

THE GOD DELUSION

Richard Dawkins



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In Memoriam
Douglas Adams (1952-2001)

'Isn't it enough to see that a garden is beautiful without having to believe that there are fairies at the bottom of it too?'

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Preface

As a child, my wife hated her school and wished she could leave. Years later, when she was in her twenties, she disclosed this unhappy fact to her parents, and her mother was aghast: 'But darling, why didn't you come to us and tell us?' Lalla's reply is my text for today: 'But I didn't know I could.'

I didn't know I could.

I suspect - well, I am sure - that there are lots of people out there who have been brought up in some religion or other, are unhappy in it, don't believe it, or are worried about the evils that are done in its name; people who feel vague yearnings to leave their parents' religion and wish they could, but just don't realize that leaving is an option. If you are one of them, this book is for you. It is intended to raise consciousness - raise consciousness to the fact that to be an atheist is a realistic aspiration, and a brave and splendid one. You can be an atheist who is happy, balanced, moral, and intellectually fulfilled. That is the first of my consciousness-raising messages. I also want to raise consciousness in three other ways, which I'll come on to.

In January 2006 I presented a two-part television documentary on British television (Channel Four) called *Root of All Evil?* From the start, I didn't like the title. Religion is not the root of *all* evil, for no one thing is the root of all anything. But I was delighted with the advertisement that Channel Four put in the national newspapers. It was a picture of the Manhattan skyline with the caption 'Imagine a world without religion.' What was the connection? The twin towers of the World Trade Center were conspicuously present.

Imagine, with John Lennon, a world with no religion. Imagine no suicide bombers, no 9/11, no 7/7, no Crusades, no witch-hunts, no Gunpowder Plot, no Indian partition, no Israeli/Palestinian wars, no Serb/Croat/Muslim massacres, no persecution of Jews as 'Christ-killers', no Northern Ireland 'troubles', no 'honour killings', no shiny-suited bouffant-haired televangelists fleecing gullible people of their money ('God wants you to give till it hurts'). Imagine no Taliban to blow up ancient statues, no public

beheadings of blasphemers, no flogging of female skin for the crime of showing an inch of it. Incidentally, my colleague Desmond Morris informs me that John Lennon's magnificent song is sometimes performed in America with the phrase 'and no religion too' expurgated. One version even has the effrontery to change it to 'and *one* religion too'.

Perhaps you feel that agnosticism is a reasonable position, but that atheism is just as dogmatic as religious belief? If so, I hope Chapter 2 will change your mind, by persuading you that 'the God Hypothesis' is a scientific hypothesis about the universe, which should be analysed as sceptically as any other. Perhaps you have been taught that philosophers and theologians have put forward good reasons to believe in God. If you think that, you might enjoy Chapter 3 on 'Arguments for God's existence' - the arguments turn out to be spectacularly weak. Maybe you think it is obvious that God must exist, for how else could the world have come into being? How else could there be life, in all its rich diversity, with every species looking uncannily as though it had been 'designed'? If your thoughts run along those lines, I hope you will gain enlightenment from Chapter 4 on 'Why there almost certainly is no God'. Far from pointing to a designer, the illusion of design in the living world is explained with far greater economy and with devastating elegance by Darwinian natural selection. And, while natural selection itself is limited to explaining the living world, it raises our consciousness to the likelihood of comparable explanatory 'cranes' that may aid our understanding of the cosmos itself. The power of cranes such as natural selection is the second of my four consciousness-raisers.

Perhaps you think there must be a god or gods because anthropologists and historians report that believers dominate every human culture. If you find that convincing, please refer to Chapter 5, on 'The roots of religion', which explains why belief is so ubiquitous. Or do you think that religious belief is necessary in order for us to have justifiable morals? Don't we need God, in order to be good? Please read Chapters 6 and 7 to see why this is not so. Do you still have a soft spot for religion as a good thing for the world, even if you yourself have lost your faith? Chapter 8 will invite you to think about ways in which religion is not such a good thing for the world.

If you feel trapped in the religion of your upbringing, it would be worth asking yourself how this came about. The answer is usually some form of childhood indoctrination. If you are religious at all it is overwhelmingly probable that your religion is that of your parents. If you were born in Arkansas and you think Christianity is true and Islam false, knowing full well that you would think the opposite if you had been born in Afghanistan, you are the victim of childhood indoctrination. *Mutatis mutandis* if you were born in Afghanistan.

The whole matter of religion and childhood is the subject of Chapter 9, which also includes my third consciousness-raiser. Just as feminists wince when they hear 'he' rather than 'he or she', or 'man' rather than 'human', I want everybody to flinch whenever we hear a phrase such as 'Catholic child' or 'Muslim child'. Speak of a 'child of Catholic parents' if you like; but if you hear anybody speak of a 'Catholic child', stop them and politely point out that children are too young to know where they stand on such issues, just as they are too young to know where they stand on economics or politics. Precisely because my purpose is consciousness-raising, I shall not apologize for mentioning it here in the Preface as well as in Chapter 9. You can't say it too often. I'll say it again. That is not a Muslim child, but a child of Muslim parents. That child is too young to know whether it is a Muslim or not. There is no such thing as a Muslim child. There is no such thing as a Christian child.

Chapters 1 and 10 top and tail the book by explaining, in their different ways, how a proper understanding of the magnificence of the real world, while never becoming a religion, can fill the inspirational role that religion has historically - and inadequately - usurped.

My fourth consciousness-raiser is atheist pride. Being an atheist is nothing to be apologetic about. On the contrary, it is something to be proud of, standing tall to face the far horizon, for atheism nearly always indicates a healthy independence of mind and, indeed, a healthy mind. There are many people who know, in their heart of hearts, that they are atheists, but dare not admit it to their families or even, in some cases, to themselves. Partly, this is because the very word 'atheist' has been assiduously built up as a

terrible and frightening label. Chapter 9 quotes the comedian Julia Sweeney's tragi-comic story of her parents' discovery, through reading a newspaper, that she had become an atheist. Not believing in God they could just about take, but an atheist! *An ATHEIST!* (The mother's voice rose to a scream.)

I need to say something to American readers in particular at this point, for the religiosity of today's America is something truly remarkable. The lawyer Wendy Kaminer was exaggerating only slightly when she remarked that making fun of religion is as risky as burning a flag in an American Legion Hall.¹ The status of atheists in America today is on a par with that of homosexuals fifty years ago. Now, after the Gay Pride movement, it is possible, though still not very easy, for a homosexual to be elected to public office. A Gallup poll taken in 1999 asked Americans whether they would vote for an otherwise well-qualified person who was a woman (95 per cent would), Roman Catholic (94 per cent would), Jew (92 per cent), black (92 per cent), Mormon (79 per cent), homosexual (79 per cent) or atheist (49 per cent). Clearly we have a long way to go. But atheists are a lot more numerous, especially among the educated elite, than many realize. This was so even in the nineteenth century, when John Stuart Mill was already able to say: 'The world would be astonished if it knew how great a proportion of its brightest ornaments, of those most distinguished even in popular estimation for wisdom and virtue, are complete sceptics in religion.'

This must be even truer today and, indeed, I present evidence for it in Chapter 3. The reason so many people don't notice atheists is that many of us are reluctant to 'come out'. My dream is that this book may help people to come out. Exactly as in the case of the gay movement, the more people come out, the easier it will be for others to join them. There may be a critical mass for the initiation of a chain reaction.

American polls suggest that atheists and agnostics far outnumber religious Jews, and even outnumber most other particular religious groups. Unlike Jews, however, who are notoriously one of the most effective political lobbies in the United States, and unlike evangelical Christians, who wield even greater political power, atheists and agnostics are not organized and therefore exert almost zero influence. Indeed, organizing atheists has been compared to

herding cats, because they tend to think independently and will not conform to authority. But a good first step would be to build up a critical mass of those willing to 'come out', thereby encouraging others to do so. Even if they can't be herded, cats in sufficient numbers can make a lot of noise and they cannot be ignored.

The word 'delusion' in my title has disquieted some psychiatrists who regard it as a technical term, not to be bandied about. Three of them wrote to me to propose a special technical term for religious delusion: 'relusion'.² Maybe it'll catch on. But for now I am going to stick with 'delusion', and I need to justify my use of it. The *Penguin English Dictionary* defines a delusion as 'a false belief or impression'. Surprisingly, the illustrative quotation the dictionary gives is from Phillip E. Johnson: 'Darwinism is the story of humanity's liberation from the delusion that its destiny is controlled by a power higher than itself.' Can that be the same Phillip E. Johnson who leads the creationist charge against Darwinism in America today? Indeed it is, and the quotation is, as we might guess, taken out of context. I hope the fact that I have stated as much will be noted, since the same courtesy has not been extended to me in numerous creationist quotations of my works, deliberately and misleadingly taken out of context. Whatever Johnson's own meaning, his sentence as it stands is one that I would be happy to endorse. The dictionary supplied with Microsoft Word defines a delusion as 'a persistent false belief held in the face of strong contradictory evidence, especially as a symptom of psychiatric disorder'. The first part captures religious faith perfectly. As to whether it is a symptom of a psychiatric disorder, I am inclined to follow Robert M. Pirsig, author of *Zen and the Art of Motorcycle Maintenance*, when he said, 'When one person suffers from a delusion, it is called insanity. When many people suffer from a delusion it is called Religion.'

If this book works as I intend, religious readers who open it will be atheists when they put it down. What presumptuous optimism! Of course, dyed-in-the-wool faith-heads are immune to argument, their resistance built up over years of childhood indoctrination using methods that took centuries to mature (whether by evolution or design). Among the more effective immunological devices is a dire warning to avoid even opening a book like this, which is surely

a work of Satan. But I believe there are plenty of open-minded people out there: people whose childhood indoctrination was not too insidious, or for other reasons didn't 'take', or whose native intelligence is strong enough to overcome it. Such free spirits should need only a little encouragement to break free of the vice of religion altogether. At very least, I hope that nobody who reads this book will be able to say, 'I didn't know I could.'

For help in the preparation of this book, I am grateful to many friends and colleagues. I cannot mention them all, but they include my literary agent John Brockman, and my editors, Sally Gaminara (for Transworld) and Eamon Dolan (for Houghton Mifflin), both of whom read the book with sensitivity and intelligent understanding, and gave me a helpful mixture of criticism and advice. Their whole-hearted and enthusiastic belief in the book was very encouraging to me. Gillian Somerscales has been an exemplary copy editor, as constructive with her suggestions as she was meticulous with her corrections. Others who criticized various drafts, and to whom I am very grateful, are Jerry Coyne, J. Anderson Thomson, R. Elisabeth Cornwell, Ursula Goodenough, Latha Menon and especially Karen Owens, critic *extraordinaire*, whose acquaintance with the stitching and unstitching of every draft of the book has been almost as detailed as my own.

The book owes something (and vice versa) to the two-part television documentary *Root of All Evil?*, which I presented on British television (Channel Four) in January 2006. I am grateful to all who were involved in the production, including Deborah Kidd, Russell Barnes, Tim Cragg, Adam Prescod, Alan Clements and Hamish Mykura. For permission to use quotations from the documentary I thank IWC Media and Channel Four. *Root of All Evil?* achieved excellent ratings in Britain, and it has also been taken by the Australian Broadcasting Corporation. It remains to be seen whether any US television channel will dare to show it. *

This book has been developing in my mind for some years. During that time, some of the ideas inevitably found their way into lectures, for example my Tanner Lectures at Harvard, and articles in newspapers and magazines. Readers of my regular column in

*Bootleg copies are being downloaded from numerous US websites. Negotiations are under way for legitimate DVDs to be marketed. At the time of going to press these negotiations are incomplete - updates will be posted at www.richarddawkins.net.

Free Inquiry, especially, may find certain passages familiar. I am grateful to Tom Flynn, the Editor of that admirable magazine, for the stimulus he gave me when he commissioned me to become a regular columnist. After a temporary hiatus during the finishing of the book, I hope now to resume my column, and will no doubt use it to respond to the aftermath of the book.

For a variety of reasons I am grateful to Dan Dennett, Marc Hauser, Michael Stirrat, Sam Harris, Helen Fisher, Margaret Downey, Ibn Warraq, Hermione Lee, Julia Sweeney, Dan Barker, Josephine Welsh, Ian Baird and especially George Scales. Nowadays, a book such as this is not complete until it becomes the nucleus of a living website, a forum for supplementary materials, reactions, discussions, questions and answers - who knows what the future may bring? I hope that www.richarddawkins.net/, the website of the Richard Dawkins Foundation for Reason and Science, will come to fill that role, and I am extremely grateful to Josh Timonen for the artistry, professionalism and sheer hard work that he is putting into it.

Above all, I thank my wife Lalla Ward, who has coaxed me through all my hesitations and self-doubts, not just with moral support and witty suggestions for improvement, but by reading the entire book aloud to me, at two different stages in its development, so I could apprehend very directly how it might seem to a reader other than myself. I recommend the technique to other authors, but I must warn that for best results the reader must be a professional actor, with voice and ear sensitively tuned to the music of language.

CHAPTER 4

Why there almost
certainly is no God

The priests of the different religious sects . . . dread the advance of science as witches do the approach of daylight, and scowl on the fatal harbinger announcing the subdivision of the duperies on which they live.

THOMAS JEFFERSON

THE ULTIMATE BOEING 747

The argument from improbability is the big one. In the traditional guise of the argument from design, it is easily today's most popular argument offered in favour of the existence of God and it is seen, by an amazingly large number of theists, as completely and utterly convincing. It is indeed a very strong and, I suspect, unanswerable argument - but in precisely the opposite direction from the theist's intention. The argument from improbability, properly deployed, comes close to proving that God does *not* exist. My name for the statistical demonstration that God almost certainly does not exist is the Ultimate Boeing 747 gambit.

The name comes from Fred Hoyle's amusing image of the Boeing 747 and the scrapyard. I am not sure whether Hoyle ever wrote it down himself, but it was attributed to him by his close colleague Chandra Wickramasinghe and is presumably authentic.⁵⁸ Hoyle said that the probability of life originating on Earth is no greater than the chance that a hurricane, sweeping through a scrapyard, would have the luck to assemble a Boeing 747. Others have borrowed the metaphor to refer to the later evolution of complex living bodies, where it has a spurious plausibility. The odds against assembling a fully functioning horse, beetle or ostrich by randomly shuffling its parts are up there in 747 territory. This, in a nutshell, is the creationist's favourite argument - an argument that could be made only by somebody who doesn't understand the first thing about natural selection: somebody who thinks natural selection is a theory of chance whereas - in the relevant sense of chance - it is the opposite.

The creationist misappropriation of the argument from improbability always takes the same general form, and it doesn't make any difference if the creationist chooses to masquerade in the politically expedient fancy dress of 'intelligent design' (ID).^{*} Some observed phenomenon - often a living creature or one of its more complex organs, but it could be anything from a molecule up to the universe itself - is correctly extolled as statistically improbable. Sometimes the language of information theory is used: the Darwinian is challenged to explain the source of all the information

^{*} Intelligent design has been unkindly described as creationism in a cheap tuxedo.

in living matter, in the technical sense of information content as a measure of improbability or 'surprise value'. Or the argument may invoke the economist's hackneyed motto: there's no such thing as a free lunch - and Darwinism is accused of trying to get something for nothing. In fact, as I shall show in this chapter, Darwinian natural selection is the only known solution to the otherwise unanswerable riddle of where the information comes from. It turns out to be the God Hypothesis that tries to get something for nothing. God tries to have his free lunch and be it too. However statistically improbable the entity you seek to explain by invoking a designer, the designer himself has got to be at least as improbable. God is the Ultimate Boeing 747.

