown statements about 'knowing the mind of God' into his work, suggests in his recent book on M-theory that the law of gravity is sufficient explanation for the existence of the universe; 'it is not necessary to invoke God'. Professor Hawking does not attempt to explain how or why the law of gravity should itself exist, and early responses suggest that most scientists (including many atheists) and theologians see no incompatibility between the potential implications of the (as yet unproven) M-theory and the Christian faith. See Stephen Hawking and Leonard Mlodinow, *The Grand Design*. Hawking, like Nietzsche before him, may be premature in his declaration that God is unnecessary. Frank Close, theoretical physicist at the University of Oxford, comments: 'I don't see that M-theory adds one iota to the God debate, either pro or con' - see Hannah Devlin, *The Times*, 2.9.2010.

¹⁰ Geneticist Richard Lewontin agrees: 'our willingness to accept scientific claims that are against common sense is the key to an understanding of the real struggle between science and the supernatural. We take the side of science.. because we have a prior commitment.. to materialism.' See John Lennox, *God's Undertaker - has science buried God?*, p.34-35. Science itself, on the other hand, is simply a method; it can be defined as 'an organised endeavour to explain the properties of the physical world by means of empirically testable theories constructed by a research community trained in specialised techniques' - Denis Alexander, *Science, Friend or Foe?*, quoted Nick Spencer and Denis Alexander, *Rescuing Darwin*, p.52.

¹¹ Romans 1.20. Bonaventure's 13th century *Ascent of the Mind to God* describes the ways in which contemplation of the physical world can lead us, as if by the rungs of a ladder, into the presence of God; see the article by Alison Morgan on Praying with St Bonaventure, online at www.alisonmorgan.co.uk/Articles.htm. Or try 18th century Jonathan Edwards, *Images or Shadows of Divine Things*. Many examples of such writings are given by Matthew Fox, *Original Blessing*, particularly in Appendices A and C.

¹² *The Blind Watchmaker*, p.112.

¹³ Francis Collins, *The Language of God*. Denis Alexander, *Creation or evolution - do we have to choose?*.

¹⁴ Paul Davies, *New Scientist*, 30.1.99 (Davies has written many books, including *God and the New Physics* and *The Goldilocks Enigma - why is the universe just right for life?*). John Lennox, *God's Undertaker*, quotes Bernd-Olaf Koppers, *Information and the Origin of Life: 'the problem of the origin of life is clearly basically equivalent to the problem of the origin of biological information'*, p.139. For Wheeler see p.167; see also Lennox's full discussion in chapter 9, 'Matters of information'.

¹⁵ Examples of biblical passages referring to the role of God in creation can be found in Alison Morgan, *Praying with Creation*; in addition to those cited in this chapter see especially Psalm 104. Other examples are Job 12.10; Job 33.4; Job 37-39; Psalm 33.6-9; Psalm 65.5-13; Psalm 102.25-26; Psalm 135.6-7; Psalm 148; Proverbs 8.22-31; Jeremiah 10.12-13; Wisdom of Solomon 11. 17-12.1; Wisdom 13.1-9; Jeremiah 10.12-13; Matthew 6.25-30.

¹⁶ It is notable that both the coming of the Spirit upon Jesus at his baptism and the release of the Spirit to all believers after his crucifixion are represented as irruptions of energy which tear open the heavens (see Mark 1.10 and Mark 15.38). The resurrection itself is an event which depends upon divine energy.

¹⁷ *Science and Christian Belief - theological reflections of a bottom-up thinker*, p.71. See also quantum chemist Henry Schaeffer, who remarks: 'A Creator must exist. The Big Bang ripples and subsequent scientific findings are clearly pointing to an ex nihilo creation consistent with the first few verses of the book of Genesis', quoted by John Lennox, *God's Undertaker*, p.29.

¹⁸ Terry Pratchett, *Lords and Ladies*, p.7.

¹⁹ See for example the article 'The Myth of the Beginning of Time', by Gabriele Veneziano, founder of string theory, *Scientific American*, May 2004.

²⁰ Quoted by Francis Collins, *The Language of God*, p.67. Collins also notes that the laws of physics work perfectly from the first 10⁻⁴³ seconds after the Big Bang onwards, but break down if we attempt to reach backwards beyond that point.

²¹ 'You may not feel outstandingly robust, but if you are an average-sized adult you will contain within your modest frame no less than 7 x 10¹⁸ joules of potential energy - enough to explode with the force of thirty very large hydrogen bombs, assuming you knew how to liberate it and really wished to make a point. Everything has this kind of energy trapped within it. We're just not very good at getting it out. Even a uranium bomb - the most energetic thing we have produced yet - releases less than 1 per cent of the energy it could release if only we were more cunning' - Bill Bryson, *A Short History of Nearly Everything*, p.109.

