

further information

Articles:

The Faraday Papers, particularly numbers 5 “*Why Care for the Environment?*”, 8 “*The Age of the Earth*” and 12 “*Creation and Evolution not Creation or Evolution*”.

All available at www.st-edmunds.cam.ac.uk/faraday/Papers.php

Wiens, R. C., “*Radiometric Dating: A Christian Perspective*”

www.asa3.org/ASA/resources/Wiens.html

Kolstoe, S. and Moore, H., “*Being a Christian in Research.*”

www.cis.org.uk/resources/articles-talks-and-links/students/

Books:

White, R. S. (ed.) “*Creation in Crisis: Christian Perspectives on Sustainability*”

(2009) ISBN 978-0281061907 - particularly chapter 7

Alexander, D., “*Creation or Evolution - Do We Have to Choose?*”

(2008) ISBN 978-1854247469

Spencer, N. and White, R. S., “*Christianity, Climate Change and Sustainable Living*”

(2007) ISBN 978-0281058334

Useful Websites:

Christians in Science: www.cis.org.uk

The ASA, CiS's US sister organisation: www.asa3.org

Be Thinking: www.bethinking.org/science-christianity

Biologos - science and faith in dialogue: biologos.org

Map of Life: www.mapoflife.org

Geology for Global Development: www.gfgd.org

Geology for Global Development Blog: www.geo-development.blogspot.co.uk

Test of Faith: www.testoffaith.com

The Faraday Institute: www.faraday-institute.org



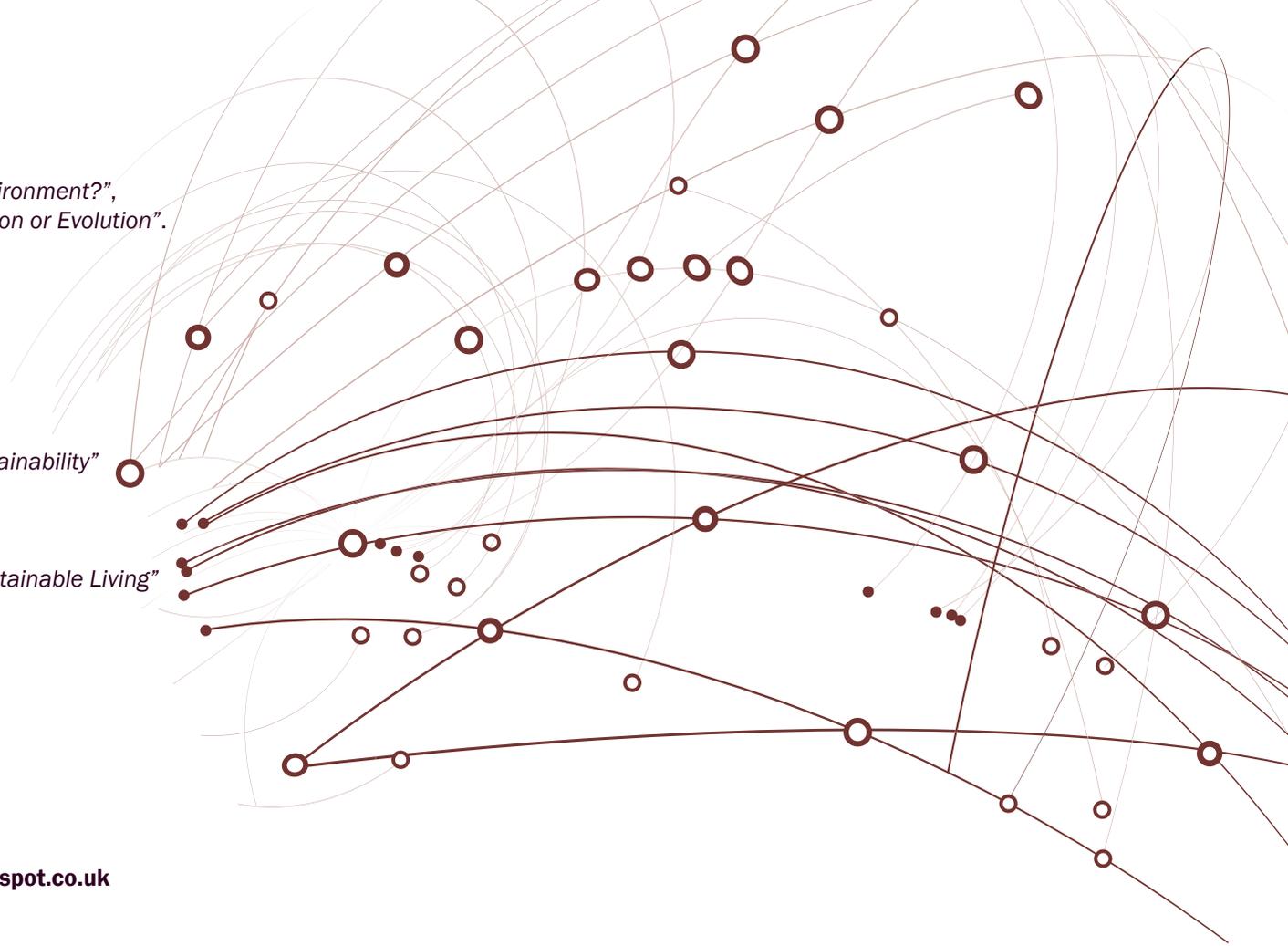
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being a christian in
earth science