The argument from improbability states that complex things could not have come about by chance. But many people *define* 'come about by chance' as a synonym for 'come about in the absence of deliberate design'. Not surprisingly, therefore, they think improbability is evidence of design. Darwinian natural selection shows how wrong this is with respect to biological improbability. And although Darwinism may not be directly relevant to the inanimate world - cosmology, for example - it raises our consciousness in areas outside its original territory of biology.

A deep understanding of Darwinism teaches us to be wary of the easy assumption that design is the only alternative to chance, and teaches us to seek out graded ramps of slowly increasing complexity. Before Darwin, philosophers such as Hume understood that the improbability of life did not mean it had to be designed, but they couldn't imagine the alternative. After Darwin, we all should feel, deep in our bones, suspicious of the very idea of design. The illusion of design is a trap that has caught us before, and Darwin should have immunized us by raising our consciousness. Would that he had succeeded with all of us.

NATURAL SELECTION AS A CONSCIOUSNESS-RAISER

In a science-fiction starship, the astronauts were homesick: 'Just to

think that it's springtime back on Earth!' You may not immediately see what's wrong with this, so deeply ingrained is the unconscious northern hemisphere chauvinism in those of us who live there, and even some who don't. 'Unconscious' is exactly right. That is where consciousness-raising comes in. It is for a deeper reason than gimmicky fun that, in Australia and New Zealand, you can buy maps of the world with the South Pole on top. What splendid consciousness-raisers those maps would be, pinned to the walls of our northern hemisphere classrooms. Day after day, the children would be reminded that 'north' is an arbitrary polarity which has no monopoly on 'up'. The map would intrigue them as well as raise their consciousness. They'd go home and tell their parents - and, by the way, giving children something with which to surprise their parents is one of the greatest gifts a teacher can bestow.

It was the feminists who raised my consciousness of the power of consciousness-raising. 'Herstory' is obviously ridiculous, if only because the 'his' in 'history' has no etymological connection with the masculine pronoun. It is as etymologically silly as the sacking, in 1999, of a Washington official whose use of 'niggardly' was held to give racial offence. But even daft examples like 'niggardly' or 'herstory' succeed in raising consciousness. Once we have smoothed our philological hackles and stopped laughing, herstory shows us history from a different point of view. Gendered pronouns notoriously are the front line of such consciousness-raising. He or she must ask himself or herself whether his or her sense of style could ever allow himself or herself to write like this. But if we can just get over the clunking infelicity of the language, it raises our consciousness to the sensitivities of half the human race. Man, mankind, the Rights of Man, all men are created equal, one man one vote - English too often seems to exclude woman.* When I was young, it never occurred to me that women might feel slighted by a phrase like 'the future of man'. During the intervening decades, we have all had our consciousness raised. Even those who still use 'man' instead of 'human' do so with an air of self-conscious apology - or truculence, taking a stand for traditional language, even deliberately to rile feminists. All participants in the *Zeitgeist*

* Classical Latin and Greek were better equipped. Latin *homo* (Greek *anthropo-*) means human, as opposed to *vir* (*andro-*) which means man, and *fetmina* (*gyne-*) which means woman. Thus anthropology pertains to all humanity, where andrology and gynecology are sexually exclusive branches of medicine.

have had their consciousness raised, even those who choose to respond negatively by digging in their heels and redoubling the offence.

Feminism shows us the power of consciousness-raising, and I want to borrow the technique for natural selection. Natural selection not only explains the whole of life; it also raises our consciousness to the power of science to explain how organized complexity can emerge from simple beginnings without any deliberate guidance. A full understanding of natural selection encourages us to move boldly into other fields. It arouses our suspicion, in those other fields, of the kind of false alternatives that once, in pre-Darwinian days, beguiled biology. Who, before Darwin, could have guessed that something so apparently *designed* as a dragonfly's wing or an eagle's eye was really the end product of a long sequence of non-random but purely natural causes?

Douglas Adams's moving and funny account of his own conversion to radical atheism - he insisted on the 'radical' in case anybody should mistake him for an agnostic - is testimony to the power of Darwinism as a consciousness-raiser. I hope I shall be forgiven the self-indulgence that will become apparent in the following quotation. My excuse is that Douglas's conversion by my earlier books - which did not set out to convert anyone - inspired me to dedicate to his memory this book - which does! In an interview, reprinted posthumously in *The Salmon of Doubt*, he was asked by a journalist how he became an atheist. He began his reply by explaining how he became an agnostic, and then proceeded:

And I thought and thought and thought. But I just didn't have enough to go on, so I didn't really come to any resolution. I was extremely doubtful about the idea of god, but I just didn't know enough about anything to have a good working model of any other explanation for, well, life, the universe, and everything to put in its place. But I kept at it, and I kept reading and I kept thinking. Sometime around my early thirties I stumbled upon evolutionary biology, particularly in the form of Richard Dawkins's books *The Selfish Gene* and then *The Blind Watchmaker*, and suddenly (on, I think the second

reading of *The Selfish Gene*) it all fell into place. It was a concept of such stunning simplicity, but it gave rise, naturally, to all of the infinite and baffling complexity of life. The awe it inspired in me made the awe that people talk about in respect of religious experience seem, frankly, silly beside it. I'd take the awe of understanding over the awe of ignorance any day.⁵⁹

The concept of stunning simplicity that he was talking about was, of course, nothing to do with me. It was Darwin's theory of evolution by natural selection - the ultimate scientific consciousness-raiser. Douglas, I miss you. You are my cleverest, funniest, most open-minded, wittiest, tallest, and possibly only convert. I hope this book might have made you laugh - though not as much as you made me.

That scientifically savvy philosopher Daniel Dennett pointed out that evolution counters one of the oldest ideas we have: 'the idea that it takes a big fancy smart thing to make a lesser thing. I call that the trickle-down theory of creation. You'll never see a spear making a spear maker. You'll never see a horse shoe making a blacksmith. You'll never see a pot making a potter.'⁶⁰ Darwin's discovery of a workable process that does that very counter-intuitive thing is what makes his contribution to human thought so revolutionary, and so loaded with the power to raise consciousness.

It is surprising how necessary such consciousness-raising is, even in the minds of excellent scientists in fields other than biology. Fred Hoyle was a brilliant physicist and cosmologist, but his Boeing 747 misunderstanding, and other mistakes in biology such as his attempt to dismiss the fossil *Archaeopteryx* as a hoax, suggest that he needed to have his consciousness raised by some good exposure to the world of natural selection. At an intellectual level, I suppose he understood natural selection. But perhaps you need to be steeped in natural selection, immersed in it, swim about in it, before you can truly appreciate its power.

Other sciences raise our consciousness in different ways. Fred Hoyle's own science of astronomy puts us in our place, metaphorically as well as literally, scaling down our vanity to fit the tiny stage on which we play out our lives - our speck of debris from the

cosmic explosion. Geology reminds us of our brief existence both as individuals and as a species. It raised John Ruskin's consciousness and provoked his memorable heart cry of 1851: 'If only the Geologists would let me alone, I could do very well, but those dreadful hammers! I hear the clink of them at the end of every cadence of the Bible verses.' Evolution does the same thing for our sense of time - not surprisingly, since it works on the geological timescale. But Darwinian evolution, specifically natural selection, does something more. It shatters the illusion of design within the domain of biology, and teaches us to be suspicious of any kind of design hypothesis in physics and cosmology as well. I think the physicist Leonard Susskind had this in mind when he wrote, 'I'm not an historian but I'll venture an opinion: Modern cosmology really began with Darwin and Wallace. Unlike anyone before them, they provided explanations of our existence that completely rejected supernatural agents . . . Darwin and Wallace set a standard not only for the life sciences but for cosmology as well.'⁶¹ Other physical scientists who are far above needing any such consciousness-raising are Victor Stenger, whose book *Has Science Found God?* (the answer is no) I strongly recommend, and Peter Atkins, whose *Creation Revisited* is my favourite work of scientific prose poetry.

I am continually astonished by those theists who, far from having their consciousness raised in the way that I propose, seem to rejoice in natural selection as 'God's way of achieving his creation'. They note that evolution by natural selection would be a very easy and neat way to achieve a world full of life. God wouldn't need to do anything at all! Peter Atkins, in the book just mentioned, takes this line of thought to a sensibly godless conclusion when he postulates a hypothetically lazy God who tries to get away with as little as possible in order to make a universe containing life. Atkins's lazy God is even lazier than the deist God of the eighteenth-century Enlightenment: *deus otiosus* - literally God at leisure, unoccupied, unemployed, superfluous, useless. Step by step, Atkins succeeds in reducing the amount of work the lazy God has to do until he finally ends up doing nothing at all: he might as well not bother to exist. My memory vividly hears Woody Allen's perceptive whine: 'If it turns out that there is a God, I don't think that he's evil. But the

worst that you can say about him is that basically he's an under-achiever.'

IRREDUCIBLE COMPLEXITY

It is impossible to exaggerate the magnitude of the problem that Darwin and Wallace solved. I could mention the anatomy, cellular structure, biochemistry and behaviour of literally any living organism by example. But the most striking feats of apparent design are those picked out - for obvious reasons - by creationist authors, and it is with gentle irony that I derive mine from a creationist book. *Life - How Did It Get Here?*, with no named author but published by the Watchtower Bible and Tract Society in sixteen languages and eleven million copies, is obviously a firm favourite because no fewer than six of those eleven million copies have been sent to me as unsolicited gifts by well-wishers from around the world.

Picking a page at random from this anonymous and lavishly distributed work, we find the sponge known as Venus' Flower Basket (*Euplectella*), accompanied by a quotation from Sir David Attenborough, no less: 'When you look at a complex sponge skeleton such as that made of silica spicules which is known as Venus' Flower Basket, the imagination is baffled. How could quasi-independent microscopic cells collaborate to secrete a million glassy splinters and construct such an intricate and beautiful lattice? We do not know.' The Watchtower authors lose no time in adding their own punchline: 'But one thing we do know: Chance is not the likely designer.' No indeed, chance is not the likely designer. That is one thing on which we can all agree. The statistical improbability of phenomena such as *Euplectella's* skeleton is the central problem that any theory of life must solve. The greater the statistical improbability, the less plausible is chance as a solution: that is what improbable means. But the candidate solutions to the riddle of improbability are not, as is falsely implied, design and chance. They are design and natural selection. Chance is not a solution, given the high levels of improbability we see in living organisms,

and no sane biologist ever suggested that it was. Design is not a real solution either, as we shall see later; but for the moment I want to continue demonstrating the problem that any theory of life must solve: the problem of how to escape from chance.

Turning Watchtower's page, we find the wonderful plant known as Dutchman's Pipe (*Aristolochia trilobata*), all of whose parts seem elegantly designed to trap insects, cover them with pollen and send them on their way to another Dutchman's Pipe. The intricate elegance of the flower moves Watchtower to ask: 'Did all of this happen by chance? Or did it happen by intelligent design?' Once again, no of *course* it didn't happen by chance. Once again, intelligent design is not the proper alternative to chance. Natural selection is not only a parsimonious, plausible and elegant solution; it is the only workable alternative to chance that has ever been suggested. Intelligent design suffers from exactly the same objection as chance. It is simply not a plausible solution to the riddle of statistical improbability. And the higher the improbability, the more implausible intelligent design becomes. Seen clearly, intelligent design will turn out to be a redoubling of the problem. Once again, this is because the designer himself (/herself/itself) immediately raises the bigger problem of his own origin. Any entity capable of intelligently designing something as improbable as a Dutchman's Pipe (or a universe) would have to be even more improbable than a Dutchman's Pipe. Far from terminating the vicious regress, God aggravates it with a vengeance.

Turn another Watchtower page for an eloquent account of the giant redwood (*Sequoiadendron giganteum*), a tree for which I have a special affection because I have one in my garden - a mere baby, scarcely more than a century old, but still the tallest tree in the neighbourhood. 'A puny man, standing at a sequoia's base, can only gaze upward in silent awe at its massive grandeur. Does it make sense to believe that the shaping of this majestic giant and of the tiny seed that packages it was not by design?' Yet again, if you think the only alternative to design is chance then, no, it does not make sense. But again the authors omit all mention of the real alternative, natural selection, either because they genuinely don't understand it or because they don't want to.

The process by which plants, whether tiny pimpernels or

massive wellingtonias, acquire the energy to build themselves is photosynthesis. Watchtower again: "There are about seventy separate chemical reactions involved in photosynthesis," one biologist said. "It is truly a miraculous event." Green plants have been called nature's "factories" - beautiful, quiet, nonpolluting, producing oxygen, recycling water and feeding the world. Did they just happen by chance? Is that truly believable? No, it is not believable; but the repetition of example after example gets us nowhere. Creationist 'logic' is always the same. Some natural phenomenon is too statistically improbable, too complex, too beautiful, too awe-inspiring to have come into existence by chance. Design is the only alternative to chance that the authors can imagine. Therefore a designer must have done it. And science's answer to this faulty logic is also always the same. Design is not the only alternative to chance. Natural selection is a better alternative. Indeed, design is not a real alternative at all because it raises an even bigger problem than it solves: who designed the designer? Chance and design both fail as solutions to the problem of statistical improbability, because one of them is the problem, and the other one regresses to it. Natural selection is a real solution. It is the only workable solution that has ever been suggested. And it is not only a workable solution, it is a solution of stunning elegance and power.

What is it that makes natural selection succeed as a solution to the problem of improbability, where chance and design both fail at the starting gate? The answer is that natural selection is a cumulative process, which breaks the problem of improbability up into small pieces. Each of the small pieces is slightly improbable, but not prohibitively so. When large numbers of these slightly improbable events are stacked up in series, the end product of the accumulation is very very improbable indeed, improbable enough to be far beyond the reach of chance. It is these end products that form the subjects of the creationist's wearisomely recycled argument. The creationist completely misses the point, because he (women should for once not mind being excluded by the pronoun) insists on treating the genesis of statistical improbability as a single, one-off event. He doesn't understand the power of *accumulation*.

In *Climbing Mount Improbable*, I expressed the point in a parable. One side of the mountain is a sheer cliff, impossible to

climb, but on the other side is a gentle slope to the summit. On the summit sits a complex device such as an eye or a bacterial flagellar motor. The absurd notion that such complexity could spontaneously self-assemble is symbolized by leaping from the foot of the cliff to the top in one bound. Evolution, by contrast, goes around the back of the mountain and creeps up the gentle slope to the summit: easy! The principle of climbing the gentle slope as opposed to leaping up the precipice is so simple, one is tempted to marvel that it took so long for a Darwin to arrive on the scene and discover it. By the time he did, nearly three centuries had elapsed since Newton's *annus mirabilis*, although his achievement seems, on the face of it, harder than Darwin's.

