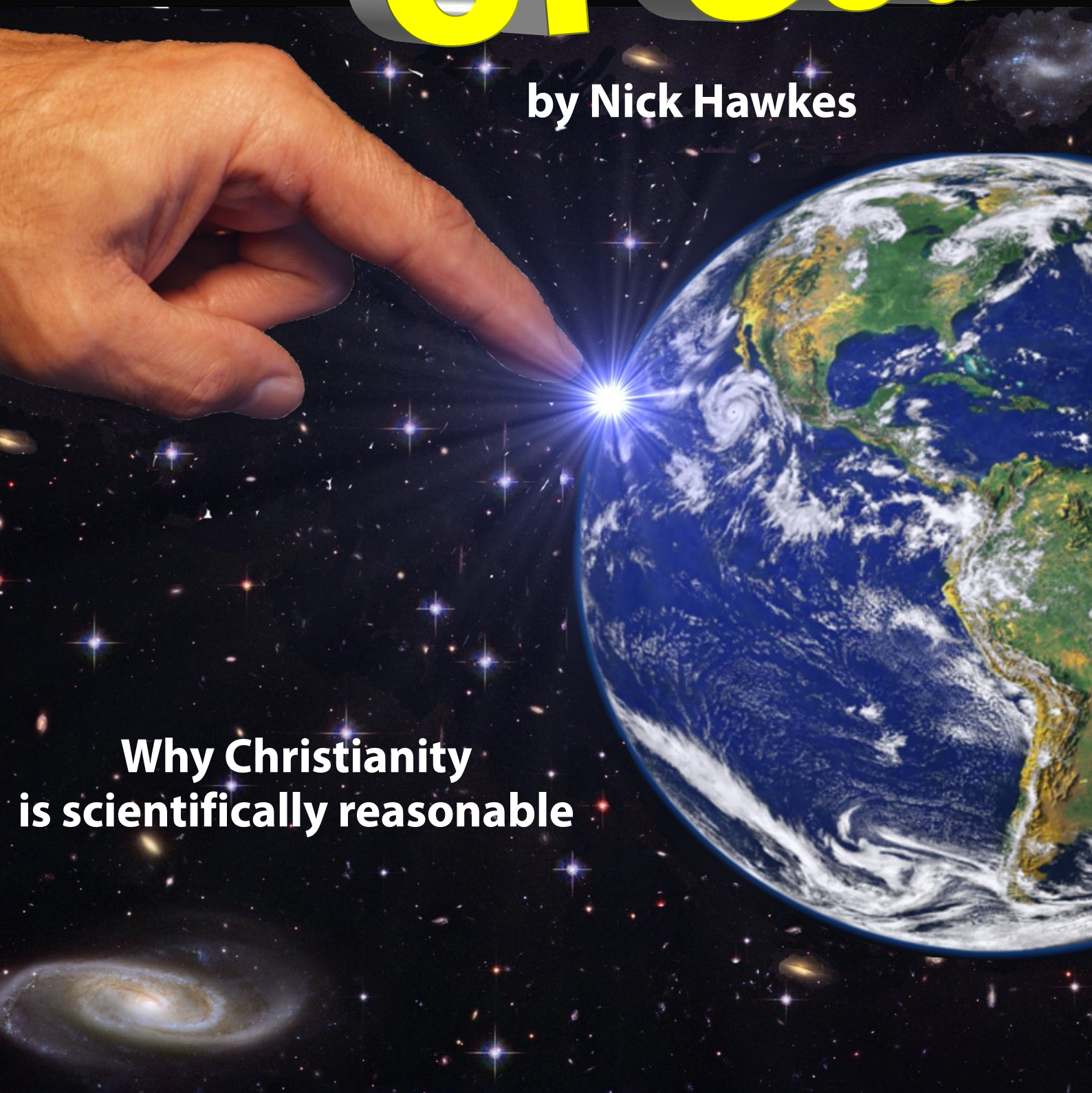
BASICS III

# Evidence of God

by Nick Hawkes



Why Christianity
is scientifically reasonable

Basics 3

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**ACKNOWLEDGEMENTS**

Patrick Atherton: Cartoons. Fantastic, Patrick, thanks ...yet again!

Space shots on cover - courtesy of NASA (used with permission)

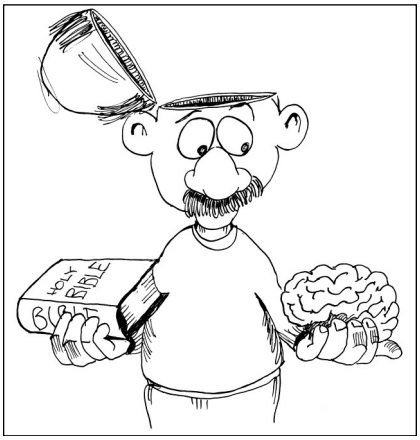
# *Contents*

# Introduction

Welcome to *BASICS 3: Evidence of God.* This is a five session course designed to help you explore the scientific credibility of faith.

Some people today have the impression that Christianity involves believing ten impossible things before breakfast. As a result, many feel that there is an irreconcilable gap between contemporary science and the Christian faith. Is this the case?

Would it surprise you to learn that the same percentage of scientists attend church as the general public? The Carnegie Commission surveyed over 60,000 scientific professors in the United States of America in 1969 and discovered that scientists attended church with the same regularity as the general population. Larson and Witham carried out a more recent study amongst scientists in the United States of American in 1996. Their work revealed that 39% of scientists believed in a God to whom they could pray with the expectation of receiving an answer.[1]




This course makes it clear that faith is scientifically reasonable. So much so, that there has recently been a great increase in dialogue between scientists and theologians. Some scientists with no orthodox faith are now saying that belief in God is logically justified. Certainly, if it is true that all truth has its fundamental origins in God, then scientific truth cannot be at odds with theological truth.

I hope you will have a wonderful time finding out about the scientific credibility of faith.

**Nick Hawkes**

## Any Questions?

Before you do the *BASICS 3: Evidence of God* course, it may be helpful for you to write down the main questions you have concerning the scientific credibility of faith. At the end of the course, you can check to see if these questions have been answered:

These are the main questions I have about the scientific credibility of faith:

.....
.....
.....
.....

## Using the Bible

The only ability you need for this course is the ability to find a passage of Scripture in the Bible. This is very easy to do. Bible passages are referred to like this: **John 3:16-17, 36**

- **John** is a book in the Bible. (Find which page John begins on by looking in the front of the Bible at the index.)
- **3** means it's the third chapter of the book of John.
- **16-17, 36** refers to the verses in the chapter (in this case, verses 16 to 17, and verse 36).

1) R. Stark and R. Finke, *Acts of Faith: Explaining the Human Side of Religion* (Berkeley, CA: University of California Press, 2000), 53, 73.

# Session One The dance between science and faith in history

The relationship of science to faith is not one which has seen them diverge steadily from each other throughout history. Rather, the relationship has been one that has diverged and come close repeatedly throughout history.

## Period 1 *Up until the end of the medieval time:* **Science nurtured by Christianity**.

### Ausustine

In this period of history, Christianity was helpful to science because it taught that nature itself was not God. Because Christianity taught that nature was not God but something created by God, nature could be examined without being improper.

The great theologian of the early church, St. Augustine (354 -430 AD), had three understandings which were to prove helpful to science:

1) He taught that the potential for the things God wanted to come about had been placed in the universe like seeds which awaited the right conditions to grow and come about. God's creation could therefore be an ongoing process.[1] God hadn't made everything that would ever be and then left things alone, never to change.
2) Augustine taught that God existed before time began.[2] God, therefore, created time. Because there was no such thing as time before the universe existed, time had a beginning and had not eternally existed in some endless cyle. (This perceptive comment was proved true by Einstein many centuries later.)
3) Augustine also allowed that some sections of the Bible, e.g. the Genesis account of creation, needed to be treated metaphorically rather than literally. The Bible was primarily concerned with our salvation, as such, it did not have to conflict with science.[3]

### Thomas Aquinas

The great medieval theologian, Thomas Aquinas (1225-1274 AD) was also helpful to science. He taught that nature showed evidence of intelligent design and that this indicated the existence of God. God was the mind directing a changing universe.[4]

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1) Augustine, *De Genesi ad litteram*, V.5.23.
2) Augustine, *Confessions* XI.14.
3) Augustine, *De Genesi ad litteram*, II. 9.
4) Thomas expressed his thinking in “Five Ways”, five arguments in support of God's existence. (See: T. Aquinas, *Summa Theologica* 1.2.3.)

# Period 2 The Roman Catholic church in the sixteenth century

## A time when the church suppressed science.

## Copernicus

The Polish astronomer Nicolaus Copernicus (1473 – 1543) discovered that the earth rotated on its axis once daily and traveled around the sun once yearly. He published his findings in a book called *De Revolutionibus* in 1530. Because his ideas challenged the literal teaching of Genesis (which suggested that the earth was the center of the universe) the Roman Catholic church banned his work in 1616.

However, Copernicus' work was not universally condemned by all clerics:

- The foreword to *De Revolutionibus* was written by a Lutheran theologian, Andreas Osiander.
- The Carmelite friar Foscarini wrote to Cardinal Bellarmine in 1615 to say that Copernicus' ideas were not inconsistent with Scripture.

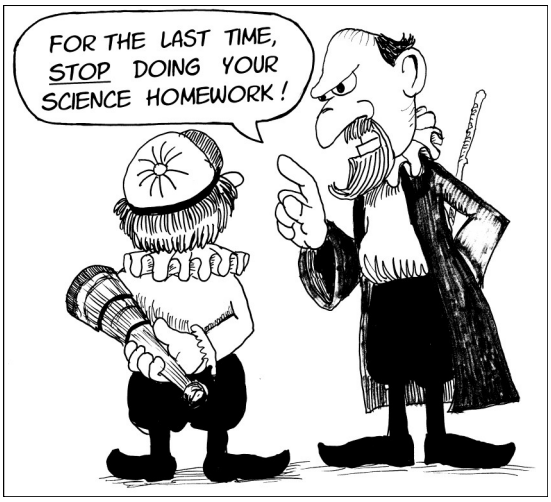
## Galileo

The Italian mathematician and astronomer Galileo (1564-1642) (famous for developing the telescope) gave further scientific support to Copernicus' work. However, even though Pope Urban VIII had once been kindly disposed to Galileo's ideas, he later put Galileo on trial for heresy, forcing Galileo to retract his teaching.

Why did the church seek to suppress the findings of science?

1) The Roman Catholic church was battling to retain control and authority, particularly in a climate of religious schism brought about by the Reformation.

2) Science was not accorded much significance in those days. Theology was thought to be more important. It was therefore church leaders who presided over society and they did not have the skills to appreciate the significance of scientific discoveries.




**School was different in Galileo's time!**

3) The church had an inadequate understanding of biblical authority. Galileo, however, understood that the Bible sometimes spoke metaphorically rather than literally.[5]

Remember, however, that although Copernicus and Galileo fell foul of the Roman Catholic Church, both remained deeply religious men.

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5) S. Drake (tr.), *Discoveries and Opinions of Galileo* (New York: Doubleday, 1957), 188-199.

# Period 3 The Reformed church in the sixteenth century

## The reformed church's ambiguous relationship with science.

## Martin Luther

The famous German theologian Martin Luther (1483 – 1546) led Germany out of the Roman Catholic church and began the protestant church. What did he believe?