studying earth science as a christian

What has earth science got to do with Christianity? Not much on the face of it, but in reality quite a lot. Issues such as the age of the Earth, what the fossil record says about evolution, natural disasters and climate change are of vital importance. This leaflet aims to encourage you in your calling as an earth scientist and provide some advice on dealing with common challenges associated with being a Christian in earth science.

about the authors



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for Global Development and has been President of Cambridge University's science magazine, BlueSci. Having been brought up in the Church of England, he has since drifted from, and returned to, Christianity. He now takes a keen interest in theology and is an Associate of The Faraday Institute for Science and Religion.



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His research group studies mantle plumes and rifting, the structure of continental margins, flood basalts and active volcanoes. He attended church from childhood but became a committed follower of Jesus during his first year at university when he first sat under biblical preaching.

earth science as a calling

Earth scientists are very privileged. We study phenomena at a tangible, human scale; we have a good appreciation of the incredible power of natural forces; and much of our work is outside, where we can admire the beauty of the landscape. It is easy to see, therefore, how earth scientists can develop a deep admiration for the beauty of creation. As St. Paul writes to the Romans, “[God’s] eternal power and deity, has been clearly perceived in the things that have been made.” (Romans 1 : 20). This verse is often used to promote natural theology, the idea that God is self-evident in our ordinary experiences of the world around us. This natural theology doesn’t necessarily ‘prove’ the existence of God, but for many it nonetheless induces a feeling of the transcendent, a deep-seated longing that points towards God.

But it doesn’t stop there. Our awe for the world around us should also instil in us the desire to care for the creation. In Genesis, God set humankind in ‘dominion’ over the planet. This doesn’t mean we can do as we please with it, but rather that we are to be stewards of the majestic world in which we find ourselves. Since we are created “in the image of God”, this gives us the responsibility to care for the world in the same way as God does.

Consequently, Christians in earth science have numerous important roles to play: in developing and conserving clean water supplies; in attempting to minimise human tragedies as a result of natural disasters; in working towards the sustainable use of resources; and in researching both climate change

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and mitigation technologies such as carbon sequestration. The organisation *Geology for Global Development* (www.gfgd.org/) is one way to find out more about careers in these areas.

Furthermore, as Christians with an understanding of how our planet works, we are also called to respond to the various global problems on a personal level. This includes: humanitarian aid, education and awareness, prayer, political lobbying, ethical purchasing and careful consideration of our own use of resources.

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earth science and christianity - common challenges

The earth sciences are a fertile area for Christian reflection. For example, the age of the Earth and the evolution of life are both areas in which there has been significant debate. In the sections below we will explore how polar viewpoints on such issues might perhaps be reconciled.

This is followed by sections on natural disasters and climate change. These topics pose searching questions; here we aim not so much to provide an 'answer' to a 'problem', but rather to suggest some possible starting points for further reflection.

the age of the earth

Over the last century, science has developed techniques to measure the age of the Earth. We now know from radiometric dating that, to within a few million years, the Earth is 4,567 million years old. The radiometric dating methods used are scientifically robust and there are large volumes of evidence to support them. Thousands of papers have been published in scientific journals on the subject and the ages obtained agree well with other measurements from independent methods such as tree rings and ice cores.