Another favourite metaphor for extreme improbability is the combination lock on a bank vault. Theoretically, a bank robber could get lucky and hit upon the right combination of numbers by chance. In practice, the bank's combination lock is designed with enough improbability to make this tantamount to impossible - almost as unlikely as Fred Hoyle's Boeing 747. But imagine a badly designed combination lock that gave out little hints progressively - the equivalent of the 'getting warmer' of children playing Hunt the Slipper. Suppose that when each one of the dials approaches its correct setting, the vault door opens another chink, and a dribble of money trickles out. The burglar would home in on the jackpot in no time.

Creationists who attempt to deploy the argument from improbability in their favour always assume that biological adaptation is a question of the jackpot or nothing. Another name for the 'jackpot or nothing' fallacy is 'irreducible complexity' (IC). Either the eye sees or it doesn't. Either the wing flies or it doesn't. There are assumed to be no useful intermediates. But this is simply wrong. Such intermediates abound in practice - which is exactly what we should expect in theory. The combination lock of life is a 'getting warmer, getting cooler, getting warmer' Hunt the Slipper device. Real life seeks the gentle slopes at the back of Mount Improbable, while creationists are blind to all but the daunting precipice at the front.

Darwin devoted an entire chapter of the *Origin of Species* to 'Difficulties on the theory of descent with modification', and it is

fair to say that this brief chapter anticipated and disposed of every single one of the alleged difficulties that have since been proposed, right up to the present day. The most formidable difficulties are Darwin's 'organs of extreme perfection and complication', sometimes erroneously described as 'irreducibly complex'. Darwin singled out the eye as posing a particularly challenging problem: 'To suppose that the eye with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest degree.' Creationists gleefully quote this sentence again and again. Needless to say, they never quote what follows. Darwin's fulsomely free confession turned out to be a rhetorical device. He was drawing his opponents towards him so that his punch, when it came, struck the harder. The punch, of course, was Darwin's effortless explanation of exactly how the eye evolved by gradual degrees. Darwin may not have used the phrase 'irreducible complexity', or 'the smooth gradient up Mount Improbable', but he clearly understood the principle of both.

'What is the use of half an eye?' and 'What is the use of half a wing?' are both instances of the argument from 'irreducible complexity'. A functioning unit is said to be irreducibly complex if the removal of one of its parts causes the whole to cease functioning. This has been assumed to be self-evident for both eyes and wings. But as soon as we give these assumptions a moment's thought, we immediately see the fallacy. A cataract patient with the lens of her eye surgically removed can't see clear images without glasses, but can see enough not to bump into a tree or fall over a cliff. Half a wing is indeed not as good as a whole wing, but it is certainly better than no wing at all. Half a wing could save your life by easing your fall from a tree of a certain height. And 51 per cent of a wing could save you if you fall from a slightly taller tree. Whatever fraction of a wing you have, there is a fall from which it will save your life where a slightly smaller winglet would not. The thought experiment of trees of different height, from which one might fall, is just one way to see, in theory, that there must be a smooth gradient of advantage all the way from 1 per cent of a wing to 100 per cent. The forests are replete with gliding or parachuting animals

illustrating, in practice, every step of the way up that particular slope of Mount Improbable.

By analogy with the trees of different height, it is easy to imagine situations in which half an eye would save the life of an animal where 49 per cent of an eye would not. Smooth gradients are provided by variations in lighting conditions, variations in the distance at which you catch sight of your prey - or your predators. And, as with wings and flight surfaces, plausible intermediates are not only easy to imagine: they are abundant all around the animal kingdom. A flatworm has an eye that, by any sensible measure, is less than half a human eye. *Nautilus* (and perhaps its extinct ammonite cousins who dominated Paleozoic and Mesozoic seas) has an eye that is intermediate in quality between flatworm and human. Unlike the flatworm eye, which can detect light and shade but see no image, the *Nautilus* 'pinhole camera' eye makes a real image; but it is a blurred and dim image compared to ours. It would be spurious precision to put numbers on the improvement, but nobody could sanely deny that these invertebrate eyes, and many others, are all better than no eye at all, and all lie on a continuous and shallow slope up Mount Improbable, with our eyes near a peak - not the highest peak but a high one. In *Climbing Mount Improbable*, I devoted a whole chapter each to the eye and the wing, demonstrating how easy it was for them to evolve by slow (or even, maybe, not all that slow) gradual degrees, and I will leave the subject here.

So, we have seen that eyes and wings are certainly not irreducibly complex; but what is more interesting than these particular examples is the general lesson we should draw. The fact that so many people have been dead wrong over these obvious cases should serve to warn us of other examples that are less obvious, such as the cellular and biochemical cases now being touted by those creationists who shelter under the politically expedient euphemism of 'intelligent design theorists'.

We have a cautionary tale here, and it is telling us this: do not just declare things to be irreducibly complex; the chances are that you haven't looked carefully enough at the details, or thought carefully enough about them. On the other hand, we on the science side must not be too dogmatically confident. Maybe there is something out there in nature that really does preclude, by its *genuinely*

irreducible complexity, the smooth gradient of Mount Improbable. The creationists are right that, if genuinely irreducible complexity could be properly demonstrated, it would wreck Darwin's theory. Darwin himself said as much: 'If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down. But I can find no such case.' Darwin could find no such case, and nor has anybody since Darwin's time, despite strenuous, indeed desperate, efforts. Many candidates for this holy grail of creationism have been proposed. None has stood up to analysis.

In any case, even though genuinely irreducible complexity would wreck Darwin's theory if it were ever found, who is to say that it wouldn't wreck the intelligent design theory as well? Indeed, it already *has* wrecked the intelligent design theory, for, as I keep saying and will say again, however little we know about God, the one thing we can be sure of is that he would have to be very very complex and presumably irreducibly so!

THE WORSHIP OF GAPS

Searching for particular examples of irreducible complexity is a fundamentally unscientific way to proceed: a special case of arguing from present ignorance. It appeals to the same faulty logic as 'the God of the Gaps' strategy condemned by the theologian Dietrich Bonhoeffer. Creationists eagerly seek a gap in present-day knowledge or understanding. If an apparent gap is found, it is *assumed* that God, by default, must fill it. What worries thoughtful theologians such as Bonhoeffer is that gaps shrink as science advances, and God is threatened with eventually having nothing to do and nowhere to hide. What worries scientists is something else. It is an essential part of the scientific enterprise to admit ignorance, even to exult in ignorance as a challenge to future conquests. As my friend Matt Ridley has written, 'Most scientists are bored by what they have already discovered. It is ignorance that drives them on.' Mystics exult in mystery and want it to stay mysterious. Scientists

exult in mystery for a different reason: it gives them something to do. More generally, as I shall repeat in Chapter 8, one of the truly bad effects of religion is that it teaches us that it is a virtue to be satisfied with not understanding.

Admissions of ignorance and temporary mystification are vital to good science. It is therefore unfortunate, to say the least, that the main strategy of creation propagandists is the negative one of seeking out gaps in scientific knowledge and claiming to fill them with 'intelligent design' by default. The following is hypothetical but entirely typical. A creationist speaking: 'The elbow joint of the lesser spotted weasel frog is irreducibly complex. No part of it would do any good at all until the whole was assembled. Bet you can't think of a way in which the weasel frog's elbow could have evolved by slow gradual degrees.' If the scientist fails to give an immediate and comprehensive answer, the creationist draws a *default* conclusion: 'Right then, the alternative theory, "intelligent design", wins by default.' Notice the biased logic: if theory A fails in some particular, theory B must be right. Needless to say, the argument is not applied the other way around. We are encouraged to leap to the default theory without even looking to see whether it fails in the very same particular as the theory it is alleged to replace. Intelligent design - ID - is granted a Get Out Of Jail Free card[^] a charmed immunity to the rigorous demands made of evolution.

But my present point is that the creationist ploy undermines the scientist's natural - indeed necessary - rejoicing in (temporary) uncertainty. For purely political reasons, today's scientist might hesitate before saying: 'Hm, interesting point. I wonder how the weasel frog's ancestors *did* evolve their elbow joint. I'm not a specialist in weasel frogs, I'll have to go to the University Library and take a look. Might make an interesting project for a graduate student.' The moment a scientist said something like that - and long before the student began the project - the default conclusion would become a headline in a creationist pamphlet: 'Weasel frog could only have been designed by God.'

There is, then, an unfortunate hook-up between science's methodological need to seek out areas of ignorance in order to target research, and ID's need to seek out areas of ignorance in order to claim victory by default. It is precisely the fact that ID has

no evidence of its own, but thrives like a weed in gaps left by scientific knowledge, that sits uneasily with science's need to identify and proclaim the very same gaps as a prelude to researching them. In this respect, science finds itself in alliance with sophisticated theologians like Bonhoeffer, united against the common enemies of naive, populist theology and the gap theology of intelligent design.

The creationists' love affair with 'gaps' in the fossil record symbolizes their whole gap theology. I once introduced a chapter on the so-called Cambrian Explosion with the sentence, 'It is as though the fossils were planted there without any evolutionary history.' Again, this was a rhetorical overture, intended to whet the reader's appetite for the full explanation that was to follow. Sad hindsight tells me now how predictable it was that my patient explanation would be excised and my overture itself gleefully quoted out of context. Creationists adore 'gaps' in the fossil record, just as they adore gaps generally.

Many evolutionary transitions are elegantly documented by more or less continuous series of gradually changing intermediate fossils. Some are not, and these are the famous 'gaps'. Michael Shermer has wittily pointed out that if a new fossil discovery neatly bisects a 'gap', the creationist will declare that there are now twice as many gaps! But in any case, note yet again the unwarranted use of a default. If there are no fossils to document a postulated evolutionary transition, the default assumption is that there was no evolutionary transition, therefore God must have intervened.

It is utterly illogical to demand complete documentation of every step of any narrative, whether in evolution or any other science. You might as well demand, before convicting somebody of murder, a complete cinematic record of the murderer's every step leading up to the crime, with no missing frames. Only a tiny fraction of corpses fossilize, and we are lucky to have as many intermediate fossils as we do. We could easily have had no fossils at all, and still the evidence for evolution from other sources, such as molecular genetics and geographical distribution, would be overwhelmingly strong. On the other hand, evolution makes the strong prediction that if a *single* fossil turned up in the *wrong* geological stratum, the theory would be blown out of the water. When challenged by a

zealous Popperian to say how evolution could ever be falsified, J. B. S. Haldane famously growled: 'Fossil rabbits in the Precambrian.' No such anachronistic fossils have ever been authentically found, despite discredited creationist legends of human skulls in the Coal Measures and human footprints interspersed with dinosaurs'.

Gaps, by default in the mind of the creationist, are filled by God. The same applies to all apparent precipices on the massif of Mount Improbable, where the graded slope is not immediately obvious or is otherwise overlooked. Areas where there is a lack of data, or a lack of understanding, are automatically assumed to belong, by default, to God. The speedy resort to a dramatic proclamation of 'irreducible complexity' represents a failure of the imagination. Some biological organ, if not an eye then a bacterial flagellar motor or a biochemical pathway, is *decreed* without further argument to be irreducibly complex. No attempt is made to *demonstrate* irreducible complexity. Notwithstanding the cautionary tales of eyes, wings and many other things, each new candidate for the dubious accolade is assumed to be transparently, self-evidently irreducibly complex, its status asserted by fiat. But think about it. Since irreducible complexity is being deployed as an argument for design, it should no more be asserted by fiat than design itself. You might as well simply assert that the weasel frog (bombardier beetle, etc.) demonstrates design, without further argument or justification. That is no way to do science.

The logic turns out to be no more convincing than this: 'I [insert own name] am personally unable to think of any way in which [insert biological phenomenon] could have been built up step by step. Therefore it is irreducibly complex. That means it is designed.' Put it like that, and you immediately see that it is vulnerable to some scientist coming along and finding an intermediate; or at least imagining a plausible intermediate. Even if no scientists do come up with an explanation, it is plain bad logic to assume that 'design' will fare any better. The reasoning that underlies 'intelligent design' theory is lazy and defeatist - classic 'God of the Gaps' reasoning. I have previously dubbed it the Argument from Personal Incredulity.

Imagine that you are watching a really great magic trick. The celebrated conjuring duo Penn and Teller have a routine in which

they simultaneously appear to shoot each other with pistols, and each appears to catch the bullet in his teeth. Elaborate precautions are taken to scratch identifying marks on the bullets before they are put in the guns, the whole procedure is witnessed at close range by volunteers from the audience who have experience of firearms, and apparently all possibilities for trickery are eliminated. Teller's marked bullet ends up in Penn's mouth and Penn's marked bullet ends up in Teller's. I [Richard Dawkins] am utterly unable to think of any way in which this could be a trick. The Argument from Personal Incredulity screams from the depths of my prescientific brain centres, and almost compels me to say, 'It must be a miracle. There is no scientific explanation. It's got to be supernatural.' But the still small voice of scientific education speaks a different message. Penn and Teller are world-class illusionists. There is a perfectly good explanation. It is just that I am too naive, or too unobservant, or too unimaginative, to think of it. That is the proper response to a conjuring trick. It is also the proper response to a biological phenomenon that appears to be irreducibly complex. Those people who leap from personal bafflement at a natural phenomenon straight to a hasty invocation of the supernatural are no better than the fools who see a conjuror bending a spoon and leap to the conclusion that it is 'paranormal'.

In his book *Seven Clues to the Origin of Life*, the Scottish chemist A. G. Cairns-Smith makes an additional point, using the analogy of an arch. A free-standing arch of rough-hewn stones and no mortar can be a stable structure, but it is irreducibly complex: it collapses if any one stone is removed. How, then, was it built in the first place? One way is to pile a solid heap of stones, then carefully remove stones one by one. More generally, there are many structures that are irreducible in the sense that they cannot survive the subtraction of any part, but which were built with the aid of scaffolding that was subsequently subtracted and is no longer visible. Once the structure is completed, the scaffolding can be removed safely and the structure remains standing. In evolution, too, the organ or structure you are looking at may have had scaffolding in an ancestor which has since been removed.

'Irreducible complexity' is not a new idea, but the phrase itself was invented by the creationist Michael Behe in 1996.⁶² He is

credited (if credited is the word) with moving creationism into a new area of biology: biochemistry and cell biology, which he saw as perhaps a happier hunting ground for gaps than eyes or wings. His best approach to a good example (still a bad one) was the bacterial flagellar motor.