1. Luther was inconsistent in his understanding of Biblical interpretation. Sometimes he believed the Bible should be taken literally,[6] sometimes he didn't.[7] Although he scorned Copernicus' ideas, he was happy to teach alongside Erasmus Reinhold (an advocate of Copernicus) in Wittenburg.
2. Luther was convinced, however, that the wonder of creation displayed God's glory. "*All creation is the most beautiful book or Bible; in it God has described and portrayed Himself*".[8]

## John Calvin

John Calvin (1509 – 1564), who led Switzerland out of the Roman Catholic church, was one of the great Reformation theologians. He believed that:

1. The Bible was not written to be a scientific textbook. Calvin says: "*He who would learn astronomy and other recondite arts, let him go elsewhere*".[9]
2. God "accommodated" his language in Scripture in order to meet our limited abilities and understandings.[10] Therefore, not all of the Bible should be taken literally. Scripture need not disqualify science.
3. Nature pointed to the existence of God. He said that nature was, "*a most beautiful book in which all created things, whether great or small, are as letters showing the invisible things of God to us."*[11]

### Creation, Adam and Eve

It can be seen that central to the debate between science and faith is the issue of the authority of Scripture. Ever since the Christian church was quite young, the leaders of the Christian church have come to understand that the early chapters of Genesis (which talk about God creating the world) were written to answer the theological questions "who" and "why" rather than science's questions "how" and "when".

This makes these chapters no less vital as they teach the fundamental principles upon which the rest of the Bible is based, namely:

1) God is responsible for the existence of the universe. It's existence was a purposeful act. This means that nature is not special because it is God. Nature is special because it was created by God.
2) God considered his creation to be "good".
3) God gave humankind freewill to obey him or not.
4) Sin and rebellion against God spoilt God's best plan for us and resulted in the existence of increased suffering.
5) God is in the process of rescuing us back to himself.

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6) M. Luther, *Luther's Works*, ed. & trans T.G. Tappert, 55 vols, (Philadelphia: Fortress, 1965), Vol 54, 358-359.
7) Luther, *Luther's Works*, 54: 452.
8) English translation of the Latin from: M. Luther, *Werke*, (Weimarer Ausgabe: 1927), Vol 48), 201.
9) J. Calvin, *Commentaries: Genesis*, Vol.1, Genesis, chapter.1, verse 6.
10) See:J. Calvin, *Commentaries: Genesis*, Vol.1, Genesis, chapter.1, verses 6, 80. See also chapter 6:14.
11) J. Calvin, *Confessio Belgica* (1561), cited in: A. McGrath, *Science and Religion: An Introduction,* (Oxford: Blackwell, 1999), 11.

# The seventeenth and eighteenth century

## Period 4 — A period when the church was supportive of science, particularly in England.

The characteristic feature of this period was the idea of there being two books of God's revelation:

1. The Bible
2. The beauty and order of nature.

Francis Bacon (1561 – 1662), father of scientific reasoning, said that:

> no one "*can search too far, or be too well studied in the book of God's word, or in the book of God's works ...but rather, let people endeavour an endless proficience in both.*"[12]

Thomas Brown, (1605 – 1682), physician and author, wrote:

> "*There are two books from whence I collect my divinity: besides that written one of God, another of his servant nature .... Those that never saw him in the one have discovered him in the other.*"[13]

The famous scientist, Robert Boyle (1627 – 1691), also said:

> *"The two great books of nature and scripture have the same author, so the study of the latter does not at all hinder the inquisitive man's delight in the study of the former.*"[14]

In this period, theologians believed that by studying nature, they were helping to uncover the glory of God. It therefore behove them to study it.

## Isaac Newton

The belief that studying nature helped uncover the glory of God was also shared by Isaac Newton (1642 – 1727). Newton wrote the magisterial work, *Principia,* in which he presented equations that accurately predicted the motions of the planets and the rate at which objects fell on earth. In doing so, he vindicated the rotating Earth cosmology of Copernicus and Galileo.

Newton had a mechanistic world-view. He believed that the solar system operated according to inbuilt unchanging universal principles. God had made the universe like a clock which must work in its inevitable self-governing way. God was hardly needed to make it work beyond creating the mechanism. Once God had created, God did little else other than stop planets collapsing into the sun. Unfortunately, this led to the idea the God could be an "absentee Landlord," someone of little relevance to his creation today.

## William Paley

The argument for the existence of God because of the apparent design and complexity of natural things, reached its hight with William Paley. Paley, (1743 – 1805) an English theologian, spoke of the analogy of finding a watch on the ground whilst out walking. No one would seriously consider that the watch had invented itself. As nature is infinitely more complex than a watch, it too must have a creator – God.

All this could be believed until Darwin.

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12) F. Bacon, *The Advancement of Learning* (1605), 8 (1.1.3).
13) T. Browne, *Religio Medici* (1642) ed. J. Winney (Cambridge: Cambridge University Press, 1983) part I, section 16, 18-19.
14) R. Boyle, *The Excellency of Theology Compared with Natural Theology* (tract, 1772) in Boyle R. *The Works of the Honourable Robert Boyle*, ed. T. Birch, 2nd edition, 6 vols, (London: Rivingtons) Vol 4, 1-66.

# *From Charles Darwin until the 1980s*

## *Period 5* Science and theology in conflict.

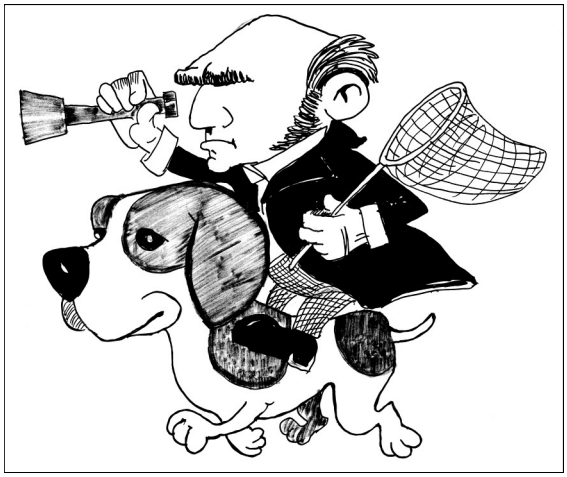
The naturalist Charles Darwin (1809-1882) traveled the world in a ship *The Beagle* observing and collecting wildlife and fossils. From what he observed, he concluded that some individuals of a species were able to adapt slightly to their environment in a way that made them better able to thrive in a particular environmental niche. Because they were able to thrive, the characteristics that gave them an advantage over other species were passed on to successive generations. Nature therefore selected the "survival of the fittest". Nature's continual selection of what worked best ensured that all living species were able to continually adapt and develop so that they become ever more specialised at thriving in a particular ecological niche. This meant the nature did the selection and drove organisms to become more complicated. God was no longer necessary.

Darwin put paid to the idea that any gaps in our understanding about the order we see in nature could be plugged by invoking the existence of God. The "God of the gaps" was dead.

The Christian church reacted in two ways. Many in the church were outraged and flocked to defend God's role in designing life. Others welcomed Darwin's findings. Frederick Temple (who became Archbishop of Canterbury) preached that the finger of God could be seen at work in the laws of nature and, as such, there was no need to oppose the new theory of evolution.[15]

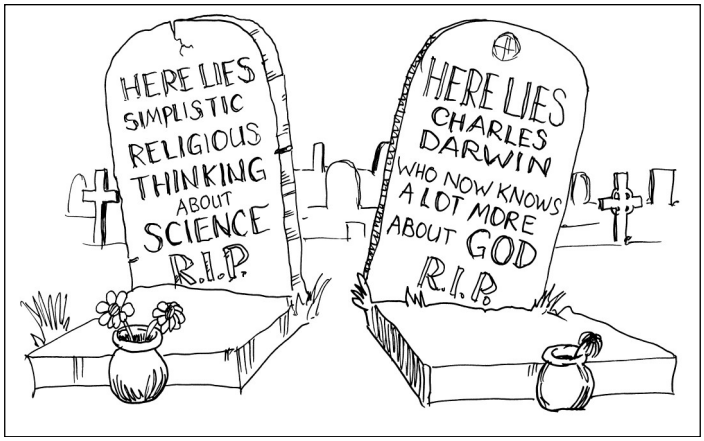
Darwin was not universally shunned by the church. His mentor was the eminent botanist and mineralogist, The Rev. Professor J.S. Henslow. Later, he developed a lifelong friendship with The Rev. John Brodie Innes. Darwin also enjoyed the support of the country rector and novelist Charles Kingsley and the Harvard botanist, Professor Asa Gray, both of whom maintained that Christianity was compatible with evolution. Kingsley wrote that he found it "*just as noble a conception of Deity to believe that He created primal forms capable of self development...*"[16]

Darwin had not been brought up an active Christian. His two grandfathers were Josiah Wedgwood, a Unitarian, and Erasmus Darwin, a strident "free thinker." Darwin was only encouraged to train for the Anglican ministry because his father thought it a respectable profession for a son who had failed as a medical student. Whilst Darwin originally found the teaching of some Christians, including William Paley, persuasive, he did not find them robust enough to accommodate the observations he made during his voyage on the *Beagle*.



15) F. Temple, *The Present Relations of Science to Religion*: A Sermon Preached on July 1, 1860 before the University of Oxford.

16) From Kingsley's letter Darwin in 1859 thanking him for sending a copy of his ground-breaking book, *The Origin of Species*. See: F. Darwin, *The Life and Letters of Charles Darwin*, 2 vols. (New York: Appleton, 1898), Vol.2, 82.




Three things caused Darwin to lose faith in Christianity:
1) His conviction that God did not necessarily intend the existence of specific life forms, as Christianity suggested.
2) The death of his daughter Annie and the suffering seen in nature meant that he could not believe in a loving Christian God.
3) The belief that God could eternally condemn good people who were not Christians (including his father) persuaded him that Christianity could not be true.

Darwin had not developed his Christian understanding well enough to answer these deep issues. Despite this, he was never to lose his faith in the existence of a higher being.

> "*I have never been an atheist in the sense of denying the existence of God."* (Charles Darwin) [17]

Nonetheless, Darwin's thinking resulted in many believing there to be an irreconcilable difference between science and Christianity. (This state of affairs was encouraged by the fact that science developed beyond the technical reach of the amateur clerical naturalist.) Joseph Le Conte, Professor of Geology at the University of California, Berkeley wrote in 1902:

> "*I find sufficient justification of this course of lectures in the existence of a constantly growing feeling amongst intelligent people, that there is an irreconcilable antagonism between science and revelation.*" [18]
>
> J. Le Conte


Why would you agree or disagree with this?

This state existed right up until modern times.

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17) Charles Darwin, in a letter first published in 1887 by his son Francis Darwin: (F. Darwin [ed.], *The Life and Letters of Charles Darwin* 2 vols, [London, 1887, Vol 1], 304).
18) J. Le Conte, *Religion and Science* (New York: D. Appleton and Company, 1902), 11.