²² For the statistical odds see John Lennox, *God's Undertaker*, ch 7, 'The Origin of Life.' For a layman's summary see Bill Bryson: 'By all the laws of probability proteins shouldn't exist. To make a protein you need to assemble amino acids (which I am obliged by long tradition to refer to here as 'the building blocks of life') in a particular order, in much the same way that you assemble letters in a particular order to spell a word. The problem is that words in the amino-acid alphabet are often exceedingly long. To spell 'collagen', the name of a common type of protein, you need to arrange eight letters in the right order. To make collagen, you need to arrange 1,055 amino acids in precisely the right sequence. But - and here's an obvious but crucial point - you don't make it. It makes itself, spontaneously, without direction, and this is where the unlikelihoods come in. The chances of a 1,055-sequence molecule like collagen spontaneously self-assembling are, frankly, nil. It just isn't going to happen.' Bill Bryson, *A Short History of Nearly Everything*, p.254.

²³ Paul Davies, *God and the New Physics*, p.58.

²⁴ Consciousness cannot be accounted for in physical terms; research in the new discipline of neuroscience suggests that logical, emotional and spiritual processes occur as mutually distinct patterns of activity in the brain - see Danah Zohar and Ian Marshall, *SQ - Spiritual Intelligence*, ch 3 'Three kinds of thinking'.

²⁵ *A Brief History of Time*, p.209. See also John Lennox: 'All theories on the origin of life run aground on the question 'how did the genetic code, along with the mechanisms for its translation, originate?' - for it seems not that DNA created life but rather that life created DNA, p.134-36.

²⁶ For the maths see John Lennox, *God's Undertaker*, pp.109-10 - 'What say the mathematicians?'. For the bias see Hugh Montefiore, *The Probability of God*, p.161: 'although there is no external force imposed on species, and in particular on their genetic systems, mutations occur which would not be expected by random mutation. This is not because of external pressure, but because of the bias implanted in matter. Such bias is not, of course, to be detected by scientific measurement (and so the hypothesis is not testable) since there is no possibility of setting alongside it matter which is not implanted by the bias towards complexity and integration. Another way of describing this bias would be to call it the Holy Spirit working with the matter of the universe, unfolding the purposes of the Creator by immanent operation.'

²⁷ *The Language of God*, ch 10, 'BioLogos'.

²⁸ 'The entire range of living matter on Earth, from whales to viruses, and from oaks to algae, could be regarded as constituting a single living entity, capable of manipulating the Earth's atmosphere to suit its overall needs and endowed with faculties and powers far beyond those of its constituent parts.' Lovelock called this mechanism 'Gaia'. James Lovelock, *Gaia*, pp.6-9.

²⁹ *On the Holy Spirit*, 2.5.33, quoted by Simon Ponsonby, *God inside Out*, p.94. Simon has a whole chapter on the Spirit and creation.

³⁰ Thomas Browne, *Religio medici, Major Works* p.99. For Hegel see Simon Ponsonby, *God inside Out*, p.76. Pierre Teilhard de Chardin's *The Divine Milieu* is an extended essay on the role of the Spirit in the created world. Paul Tillich deals with the Spirit and creation in vol 3 of his *Systematic Theology, Life and the Spirit*.

³¹ Wolfhart Pannenberg, *Toward a Theology of Nature*; see especially pp.65-66. The theological perspective which holds that creation is a continuous process in which the universe is actively sustained in being by its creator is often called process theology or panentheism. A good summary is given in the Church of England's report *Man and Nature*, edited by Hugh Montefiore.

³² Vincent Donovan, *Christianity Rediscovered - an epistle from the Masai*, pp.133-4.

³³ Arthur Peacocke, *Creation and the World of Science*, p.151.

³⁴ Francis Crick, one of the discoverers of the structure of DNA, had this to say about human identity: 'You, your joys and your sorrows, your memories and ambitions, your sense of personal identity and free will, are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules' - *Astonishing Hypothesis - the scientific search for the soul*, p.3. Peter Atkins, professor of chemistry at Oxford, offers these contributions to the human search for meaning: 'There is no reason to suppose that science cannot deal with every aspect of existence. Science has no need of purpose. All the extraordinary, wonderful richness of the world can be expressed as growth from the dunghill of purposeless interconnected corruption', *Creation Revisited - the origin of space, time and the universe*, pp.127-28. Richard Dawkins asks 'Why on Earth should anyone assume that there IS a purpose? You are assuming that the "why" question is a sensible or legitimate question. Not all questions are. You have no right to expect an answer to a silly question' - in a webchat with Ruth Gledhill, *The Times*, 9th September 2010. They would do well to heed the advice given by Nobel Laureate Sir Peter Medawar: 'There is no quicker way for a scientist to bring discredit upon himself and upon his profession than roundly to declare - particularly when no declaration of any kind is called for - that science knows, or soon will know, the answers to all questions worth asking, and that questions which do not admit a scientific answer are in some way non-questions.. that only simpletons ask and only the gullible profess to be able to answer.' *Advice to a Young Scientist*, Harper and Row 1979, p.31.

³⁵ John Ruskin, *Modern Painters* (1843) - quoted in *The Creation Spirit: An Anthology*, p.19.

³⁶ 'Impeaching a self-appointed judge', *Scientific American*.