The flagellar motor of bacteria is a prodigy of nature. It drives the only known example, outside human technology, of a freely rotating axle. Wheels for big animals would, I suspect, be genuine examples of irreducible complexity, and this is probably why they don't exist. How would the nerves and blood vessels get across the bearing?*

The flagellum is a thread-like propeller, with which the bacterium burrows its way through the water. I say 'burrows' rather than 'swims' because, on the bacterial scale of existence, a liquid such as water would not feel as a liquid feels to us. It would feel more like treacle, or jelly, or even sand, and the bacterium would seem to burrow or screw its way through the water rather than swim. Unlike the so-called flagellum of larger organisms like protozoans, the bacterial flagellum doesn't just wave about like a whip, or row like an oar. It has a true, freely rotating axle which turns continuously inside a bearing, driven by a remarkable little molecular motor. At the molecular level, the motor uses essentially the same principle as muscle, but in free rotation rather than in intermittent contraction.! It has been happily described as a tiny outboard motor (although by engineering standards - and

* There is an example in fiction. The children's writer Philip Pullman, in *His Dark Materials*, imagines a species of animals, the 'mulefa', that co-exist with trees that produce perfectly round seedpods with a hole in the centre. These pods the mulefa adopt as wheels. The wheels, not being part of the body, have no nerves or blood vessels to get twisted around the 'axle' (a strong claw of horn or bone). Pullman perceptively notes an additional point: the system works only because the planet is paved with natural basalt ribbons, which serve as 'roads'. Wheels are no good over rough country.

f Fascinatingly, the muscle principle is deployed in yet a third mode in some insects such as flies, bees and bugs, in which the flight muscle is intrinsically oscillatory, like a reciprocating engine. Whereas other insects such as locusts send nervous instructions for each wing stroke (as a bird does), bees send an instruction to switch on (or switch off) the oscillatory motor. Bacteria have a mechanism which is neither a simple contractor (like a bird's flight muscle) nor a reciprocator (like a bee's flight muscle), but a true rotator: in that respect it is like an electric motor or a Wankel engine.

unusually for a biological mechanism - it is a spectacularly inefficient one).

Without a word of justification, explanation or amplification, Behe simply *proclaims* the bacterial flagellar motor to be irreducibly complex. Since he offers no argument in favour of his assertion, we may begin by suspecting a failure of his imagination. He further alleges that specialist biological literature has ignored the problem. The falsehood of this allegation was massively and (to Behe) embarrassingly documented in the court of Judge John E. Jones in Pennsylvania in 2005, where Behe was testifying as an expert witness on behalf of a group of creationists who had tried to impose 'intelligent design' creationism on the science curriculum of a local public school - a move of 'breathhtaking inanity', to quote Judge Jones (phrase and man surely destined for lasting fame). This wasn't the only embarrassment Behe suffered at the hearing, as we shall see.

The key to demonstrating irreducible complexity is to show that none of the parts could have been useful on its own. They all needed to be in place before any of them could do any good (Behe's favourite analogy is a mousetrap). In fact, molecular biologists have no difficulty in finding parts functioning outside the whole, both for the flagellar motor and for Behe's other alleged examples of irreducible complexity. The point is well put by Kenneth Miller of Brown University, for my money the most persuasive nemesis of 'intelligent design', not least because he is a devout Christian. I frequently recommend Miller's book, *Finding Darwin's God*, to religious people who write to me having been bamboozled by Behe.

In the case of the bacterial rotary engine, Miller calls our attention to a mechanism called the Type Three Secretory System or TTSS.⁶³ The TTSS is not used for rotatory movement. It is one of several systems used by parasitic bacteria for pumping toxic substances through their cell walls to poison their host organism. On our human scale, we might think of pouring or squirting a liquid through a hole; but, once again, on the bacterial scale things look different. Each molecule of secreted substance is a large protein with a definite, three-dimensional structure on the same scale as the TTSS's own: more like a solid sculpture than a liquid. Each molecule is individually propelled through a carefully shaped mechanism, like an automated slot machine dispensing, say, toys or

bottles, rather than a simple hole through which a substance might 'flow'. The goods-dispenser itself is made of a rather small number of protein molecules, each one comparable in size and complexity to the molecules being dispensed through it. Interestingly, these bacterial slot machines are often similar across bacteria that are not closely related. The genes for making them have probably been 'copied and pasted' from other bacteria: something that bacteria are remarkably adept at doing, and a fascinating topic in its own right, but I must press on.

The protein molecules that form the structure of the TTSS are very similar to components of the flagellar motor. To the evolutionist it is clear that TTSS components were commandeered for a new, but not wholly unrelated, function when the flagellar motor evolved. Given that the TTSS is tugging molecules through itself, it is not surprising that it uses a rudimentary version of the principle used by the flagellar motor, which tugs the molecules of the axle round and round. Evidently, crucial components of the flagellar motor were already in place and working before the flagellar motor evolved. Commandeering existing mechanisms is an obvious way in which an apparently irreducibly complex piece of apparatus could climb Mount Improbable.

A lot more work needs to be done, of course, and I'm sure it will be. Such work would never be done if scientists were satisfied with a lazy default such as 'intelligent design theory' would encourage. Here is the message that an imaginary 'intelligent design theorist' might broadcast to scientists: 'If you don't understand how something works, never mind: just give up and say God did it. You don't know how the nerve impulse works? Good! You don't understand how memories are laid down in the brain? Excellent! Is photosynthesis a bafflingly complex process? Wonderful! Please don't go to work on the problem, just give up, and appeal to God. Dear scientist, don't *work* on your mysteries. Bring us your mysteries, for we can use them. Don't squander precious ignorance by researching it away. We need those glorious gaps as a last refuge for God.' St Augustine said it quite openly: 'There is another form of temptation, even more fraught with danger. This is the disease of curiosity. It is this which drives us to try and discover the secrets of nature, those secrets which are beyond our understanding, which

can avail us nothing and which man should not wish to learn' (quoted in Freeman 2002).

Another of Behe's favourite alleged examples of 'irreducible complexity' is the immune system. Let Judge Jones himself take up the story:

In fact, on cross-examination, Professor Behe was questioned concerning his 1996 claim that science would never find an evolutionary explanation for the immune system. He was presented with fifty-eight peer-reviewed publications, nine books, and several immunology textbook chapters about the evolution of the immune system; however, he simply insisted that this was still not sufficient evidence of evolution, and that it was not 'good enough.'

Behe, under cross-examination by Eric Rothschild, chief counsel for the plaintiffs, was forced to admit that he hadn't read most of those fifty-eight peer-reviewed papers. Hardly surprising, for immunology is hard work. Less forgivable is that Behe dismissed such research as 'unfruitful'. It certainly is unfruitful if your aim is to make propaganda among gullible laypeople and politicians, rather than to discover important truths about the real world. After listening to Behe, Rothschild eloquently summed up what every honest person in that courtroom must have felt:

Thankfully, there are scientists who do search for answers to the question of the origin of the immune system . . . It's our defense against debilitating and fatal diseases. The scientists who wrote those books and articles toil in obscurity, without book royalties or speaking engagements. Their efforts help us combat and cure serious medical conditions. By contrast, Professor Behe and the entire intelligent design movement are doing nothing to advance scientific or medical knowledge and are telling future generations of scientists, don't bother.⁶⁴

As the American geneticist Jerry Coyne put it in his review of Behe's book: 'If the history of science shows us anything, it is that

we get nowhere by labelling our ignorance "God".' Or, in the words of an eloquent blogger, commenting on an article on intelligent design in the *Guardian* by Coyne and me,

Why is God considered an explanation for anything? It's not - it's a failure to explain, a shrug of the shoulders, an 'I dunno' dressed up in spirituality and ritual. If someone credits something to God, generally what it means is that they haven't a clue, so they're attributing it to an unreachable, unknowable sky-fairy. Ask for an explanation of where that bloke came from, and odds are you'll get a vague, pseudo-philosophical reply about having always existed, or being outside nature. Which, of course, explains nothing.⁶⁵

Darwinism raises our consciousness in other ways. Evolved organs, elegant and efficient as they often are, also demonstrate revealing flaws - exactly as you'd expect if they have an evolutionary history, and exactly as you would not expect if they were designed. I have discussed examples in other books: the recurrent laryngeal nerve, for one, which betrays its evolutionary history in a massive and wasteful detour on its way to its destination. Many of our human ailments, from lower back pain to hernias, prolapsed uteruses and our susceptibility to sinus infections, result directly from the fact that we now walk upright with a body that was shaped over hundreds of millions of years to walk on all fours. Our consciousness is also raised by the cruelty and wastefulness of natural selection. Predators seem beautifully 'designed' to catch prey animals, while the prey animals seem equally beautifully 'designed' to escape them. Whose side is God on?⁶⁶

THE ANTHROPIC PRINCIPLE: PLANETARY VERSION

Gap theologians who may have given up on eyes and wings, flagellar motors and immune systems, often pin their remaining

hopes on the origin of life. The root of evolution in non-biological chemistry somehow seems to present a bigger gap than any particular transition during subsequent evolution. And in one sense it is a bigger gap. That one sense is quite specific, and it offers no comfort to the religious apologist. The origin of life only had to happen once. We therefore can allow it to have been an extremely improbable event, many orders of magnitude more improbable than most people realize, as I shall show. Subsequent evolutionary steps are duplicated, in more or less similar ways, throughout millions and millions of species independently, and continually and repeatedly throughout geological time. Therefore, to explain the evolution of complex life, we cannot resort to the same kind of statistical reasoning as we are able to apply to the origin of life. The events that constitute run-of-the-mill evolution, as distinct from its singular origin (and perhaps a few special cases), cannot have been very improbable.

This distinction may seem puzzling, and I must explain it further, using the so-called anthropic principle. The anthropic principle was named by the British mathematician Brandon Carter in 1974 and expanded by the physicists John Barrow and Frank Tipler in their book on the subject.⁶⁷ The anthropic argument is usually applied to the cosmos, and I'll come to that. But I'll introduce the idea on a smaller, planetary scale. We exist here on Earth. Therefore Earth must be the kind of planet that is capable of generating and supporting us, however unusual, even unique, that kind of planet might be. For example, our kind of life cannot survive without liquid water. Indeed, exobiologists searching for evidence of extra-terrestrial life are scanning the heavens, in practice, for signs of water. Around a typical star like our sun, there is a so-called Goldilocks zone - not too hot and not too cold, but just right - for planets with liquid water. A thin band of orbits lies between those that are too far from the star, where water freezes, and too close, where it boils.

Presumably, too, a life-friendly orbit has to be nearly circular. A fiercely elliptical orbit, like that of the newly discovered tenth planet informally known as Xena, would at best allow the planet to whizz briefly through the Goldilocks zone once every few (Earth) decades or centuries. Xena itself doesn't get into the Goldilocks

zone at all, even at its closest approach to the sun, which it reaches once every 560 Earth years. The temperature of Halley's Comet varies between about 47°C at perihelion and minus 270°C at aphelion. Earth's orbit, like those of all the planets, is technically an ellipse (it is closest to the sun in January and furthest away in July*); but a circle is a special case of an ellipse, and Earth's orbit is so close to circular that it never strays out of the Goldilocks zone. Earth's situation in the solar system is propitious in other ways that singled it out for the evolution of life. The massive gravitational vacuum cleaner of Jupiter is well placed to intercept asteroids that might otherwise threaten us with lethal collision. Earth's single relatively large moon serves to stabilize our axis of rotation,⁶⁸ and helps to foster life in various other ways. Our sun is unusual in not being a binary, locked in mutual orbit with a companion star. It is possible for binary stars to have planets, but their orbits are likely to be too chaotically variable to encourage the evolution of life.

Two main explanations have been offered for our planet's peculiar friendliness to life. The design theory says that God made the world, placed it in the Goldilocks zone, and deliberately set up all the details for our benefit. The anthropic approach is very different, and it has a faintly Darwinian feel. The great majority of planets in the universe are not in the Goldilocks zones of their respective stars, and not suitable for life. None of that majority has life. However small the minority of planets with just the right conditions for life may be, we necessarily have to be on one of that minority, because here we are thinking about it.

It is a strange fact, incidentally, that religious apologists love the anthropic principle. For some reason that makes no sense at all, they think it supports their case. Precisely the opposite is true. The anthropic principle, like natural selection, is an *alternative* to the design hypothesis. It provides a rational, design-free explanation for the fact that we find ourselves in a situation propitious to our existence. I think the confusion arises in the religious mind because the anthropic principle is only ever mentioned in the context of the problem that it solves, namely the fact that we live in a life-friendly place. What the religious mind then fails to grasp is that two candidate solutions are offered to the problem. God is one. The anthropic principle is the other. They are *alternatives*.

* If you find that surprising, you may be suffering from northern hemisphere chauvinism, as described on page 115.

Liquid water is a necessary condition for life as we know it, but it is far from sufficient. Life still has to originate in the water, and the origin of life may have been a highly improbable occurrence. Darwinian evolution proceeds merrily once life has originated. But how does life get started? The origin of life was the chemical event, or series of events, whereby the vital conditions for natural selection first came about. The major ingredient was heredity, either DNA or (more probably) something that copies like DNA but less accurately, perhaps the related molecule RNA. Once the vital ingredient - some kind of genetic molecule - is in place, true Darwinian natural selection can follow, and complex life emerges as the eventual consequence. But the spontaneous arising by chance of the first hereditary molecule strikes many as improbable. Maybe it is - very very improbable, and I shall dwell on this, for it is central to this section of the book.

The origin of life is a flourishing, if speculative, subject for research. The expertise required for it is chemistry and it is not mine. I watch from the sidelines with engaged curiosity, and I shall not be surprised if, within the next few years, chemists report that they have successfully midwived a new origin of life in the laboratory. Nevertheless it hasn't happened yet, and it is still possible to maintain that the probability of its happening is, and always was, exceedingly low - although it did happen once!

Just as we did with the Goldilocks orbits, we can make the point that, however improbable the origin of life might be, we know it happened on Earth because we are here. Again as with temperature, there are two hypotheses to explain what happened - the design hypothesis and the scientific or 'anthropic' hypothesis. The design approach postulates a God who wrought a deliberate miracle, struck the prebiotic soup with divine fire and launched DNA, or something equivalent, on its momentous career.

Again, as with Goldilocks, the anthropic alternative to the design hypothesis is statistical. Scientists invoke the magic of large numbers. It has been estimated that there are between 1 billion and 30 billion planets in our galaxy, and about 100 billion galaxies in the universe. Knocking a few noughts off for reasons of ordinary prudence, a billion billion is a conservative estimate of the number of available planets in the universe. Now, suppose the origin of life,

the spontaneous arising of something equivalent to DNA, really was a quite staggeringly improbable event. Suppose it was so improbable as to occur on only one in a billion planets. A grant-giving body would laugh at any chemist who admitted that the chance of his proposed research succeeding was only one in a hundred. But here we are talking about odds of one in a billion. And yet . . . even with such absurdly long odds, life will still have arisen on a billion planets - of which Earth, of course, is one.⁶⁹

This conclusion is so surprising, I'll say it again. If the odds of life originating spontaneously on a planet were a billion to one against, nevertheless that stupefyingly improbable event would still happen on a billion planets. The chance of finding any one of those billion life-bearing planets recalls the proverbial needle in a haystack. But we don't have to go out of our way to find a needle because (back to the anthropic principle) any beings capable of looking must necessarily be sitting on one of those prodigiously rare needles before they even start the search.