# Period 6 *From the 1980s until today*

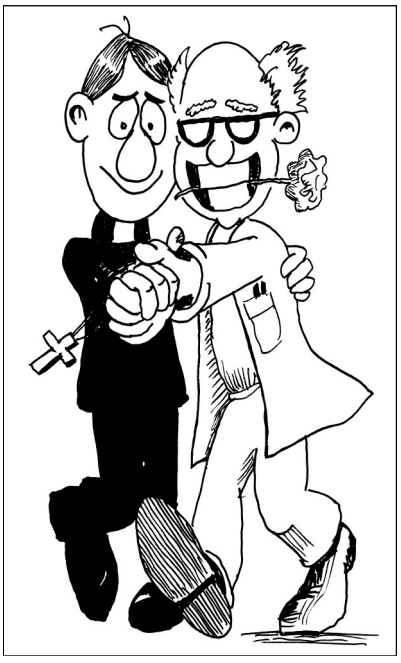
## Science and Christianity in dialogue.

In recent years there has been a renewed international interest in the relationship between science and religion. Scientists are now allowing that there is more mystery. Recent advances in science have led scientists to discover a level of order in the universe beyond that which is easily explained as being the result of chance. As such, some scientists with no orthodox faith are saying that belief in God is scientifically reasonable.

> "*I belong to the group of scientists who do not subscribe to a conventional religion but nevertheless deny that the universe is a purposeless accident. Through my scientific work I have come to believe more and more strongly that the universe is put together with an ingenuity so astonishing that I cannot accept it merely as a brute fact*."
> (Paul Davies, mathematical physicist and cosmologist.)[19]

Scientists and theologians are now in exciting dialogue over the significance of such order in the universe. Evidence for this is seen in the creation of many new centres of combined research.[20]

What have you learnt that has particularly surprised you in this session?



19) Paul Davies, *The Mind of God: Science and the Search for Ultimate Meaning*. (New York: Simon & Schuster Ltd., 1992), p.16.

20) Some of these centres include: The Carl Howie Center for Science, Art and Theology (Union Theological Seminary and Presbyterian School of Christian Education, Richmond, Virginia); The Center for Theology and the Natural Sciences (Berkeley, California); The Center for Research in Science (Azusa Pacific University, Los Angeles); The Center for the Renewal of Science and Culture (Seattle); the Center for Faith and Science Exchange (Boston Theological Institute); The Chicago Center for Religion and Science; The Institute for Theological Encounter with Science and Technology (St. Louis); The Pascal Center for Advanced Studies in Faith and Science (Redeemer College, Ontario, Canada); The Ian Ramsey Centre (Oxford); Wycliffe Hall (Oxford).

# Session Two Can science allow faith?

"*I realised science couldn't answer any of the really interesting questions so I turned to philosophy and have been searching for God ever since.*" (Chantlas)[1]

## Make room for God

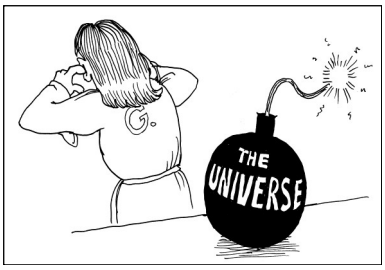
Einstein once said, famously, "*Science without religion is lame, religion without science is blind.*"[2] Both science and religion are necessary.

The scientific community needs to avoid the temptation of believing it has the sole monopoly on truth. Otherwise it will have the same overbearing stance it once accused the Christian church of adopting towards science in the sixteenth century. Both science and theology share in the quest for understanding, and both are the product of human experience and culture. As such, both need to be allowed to inform humankind's quest for truth and meaning.

Science has generated an immensely powerful and successful conceptual machinery which has generated a momentum of its own. However, if it lapses into a type of empiricist rationalism that cannot allow for the possibility of God, it risks not understanding reality fully. The German theologian, Wolfhart Pannenberg makes the point that if God is creator of the universe, it will not be possible to understand nature properly without reference to that God.[3]


Do you think science and faith have treated each other fairly?

## The Big Bang




The "big bang" theory has not only been opposed by biblical literalists but also by some scientists. Both have done so for ideological reasons rather than scientific ones.

There is good scientific evidence that the universe began with a "big bang". The American astronomer Vesto Slipher noticed that the electro-magnetic spectrum of distant galaxies was shifted towards the red end of the spectrum indicating that they were moving away from our galaxy. The fact that the universe was expanding was finally confirmed by observations by the American astronomer Edwin Hubble who discovered in 1929 that the more remote the galaxy, the faster it was moving away.

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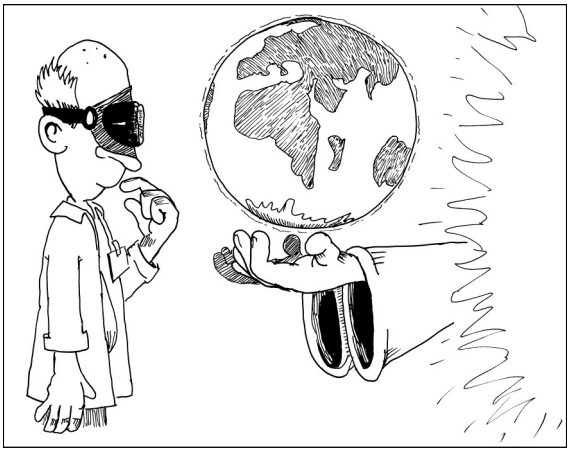
1) A line spoken by Chantlas in the film *Red Planet*, (Warner Bros./Village Roadshow Pictures, 1999).
2) Einstein delivered this quote at a Symposium on Science, Philosophy and Religion in 1941. It was also published in *Nature* 146 (1941), 605.
3) W. Pannenberg, "Theological Questions to Scientist", in A.R. Peacocke, (ed.) *The Sciences and Theology in the Twentieth Century.* London: Oriel Press, 1981, 4.

In 1948, the Russian-American physicist George Gamow developed an idea gaining credence amongst scientists that the universe originated from an exploding microscopic hot, dense particle. This came to be known as the "big bang" theory.[4] Gamow predicted that the residual radiation from such an explosion must still exist in the universe and would now measure approximately minus 268° C.

In 1964, Arno Penzias and Robert Wilson of Bell Laboratories turned a large radio receiver towards space and discovered that no matter where they pointed it, they were getting a signal indicating the presence of microwaves that represented the residual "heat" from the big bang. The COBE (Cosmic Background Explorer) satellite launched in 1989, found Gamow's predicted residual radiation and discovered that the residual Big Bang microwave had, in fact, cooled to minus 270.3° C (very close to the minus 268° C predicted).

Scientists also reasoned that in order for galaxies to be formed, there would need to be evidence of slight ripples in this background radiation which would allow matter to clump together to form clusters of galaxies. In 1992, these density ripples in the microwave background were discovered by the same COBE space satellite.



**The glasses you wear will affect what you see**

Despite the compelling evidence for the cosmic big bang, the English physicist Fred Hoyle, a committed atheist, didn't want to consider anything so inexplicable as a beginning, as it suggested that God would be necessary to begin the act of creation. Instead, he proposed an idea of the universe always existing and remaining the same. What is of significance is that Hoyle believed this for ideological reasons, not scientific reasons.

When anti-Christian European communism was at its hight, Russian scientists such as V. I. Sviderskii and V. A. Ambartsumian, also dismissed the big bang theory for ideological reasons rather than scientific ones.

This story teaches us that some non-Christian scientists have distorted science for ideological reasons just as some fundamentalist Christians have distorted science for their ideological convictions. True progress in the dialogue between science and faith will only exist if both disciplines resist such distortions.

4) The term "big bang" was originally a derogatory term for this theory, used by the English physicist, Fred Hoyle.

# It depends on your point of view

The biologist Jacques Monod has said:

> "*The ancient covenant is in pieces: man at last knows that he is alone in the unfeeling immensity of the universe, out of which he has emerged only by chance. Neither his destiny nor his duty have been written down.*"[5]

This mournful statement is an ideological statement, not a scientific one.

The physicist Robert Russell, sees the same creation but says that we must reflect on the serious possibility of God because of our highly unlikely existence here on earth. He says:

> "*Suppose you are lost and thirsty in a vast, dry desert. Suddenly you spot a palm tree on the horizon. Are you going to say, 'Well since the desert is so vast and barren, that wavy tree is insignificant, a statistical fluke not worth taking seriously?'*"[6]

# The need for integrity

The fact that science has the reputation in many quarters of being a relatively objective, empirical discipline means that it is particularly incumbent on scientists to make it clear when they jump from empirical data to philosophical speculation. They need to do this because the non scientists who listen to them may lack the ability to determine when a scientist strays from empirical data to subjective judgments.

# Richard Dawkins' attack on religion

The English biologist, Richard Dawkins, has written a number of books seeking to prove that the complexity and order we see in nature has a perfectly rational explanation and that belief in God is not scientifically sustainable.[7] Dawkins argues that evolution works at the level of the gene. The survival and replication of genes is the true purpose of life. Genes occupy and then discard bodies.

This, of course, begs the question of how and why the DNA in genes became so clever. How did the codes gets encoded in the DNA of genes? As such, Dawkins may not have identified genes as being the basic agent responsible for change so much as pointed to genes being the tools God uses to allow change. Dawkins also fails to answer why it is that "w*e, alone on earth, can rebel against the tyranny of the selfish replicators*"[8] and make real choices. Similarly, he needs to explain why it is that evolution has not only molded our bodies but also our human consciousness, a consciousness that leads many to seek God.

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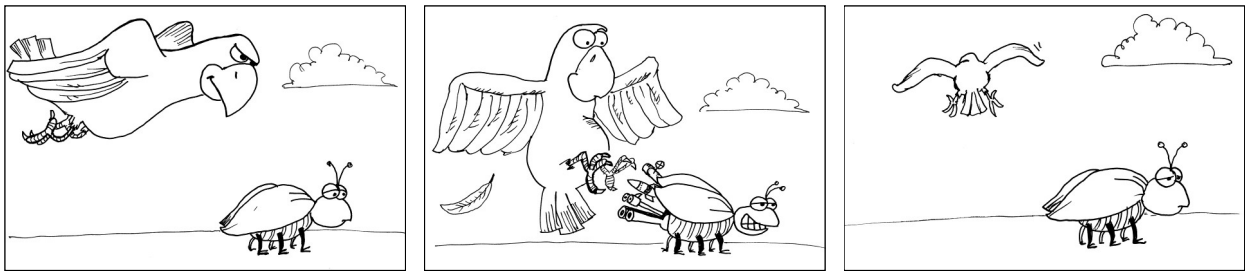
5) The 1965 Nobel Prize-winning French biochemist Jacques Monod (1910-1976) in his 1970 treatise *Chance and Necessity.* Tr. A. Wainhouse, (London: Collins, 1972).
6) R.J. Russell, "Intelligent Life in the Universe: Philosophical and Theological Issues" (working draft) www.ictp.trieste.it/~chelaf/lecture,html (Robert Russell is Director of the *Center for Theology and Natural Sciences*, Berkeley, U.S.A.)
7) Including: *The Selfish Gene* [1976], *The Blind Watchmaker* [1986], *River out of Eden* [1995] and *Climbing Mount Improbable* [1996].)
8) This is the last sentence in Dawkins' book, *The Selfish Gene* (Oxford: Oxford University Press, 1976), 215.