But some Christians, particularly Young Earth Creationists, disagree. They interpret the beginning of Genesis literally, believing that the Earth was created in six days. They then approximate its age by adding up the

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life-spans of those mentioned in various genealogies and conclude that it is less than 10,000 years old. It is important not to alienate Christians who hold such views; this is not an issue that greatly affects the way we live out our faith. Nonetheless, such a view is incompatible with the science and can result in other scientists shunning the whole of Christianity. We gently suggest that there is room for an alternative view.

Scientific writing didn't emerge until the seventeenth century, so it doesn't make sense to read the Genesis narrative as a scientific textbook. Furthermore, it's hard to see how Genesis can be referring to literal days of creation when the sun and moon aren't made until the fourth day! Rather, Genesis is a theological text that explains God's purposes in creation and his relationship to it. Indeed, many of the early church fathers and the great theologian Augustine took this approach.

In fact, an 'old' Universe is vitally necessary for life to have developed at all - an idea known as the anthropic principle. What is more, life on Earth has survived despite the rate of rotation of the Earth slowing by about five times and the Sun's power increasing by 30 percent over its lifetime. The position of humankind relative to the size and age of the Universe is truly humbling; a feeling which should reinforce, not diminish, our wonder at God's creation.



evolution and the fossil record

Evolution is a popular topic in the realm of science and religion and one that is pertinent to earth scientists because of the importance of the fossil record.

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One of the counter-arguments to evolutionary theory is the supposed absence of intermediate forms. However, it is known that the resolution of the fossil record is much too poor to keep pace with the expected speed of evolution based on what we observe today.

Furthermore, speciation events are known to occur in small, isolated populations that stand little chance of being preserved in the fossil record. Quite simply, we wouldn't expect to see many intermediate forms anyway! As evolutionary biologist J. B. S. Haldane pointed out, all you need to falsify evolution is a rabbit in the Precambrian. But amongst all the fossils ever collected, nobody ever has - the scientific evidence for evolution is overwhelming.

An alternative stance is Intelligent Design. This position isn't creationist as such, but it invokes God as the sole explanation for certain 'irreducibly complex' aspects of living organisms, such as the bacterial flagellum. But evolutionary theory doesn't need this sort of intervention to explain

complex organisms. What is more, Intelligent Design doesn't make robust scientific predictions; it too is contrary to both the scientific method and the scientific evidence.

But a harmonious position is possible, best described as 'theistic evolution'. Rather than stepping in and magically fixing some things and not others, as suggested by proponents of Intelligent Design, God imbues his creation with such fertility that life creates itself via the process of evolution. This doesn't remove God's involvement, but rather emphasises his immanent, sustaining power in the process.

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Palaeobiologist Simon Conway Morris makes a further interesting point. Convergent evolution, by which we mean the development of similar biological solutions in different branches of the evolutionary tree, is a known scientific phenomenon (see the *Map of Life* website www.mapoflife.org/index/).

The camera eye, for example, has evolved seven separate times.

Conway Morris sees evolution as a sort of search engine exploring a fixed landscape of biological possibilities. Perhaps, then, evolution does in a sense have only a limited number of outcomes, of which humankind is an inevitable one.



natural disasters

The problem of evil and suffering in the world is often seen as one of the greatest barriers to faith in God. How could a benevolent God allow such pain, particularly when that pain has a natural cause? The devastation caused by floods, earthquakes and volcanoes seems on the face of it to be irreconcilable with Christianity.

Life is hard—there are no easy answers to this problem and we lose credibility if we try to offer them. Furthermore, our response on an intellectual level is almost certainly not going to be useful pastorally. Nonetheless, a few things are worth thinking about.

The same natural processes that make the Earth habitable can also cause us suffering. Without the natural greenhouse effect, there would be no liquid water on the planet and no life as we know it. Without flooding, agriculture would not be possible in many parts of the world. Without earthquakes and volcanoes, vital minerals and nutrients wouldn't be recycled. But couldn't an omnipotent God make a habitable natural world without the need for these disasters?

There are three approaches which attempt to address this question, each with their own problems. The first is the idea that all suffering in the world is in some sense ultimately the result of humankind's disobedience to God. But it is clearly a mistake to make a one-to-one correlation between those who suffer in a particular disaster and the sins they may have committed. What about the case of a two-month-old baby dying in a tsunami? Jesus pointed out the fallacy of a one-to-one link when a tower at Siloam fell down, killing 18 people. He

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commented, *"Do you think that they were worse offenders than all the others who lived in Jerusalem? No, I tell you."* Jesus then went on to point out that physical death comes to everyone: *"unless you repent, you will all likewise perish"* (Luke 13 : 4-5). He reminds us of the reality of our need for God's mercy.