Any probability statement is made in the context of a certain level of ignorance. If we know nothing about a planet, we may postulate the odds of life's arising on it as, say, one in a billion. But if we now import some new assumptions into our estimate, things change. A particular planet may have some peculiar properties, perhaps a special profile of element abundances in its rocks, which shift the odds in favour of life's emerging. Some planets, in other words, are more 'Earth-like' than others. Earth itself, of course, is especially Earth-like! This should give encouragement to our chemists trying to recreate the event in the lab, for it could shorten the odds against their success. But my earlier calculation demonstrated that even a chemical model with odds of success as low as one in a billion would *still* predict that life would arise on a billion planets in the universe. And the beauty of the anthropic principle is that it tells us, against all intuition, that a chemical model need only predict that life will arise on *one* planet in a billion billion to give us a good and entirely satisfying explanation for the presence of life here. I do not for a moment believe the origin of life was anywhere near so improbable in practice. I think it is definitely worth spending money on trying to duplicate the event in the lab and - by the same token, on SETI, because I think it is likely that there is intelligent life elsewhere.

Even accepting the most pessimistic estimate of the probability that life might spontaneously originate, this statistical argument completely demolishes any suggestion that we should postulate design to fill the gap. Of all the apparent gaps in the evolutionary story, the origin of life gap can seem unbridgeable to brains calibrated to assess likelihood and risk on an everyday scale: the scale on which grant-giving bodies assess research proposals submitted by chemists. Yet even so big a gap as this is easily filled by statistically informed science, while the very same statistical science rules out a divine creator on the 'Ultimate 747' grounds we met earlier.

But now, to return to the interesting point that launched this section. Suppose somebody tried to explain the general phenomenon of biological adaptation along the same lines as we have just applied to the origin of life: appealing to an immense number of available planets. The observed fact is that every species, and every organ that has ever been looked at within every species, is good at what it does. The wings of birds, bees and bats are good at flying. Eyes are good at seeing. Leaves are good at photosynthesizing. We live on a planet where we are surrounded by perhaps ten million species, each one of which independently displays a powerful illusion of apparent design. Each species is well fitted to its particular way of life. Could we get away with the 'huge numbers of planets' argument to explain all these separate illusions of design? No, we could not, repeat *not*. Don't even think about it. This is important, for it goes to the heart of the most serious misunderstanding of Darwinism.

It doesn't matter how many planets we have to play with, lucky chance could never be enough to explain the lush diversity of living complexity on Earth in the same way as we used it to explain the existence of life here in the first place. The evolution of life is a completely different case from the origin of life because, to repeat, the origin of life was (or could have been) a unique event which had to happen only once. The adaptive fit of species to their separate environments, on the other hand, is millionfold, and ongoing.

It is clear that here on Earth we are dealing with a generalized *process* for optimizing biological species, a process that works all

over the planet, on all continents and islands, and at all times. We can safely predict that, if we wait another ten million years, a whole new set of species will be as well adapted to their ways of life as today's species are to theirs. This is a recurrent, predictable, multiple phenomenon, not a piece of statistical luck recognized with hindsight. And, thanks to Darwin, we know how it is brought about: by natural selection.

The anthropic principle is impotent to explain the multifarious details of living creatures. We really need Darwin's powerful crane to account for the diversity of life on Earth, and especially the persuasive illusion of design. The origin of life, by contrast, lies outside the reach of that crane, because natural selection cannot proceed without it. Here the anthropic principle comes into its own. We can deal with the unique origin of life by postulating a very large number of planetary opportunities. Once that initial stroke of luck has been granted - and the anthropic principle most decisively grants it to us - natural selection takes over: and natural selection is emphatically not a matter of luck.

Nevertheless, it may be that the origin of life is not the only major gap in the evolutionary story that is bridged by sheer luck, anthropically justified. For example, my colleague Mark Ridley in *Mendel's Demon* (gratuitously and confusingly retitled *The Cooperative Gene* by his American publishers) has suggested that the origin of the eucaryotic cell (our kind of cell, with a nucleus and various other complicated features such as mitochondria, which are not present in bacteria) was an even more momentous, difficult and statistically improbable step than the origin of life. The origin of consciousness might be another major gap whose bridging was of the same order of improbability. One-off events like this might be explained by the anthropic principle, along the following lines. There are billions of planets that have developed life at the level of bacteria, but only a fraction of these life forms ever made it across the gap to something like the eucaryotic cell. And of these, a yet smaller fraction managed to cross the later Rubicon to consciousness. If both of these are one-off events, we are not dealing with a ubiquitous and all-pervading *process*, as we are with ordinary, run-of-the-mill biological adaptation. The anthropic principle states that, since we are alive, eucaryotic and conscious, our planet has to be

one of the intensely rare planets that has bridged all three gaps.

Natural selection works because it is a cumulative one-way street to improvement. It needs some luck to get started, and the 'billions of planets' anthropic principle grants it that luck. Maybe a few later gaps in the evolutionary story also need major infusions of luck, with anthropic justification. But whatever else we may say, *design* certainly does not work as an explanation for life, because design is ultimately not cumulative and it therefore raises bigger questions than it answers - it takes us straight back along the Ultimate 747 infinite regress.

We live on a planet that is friendly to our kind of life, and we have seen two reasons why this is so. One is that life has evolved to flourish in the conditions provided by the planet. This is because of natural selection. The other reason is the anthropic one. There are billions of planets in the universe, and, however small the minority of evolution-friendly planets may be, our planet necessarily has to be one of them. Now it is time to take the anthropic principle back to an earlier stage, from biology back to cosmology.

THE ANTHROPIC PRINCIPLE: COSMOLOGICAL VERSION

We live not only on a friendly planet but also in a friendly universe. It follows from the fact of our existence that the laws of physics must be friendly enough to allow life to arise. It is no accident that when we look at the night sky we see stars, for stars are a necessary prerequisite for the existence of most of the chemical elements, and without chemistry there could be no life. Physicists have calculated that, if the laws and constants of physics had been even slightly different, the universe would have developed in such a way that life would have been impossible. Different physicists put it in different ways, but the conclusion is always much the same. Martin Rees, in *Just Six Numbers*, lists six fundamental constants, which are believed to hold all around the universe. Each of these six numbers is finely tuned in the sense that, if it were slightly different, the

universe would be comprehensively different and presumably unfriendly to life.*

An example of Rees's six numbers is the magnitude of the so-called 'strong' force, the force that binds the components of an atomic nucleus: the nuclear force that has to be overcome when one 'splits' the atom. It is measured as E , the proportion of the mass of a hydrogen nucleus that is converted to energy when hydrogen fuses to form helium. The value of this number in our universe is 0.007, and it looks as though it had to be very close to this value in order for any chemistry (which is a prerequisite for life) to exist. Chemistry as we know it consists of the combination and recombination of the ninety or so naturally occurring elements of the periodic table. Hydrogen is the simplest and commonest of the elements. All the other elements in the universe are made ultimately from hydrogen by nuclear fusion. Nuclear fusion is a difficult process which occurs in the intensely hot conditions of the interiors of stars (and in hydrogen bombs). Relatively small stars, such as our sun, can make only light elements such as helium, the second lightest in the periodic table after hydrogen. It takes larger and hotter stars to develop the high temperatures needed to forge most of the heavier elements, in a cascade of nuclear fusion processes whose details were worked out by Fred Hoyle and two colleagues (an achievement for which, mysteriously, Hoyle was not given a share of the Nobel Prize received by the others). These big stars may explode as supernovas, scattering their materials, including the elements of the periodic table, in dust clouds. These dust clouds eventually condense to form new stars and planets, including our own. This is why Earth is rich in elements over and above the ubiquitous hydrogen: elements without which chemistry, and life, would be impossible.

The relevant point here is that the value of the strong force crucially determines how far up the periodic table the nuclear fusion cascade goes. If the strong force were too small, say 0.006

* I say 'presumably', partly because we don't know how different alien forms of life might be, and partly because it is possible that we make a mistake if we consider only the consequences of changing one constant at a time. Could there be other *combinations* of values of the six numbers which would turn out to be friendly to life, in ways that we do not discover if we consider them only one at a time? Nevertheless, I shall proceed, for simplicity, as though we really do have a big problem to explain in the apparent fine-tuning of the fundamental constants.

instead of 0.007, the universe would contain nothing but hydrogen, and no interesting chemistry could result. If it were too large, say 0.008, all the hydrogen would have fused to make heavier elements. A chemistry without hydrogen could not generate life as we know it. For one thing, there would be no water. The Goldilocks value - 0.007 - is just right for yielding the richness of elements that we need for an interesting and life-supporting chemistry.

I won't go through the rest of Rees's six numbers. The bottom line for each of them is the same. The actual number sits in a Goldilocks band of values outside which life would not have been possible. How should we respond to this? Yet again, we have the theist's answer on the one hand, and the anthropic answer on the other. The theist says that God, when setting up the universe, tuned the fundamental constants of the universe so that each one lay in its Goldilocks zone for the production of life. It is as though God had six knobs that he could twiddle, and he carefully tuned each knob to its Goldilocks value. As ever, the theist's answer is deeply unsatisfying, because it leaves the existence of God unexplained. A God capable of calculating the Goldilocks values for the six numbers would have to be at least as improbable as the finely tuned combination of numbers itself, and that's very improbable indeed - which is indeed the premise of the whole discussion we are having. It follows that the theist's answer has utterly failed to make any headway towards solving the problem at hand. I see no alternative but to dismiss it, while at the same time marvelling at the number of people who can't see the problem and seem genuinely satisfied by the 'Divine Knob-Twiddler' argument.

Maybe the psychological reason for this amazing blindness has something to do with the fact that many people have not had their consciousness raised, as biologists have, by natural selection and its power to tame improbability. J. Anderson Thomson, from his perspective as an evolutionary psychiatrist, points me to an additional reason, the psychological bias that we all have towards personifying inanimate objects as agents. As Thomson says, we are more inclined to mistake a shadow for a burglar than a burglar for a shadow. A false positive might be a waste of time. A false negative could be fatal. In a letter to me, he suggested that, in our ancestral past, our greatest challenge in our environment came from each

other. 'The legacy of that is the default assumption, often fear, of human intention. We have a great deal of difficulty seeing anything other than *human* causation.' We naturally generalized that to divine intention. I shall return to the seductiveness of 'agents' in Chapter 5.

Biologists, with their raised consciousness of the power of natural selection to explain the rise of improbable things, are unlikely to be satisfied with any theory that evades the problem of improbability altogether. And the theistic response to the riddle of improbability is an evasion of stupendous proportions. It is more than a restatement of the problem, it is a grotesque amplification of it. Let's turn, then, to the anthropic alternative. The anthropic answer, in its most general form, is that we could only be discussing the question in the kind of universe that was capable of producing us. Our existence therefore determines that the fundamental constants of physics had to be in their respective Goldilocks zones. Different physicists espouse different kinds of anthropic solutions to the riddle of our existence.

Hard-nosed physicists say that the six knobs were never free to vary in the first place. When we finally reach the long-hoped-for Theory of Everything, we shall see that the six key numbers depend upon each other, or on something else as yet unknown, in ways that we today cannot imagine. The six numbers may turn out to be no freer to vary than is the ratio of a circle's circumference to its diameter. It will turn out that there is only one way for a universe to be. Far from God being needed to twiddle six knobs, there are no knobs to twiddle.

Other physicists (Martin Rees himself would be an example) find this unsatisfying, and I think I agree with them. It is indeed perfectly plausible that there is only one way for a universe to be. But why did that one way have to be such a set-up for our eventual evolution? Why did it have to be the kind of universe which seems almost as if, in the words of the theoretical physicist Freeman Dyson, it 'must have known we were coming'? The philosopher John Leslie uses the analogy of a man sentenced to death by firing squad. It is just possible that all ten men of the firing squad will miss their victim. With hindsight, the survivor who finds himself in a position to reflect upon his luck can cheerfully say, 'Well,

obviously they all missed, or I wouldn't be here thinking about it.' But he could still, forgivably, wonder why they all missed, and toy with the hypothesis that they were bribed, or drunk.

This objection can be answered by the suggestion, which Martin Rees himself supports, that there are many universes, co-existing like bubbles of foam, in a 'multiverse' (or 'megaverse', as Leonard Susskind prefers to call it).^{*} The laws and constants of any one universe, such as our observable universe, are by-laws. The multiverse as a whole has a plethora of alternative sets of by-laws. The anthropic principle kicks in to explain that we have to be in one of those universes (presumably a minority) whose by-laws happened to be propitious to our eventual evolution and hence contemplation of the problem.

An intriguing version of the multiverse theory arises out of considerations of the ultimate fate of our universe. Depending upon the values of numbers such as Martin Rees's six constants, our universe may be destined to expand indefinitely, or it may stabilize at an equilibrium, or the expansion may reverse itself and go into contraction, culminating in the so-called 'big crunch'. Some big crunch models have the universe then bouncing back into expansion, and so on indefinitely with, say, a 20-billion-year cycle time. The standard model of our universe says that time itself began in the big bang, along with space, some 13 billion years ago. The serial big crunch model would amend that statement: our time and space did indeed begin in our big bang, but this was just the latest in a long series of big bangs, each one initiated by the big crunch that terminated the previous universe in the series. Nobody understands what goes on in singularities such as the big bang, so it is conceivable that the laws and constants are reset to new values, each time. If bang-expansion-contraction-crunch cycles have been going on for ever like a cosmic accordion, we have a serial, rather than a parallel, version of the multiverse. Once again, the anthropic principle does its explanatory duty. Of all the universes in the series, only a minority have their 'dials' tuned to biogenic conditions. And, of course, the present universe has to be one of that minority, because we are in it. As it turns out, this serial version of the multiverse must now be judged less likely than it once was, because

^{*} Susskind (2006) gives a splendid advocacy of the anthropic principle in the megaverse. He says the idea is hated by most physicists. I can't understand why. I think it is beautiful - perhaps because my consciousness has been raised by Darwin.

recent evidence is starting to steer us away from the big crunch model. It now looks as though our own universe is destined to expand for ever.

Another theoretical physicist, Lee Smolin, has developed a tantalizingly Darwinian variant on the multiverse theory, including both serial and parallel elements. Smolin's idea, expounded in *The Life of the Cosmos*, hinges on the theory that daughter universes are born of parent universes, not in a fully fledged big crunch but more locally in black holes. Smolin adds a form of heredity: the fundamental constants of a daughter universe are slightly 'mutated' versions of the constants of its parent. Heredity is the essential ingredient of Darwinian natural selection, and the rest of Smolin's theory follows naturally. Those universes that have what it takes to 'survive' and 'reproduce' come to predominate in the multiverse. 'What it takes' includes lasting long enough to 'reproduce'. Because the act of reproduction takes place in black holes, successful universes must have what it takes to make black holes. This ability entails various other properties. For example, the tendency for matter to condense into clouds and then stars is a prerequisite to making black holes. Stars also, as we have seen, are the precursors to the development of interesting chemistry, and hence life. So, Smolin suggests, there has been a Darwinian natural selection of universes in the multiverse, directly favouring the evolution of black hole fecundity and indirectly favouring the production of life. Not all physicists are enthusiastic about Smolin's idea, although the Nobel Prize-winning physicist Murray Gell-Mann is quoted as saying: 'Smolin? Is he that young guy with those crazy ideas? He may not be wrong.'⁷⁰ A mischievous biologist might wonder whether some other physicists are in need of Darwinian consciousness-raising.