# Getting blasted by a beetle

Whilst much can be explained by the process of evolution, some believe that it does not explain everything. Some abilities seem to exist for which it is difficult to imagine intermediary evolutionary steps. An example of this is the peculiar form of defense developed by the "bombadier beetle" (*Stenaptinus insignis*). This beetle secretes two chemicals into a chamber in its abdomen, hydroquinone and hydrogen peroxide. When the beetle is threatened by an attacker it squirts this chemical mix into another chamber which contains a catalytic enzyme which causes the two chemicals to react together violently and boil. The resultant hot noxious spray is then squirted through two tubes in the end of its abdomen at an aggressor. The biochemist Michael Behe cites this is an example of "*irreducible complexity*", i.e. it is a system so complicated that it could not be something that could have been achieved incrementally by evolution. Too many parallel developments would need to happen for which it is difficult to imagine any benefit to survival offered by the intermediate steps.[9]

Do you think that bombadier beetle could have evolved this ability to defend itself?



Appealing to things like the bombadier beetle as evidence of God's intelligent design may seem attractive but is dangerous. The claims of “irreducible complexity” have been refuted by a number of reputable scientists.[10] Certainly, related beetles showing intermediate evolutionary steps featuring the same chemicals, do exist in the beetle kingdom.

If everything is as God designed it, one would also need to ask why God designed the tape-worm or the candiru fish (*Vandellia cirrhosa*) of South America. This tiny parasitic catfish can swim up the urinary tract of humans and embed itself into position with the backward facing spines it has around its head. Once in position, it feeds on the blood from the wound it makes. Understandably, it is extraordinarily difficult to remove! Certainly, Darwin wondered why God would design something like the ichneumon wasp which injects its eggs into living caterpillars. The eggs hatch and the maggots eat their way through the living caterpillar until it dies.[11]

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9) M. J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution,* (New York: Free Press, 1996), 31-36.

10) For example: K.R. Miller, *Finding Darwin's God: A Scientist's Search for Common Ground Between God and Evolution* (New York: Perennial, an imprint of HarperCollins, 1999), 130-164.

11) F. Darwin, *The Life and Letters of Charles Darwin.* 2 vols. (London, 1887), Vol 2, 2.105.

# Science asks how, religion asks why.

The role of theology is not to set up in opposition to science but to set science in a deeper context.

> "*Upon this gifted age, in its dark hour,*
> *Falls from the sky, a meteoric shower*
> *Of facts ... they lie unquestioned, uncombined.*
> *Wisdom enough to leech us of our ill*
> *Is daily spun; but there exists no loom*
> *To weave it into fabric...*"
> (Edna St. Vincent Millay)[12]

Theology asks if there is more to be understood about science's laws of nature than the fact that they exist. As such, theology seeks to complement science, going beyond its realm of inquiry to address questions such as why are things as they are. Theism, says the physicist and theologian, John Polkinghorne, "*is concerned with making <u>total</u> sense of the world*." [13]

# Let's talk together

If we only had scientific explanations, music would simply be vibrations in the air, acts of heroism would simply be a genetic instinct to help our species survive, and worship would simply be a delusionary mental analgesic evolved to help us cope with a meaningless existence.

Because the two disciplines are different ways of knowing truth, they can inform and constrain each other so that each becomes the other's moderator and mentor. Without science, theology can become polluted with illogical dogma. Without theology, science will struggle to make sense of suffering, order and people's experience of the spiritual.

> "*Science and religion cannot be confined to their separate compartments and ignore each other. They are each concerned with truth and there cannot be multiple truths which are completely unconnected with each other.*"
> (Fraser Watts) [14]

Science and theology are different disciplines with different languages but they must be allowed to speak to each other. Both are concerned with fundamental questions of why things are as they are. Both share deeply in the quest for the origin and meaning of our universe. If we neglect one in favour of the other, we risk ignoring one way we can understand the hand of God. If only science is allowed to contribute to truth, our understanding will be incomplete, for science was never meant to be all that we know.

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12) From the poem "Upon This Age" by Edna St. Vincent Millay (1892-1950).
13) J. Polkinghorne, *Belief in God in an Age of Science,* (Yale University Press, 1998), 24.
14) F. Watts, (ed.) *Science Meets Faith*: Theology and Science in Conversation, (London: SPCK, 1998), 13.

# Session Three Cosmic order as evidence for God

## A sneaking suspicion

When you look at the beauty of creation, its order and complexity, do you get a sneaking suspicion that it is not simply the product of random chance?

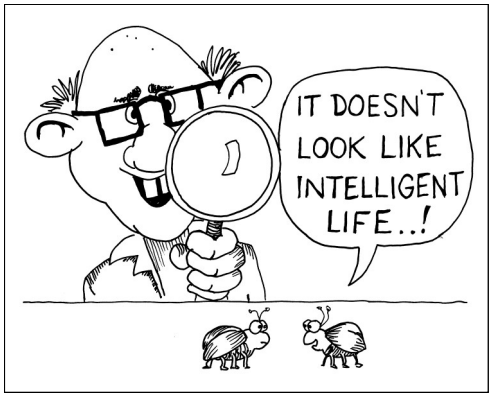
In the last few decades, a new understanding has been embraced by some Christian scientists.[1] It is not the old style thinking of Aquinas who talked of the design in nature being evidence for God, (an idea challenged by Darwin) but the more modest observation that the universe exists in a remarkable form that has allowed the development of human existence.

Many scientists today have observed the existence of many extraordinarily finely tuned physical characteristics of the universe that have allowed life to exist, and wonder whether this has significance. Paul Davies, a scientist with no conventional faith, says:

> "*In the case of living organisms, their existence seems to depend on a number of fortuitous coincidences that some scientists and philosophers have hailed as nothing short of astonishing. ... There seems to be no logical obstacle to the idea of such unruly universes. But the real universe is not like this. It is highly ordered.*" (Paul Davies)[2]

## The anthropic principle

The fact that our universe is one that seems remarkably conducive to the evolution of intelligent life has led to the development of what has become known as the "anthropic principle". This is the idea that the universe seems to exist in a very precise way that has allowed the existence of humankind. (Anthropic literally means "of humankind".)

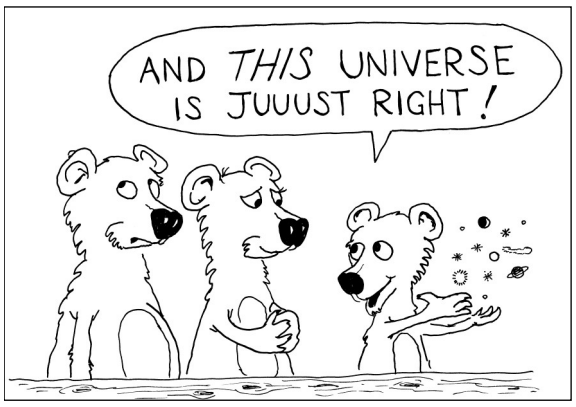



There are two main versions of the anthropic principle, the "weak" and the "strong" version. The "weak" anthropic principle says that we are here because a certain combinations of circumstances made it possible. The "strong" anthropic principle says that the universe was made in such a way in order that life could exist.

1) For example, John Polkinghorne, Ian Barbour and Arthur Peacocke.
2) P. Davies, *The Mind of God: Science and the Search for Ultimate Meaning* (Simon & Schuster Ltd., 1992), 195.

Certainly, ours is a very special universe.[3] Billions of things had to be just right for life, as we know it, to evolve. If the universe had differed only slightly intelligent life would not now be present to observe it. For example, if the strength of the gravitational force differed by just one thousandths of its current value, no stars would have existed to allow life on any planet. Similarly, the force of the "big bang" had to be just right. The universe could not expand too quickly, otherwise it would become too dilute for matter to clump together to form galaxies. However, if it expanded too slowly, gravity would have caused it to clump together too quickly to allow time for life to develop. As the English physicist Stephen Hawking says:"

> *If the rate of expansion one second after the big bang had been smaller by even one part in a hundred thousand million million, the universe would have recollapsed before it even reached its present size*."[4]
> (Stephen Hawking)




The universe would also need to have matter scattered evenly throughout it, otherwise there would be catastrophically destructive cosmic turbulence. However, the distribution of matter could not be too even but exist with slight concentrations so that galaxies could form. The nuclear forces that exist in the universe also had to be just right. If they had been slightly weaker, we would have only hydrogen in the universe. If they were slightly stronger, only helium. As it was, the nuclear forces were just right to allow stable stars to develop.

There needed to be a delicate balance between gravity and electromagnetism to allow these stars to burn uniformly for long periods of time at the right temperature to convert hydrogen and helium into carbon. Every atom of carbon inside our bodies was once inside a star. In fact, all the elements that exist, up to the weight of iron in the periodic table, could only be made in stars. The larger stars needed to be able to explode as supernovae in order to provide the temperature and forces needed to make the heavier elements necessary for life.[5]

Coincidences like this have even caused Stephen Hawking (who is ambivalent about faith) to wonder about religious implications.

> "*The odds against a universe like ours emerging out of something like the Big Bang are enormous. I think there are clearly religious implications*."[6]
> (Stephen Hawking)

A Cosmic Planner seems to have endowed the universe with specific laws of nature that have allowed life to develop.

**Q** What do you see in the beauty and order of creation that suggests to you the existence of a higher being?

3) J. Polkinghorne, *Quarks, Chaos and Christianity* (London: Triangle, SPCK, 1994), 27.
4) S. Hawking, *A Brief History of Time: From the Big Bang to Black Holes* (London and New York: Bantam, 1988), 291.
5) Polkinghorne, *Quarks, Chaos and Christianity,* 28-30.
6) Stephen Hawking, quoted in: J. Boslough, *Stephen Hawking's Universe* (New York: Simon and Schuster, 1983), 30.

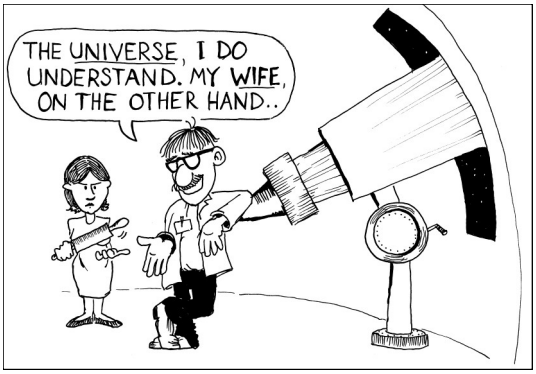
# Why can we understand the universe?

"T*he eternal (and incomprehensible) mystery of the world is its comprehensibility*." Albert Einstein[7]

Another extraordinary mystery of the universe is that we are able to understand it. Paul Davies says that it is remarkable "*that the human mind has the necessary intellectual equipment for us to `unlock the secrets of nature'."*[8] Ours is a universe that is intelligible to us, a universe which allows mathematics to unlock its secrets. This remarkable feature requires an explanation.