A second proposal is the 'free process' approach, namely that God created a free world. As John Polkinghorne explains in his book *Belief in God in an Age of Science*, *"A world allowed to make itself is better than a puppet theatre with a Cosmic Tyrant."* In other words, if humans are to be truly free agents - thereby allowing the possibility of sin - then we must inhabit a free physical

world that is morally neutral. However, some see this as problematic because it suggests that God does not have foreknowledge of the future.

Relevant to both these positions is a challenging question: on what grounds are we able to judge benevolence or omnipotence anyway? As Voltaire points out, if God has created us in his image, we have more than returned the compliment. We are inherently limited by our characteristically human and self-centred perspectives.

A third approach comes from the book of Job. We read there of Job's terrible pain as a result of losing his children and his wealth from a series of both human and natural disasters. Job, as he suffered, cried out for an explanation from God. God's response, when he finally speaks "out of the whirlwind", is not to give an intellectual answer to the problem of suffering, but rather to paint a majestic picture of the beauty and power of his creation. It provides some

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solace in that it helps to shake us out of our anthropocentric comfort zones and encourages us to trust in God. God also makes clear that ultimately he is sovereign over even the worst evils and disasters that may happen.

Despite all the uncertainty, we can still respond to disasters in a tangible and practical manner. Human actions are often responsible for turning natural processes into disasters. Our patterns of unsustainable living are



responsible for droughts and floods. Our failure to adhere to building regulations leads to higher numbers of fatalities in earthquakes. Our inability to communicate warnings of impending volcanic eruptions has cost lives and livelihoods. Our failure to provide care and aid in the aftermath of disasters has often worsened the problems. And our exponential population growth is exacerbating the issue. This doesn't necessarily explain away our original problem, but it should motivate us to act. It is clear that we must do all we can to mitigate the human contribution to natural disasters. Part of our worship of God is through practical aid, charity and raising awareness.

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climate change

The scientific evidence for climate change is unequivocal; the Intergovernmental Panel for Climate Change's publications are the largest and most carefully checked scientific collaborations in the world. If current trends continue, the Earth's temperature could rise by between 2 and 7 °C by the end of the century with disastrous consequences for many parts of the world. In just the next ten years, at least 75 million people in Africa will be exposed to increased water stress. Rising sea levels threaten coastal cities, such as Tokyo, New York, Cairo and London, and tens of millions of people in Bangladesh will lose their homes. By 2050 there will be 150 million extra refugees as a direct result of our warming planet. Leading climate scientist Sir John Houghton has described climate change as *"the biggest and most challenging issue that the world faces"*. How, as Christians, are we to respond to this?

Firstly, Christian theology highlights the need to care for creation. God's creation isn't simply a stage for the drama of human salvation; it is an expression of God's character that tells of his glory.

Secondly, Christianity makes a very strong connection between the material and the spiritual. Humans are embodied

and therefore the material world is important. God's complete commitment to the physical creation is demonstrated most powerfully in the incarnation of Jesus Christ. What we do to the world around us, therefore, really does matter to God. As Martin Luther is alleged to have said, *"if I knew Jesus would return tomorrow, I would plant a tree today."*

Finally, we are told that the two most important commandments are to love God and to love our neighbours. The parable of the Good Samaritan reminds us that our neighbours aren't just those with whom we share ethnic, cultural or geographical links; our neighbours are those with whom we share this planet, now and in generations to come.

Tragically, it is the poorest who will be hardest hit by the adverse effects of climate change. These are people who have no choice about where they live, are utterly dependent on their methods of subsistence farming for survival and, most distressingly, are in no way responsible for filling our atmosphere with carbon.

Care for our climate, therefore, is inseparable from the command to love our neighbours. As clergyman Christopher Wright puts it in his book *The Mission of God: Unlocking the Bible's Grand Narrative*, *"trashing someone else's property is incompatible with any claim to love that person."*

Responding to climate change, through mitigation, responsible energy use and political campaigning, is not a tiresome duty, but an act of love.

Tim Middleton and Bob White

An electronic version of this leaflet can be found at www.cis.org.uk/resources/articles-talks-and-links/students