It is tempting to think (and many have succumbed) that to postulate a plethora of universes is a profligate luxury which should not be allowed. If we are going to permit the extravagance of a multiverse, so the argument runs, we might as well be hung for a sheep as a lamb and allow a God. Aren't they both equally unparsimonious ad hoc hypotheses, and equally unsatisfactory? People who think that have not had their consciousness raised by natural selection. The key difference between the genuinely

extravagant God hypothesis and the apparently extravagant multiverse hypothesis is one of statistical improbability. The multiverse, for all that it is extravagant, is simple. God, or any intelligent, decision-taking, calculating agent, would have to be highly improbable in the very same statistical sense as the entities he is supposed to explain. The multiverse may seem extravagant in sheer *number* of universes. But if each one of those universes is simple in its fundamental laws, we are still not postulating anything highly improbable. The very opposite has to be said of any kind of intelligence.

Some physicists are known to be religious (Russell Stannard and the Reverend John Polkinghorne are the two British examples I have mentioned). Predictably, they seize upon the improbability of the physical constants all being tuned in their more or less narrow Goldilocks zones, and suggest that there must be a cosmic intelligence who deliberately did the tuning. I have already dismissed all such suggestions as raising bigger problems than they solve. But what attempts have theists made to reply? How do they cope with the argument that any God capable of designing a universe, carefully and foresightfully tuned to lead to our evolution, must be a supremely complex and improbable entity who needs an even bigger explanation than the one he is supposed to provide?

The theologian Richard Swinburne, as we have learned to expect, thinks he has an answer to this problem, and he expounds it in his book *Is There a God?*. He begins by showing that his heart is in the right place by convincingly demonstrating why we should always prefer the simplest hypothesis that fits the facts. Science explains complex things in terms of the interactions of simpler things, ultimately the interactions of fundamental particles. I (and I dare say you) think it a beautifully simple idea that all things are made of fundamental particles which, although exceedingly numerous, are drawn from a small, finite set of *types* of particle. If we are sceptical, it is likely to be because we think the idea too simple. But for Swinburne it is not simple at all, quite the reverse.

Given that the number of particles of any one type, say electrons, is large, Swinburne thinks it too much of a coincidence that so many should have the same properties. One electron, he could stomach. But billions and billions of electrons, *all with the same*

properties, that is what really excites his incredulity. For him it would be simpler, more natural, less demanding of explanation, if all electrons were different from each other. Worse, no one electron should naturally retain its properties for more than an instant at a time; each should change capriciously, haphazardly and fleetingly from moment to moment. That is Swinburne's view of the simple, native state of affairs. Anything more uniform (what you or I would call more simple) requires a special explanation. 'It is only because electrons and bits of copper and all other material objects have the same powers in the twentieth century as they did in the nineteenth century that things are as they are now.'

Enter God. God comes to the rescue by deliberately and continuously sustaining the properties of all those billions of electrons and bits of copper, and neutralizing their otherwise ingrained inclination to wild and erratic fluctuation. That is why when you've seen one electron you've seen them all; that is why bits of copper all behave like bits of copper, and that is why each electron and each bit of copper stays the same as itself from microsecond to microsecond and from century to century. It is because God constantly keeps a finger on each and every particle, curbing its reckless excesses and whipping it into line with its colleagues to keep them all the same.

But how can Swinburne possibly maintain that this hypothesis of God simultaneously keeping a gazillion fingers on wayward electrons is a *simple* hypothesis? It is, of course, precisely the opposite of simple. Swinburne pulls off the trick to his own satisfaction by a breathtaking piece of intellectual *chutzpah*. He asserts, without justification, that God is only a *single* substance. What brilliant economy of explanatory causes, compared with all those gigazillions of independent electrons all just happening to be the same!

Theism claims that every other object which exists is caused to exist and kept in existence by just one substance, God. And it claims that every property which every substance has is due to God causing or permitting it to exist. It is a hallmark of a simple explanation to postulate few causes. There could in this respect be no

simpler explanation than one which postulated only one cause. Theism is simpler than polytheism. And theism postulates for its one cause, a person [with] infinite power (God can do anything logically possible), infinite knowledge (God knows everything logically possible to know), and infinite freedom.

Swinburne generously concedes that God cannot accomplish feats that are *logically* impossible, and one feels grateful for this forbearance. Having said that, there is no limit to the explanatory purposes to which God's infinite power is put. Is science having a little difficulty explaining X? No problem. Don't give X another glance. God's infinite power is effortlessly wheeled in to explain X (along with everything else), and it is always a supremely *simple* explanation because, after all, there is only one God. What could be simpler than that?

Well, actually, almost everything. A God capable of continuously monitoring and controlling the individual status of every particle in the universe *cannot* be simple. His existence is going to need a mammoth explanation in its own right. Worse (from the point of view of simplicity), other corners of God's giant consciousness are simultaneously preoccupied with the doings and emotions and prayers of every single human being - and whatever intelligent aliens there might be on other planets in this and 100 billion other galaxies. He even, according to Swinburne, has to decide continuously *not* to intervene miraculously to save us when we get cancer. That would never do, for, 'If God answered most prayers for a relative to recover from cancer, then cancer would no longer be a problem for humans to solve.' And *then* what would we find to do with our time?

Not all theologians go as far as Swinburne. Nevertheless, the remarkable suggestion that the God Hypothesis is *simple* can be found in other modern theological writings. Keith Ward, then Regius Professor of Divinity at Oxford, was very clear on the matter in his 1996 book *God, Chance and Necessity*:

As a matter of fact, the theist would claim that God is a very elegant, economical and fruitful explanation for the

existence of the universe. It is economical because it attributes the existence and nature of absolutely everything in the universe to just one being, an ultimate cause which assigns a reason for the existence of everything, including itself. It is elegant because from one key idea - the idea of the most perfect possible being - the whole nature of God and the existence of the universe can be intelligibly explicated.

Like Swinburne, Ward mistakes what it means to explain something, and he also seems not to understand what it means to say of something that it is simple. I am not clear whether Ward really thinks God is simple, or whether the above passage represented a temporary 'for the sake of argument' exercise. Sir John Polkinghorne, in *Science and Christian Belief*, quotes Ward's earlier criticism of the thought of Thomas Aquinas: 'Its basic error is in supposing that God is logically simple - simple not just in the sense that his being is indivisible, but in the much stronger sense that what is true of any part of God is true of the whole. It is quite coherent, however, to suppose that God, while indivisible, is internally complex.' Ward gets it right here. Indeed, the biologist Julian Huxley, in 1912, defined complexity in terms of 'heterogeneity of parts', by which he meant a particular kind of functional indivisibility.⁷¹

Elsewhere, Ward gives evidence of the difficulty the theological mind has in grasping where the complexity of life comes from. He quotes another theologian-scientist, the biochemist Arthur Peacocke (the third member of my trio of British religious scientists), as postulating the existence in living matter of a 'propensity for increased complexity'. Ward characterizes this as 'some inherent weighting of evolutionary change which favours complexity'. He goes on to suggest that such a bias 'might be some weighting of the mutational process, to ensure that more complex mutations occurred'. Ward is sceptical of this, as well he should be. The evolutionary drive towards complexity comes, in those lineages where it comes at all, not from any inherent propensity for increased complexity, and not from biased mutation. It comes from natural selection: the process which, as far as we know, is the only

process ultimately capable of generating complexity out of simplicity. The theory of natural selection is genuinely simple. So is the origin from which it starts. That which it explains, on the other hand, is complex almost beyond telling: more complex than anything we can imagine, save a God capable of designing it.

AN INTERLUDE AT CAMBRIDGE

At a recent Cambridge conference on science and religion, where I put forward the argument I am here calling the Ultimate 747 argument, I encountered what, to say the least, was a cordial failure to achieve a meeting of minds on the question of God's simplicity. The experience was a revealing one, and I'd like to share it.

First I should confess (that is probably the right word) that the conference was sponsored by the Templeton Foundation. The audience was a small number of hand-picked science journalists from Britain and America. I was the token atheist among the eighteen invited speakers. One of the journalists, John Horgan, reported that they had each been paid the handsome sum of \$15,000 to attend the conference, on top of all expenses. This surprised me. My long experience of academic conferences included no instances where the audience (as opposed to the speakers) was paid to attend. If I had known, my suspicions would immediately have been aroused. Was Templeton using his money to suborn science journalists and subvert their scientific integrity? John Horgan later wondered the same thing and wrote an article about his whole experience.⁷² In it he revealed, to my chagrin, that my advertised involvement as a speaker had helped him and others to overcome their doubts:

The British biologist Richard Dawkins, whose participation in the meeting helped convince me and other fellows of its legitimacy, was the only speaker who denounced religious beliefs as incompatible with science, irrational, and harmful. The other speakers - three

agnostics, one Jew, a deist, and 12 Christians (a Muslim philosopher canceled at the last minute) - offered a perspective clearly skewed in favor of religion and Christianity.

Horgan's article is itself endearingly ambivalent. Despite his misgivings, there were aspects of the experience that he clearly valued (and so did I, as will become apparent below). Horgan wrote:

My conversations with the faithful deepened my appreciation of why some intelligent, well-educated people embrace religion. One reporter discussed the experience of speaking in tongues, and another described having an intimate relationship with Jesus. My convictions did not change, but others' did. At least one fellow said that his faith was wavering as a result of Dawkins's dissection of religion. And if the Templeton Foundation can help bring about even such a tiny step toward my vision of a world without religion, how bad can it be?

Horgan's article was given a second airing by the literary agent John Brockman on his 'Edge' website (often described as an on-line scientific *salon*) where it elicited varying responses, including one from the theoretical physicist Freeman Dyson. I responded to Dyson, quoting from his acceptance speech when he won the Templeton Prize. Whether he liked it or not, by accepting the Templeton Prize Dyson had sent a powerful signal to the world. It would be taken as an endorsement of religion by one of the world's most distinguished physicists.

'I am content to be one of the multitude of Christians who do not care much about the doctrine of the Trinity or the historical truth of the gospels.'

But isn't that exactly what any atheistic scientist *would* say, if he wanted to sound Christian? I gave further quotations from Dyson's acceptance speech, satirically interspersing them with imagined questions (in italics) to a Templeton official:

*Oh, you want something a bit more profound, as well?
How about. . .*

'I do not make any clear distinction between mind and God. God is what mind becomes when it has passed beyond the scale of our comprehension.'

Have I said enough yet, and can I get back to doing physics now? Oh, not enough yet? OK then, how about this:

'Even in the gruesome history of the twentieth century, I see some evidence of progress in religion. The two individuals who epitomized the evils of our century, Adolf Hitler and Joseph Stalin, were both avowed atheists.'*

Can I go now?

Dyson could easily refute the implication of these quotations from his Templeton acceptance speech, if only he would explain clearly what evidence he finds to believe in God, in something more than just the Einsteinian sense which, as I explained in Chapter 1, we can all trivially subscribe to. If I understand Horgan's point, it is that Templeton's money corrupts science. I am sure Freeman Dyson is way above being corrupted. But his acceptance speech is still unfortunate if it seems to set an example to others. The Templeton Prize is two orders of magnitude larger than the inducements offered to the journalists at Cambridge, having been explicitly set up to be larger than the Nobel Prize. In Faustian vein, my friend the philosopher Daniel Dennett once joked to me, 'Richard, if ever you fall on hard times . . .'

For better or worse, I attended two days at the Cambridge conference, giving a talk of my own and taking part in the discussion of several other talks. I challenged the theologians to answer the point that a God capable of designing a universe, or anything else, would have to be complex and statistically improbable. The strongest response I heard was that I was brutally foisting a scientific epistemology upon an unwilling theology, for theologians had always defined God as simple. Who was I, a scientist, to dictate

* This calumny is dealt with in Chapter 7.

f This accusation is reminiscent of 'NOMA', whose overblown claims I dealt with in Chapter 2.

to theologians that their God had to be complex? Scientific arguments, such as those I was accustomed to deploying in my own field, were inappropriate since theologians had always maintained that God lay outside science.

I did not gain the impression that the theologians who mounted this evasive defence were being wilfully dishonest. I think they were sincere. Nevertheless, I was irresistibly reminded of Peter Medawar's comment on Father Teilhard de Chardin's *The Phenomenon of Man*, in the course of what is possibly the greatest negative book review of all time: 'its author can be excused of dishonesty only on the grounds that before deceiving others he has taken great pains to deceive himself'.⁷³ The theologians of my Cambridge encounter were *defining* themselves into an epistemological Safe Zone where rational argument could not reach them because they had *declared by fiat* that it could not. Who was I to say that rational argument was the only admissible kind of argument? There are other ways of knowing besides the scientific, and it is one of these other ways of knowing that must be deployed to know God.

The most important of these other ways of knowing turned out to be personal, subjective experience of God. Several discussants at Cambridge claimed that God spoke to them, inside their heads, just as vividly and as personally as another human might. I have dealt with illusion and hallucination in Chapter 3 ('The argument from personal experience'), but at the Cambridge conference I added two points. First, that if God really did communicate with humans that fact would emphatically not lie outside science. God comes bursting through from whatever other-worldly domain is his natural abode, crashing through into our world where his messages can be intercepted by human brains - and that phenomenon has nothing to do with science? Second, a God who is capable of sending intelligible signals to millions of people simultaneously, and of receiving messages from all of them simultaneously, cannot be, whatever else he might be, simple. Such bandwidth! God may not have a brain made of neurones, or a CPU made of silicon, but if he has the powers attributed to him he must have something far more elaborately and non-randomly constructed than the largest brain or the largest computer we know.

Time and again, my theologian friends returned to the point that there had to be a reason why there is something rather than nothing. There must have been a first cause of everything, and we might as well give it the name God. Yes, I said, but it must have been simple and therefore, whatever else we call it, God is not an appropriate name (unless we very explicitly divest it of all the baggage that the word 'God' carries in the minds of most religious believers). The first cause that we seek must have been the simple basis for a self-bootstrapping crane which eventually raised the world as we know it into its present complex existence. To suggest that the original prime mover was complicated enough to indulge in intelligent design, to say nothing of mindreading millions of humans simultaneously, is tantamount to dealing yourself a perfect hand at bridge. Look around at the world of life, at the Amazon rainforest with its rich interlacement of lianas, bromeliads, roots and flying buttresses; its army ants and its jaguars, its tapirs and peccaries, treefrogs and parrots. What you are looking at is the statistical equivalent of a perfect hand of cards (think of all the other ways you could permute the parts, none of which would work) - except that we know how it came about: by the gradualistic crane of natural selection. It is not just scientists who revolt at mute acceptance of such improbability arising spontaneously; common sense balks too. To suggest that the first cause, the great unknown which is responsible for something existing rather than nothing, is a being capable of designing the universe and of talking to a million people simultaneously, is a total abdication of the responsibility to find an explanation. It is a dreadful exhibition of self-indulgent, thought-denying skyhookery.