Christianity gives such an explanation. It claims that the universe is created by a rational God. It also claims that we are created in God's image, as such, it is entirely logical that the universe is ordered and that we can understand it."[9]

Some scientists have not only wondered why the universe is intelligible but also why the mathematical equations that explain the laws of physics are themselves beautiful. Paul Dirac, (1902 – 1984) a physicist at Cambridge University, said that it was more important that there be beauty in scientific equations than that they should be right because if they were ugly, there was no chance that they could be right.[10]

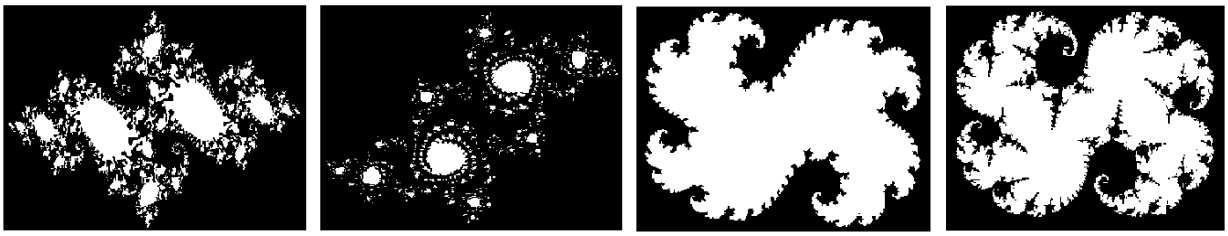



# Order

It follows, logically, that if the universe is rational, there must be evidence of order. This has proved to be the case. In fact, scientists are finding this order in places they did not expect. One example is in mathematics. By varying a constant in a fairly simple mathematical equation (used to determine whether to colour a pixel that builds a picture black or white) the result is not a chaotic spread of black and white marks, as would be expected, but a beautiful, complex, symmetrical picture.

Is the fact that we find design in surprising places significant?

Pictures drawn by mathematics which were expected to be chaotic.
(These four pictures used a constant in the equation taken from the "Mandelbrot Set.")



7) A. Einstein, "Physics and Reality", *Ideas and Opinions* (New York: Random House, 1988), 292.
8) Davies, *The Mind of God,* 21,148.
9) J. Polkinghorne, *Science and Theology: An Introduction* (London: SPCK, 1998), 73.
10) Paul Dirac, "The Evolution of the Physicist's Picture of Nature." pages 45-53 in *Scientific American* 208 (1963), 47.

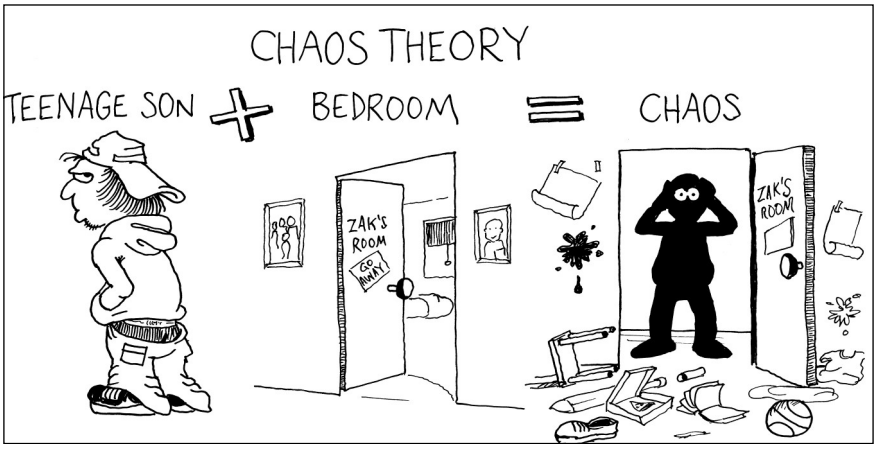
# Finding order in chaos

Scientists are even finding order in chaos.

Recent scientific discoveries have shown that everything in the universe is remarkably interconnected. Systems in the universe are so exquisitely sensitive to circumstances that the slightest disturbance will make them behave in totally different ways.[11] The tiniest change in an initial condition of a system can result in a completely different (and unpredictable) chain of events. This behaviour has come to be known as the "butterfly effect." This name came from his proposition that a butterfly stirring its wings over Hong Kong could initiate a chain of events which could affect the course of a tornado in Texas. This sensitivity to initial conditions leading to unpredictable outcomes has come to be known as "chaos theory".

However, "chaos" may not be the right word as it has been discovered that random behaviour is constrained within chaotic systems. Some outcomes in chaotic systems seem to be favoured more than others. As such, they do not appear to be completely chaotic. These favoured possibilities have been dubbed "strange attractors". The scientist and theologian John Polkinghorne has even suggested that God may control the universe by controlling these strange attractors which encourage some outcomes rather than others.[12]

However, God must be God of more than the strange attractors of chaos theory. God is God of all. Almost by definition, God must be able to act at every level of creation. Sub atomic particles through to human beings must all be subject to God, otherwise God is not truly God at all.




How would you answer someone who said that the order we see in creation is simply a matter of chance?

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11) Polkinghorne, *Quarks, Chaos and Christianity,* 57.

12) J Polkinghorne, *Belief in God in an Age of Science* (Yale University Press, 1998), 61,63.

# Playing God

Whilst the anthropic principle is a theory based on observation, it has actually been used to successfully predict a scientific discovery. This has lent credibility to the theory that the universe exists in a very specific way that allows life to develop.

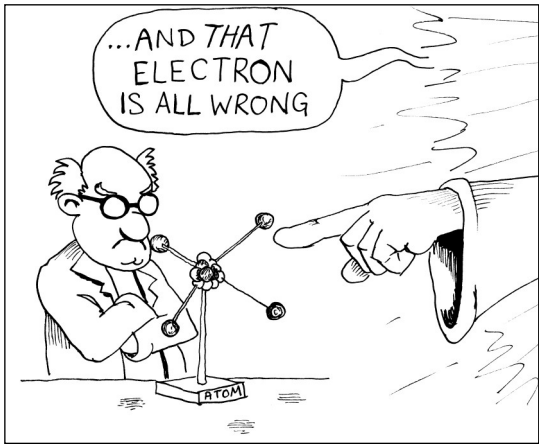
Scientists had discovered that atoms heavier than helium were made by combining smaller atoms together inside hot stars. However, no one could explain how the carbon atom could be formed. As carbon is the fourth most common element in the universe and forms the basis of all life, this was a major puzzle. The problem was that the isotopes of helium and the beryllium needed to build carbon were so unstable that they decayed back into smaller particles before they could combine to form carbon. The atoms of helium and beryllium would only stick together long enough to combine if a special "resonance" energy state existed which would greatly increase the reaction rate between helium and beryllium so that it could form carbon.

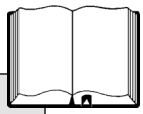
A resonance state operates in a similar way to the special frequency which can allow an opera singer to shatter a wine glass. The physicist Fred Hoyle argued that if anyone had to design a process that would allow life to exist, carbon must have a special state of resonance at 7.6 million electron volts to allow it to be synthesized inside a hot star.

However, no one knew if such a resonance state for carbon existed. He persuaded scientists at the *California Institute of Technology* to look for it, and they found it at the predicted energy level.

This meant that scientists had made a scientific discovery by trying to work out what God would have to do to allow carbon life to develop.

Fred Hoyle confessed that this finding rattled his atheistic convictions more than any other discovery.[13]



*The heavens declare the glory of God;*
*the skies proclaim the work of his hands.*" (Psalm 19:1)

"*God's eternal power and divine nature ... have been understood and seen through the things he has made.*" (Romans 1:20)

13) F. Hoyle, "The Universe: Past and Present Reflections," pages 1-35 in *Annual Review of Astronomy and Astrophysics*, 20 (1982), 16.

# So What!

Some have said, “What's so special about our universe being able to produce human beings?” They say this for three reasons:

## Reason 1

***Humans occupy such a minuscule part of the universe, it is impossible to believe they are, in any way, significant.***

> "*The eternal silence of those infinite spaces frightens me* ." (Blaise Pascal)[14]

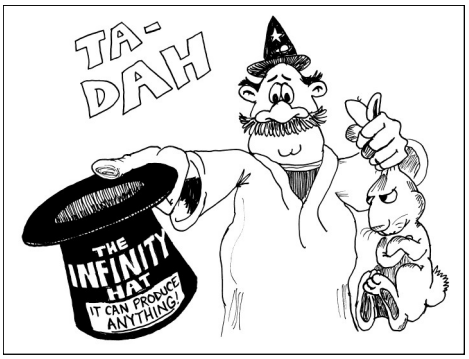
John Polkinghorne does not agree and says that we need not be upset about our apparent insignificance in a vast universe because we now understand that a universe as big and as old as ours would be necessary to allow time for carbon-based life to evolve on any one planet. The great age of the universe is necessary to allow planets able to sustain life to develop and evolved intelligent life. The size of the universe is necessary to allow the planets and galaxies to be far enough apart to avoid gravity clumping them back together before intelligent life could evolve.[15]

> `"*If it is maintained that anything so small as the Earth must, in any event, be too unimportant to merit the love of the Creator, we reply that no Christian ever supposed we did merit it*.” ( C.S. Lewis) [16]

## Reason 2

***An infinite number of universes probably exist. We only think our universe is special because it has chanced on a combination of factors which has allowed life to develop and produced human beings capable of observing it. Life is not special. One of the infinite number of universes had to eventually produce the combination of factors necessary to allow it, purely by chance.***

Caution needs to be exercised when using the term "infinite" to dilute the significance of the existence of humankind. The word "infinite" is not an infinite mental dumping ground that allows any possibility. It is not a magician's hat from which anything can be produced. We still need to ask, who or what began the first universe? Why has chance been given the chance to build a universe able to develop humankind? Where did the raw materials chance had to play with come from? The existence of any universe would still require the right quantum fields to fluctuate in order to produce the first inflation and laws of nature that would allow intelligent life. These things still require explanation.




14) Mathematician and philosopher Blaise Pascal (1623-1662), *Pensées*, (1670).
15) Polkinghorne, *Quarks, Chaos and Christianity*, 30.
16) C.S. Lewis, *Miracles, A Preliminary Study* (London: Geoffrey Bes, 1947), p.63.

# Reason 3

***It is probable that the universe is teeming with other forms of intelligent life, which, if true, would make a nonsense of the special status of humankind.***

Whilst precursors to life on earth may have been "splashed" onto Earth by meteorites crashing into Mars, there is, as yet, no evidence on any intelligent life existing in the universe. As such, it would be unwise to use a mere speculation to cancel out the wonder of what unquestionably does exist.

Some expect the church to be hostile to the idea that intelligent life might be found on other planets and cite the Italian philosopher Giordano Bruno (1548 - 1600), who was expelled by the Dominicans and burned at the stake by the Roman Catholic Church for heresy. One of the philosophies Bruno espoused was the existence of life on other planets.

In reality, Bruno had a poor understanding of astronomy, disagreeing with Copernicus on many points and espousing a bizarre belief that had little in common with good science or Christianity. Bruno was a contentious character and any one of a number of factors could have led to his death. No records exist to tell us why he was tried for heresy.

If intelligent life were found in the universe, this need not necessarily be incompatible with Christianity. If life existed on other planets, it might indicate that life was not so much due to unlikely chance events so much as the guiding hand of God who had designed an inherently fruitful universe.

What would finding intelligent life on other planets mean about the ministry of Jesus?

The fact remains, no intelligent life has yet been found elsewhere in the universe ...and Christianity makes good sense of what has been found.

The astrophysicist Robert Jastrow ends his book *God and the Astronomers* by saying:

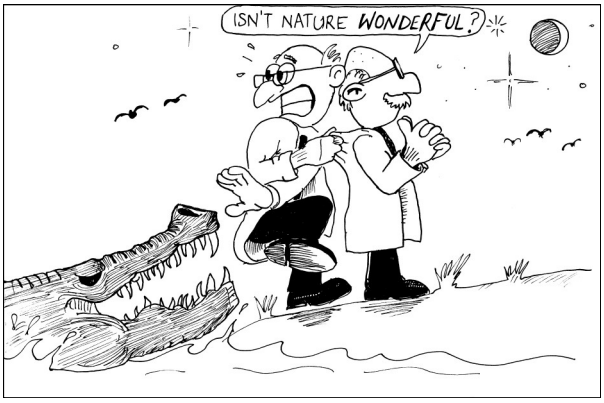
> "*At this moment, it seems as though science will never be able to raise the curtain on the mystery of creation. For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries.*".
>
> Robert Jastrow[17]

17) R. Jastrow, *God and the Astronomers* (New York: W.W. Norton, 1978), 116.

# Session Four Cosmic disorder as evidence against God

Whilst many physicists marvel at the order of the universe and the beauty of the laws of nature, many biologists see the cruelty, waste and competition that exists in nature. They see life as a lottery, a competition for existence that is careless of suffering and blind to any plans, let alone those of a loving God. As such, biologists, such as Charles Darwin, Jacques Monod, Richard Dawkins and Stephen Gould, are inclined to believe that God does not exist, or if he does exist, he exists as an unfeeling, absentee landlord.

The existence of apparent chance and disorder in the universe cannot be ignored. We see it in the harsh realities surrounding the survival of some individuals and species over others. We also see it on a cosmic scale. Chance appears to have been a major factor in determining the very composition of the earth and its rotation. A theory that currently commands respect is that, towards the end of the planet-forming period of the solar system, a massive planetismal the size of Mars smashed into planet earth.[1] The collision was so great that the iron of the planetesimal pushed through into the center of the earth. This collision gave the earth its spin and debris from the crash coalesced together to form the moon.




If we were also to consider the possibility that an asteroidal impact 65 million years ago killed off the dominant life form (dinosaurs) and allowed our miniature primate ancestors space and time to evolve into human beings, it would seems to suggest that life on earth has come about as a result of chance rather than design.

**Q** What sort of things exist that you find difficult to reconcile with the existence of a loving God?

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1) A planetesimal is a body in space formed by material that has clumped together through gravitational attraction.

# God absent?

It is tempting to believe that these indications of chance events show that God does not exist and that all the features of the universe can be explained scientifically without needing to seek recourse to God. Such a position is called “evolutionary naturalism”.

Slightly softer versions of evolutionary naturalism exist that allow that God may have put the ingredients of life together but that thereafter, the blind mechanism of evolution determines the direction life takes. This is called “biological determinism.” Those who believe this think it highly probable that humankind is not the ultimate achievement of evolution but just a transient stage. The author and scientific historian Steven Dick is one who wants to consider God as being a "natural" God, the intelligence behind the laws of physics, rather than a "supernatural" God who is also beyond physics directing the events of history.[2]


There are different forms of biological determinism. "Strong" biological determinism suggests that life is written into the laws of physics, i.e. the laws of atomic physics contain within them the blueprint for life. "Weak" biological determinism is a little more modest and claims that life emerges with a high degree of probability as a result of matter having an inherent ability to organise itself.

The physicist Paul Davies does not agree with strong determinism and says, "*There is absolutely no evidence that the laws of physics we know at present contain life, still less intelligence*."[3] Central to Davies' argument is his conviction that life is more than physical matter. He reminds us that it is also about information. In fact, he calls life an information processing and propagating system.

Most Christians would agree. Whilst God may indeed use the mechanisms of the laws of nature to achieve his purposes, it is not the laws of nature that are inherently creative so much as the God of the laws of nature.


At what times do you feel God is absent from you?

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At what times do you feel God is very close to you?

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2) S.J. Dick, "Cosmotheology: Theological Implications of the New Universe", pages 191-210 in Steven Dick (ed.) *Many Worlds.* (Philadelphia and London: Templeton Foundation Press, 2000) 204.

3) P. Davies, "Biological Determinism, Information Theory, and the Origin of Life", pages 15-28 in Steven Dick (ed.) *Many Worlds.* (Philadelphia and London: Templeton Foundation Press, 2000) 15.

# A universe able to change

The Christian claim is that the universe is contingent (i.e. dependent) on God. In other words, the universe did not have to exist because of some property of its own. It came about as a result of God's action. However, this dependency on God does not mean that the laws of nature he instituted cannot generate new things.

Some scientists, who are also theologians, (such as Ian Barbour, Arthur Peacocke and John Polkinghorne,) say that the universe is contingent on God but that God has placed within the universe generators of novelty which can produce outcomes that not even God has foreordained. They believe that whilst the universe is constrained by God to produce intelligent life, it is not slavishly following a preordained game plan but can, to some extent, invent itself.

In other words, whilst the universe is directed by God, the precise outcomes are left to chance.[4]

These scientists do not believe that God pokes an occasional divine finger into the processes of the universe or that he is an absentee landlord. Rather, God is continually sustaining a universe that is able to expand and become. However, the cost of this free choice and exploration of its fruitful potentiality is waste, competition, evolutionary blind alleys, death and suffering.

This understanding would certainly make sense of the evidence both of divine order in the universe (identified by physicists), as well as the evidence of randomness and chance (identified by biologists).


How much could a universe invent itself before you felt that God had no control over it?

4) J. Polkinghorne, *Science and Theology: An Introduction* (London: SPCK, 1998), 78.

# Let's look after it!

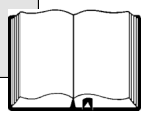
The astronomer Owen Gingerich points out that there is an awesome consequence to understanding that there is an element of innate freedom in the universe. Because there is no detailed foreordained plan, we have been given some freedom to shape the destiny of human civilization "*including both the freedom and the power to end it through greed, selfishness, and downright carelessness.*"[5] This understanding accords well with the Christian understanding that each of us have been given free-will to do things God's way or not – and live with the consequences of doing so.

In the book of Genesis, God commanded Adam and Eve to work the land and "*take care of it*" (Genesis 2:15). This responsibility of humankind towards creation is well expressed by the 17th century author, Sir Matthew Hale:

> "*The end of man's creation was that he should be the viceroy of the great God of heaven and earth, ...his steward, bailiff or farmer of this goodly farm of the ...world. Only for this reason was man invested with power, authority, right, dominion, trust and care ...to preserve the face of the earth in beauty, usefulness and fruitfulness*."
> Sir Matthew Hale

Sadly, we have been careless of this responsibility.

> "*Why has the land been ruined and laid waste like a desert that no one can cross?*
> *The Lord said, 'It is because they have forsaken my law which I set before them...*"
> (Jeremiah 9:12-13)



# Is God helpless?

The idea that God may have had no particular future in mind when he created, introduces the disturbing possibility that humankind may not have been specifically intended by God. We could simply be a mere chance phenomenon, one of an infinite number of possible outcomes destined to blossom for only a brief while in history.

How "in charge" can God be if he is present only to sustain a giant game of chance? Certainly, the apparent disorder we see in the natural world suggests that God is not in charge of the details of our existence. It is a fact that fifteen thousand people were killed in Lisbon during an earthquake which measured 8.6 on the Richter scale. The earthquake occurred on All Saints Day (November 1st) in 1755 and many were killed in churches when they collapsed upon them. Whilst 15,000 died in Lisbon (then a city of 250,000) the earthquake was eventually to be responsible for over 50,000 deaths over the whole region affected not only by the earthquake but by the resultant fires and tsunamis that followed it.

If our understanding of a God who could allows these things was only informed by science, it would describe a God who was careless of suffering, unconcerned over which species might exist and who was ignorant of the future. Is this the case?

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5) O. Gingerich, "Is There Design and Purpose in the Universe?" pages 121-132 in John F. Haught (ed.) *Science and Religion: In Search of Comic Purpose (*Washington, DC: Georgetown University Press, 2000), 130.

# Is God able to see the future?

Scientists need to be careful when speaking of the universes' ability to develop in unpredictable ways, particularly if they imply that these changes might surprise a God who does not know the future. The fact that God might allow any of a number of outcomes does not mean that the results would be unpredictable to a God who stands outside time and knows very well the course events will take.


One of the dangers in discussing how God might act is the risk of cutting God down to our level of understanding. Whilst it is indeed true that a scientific understanding of the universe is remarkably accessible to us, God, almost by definition, will not be. We are reliant only on what God chooses to reveal through his handiwork and through acts of self-revelation.

Whilst it is indeed fortunate that God has chosen to reveal quite a lot about his essential nature, most notably through his self-revelation as Jesus, there must always be room for some mystery. Care needs to be taken that we are not being presumptive by suggesting that God is a prisoner of time and does not know the future. (Remember, both St. Augustine and Einstein taught that time began when God created. Therefore, God exists outside time.) It will not be possible for us, people God has placed within time, to know very much about how God is also able to stand outside time (Psalm 90:2; Hebrews 1:10-12).

The Bible makes it plain that God does give us free choice and invites us to participate in decisions that will determine the future (Genesis 18:23-32; Exodus 32:11-14; 1 Kings 2:1-4). This is a reflection of God choosing to do things, whenever possible, through his people. However, this does not mean that God does not know the future, as the following Bible verses make clear: (1 Samuel 15:29; Psalm 139:4; Isaiah 48:3-5; Mark 14:30).

An example of both of these truths acting together can be seen in 2 Peter 3:9-12. This passage teaches that God has foreordained the events that will attend Christ's second coming, but that we can either hasten or delay Christ's return by our actions.

# Science needs more help from faith

Scientists have helped us look at the universe and observe both its finely tuned order as well as its cruelty and disorder. Science's solution to this is to suggest a God either does not exist or that God is not the loving God of Christianity who is involved with his people and who guarantees his promises concerning the future.

However, this science does not adequately explain why the universe bothers to exist or why it produces intelligent self-conscious worshiping beings only to dismiss them as a cosmic accident. Christianity, on the other hand, makes a link between the existence of an ordered universe and the existence of human beings.

Science's understanding therefore needs more help from Christianity if it is to make sense of why the universe bothers to exist.

# Session Five Science needs Christianity

Is God just an impersonal force who puts the ingredients of a self-developing universe together ...then steps back behind the veil of mystery to watch what galaxies, planets and life forms will come into existence? Is God's role simply to invent and sustain a giant game of chance? Was humankind not specifically intended by God? Are we simply the chance winners of an evolutionary race, destined to flourish briefly until overtaken by other life forms in a universe which is eventually destined to fade away into low level radiation?

If we relied on science alone, it might indicate that this was the case. However, the event that crashes against such a mournful understanding is God's self-revelation to us, most significantly as Jesus.


## Jesus makes sense of it

When it comes to understanding our worth and meaning, the only guarantee we have of this existing for us, as we inhabit a tiny planet circling a middle aged star, (one of 200 billion stars in a typical galaxy, one of 100 billion galaxies in the universe), is God's self-revelation to us as Christ Jesus. The coming of Christ changed everything, for it indicated that humankind was not simply a brief, meaningless point along the evolutionary conveyor belt of history.

The fact that God demonstrated his love for us through Jesus answers why the universe bothers to exist. It indicates that God was the driving force behind the mechanisms of chance that resulted in the development of human beings. God's love for his creation transforms a chance existence into a divine goal; the meaningless into the sacred; the unplanned into the purposed; the impersonal into the personal; and the unloved into the cherished.