I am not advocating some sort of narrowly scientific way of thinking. But the very least that any honest quest for truth must have in setting out to explain such monstrosities of improbability as a rainforest, a coral reef, or a universe is a crane and not a skyhook. The crane doesn't have to be natural selection. Admittedly, nobody has ever thought of a better one. But there could be others yet to be discovered. Maybe the 'inflation' that physicists postulate as occupying some fraction of the first yoctosecond of the universe's existence will turn out, when it is better understood, to be a cosmological crane to stand alongside Darwin's biological one. Or

maybe the elusive crane that cosmologists seek will be a version of Darwin's idea itself: either Smolin's model or something similar. Or maybe it will be the multiverse plus anthropic principle espoused by Martin Rees and others. It may even be a superhuman designer - but, if so, it will most certainly *not* be a designer who just popped into existence, or who always existed. If (which I don't believe for a moment) our universe was designed, and *a fortiori* if the designer reads our thoughts and hands out omniscient advice, forgiveness and redemption, the designer himself must be the end product of some kind of cumulative escalator or crane, perhaps a version of Darwinism in another universe.

The last-ditch defence by my critics in Cambridge was attack. My whole world-view was condemned as 'nineteenth-century'. This is such a bad argument that I almost omitted to mention it. But regrettably I encounter it rather frequently. Needless to say, to call an argument nineteenth-century is not the same as explaining what is wrong with it. Some nineteenth-century ideas were very good ideas, not least Darwin's own dangerous idea. In any case, this particular piece of namecalling seemed a bit rich coming, as it did, from an individual (a distinguished Cambridge geologist, surely well advanced along the Faustian road to a future Templeton Prize) who justified his own Christian belief by invoking what he called the historicity of the New Testament. It was precisely in the nineteenth century that theologians, especially in Germany, called into grave doubt that alleged historicity, using the evidence-based methods of history to do so. This was, indeed, swiftly pointed out by the theologians at the Cambridge conference.

In any case, I know the 'nineteenth-century' taunt of old. It goes with the 'village atheist' gibe. It goes with 'Contrary to what you seem to think Ha Ha Ha we don't believe in an old man with a long white beard any more Ha Ha Ha.' All three jokes are code for something else, just as, when I lived in America in the late 1960s, 'law and order' was politicians' code for anti-black prejudice.* What, then, is the coded meaning of 'You are so nineteenth-century' in the context of an argument about religion? It is code for: 'You are so crude and unsubtle, how could you be so insensitive and ill-mannered as to ask me a direct, point-blank question like "Do you believe in miracles?" or "Do you believe Jesus was born of a

* In Britain 'inner cities' had the equivalent coded meaning, prompting Auberon Waugh's wickedly hilarious reference to 'inner cities of both sexes'.

virgin?" Don't you know that in polite society we don't ask such questions? That sort of question went out in the nineteenth century.' But think about why it is impolite to ask such direct, factual questions of religious people today. It is because it is embarrassing! But it is the answer that is embarrassing, if it is yes.

The nineteenth-century connection is now clear. The nineteenth century is the last time when it was possible for an educated person to admit to believing in miracles like the virgin birth without embarrassment. When pressed, many educated Christians today are too loyal to deny the virgin birth and the resurrection. But it embarrasses them because their rational minds know it is absurd, so they would much rather not be asked. Hence, if somebody like me insists on asking the question, it is I who am accused of being 'nineteenth-century'. It is really quite funny, when you think about it.

I left the conference stimulated and invigorated, and reinforced in my conviction that the argument from improbability - the 'Ultimate 747' gambit - is a very serious argument against the existence of God, and one to which I have yet to hear a theologian give a convincing answer despite numerous opportunities and invitations to do so. Dan Dennett rightly describes it as 'an un-rebuttable refutation, as devastating today as when Philo used it to trounce Cleanthes in Hume's Dialogues two centuries earlier. A sky-hook would at best simply postpone the solution to the problem, but Hume couldn't think of any cranes, so he caved in.'⁷⁴ Darwin, of course, supplied the vital crane. How Hume would have loved it.

This chapter has contained the central argument of my book, and so, at the risk of sounding repetitive, I shall summarize it as a series of six numbered points.

- 1 One of the greatest challenges to the human intellect, over the centuries, has been to explain how the complex, improbable appearance of design in the universe arises.
- 2 The natural temptation is to attribute the appearance of design to actual design itself. In the case of a man-made artefact such as a watch, the designer really was an intelligent engineer. It is tempting to apply the same logic to an eye or a wing, a spider or a person.

- 3 The temptation is a false one, because the designer hypothesis immediately raises the larger problem of who designed the designer. The whole problem we started out with was the problem of explaining statistical improbability. It is obviously no solution to postulate something even more improbable. We need a 'crane', not a 'skyhook', for only a crane can do the business of working up gradually and plausibly from simplicity to otherwise improbable complexity.
- 4 The most ingenious and powerful crane so far discovered is Darwinian evolution by natural selection. Darwin and his successors have shown how living creatures, with their spectacular statistical improbability and appearance of design, have evolved by slow, gradual degrees from simple beginnings. We can now safely say that the illusion of design in living creatures is just that - an illusion.
- 5 We don't yet have an equivalent crane for physics. Some kind of multiverse theory could in principle do for physics the same explanatory work as Darwinism does for biology. This kind of explanation is superficially less satisfying than the biological version of Darwinism, because it makes heavier demands on luck. But the anthropic principle entitles us to postulate far more luck than our limited human intuition is comfortable with.
- 6 We should not give up hope of a better crane arising in physics, something as powerful as Darwinism is for biology. But even in the absence of a strongly satisfying crane to match the biological one, the relatively weak cranes we have at present are, when abetted by the anthropic principle, self-evidently better than the self-defeating skyhook hypothesis of an intelligent designer.

If the argument of this chapter is accepted, the factual premise of religion - the God Hypothesis - is untenable. God almost certainly does not exist. This is the main conclusion of the book so far. Various questions now follow. Even if we accept that God doesn't exist, doesn't religion still have a lot going for it? Isn't it consoling?

Doesn't it motivate people to do good? If it weren't for religion, how would we know what is good? Why, in any case, be so hostile? Why, if it is false, does every culture in the world have religion? True or false, religion is ubiquitous, so where does it come from? It is to this last question that we turn next.

CHAPTER 6

The roots of
morality: why are
we good?

Strange is our situation here on Earth. Each of us comes for a short visit, not knowing why, yet sometimes seeming to divine a purpose. From the standpoint of daily life, however, there is one thing we do know: that man is here for the sake of other men - above all for those upon whose smiles and well-being our own happiness depends.

ALBERT EINSTEIN

Many religious people find it hard to imagine how, without religion, one can be good, or would even want to be good. I shall discuss such questions in this chapter. But the doubts go further, and drive some religious people to paroxysms of hatred against those who don't share their faith. This is important, because moral considerations lie hidden behind religious attitudes to other topics that have no real link with morality. A great deal of the opposition to the teaching of evolution has no connection with evolution itself, or with anything scientific, but is spurred on by moral outrage. This ranges from the naive 'If you teach children that they evolved from monkeys, then they will act like monkeys' to the more sophisticated underlying motivation for the whole 'wedge' strategy of 'intelligent design', as it is mercilessly laid bare by Barbara Forrest and Paul Gross in *Creationism's Trojan Horse: The Wedge of Intelligent Design*.

I receive a large number of letters from readers of my books,* most of them enthusiastically friendly, some of them helpfully critical, a few nasty or even vicious. And the nastiest of all, I am sorry to report, are almost invariably motivated by religion. Such unchristian abuse is commonly experienced by those who are perceived as enemies of Christianity. Here, for example is a letter, posted on the Internet and addressed to Brian Flemming, author and director of *The God Who Wasn't There*,⁵⁶ a sincere and moving film advocating atheism. Titled 'Burn while we laugh' and dated 21 December 2005, the letter to Flemming reads as follows:

You've definitely got some nerve. I'd love to take a knife, gut you fools, and scream with joy as your insides spill out in front of you. You are attempting to ignite a holy war in which some day I, and others like me, may have the pleasure of taking action like the above mentioned.

The writer at this point seems to come to a belated recognition that his language is not very Christian, for he goes on, more charitably:

However, GOD teaches us not to seek vengeance, but to pray for those like you all.

* More than I can hope adequately to reply to, for which I apologize.

His charity is short-lived, however:

I'll get comfort in knowing that the punishment GOD will bring to you will be 1000 times worse than anything I can inflict. The best part is that you WILL suffer for eternity for these sins that you're completely ignorant about. The Wrath of GOD will show no mercy. For your sake, I hope the truth is revealed to you before the knife connects with your flesh. Merry CHRISTMAS!!!

PS You people really don't have a clue as to what is in store for you . . . I thank GOD I'm not you.

I find it genuinely puzzling that a mere difference of theological opinion can generate such venom. Here's a sample (original spelling preserved) from the postbag of the Editor of the magazine *Freethought Today*, published by the Freedom from Religion Foundation (FFRF), which campaigns peacefully against the undermining of the constitutional separation of church and state:

Hello, cheese-eating scumbags. Their are way more of us Christians than you losers. Their is NO separation of church and state and you heathens will lose . . .

What is it with cheese? American friends have suggested to me a connection with the notoriously liberal state of Wisconsin - home of the FFRF and centre of the dairy industry - but surely there must be more to it than that? And how about those French 'cheese-eating surrender-monkeys'? What is the semiotic iconography of cheese? To continue:

Satan worshipping scum . . . Please die and go to hell . . . I hope you get a painful disease like rectal cancer and die a slow painful death, so you can meet your God, SATAN . . . Hey dude this freedom from religion thing sux . . . So you fags and dykes take it easy and watch where you go cuz whenever you least expect it god will get you . . . If you don't like this country and what it was founded on &C for, get the fuck out of it and go straight to hell . . .

PS Fuck you, you comunist whore . . . Get your black asses out of the U.S.A. . . . You are without excuse. Creation is more than enough evidence of the LORD JESUS CHRIST'S omnipotent power.

Why not Allah's omnipotent power? Or Lord Brahma's? Or even Yahweh's?

We will not go quietly away. If in the future that requires violence just remember you brought it on. My rifle is loaded.

Why, I can't help wondering, is God thought to need such ferocious defence? One might have supposed him amply capable of looking after himself. Bear in mind, through all this, that the Editor being abused and threatened so viciously is a gentle and charming young woman.

Perhaps because I don't live in America, most of my hate mail is not quite in the same league, but nor does it display to advantage the charity for which the founder of Christianity was notable. The following, dated May 2005, from a British medical doctor, while it is certainly hateful, strikes me as more tormented than nasty, and reveals how the whole issue of morality is a deep wellspring of hostility towards atheism. After some preliminary paragraphs excoriating evolution (and sarcastically asking whether a 'Negro' is 'still in the process of evolving'), insulting Darwin personally, misquoting Huxley as an anti-evolutionist, and encouraging me to read a book (I have read it) which argues that the world is only eight thousand years old (can he *really* be a doctor?) he concludes:

Your own books, your prestige in Oxford, everything you love in life, and have ever achieved, are an exercise in total futility . . . Camus' question-challenge becomes inescapable: Why don't we all commit suicide? Indeed, your world view has that sort of effect on students and many others . . . that we all evolved by blind chance, from nothing, and return to nothing. Even if religion were not

true, it is better, much, much better, to believe a noble myth, like Plato's, if it leads to peace of mind while we live. But *your* world view leads to anxiety, drug addiction, violence, nihilism, hedonism, Frankenstein science, and hell on earth, and World War III... I wonder how happy *you* are in your personal relationships? Divorced? Widowed? Gay? Those like you are never happy, or they would not try so hard to prove there *is* no happiness nor meaning in anything.

The sentiment of this letter, if not its tone, is typical of many. Darwinism, this person believes, is inherently nihilistic, teaching that we evolved by blind chance (for the umpteenth time, natural selection is the very *opposite* of a chance process) and are annihilated when we die. As a direct consequence of such alleged negativity, all manner of evils follow. Presumably he didn't *really* mean to suggest that widowhood could follow directly from my Darwinism, but his letter, by this point, had reached that level of frenzied malevolence which I repeatedly recognize among my Christian correspondents. I have devoted a whole book (*Unweaving the Rainbow*) to ultimate meaning, to the poetry of science, and to rebutting, specifically and at length, the charge of nihilistic negativity, so I shall restrain myself here. This chapter is about evil, and its opposite, good; about morality: where it comes from, why we should embrace it, and whether we need religion to do so.

DOES OUR MORAL SENSE HAVE A DARWINIAN ORIGIN?

Several books, including Robert Hinde's *Why Good is Good*, Michael Shermer's *The Science of Good and Evil*, Robert Buckman's *Can We Be Good Without God?*, and Marc Hauser's *Moral Minds*, have argued that our sense of right and wrong can be derived from our Darwinian past. This section is my own version of the argument.

On the face of it, the Darwinian idea that evolution is driven by natural selection seems ill-suited to explain such goodness as we possess, or our feelings of morality, decency, empathy and pity. Natural selection can easily explain hunger, fear and sexual lust, all of which straightforwardly contribute to our survival or the preservation of our genes. But what about the wrenching compassion we feel when we see an orphaned child weeping, an old widow in despair from loneliness, or an animal whimpering in pain? What gives us the powerful urge to send an anonymous gift of money or clothes to tsunami victims on the other side of the world whom we shall never meet, and who are highly unlikely to return the favour? Where does the Good Samaritan in us come from? Isn't goodness incompatible with the theory of the 'selfish gene'? No. This is a common misunderstanding of the theory - a distressing (and, with hindsight, foreseeable) misunderstanding.* It is necessary to put the stress on the right word. The selfish *gene* is the correct emphasis, for it makes the contrast with the selfish organism, say, or the selfish species. Let me explain.

The logic of Darwinism concludes that the unit in the hierarchy of life which survives and passes through the filter of natural selection will tend to be selfish. The units that survive in the world will be the ones that succeeded in surviving at the expense of their rivals at their own level in the hierarchy. That, precisely, is what selfish means in this context. The question is, what is the level of the action? The whole idea of the selfish gene, with the stress properly applied to the last word, is that the unit of natural selection (i.e. the unit of self-interest) is not the selfish organism, nor the selfish group or selfish species or selfish ecosystem, but the selfish *gene*. It is the gene that, in the form of information, either survives for many generations or does not. Unlike the gene (and arguably the meme), the organism, the group and the species are not the right kind of entity to serve as a unit in this sense, because

* I was mortified to read in the *Guardian* ('Animal Instincts', 27 May 2006) that *The Selfish Gene* is the favourite book of Jeff Skilling, CEO of the infamous Enron Corporation, and that he derived inspiration of a Social Darwinist character from it. The *Guardian* journalist Richard Conniff gives a good explanation of the misunderstanding: <http://money.guardian.co.uk/workweekly/story/0,,1783900,00.html>. I have tried to forestall similar misunderstandings in my new preface to the thirtieth-anniversary edition of *The Selfish Gene*, just brought out by Oxford University Press.

they do not make exact copies of themselves, and do not compete in a pool of such self-replicating entities. That is precisely what genes do, and that is the - essentially logical - justification for singling the gene out as the unit of 'selfishness' in the special Darwinian sense of selfish.