But how does it make sense of the existence of death and suffering, both of which might also seem to indicate that a loving God does not exist?

# Death

Death is seen by scientists as an essential tool, a mechanism which allows the universe to develop increasingly adapted life forms. The scientist and theologian, Arthur Peacocke, says that new things can only emerge in the universe if old things dissolve to make room for them. There is therefore a structural logic about living organisms dying. Death is a prerequisite for the development of biological diversity. It allows the selection of those characteristics which will best ensure the survival of a species. Death is therefore essential if a species is to be able to adapt to environmental changes. As such, scientists do not view death as a consequence of sin, as taught by Christianity (Romans 6:23), but as a necessary phenomenon which allows a species to develop. Peacocke therefore says that we appear to be "*rising beasts rather than fallen angels*."[1]

However, it is not necessary to set the scientific significance of death against the theological significance of death. It is quite possible for death to be the necessary cost of a species being able to develop and evolve, yet for the existence of this mechanism to be regretted as something imperfect, a lamentable consequence of sin. In other words, we may be both "rising beasts" and "fallen angels."


# Suffering and meaning

Although the universe shows evidence of a beautiful intrinsic order that has allowed life to develop, it also displays much that seems random and cruel. Children die of cancer. The movement of tectonic plates on the earth's surface causes earthquakes which kill people. Is this suffering and death the price we have to pay if we are to have a universe that is able to design itself and be fruitful?

Something within us rebels at such a clinical explanation. There is a feeling that suffering and death are not good things, despite them being necessary to allow the development of new things in the universe. There is a sense of "wrongness", of things being unjust and incomplete.

Is death a good thing? How would you describe you attitude to death (other than that you are trying to avoid it for as long as possible!)?

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1) A. Peacocke, "The Challenge and Stimulus of the Epic of Evolution to Theology" pp. 89-117 in Steven Dick (ed.) *Many Worlds.* (Philadelphia and London: Templeton Foundation Press, 2000), 97-98.

# The Fall

Is there an understanding that says that we are right to consider suffering and death as bad or imperfect (for reasons other than the obvious fact that they are physically and emotionally unpleasant)?

There is. It is orthodox Christianity. According to orthodox Christian theology, death and suffering came about as a consequence of humankind choosing to live independent of the lordship of God. This truth is powerfully illustrated by the theologically illustrative story of Adam and Eve and their "fall" from God's perfect provision for them in the garden of Eden as a result of them disobeying God. Suffering, the story teaches, was a consequence of their disobedience (Genesis 3:16-19) ...and death would ensure that humankind would not be trapped eternally in this imperfect state (Genesis 3:19,22).

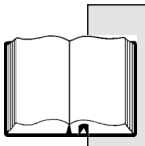
Suffering and death therefore represent something that is flawed. They represent a departure from God's best will. As such, we are right to consider them as bad. The Genesis story teaches us that God's creation was good in its initial intention (Genesis 1:12,20-21,25). However, in giving humankind freewill to choose between good and evil, evil was allowed the chance to hijack God's best plan for creation.

Creation is, therefore, a good thing spoilt.

The consequence of this, not only for humankind but all of creation, is suffering and death. But how can the sin of humankind at one point in history affect the whole history of the universe?

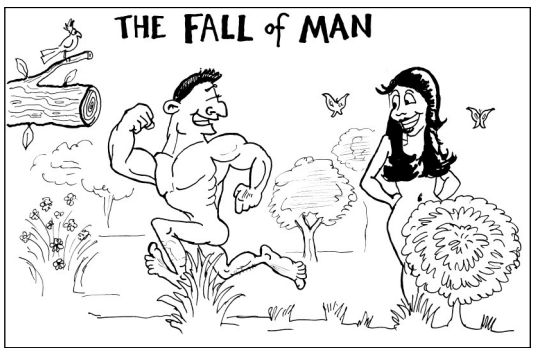
It needs to be remembered that God exists outside of time and history, for he is eternal. This means that rebellion against God by humanity, the particular object of his love, can have repercussions beyond the history of humanity and result in suffering for all created life, (indeed, throughout the whole universe), at any point in time.

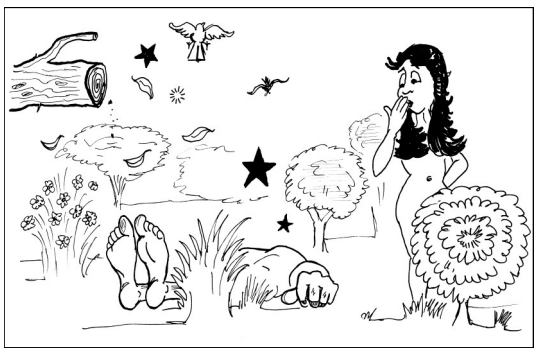
This is why the Bible teaches that nature itself, as well as humankind, waits to be renewed by God at the end of time.



"*The creation waits in eager expectation for the sons of God to be revealed. For the creation was subject to frustration, not by its own choice, but by the will of the one who subjected it, in hope that the creation itself will be liberated from its bondage to decay and brought into the glorious freedom of the children of God.*
*We know that the whole creation has been groaning as in the pains of childbirth right up to the present time ...as we wait eagerly...*" (Romans 8:19-22)

The laws of nature, corrupted by sin, have resulted in a harsh universe where suffering and death have become a necessary reality for the life we know to exist. It allows destructive tidal waves, competition between living organisms and death. However, because it is an imperfection, a consequence of sin, God will not tolerate it forever but will make all things new when the need for a world of risk (as necessary backdrop for us to act out our moral choices) is past.



# The Trinity

There are three key questions concerning the significance of humankind in the universe:
1) Is God in control of history?
2) Does God care about humanity and our suffering?
3) Does God expect humanity to simply be passive and helpless in the face of suffering?

The Christian gospel gives answers to all three questions. Rather beautifully, it answers each question by teaching of the work of each member of the Trinity (the three persons of God who mutually indwell each other, who have been revealed to us as Father, Son and Holy Spirit).

1 When we cried out against God despairing of there ever being a final solution; God the Father gives us the assurance the he will have the last word for he has set a time when this present age will be replaced by a new order, uncorrupted by sin and suffering (Revelation 21:1).

2 When we cried out against God that God did not understand how it felt to be a victim of the suffering we currently endure, God the Son, came to live amongst us and experienced the agonies of life personally. He therefore understands.

3 When we cry out against God because, although he understood our suffering, we were still helpless to address it; God comes to us as the Holy Spirit, the empowering presence of God, who compels us to address suffering practically wherever we find it.

# Christianity makes sense of it.

When we tried to make sense of things through religions, spiritualities and secular philosophies, God came to us and revealed himself to us. Christianity therefore makes sense.

- It makes sense of the order we see in creation, for God is the intelligence behind it.
- It makes sense of the harshness we see in creation, for creation is a good thing spoilt.
- It makes sense of the inevitable fact that our universe will end, for we understand that the universe is corrupted by sin and that it will end when God will make all things new.
- It makes sense of why the universe exists. A universe the size and age is necessary to allow intelligent life to exist. God wanted humankind to exist and be in a loving relationship with him. This central purpose is indicated by the capacity for our sin to mar all of creation (the universe).
- It makes sense of why God can appear to be mysterious. God allows this to preserve our autonomy so we are free to choose God's friendship through faith (this being the greatest compliment we can give God).
- It also makes sense of why God can appear to be so close and personal, for once we dare to jump into God's arms by faith, we journey with God through the eyes of faith. This need for faith will exist until God makes all things new, when we will see God face to face (1 Corinthians 13:12).

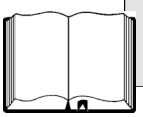
# How will you respond?

Science can point us to the possibility of God. The Christian faith is scientifically reasonable. However, this is as far as science can take us. It leaves us within a beautiful but harsh universe wondering about its purpose and our part in it all. However, all this changed when God declared his love for us and revealed himself to us.

Jesus gave us the human picture of God. God was now no longer mysterious. God was now no longer distant from us but with us sharing in our suffering.

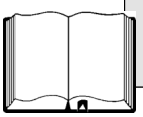
Jesus' mission was to rescue us back to God. God does not want to be without our love but has given us free will to accept or reject him. We have been given the choice.

However, there remains the problem of our unworthiness compared to God's holiness. The Bible says, with brutal honesty, that:



"*all have sinned and fall short of the glory of God*"
(Romans 3:23)

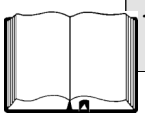
As such, our sinfulness disqualifies us from God's holy presence. Because God is holy and righteous, sin is not something God can overlook or accept.



"*Your iniquities have separated you from your God*"
(Isaiah 59:2).

There is nothing we can do to change this. We can never earn the right to God by our own efforts (Ephesians 2:8-9). The Bible says that compared to God's holiness, our righteousness is like "*filthy rags*" (Isaiah 64:6). This places us in an dreadful position.

However, the good news is that what we could not do, God did. God loved us so much that he came as Jesus to pay the price for our sins. Jesus died on a cross in our place to pay their penalty.



"*For Christ died for sins once for all, the righteous for the unrighteous, to bring you to God.*"
(1 Peter 3:18)


This extraordinary act declares how serious God is about rescuing you to himself into his eternal purpose.

The big question is, how will you respond? Are you ready to accept God's love and live your purpose?

Please know that becoming a Christian, it is a serious commitment. You will need to give up doing wrong things and be willing to be known as a Christian. It can be tough. However, God will place his empowering presence (his Holy Spirit) within you to help you.

# How do you become a Christian?

To become a Christian, you need to:

1) Accept, with gratitude, Jesus' death on the cross for you
2) Ask God's forgiveness for the sins you have committed that have grieved him
3) Let God be in charge of your life.

Is there any reason why you should not give your life to Christ right now and live your eternal purpose?

If you wish to, then tell God this by talking to him in prayer. (You can pray out loud or silently in your heart.)

Here is an example of a small prayer that incorporates the sort of things it is good to pray when you want to become a Christian.

**Heavenly Father,**
**Thank you for your love for me.**
**Thank you for sending Jesus to die for me**
**to pay the price for my sins.**
**I turn from them now and ask you to forgive me**
**for living life without you in the past.**
**I accept you as my Lord**
**and ask that you fill me with**
**the empowering presence of your spirit**
**so that I can follow Jesus faithfully**
**and fulfill your purpose for my life.**
**Amen**

If you have prayed this prayer sincerely, congratulations on becoming a Christian! I strongly suggest that you tell someone today that you have said "yes" to God, (perhaps the leader running this course). This will be your first act of faith and you will be the stronger for it.

Three habits will ensure you continue as a Christian:

1. Make it a daily habit to read a few verses of the Bible. (Many daily Bible study guides are available from Christian bookshops).

2. Get along to a good church that will encourage you to grow in your faith and ministry.

3. Learn to share your life and thoughts daily with God in prayer.

Now you know God's purposes for you, live them out well. Enjoy God's love and be part of his mission.

May God bless you richly.

# The Leader's Guide

# APPENDIX 1

## HOW TO RUN *BASICS* FOR A SMALL GROUP

### HOW TO MAKE THIS COURSE WORK

*BASICS 3: Evidence of God* is designed to teach people about the scientific credibility of faith. It does so in a three step process:

1) Everyone watches a session on film (if the course is not being taught from this book).
2) The session is then discussed together in a small group. (See Appendix 2 for suggested questions.)
3) Each group member goes through each session in their own copy of the workbook, answering the questions and looking up the Bible references.

### THE BENEFIT OF MEETING IN SMALL GROUPS

It is difficult to overemphasise the importance of small groups in the life of the church. They are as old as Christianity itself and have been the structures which have allowed the faith of communities to grow since the first century (Romans 16:5; 1 Corinthians 16:19; Colossians 4:15: Philemon 2).

The advantages of small groups are:

1. Their ability to disciple people in faith. A major part of Jesus' ministry was to small groups of disciples.
2. Their provision of caring relationships. People come to church for many reasons but they will only stay if they have developed meaningful relationships. Small groups help such friendships develop.
3. You introduce people to the benefits of learning together in groups so that they are likely to want to continue to do so after the course.

### COMPOSITION OF GROUPS

Although it might seem ideal to have representatives of every age and levels of intellect in each small group, this does not always work in practice. Groups generally work best when they contain people who have a natural affinity for each other. This can also allow for specialisation. Groups can be formed which are particularly orientated towards undergraduates or young mums. However, groups must not be so insular that they fail to address the challenge of breaking down the social barriers that can exist between people.

### THE MINISTRY OF FOOD

Chatting over coffee and dessert helps people to relax and relate and greatly helps a group to become a cohesive unit.

### PREPARING THE VENUE

A venue should be comfortable and non-threatening. Chairs should usually be placed in a circle for discussion. Avoid having chairs behind others as it encourages those sitting in them to be less involved.

Some people also take the phone off the hook or switch them off to avoid distractions.

## THE GROUP LEADER

Leaders are those who:

- have a mature, consistent and vibrant faith
- spend time usually each day developing his or her own relationship with God
- are able to:
  - lead people to faith in Christ,
  - encourage people to renew their faith
- are wise
- are the person the rest of the group will automatically defer to as leader
- have good character
- are prepared to put in that extra effort
- are able to love

The leader should be a facilitator. This means that he/she should make it possible for things to be organised and happen. The leader should not necessarily do everything but should work with apprentice leaders or assistants so that the leadership team can pray and prepare together. It is usually a good idea for the leader not be personally responsible for the domestic arrangements but to give this responsibility to an assistant.

## PROMOTE DISCUSSION

The leader's main job in the group discussion time is to get people talking. It is <u>not</u> to provide all the answers. A leader's skill is in making people feel at ease, appreciated and in gently drawing people into discussion. Leaders need to treat all questions seriously and with respect so that people will be encouraged to share because no question or opinion is considered too stupid or antagonistic to be appreciated.

## THE FIRST MEETING

People will come to the first meeting with some apprehension, particularly if they are unfamiliar with Christianity or church. They will also bring with them all sorts of fears and preconceptions of what Christianity and church are about. The first meeting is the ideal time to shatter people's negative preconceptions and put them at their ease. For this reason, consider doing four things:

1. Ensure the venue (a home or church building) is welcoming and looks good, i.e. is not too cavernous or cramped and is the right temperature. Consider using soft indirect lighting and having background music as people arrive. Surprise people with excellence and how "normal" things are.
2. Provide name tags.
3. Encourage Christians who have invited guests to the course to do the course with them.
4. Make a little extra effort at the first meeting. Imagine how encouraged new people would feel if they were greeted with a glass of good wine, (alcoholic, if your church allows it, and a non alcoholic alternative) cheese and dips. Alternatively, you could provide freshly brewed coffee and dessert.

## SINGING

Don't sing as new people will feel uncomfortable singing songs they don't know about things they don't understand.

## THE GET-TO-KNOW-YOU (OR "ICE BREAKER") ACTIVITY

Warm up activities at the start of a home group meeting can be anything that will help people relax, smile and get to know each other. It can be as basic as chat over a cup of coffee. This time is vital for establishing a healthy group dynamic. It is also fun as it is centred on the establishment of non-threatening friendships. Begin with some act of hospitality (offering food and drink), and encourage conversation between people. People will only commit to a group if they form authentic friendships, so encourage this to happen.

## WHAT SHOULD PEOPLE BRING?

Provide Bibles and ask people to bring a copy of this workbook.

## PRAYER

All prayers prayed by leaders before or after a meeting should be simple, sincere, relevant to what has been discussed and short. Such prayers will not intimidate people and will encourage them to believe that they too might soon be able to pray in such a way.

## TIMELINESS

There is no spiritual merit in meetings being long drawn out marathons. People will tire of them if they are. Be disciplined with time and let people go home at a civilised hour.

Before people go home, the meeting should have a definite ending e.g. the leader should pray a brief prayer.

## A TYPICAL PROGRAM

7:30pm Wine and/or non alcoholic punch and savoury dips (general socialising).
7:45pm Introduce the subject for the night and begin by asking people what questions they have in that area. Allow some open discussion.
8:00pm The teaching session (taught by a leader or watched on video)
8:20pm Group discussion time
9:10pm Concluding prayer followed by tea or coffee

**or**

7:00pm Tea or coffee and dessert, (different group members may take it in turn to bring dessert)
7:25pm Introduce the subject for the night and begin a discussion to explore what people think about it.
7:40pm The teaching session (taught by a leader or watched on video)
8:00pm Group discussion time
9:00pm Concluding prayer

## THE NEXT STEP

After the end of the last session in series, the leader should help the course participants towards the “next step.” Those who host home fellowship groups within the church can be invited to the final session to talk about what they do in their small groups and to invite the course participants to attend.

# APPENDIX 2

## HOW TO LEAD PEOPLE TO FAITH

1) Establish an authentic friendship and earn the right to speak into the life of your friend who may inquire about faith. Listen to their questions and respond wisely but don't feel you have to have all the answers. Be ready to share, if appropriate, how and why you became a Christian.

   Here are some key Bible verses you can learn or be ready to quote if it is appropriate, but be careful not to "Bible bash".

   > ***For Christ died for sins once for all, the righteous for the unrighteous to bring you to God.*** (1 Peter 3:18)
   >
   > ***If we confess our sins, God is faithful and just and will forgive us our sins and purify us from all unrighteousness***. (1 John 1:9)
   >
   > ***This is how God showed his love among us: He sent his son into the world that we might live through him. This is love; not that we loved God, but that he loved us and sent his Son as an atoning sacrifice for our sins.*** (1 John 4:9-10)

   It will be important to spell out the cost of being a Christian, i.e. the need to live in a godly way doing the work of Christ and the need to be willing to be known as a Christian.

2) Ask whatever is appropriate to help your friend make a commitment, e.g.
   "*It sounds to me that you are ready to become a Christian. Is that what you want*?"
   or
   "*Is there any reason why you can't become a Christian right now*?"

3) If they want to make a commitment to Christ, ask them to pray this prayer (being sure first that it expresses what they want to say):

   ***Heavenly Father***
   ***Thank you for your love for me.***
   ***Thank you for sending Jesus to die for me to pay the price for my sins.***
   ***I turn from my sinful ways now***
   ***and ask you to forgive me for living life without you in the past.***
   ***I now accept you as my only Lord.***
   ***In Jesus name, I cut the ties to all other gods***
   ***and reject the ceremonies and fetishes associated with them.***
   ***From today, I worship only you – the One True God.***
   ***I ask that you fill me now with***
   ***the empowering presence of the Holy Spirit***
   ***so that I can follow Jesus faithfully***
   ***and fulfil your purpose for my life.***
   ***I ask this in Jesus' name. Amen***

4) Congratulate your friend on becoming a Christian. If you can, give them a daily Bible reading guide and ask them to develop a daily habit of prayer and Bible reading. Encourage them to work through their doubts and questioning honestly so that they grow their faith. (God is well able to bear our questioning.) Explain that there may be days of doubt but that they are to rely on the fact of God's acceptance of them, not their feelings, which can vary according to their mood.

5) Ensure a local church follows up and cares for your new Christian friend.

# APPENDIX 3

## QUESTIONS FOR DISCUSSION IN SMALL GROUPS

### SESSION 1) "The dance between science and faith through history"

- What in this session particularly impacted upon you?
- What reactions or questions have been prompted as a result of this session?
- Why do you think some people think Christianity has been anti-science?
- In what ways do you identify with Darwin's spiritual difficulties?
- How literally should we take the creation/Adam and Eve story? How can they be explained?
- Is it fair to say that science has thrived particularly well in countries which have had a Christian heritage?

### SESSION 2) "Can science allow faith?"

- What in this session particularly impacted upon you?
- What reactions or questions have been prompted as a result of this session?
- What lessons can be learnt from the story of how the "Big Bang" theory was developed?
- Do you think that everything could exist because of chance and evolution only?
- The institutional church has sometimes sought to deny science. In what ways has science tried to deny Christianity?
- How should conventional science and Christianity relate?

### SESSION 3) "Cosmic order as evidence for God"

- What in this session particularly impacted upon you?
- What reactions or questions have been prompted as a result of this session?
- What effect would the discovery of intelligent life elsewhere in the universe have on Christian faith?
- Why do you think people wonder if it is significant that humans are able to unlock the secrets of how the universe works?
- What things give you a sneaking suspicion that the order of creation suggests the existence of a higher being?

## SESSION 4) "Cosmic disorder as evidence against God"

- What in this session particularly impacted upon you?
- What reactions or questions have been prompted as a result of this session?
- What sort of things exist that you find difficult to reconcile with the existence of a loving God?
- Are the arguments of some scientists who suggest God sustains a universe able to invent itself, persuasive?
- Do you think it likely that God may not know the details of the future?

## SESSION 5) "Science needs Christianity"

- What in this session particularly impacted upon you?
- What reactions or questions have been prompted as a result of this session?
- How can the sins of humankind (who have been in existence only a fraction of the time the universe has existed) effect all of creation.
- What reasons are there to believe that humankind was intended by God and is special to God?
- What makes the life and works of Jesus different from other religious claims?
- What difference does being a Christian make?

# BASICS FEEDBACK QUESTIONNAIRE

**Please take a moment to fill in this questionnaire and give it to the course leader.**

What would be a spiritual description of yourself before you did *BASICS 3: Evidence of God* ?

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How would you describe yourself spiritually now?

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If there has been any change, what brought it about?

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Do you have any suggestions on how we might improve *BASICS 3: Evidence of God* ?

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Your name (optional): .....

Month & year of your course ..... / .....

BASICS 3: *Evidence of God*, is a five session course designed to give reasons why the Christian faith is scientifically reasonable.

The sessions include:
1. The dance between science and faith through history
2. Can science allow faith?
3. Cosmic order as evidence for God
4. Cosmic disorder as evidence against God
5. Science needs Christianity

*Evidence of God* can be used individually or in a small group setting:
- as a powerful outreach tool for evangelism
- for discipling new Christians
- for refreshing the faith of mature Christians

*Evidence of God* can be taught from this book alone. Alternatively, this book can be used in conjunction with *Evidence of God* film which teaches this course for you.

*Evidence of God* book contains:
1. The teaching for each subject
2. The leader's guide (questions for group discussion and other resources)

BASICS 3: *Evidence of God*, is the third book in the BASICS discipling series.

The author:

Dr Nick Hawkes is a Pastor who has been growing churches in Australia for many years. Before entering the ministry, he worked as a research scientist. He has two degrees in science and two in theology. He is author of a number of books including *The Country is Different* and *The Dance Between Science and Faith.*

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