The most obvious way in which genes ensure their own 'selfish' survival relative to other genes is by programming individual organisms to be selfish. There are indeed many circumstances in which survival of the individual organism will favour the survival of the genes that ride inside it. But different circumstances favour different tactics. There are circumstances - not particularly rare - in which genes ensure their own selfish survival by influencing organisms to behave altruistically. Those circumstances are now fairly well understood and they fall into two main categories. A gene that programs individual organisms to favour their genetic kin is statistically likely to benefit copies of itself. Such a gene's frequency can increase in the gene pool to the point where kin altruism becomes the norm. Being good to one's own children is the obvious example, but it is not the only one. Bees, wasps, ants, termites and, to a lesser extent, certain vertebrates such as naked mole rats, meerkats and acorn woodpeckers, have evolved societies in which elder siblings care for younger siblings (with whom they are likely to share the genes for doing the caring). In general, as my late colleague W. D. Hamilton showed, animals tend to care for, defend, share resources with, warn of danger, or otherwise show altruism towards close kin because of the statistical likelihood that kin will share copies of the same genes.

The other main type of altruism for which we have a well-worked-out Darwinian rationale is reciprocal altruism ('You scratch my back and I'll scratch yours'). This theory, first introduced to evolutionary biology by Robert Trivers and often expressed in the mathematical language of game theory, does not depend upon shared genes. Indeed, it works just as well, probably even better, between members of widely different species, when it is often called symbiosis. The principle is the basis of all trade and barter in humans too. The hunter needs a spear and the smith wants meat. The asymmetry brokers a deal. The bee needs nectar and the flower needs pollinating. Flowers can't fly so they pay bees,

in the currency of nectar, for the hire of their wings. Birds called honeyguides can find bees' nests but can't break into them. Honey badgers (ratels) can break into bees' nests, but lack wings with which to search for them. Honeyguides lead ratels (and sometimes men) to honey by a special enticing flight, used for no other purpose. Both sides benefit from the transaction. A crock of gold may lie under a large stone, too heavy for its discoverer to move. He enlists the help of others even though he then has to share the gold, because without their help he would get none. The living kingdoms are rich in such mutualistic relationships: buffaloes and oxpeckers, red tubular flowers and hummingbirds, groupers and cleaner wrasses, cows and their gut micro-organisms. Reciprocal altruism works because of asymmetries in needs and in capacities to meet them. That is why it works especially well between different species: the asymmetries are greater.

In humans, IOUs and money are devices that permit delays in the transactions. The parties to the trade don't hand over the goods simultaneously but can hold a debt over to the future, or even trade the debt on to others. As far as I know, no non-human animals in the wild have any direct equivalent of money. But memory of individual identity plays the same role more informally. Vampire bats learn which other individuals of their social group can be relied upon to pay their debts (in regurgitated blood) and which individuals cheat. Natural selection favours genes that predispose individuals, in relationships of asymmetric need and opportunity, to give when they can, and to solicit giving when they can't. It also favours tendencies to remember obligations, bear grudges, police exchange relationships and punish cheats who take, but don't give when their turn comes.

For there will always be cheats, and stable solutions to the game-theoretic conundrums of reciprocal altruism always involve an element of punishment of cheats. Mathematical theory allows two broad classes of stable solution to 'games' of this kind. 'Always be nasty' is stable in that, if everybody else is doing it, a single nice individual cannot do better. But there is another strategy which is also stable. ('Stable' means that, once it exceeds a critical frequency in the population, no alternative does better.) This is the strategy, 'Start out being nice, and give others the benefit of the doubt. Then

repay good deeds with good, but avenge bad deeds.' In game theory language, this strategy (or family of related strategies) goes under various names, including Tit-for-Tat, Retaliator and Reciprocator. It is evolutionarily stable under some conditions in the sense that, given a population dominated by reciprocators, no single nasty individual, and no single unconditionally nice individual, will do better. There are other, more complicated variants of Tit-for-Tat which can in some circumstances do better.

I have mentioned kinship and reciprocation as the twin pillars of altruism in a Darwinian world, but there are secondary structures which rest atop those main pillars. Especially in human society, with language and gossip, reputation is important. One individual may have a reputation for kindness and generosity. Another individual may have a reputation for unreliability, for cheating and renegeing on deals. Another may have a reputation for generosity when trust has been built up, but for ruthless punishment of cheating. The unadorned theory of reciprocal altruism expects animals of any species to base their behaviour upon unconscious responsiveness to such traits in their fellows. In human societies we add the power of language to spread reputations, usually in the form of gossip. You don't need to have suffered personally from X's failure to buy his round at the pub. You hear 'on the grapevine' that X is a tightwad, or - to add an ironic complication to the example - that Y is a terrible gossip. Reputation is important, and biologists can acknowledge a Darwinian survival value in not just being a good reciprocator but fostering a *reputation* as a good reciprocator too. Matt Ridley's *The Origins of Virtue*, as well as being a lucid account of the whole field of Darwinian morality, is especially good on reputation.*

The Norwegian economist Thorstein Veblen and, in a rather different way, the Israeli zoologist Amotz Zahavi have added a further fascinating idea. Altruistic giving may be an advertisement of dominance or superiority. Anthropologists know it as the Potlatch Effect, named after the custom whereby rival chieftains of

* Reputation is not confined to humans. It has recently been shown to apply to one of the classic cases of reciprocal altruism in animals, the symbiotic relationship between small cleaner fish and their large fish clients. In an ingenious experiment, individual cleaner wrasse, *Labroides dimidiatus*, that had been observed by a would-be client to be diligent cleaners were more likely to be chosen by the client than rival *Labroides* that had been observed neglecting to clean. See R. Bshary and A. S. Grutter, 'Image scoring and cooperation in a cleaner fish mutualism', *Nature* 441, 22 June 2006, 975-8.

Pacific north-west tribes vie with each other in duels of ruinously generous feasts. In extreme cases, bouts of retaliatory entertaining continue until one side is reduced to penury, leaving the winner not much better off. Veblen's concept of 'conspicuous consumption' strikes a chord with many observers of the modern scene. Zahavi's contribution, unregarded by biologists for many years until vindicated by brilliant mathematical models from the theorist Alan Grafen, has been to provide an evolutionary version of the potlatch idea. Zahavi studies Arabian babblers, little brown birds who live in social groups and breed co-operatively. Like many small birds, babblers give warning cries, and they also donate food to each other. A standard Darwinian investigation of such altruistic acts would look, first, for reciprocation and kinship relationships among the birds. When a babbler feeds a companion, is it in the expectation of being fed at a later date? Or is the recipient of the favour a close genetic relative? Zahavi's interpretation is radically unexpected. Dominant babblers assert their dominance by feeding subordinates. To use the sort of anthropomorphic language Zahavi delights in, the dominant bird is saying the equivalent of, 'Look how superior I am to you, I can afford to give you food.' Or 'Look how superior I am, I can afford to make myself vulnerable to hawks by sitting on a high branch, acting as a sentinel to warn the rest of the flock feeding on the ground.' The observations of Zahavi and his colleagues suggest that babblers actively compete for the dangerous role of sentinel. And when a subordinate babbler attempts to offer food to a dominant individual, the apparent generosity is violently rebuffed. The essence of Zahavi's idea is that advertisements of superiority are authenticated by their cost. Only a genuinely superior individual can afford to advertise the fact by means of a costly gift. Individuals buy success, for example in attracting mates, through costly demonstrations of superiority, including ostentatious generosity and public-spirited risk-taking.

We now have four good Darwinian reasons for individuals to be altruistic, generous or 'moral' towards each other. First, there is the special case of genetic kinship. Second, there is reciprocation: the repayment of favours given, and the giving of favours in 'anticipation' of payback. Following on from this there is, third, the Darwinian benefit of acquiring a reputation for generosity and

kindness. And fourth, if Zahavi is right, there is the particular additional benefit of conspicuous generosity as a way of buying unfakeably authentic advertising.

Through most of our prehistory, humans lived under conditions that would have strongly favoured the evolution of all four kinds of altruism. We lived in villages, or earlier in discrete roving bands like baboons, partially isolated from neighbouring bands or villages. Most of your fellow band members would have been kin, more closely related to you than members of other bands - plenty of opportunities for kin altruism to evolve. And, whether kin or not, you would tend to meet the same individuals again and again throughout your life - ideal conditions for the evolution of reciprocal altruism. Those are also the ideal conditions for building a reputation for altruism, and the very same ideal conditions for advertising conspicuous generosity. By any or all of the four routes, genetic tendencies towards altruism would have been favoured in early humans. It is easy to see why our prehistoric ancestors would have been good to their own in-group but bad - to the point of xenophobia - towards other groups. But why - now that most of us live in big cities where we are no longer surrounded by kin, and where every day we meet individuals whom we are never going to meet again — why are we still so good to each other, even sometimes to others who might be thought to belong to an out-group?

It is important not to mis-state the reach of natural selection. Selection does not favour the evolution of a cognitive awareness of what is good for your genes. That awareness had to wait for the twentieth century to reach a cognitive level, and even now full understanding is confined to a minority of scientific specialists. What natural selection favours is rules of thumb, which work in practice to promote the genes that built them. Rules of thumb, by their nature, sometimes misfire. In a bird's brain, the rule 'Look after small squawking things in your nest, and drop food into their red gapes' typically has the effect of preserving the genes that built the rule, because the squawking, gaping objects in an adult bird's nest are normally its own offspring. The rule misfires if another baby bird somehow gets into the nest, a circumstance that is positively engineered by cuckoos. Could it be that our Good Samaritan urges are misfirings, analogous to the misfiring of a reed

warbler's parental instincts when it works itself to the bone for a young cuckoo? An even closer analogy is the human urge to adopt a child. I must rush to add that 'misfiring' is intended only in a strictly Darwinian sense. It carries no suggestion of the pejorative.

The 'mistake' or 'by-product' idea, which I am espousing, works like this. Natural selection, in ancestral times when we lived in small and stable bands like baboons, programmed into our brains altruistic urges, alongside sexual urges, hunger urges, xenophobic urges and so on. An intelligent couple can read their Darwin and know that the ultimate reason for their sexual urges is procreation. They know that the woman cannot conceive because she is on the pill. Yet they find that their sexual desire is in no way diminished by the knowledge. Sexual desire is sexual desire and its force, in an individual's psychology, is independent of the ultimate Darwinian pressure that drove it. It is a strong urge which exists independently of its ultimate rationale.

I am suggesting that the same is true of the urge to kindness - to altruism, to generosity, to empathy, to pity. In ancestral times, we had the opportunity to be altruistic only towards close kin and potential reciprocators. Nowadays that restriction is no longer there, but the rule of thumb persists. Why would it not? It is just like sexual desire. We can no more help ourselves feeling pity when we see a weeping unfortunate (who is unrelated and unable to reciprocate) than we can help ourselves feeling lust for a member of the opposite sex (who may be infertile or otherwise unable to reproduce). Both are misfirings, Darwinian mistakes: blessed, precious mistakes.

Do not, for one moment, think of such Darwinizing as demeaning or reductive of the noble emotions of compassion and generosity. Nor of sexual desire. Sexual desire, when channelled through the conduits of linguistic culture, emerges as great poetry and drama: John Donne's love poems, say, or *Romeo and Juliet*. And of course the same thing happens with the misfired redirection of kin- and reciprocation-based compassion. Mercy to a debtor is, when seen out of context, as un-Darwinian as adopting someone else's child:

The quality of mercy is not strained.

It droppeth as the gentle rain from heaven

Upon the place beneath.

Sexual lust is the driving force behind a large proportion of human ambition and struggle, and much of it constitutes a misfiring. There is no reason why the same should not be true of the lust to be generous and compassionate, if this is the misfired consequence of ancestral village life. The best way for natural selection to build in both kinds of lust in ancestral times was to install rules of thumb in the brain. Those rules still influence us today, even where circumstances make them inappropriate to their original functions.

Such rules of thumb influence us still, not in a Calvinistically deterministic way but filtered through the civilizing influences of literature and custom, law and tradition - and, of course, religion. Just as the primitive brain rule of sexual lust passes through the filter of civilization to emerge in the love scenes of *Romeo and Juliet*, so primitive brain rules of us-versus-them vendetta emerge in the form of the running battles between Capulets and Montagues; while primitive brain rules of altruism and empathy end up in the misfiring that cheers us in the chastened reconciliation of Shakespeare's final scene.

A CASE STUDY IN THE ROOTS OF MORALITY

If our moral sense, like our sexual desire, is indeed rooted deep in our Darwinian past, predating religion, we should expect that research on the human mind would reveal some moral universals, crossing geographical and cultural barriers, and also, crucially, religious barriers. The Harvard biologist Marc Hauser, in his book *Moral Minds: How Nature Designed our Universal Sense of Right and Wrong*, has enlarged upon a fruitful line of thought experiments originally suggested by moral philosophers. Hauser's study will serve the additional purpose of introducing the way moral philosophers think. A hypothetical moral dilemma is posed, and the difficulty we experience in answering it tells us something about our sense of right and wrong. Where Hauser goes beyond the philosophers is that he actually does statistical surveys and psychological experiments, using questionnaires on the Internet, for

example, to investigate the moral sense of real people. From the present point of view, the interesting thing is that most people come to the same decisions when faced with these dilemmas, and their agreement over the decisions themselves is stronger than their ability to articulate their reasons. This is what we should expect if we have a moral sense which is built into our brains, like our sexual instinct or our fear of heights or, as Hauser himself prefers to say, like our capacity for language (the details vary from culture to culture, but the underlying deep structure of grammar is universal). As we shall see, the way people respond to these moral tests, and their inability to articulate their reasons, seems largely independent of their religious beliefs or lack of them. The message of Hauser's book, to anticipate it in his own words, is this: 'Driving our moral judgments is a universal moral grammar, a faculty of the mind that evolved over millions of years to include a set of principles for building a range of possible moral systems. As with language, the principles that make up our moral grammar fly beneath the radar of our awareness.'

Typical of Hauser's moral dilemmas are variations on the theme of a runaway truck or 'trolley' on a railway line which threatens to kill a number of people. The simplest story imagines a person, Denise, standing by a set of points and in a position to divert the trolley onto a siding, thereby saving the lives of five people trapped on the main line ahead. Unfortunately there is a man trapped on the siding. But since he is only one, outnumbered by the five people trapped on the main track, most people agree that it is morally permissible, if not obligatory, for Denise to throw the switch and save the five by killing the one. We ignore hypothetical possibilities such as that the one man on the siding might be Beethoven, or a close friend.

Elaborations of the thought experiment present a series of increasingly teasing moral conundrums. What if the trolley can be stopped by dropping a large weight in its path from a bridge overhead? That's easy: obviously we must drop the weight. But what if the only large weight available is a very fat man sitting on the bridge, admiring the sunset? Almost everybody agrees that it is immoral to push the fat man off the bridge, even though, from one point of view, the dilemma might seem parallel to Denise's, where

throwing the switch kills one to save five. Most of us have a strong intuition that there is a crucial difference between the two cases, though we may not be able to articulate what it is.

Pushing the fat man off the bridge is reminiscent of another dilemma considered by Hauser. Five patients in a hospital are dying, each with a different organ failing. Each would be saved if a donor could be found for their particular faulty organ, but none is available. Then the surgeon notices that there is a healthy man in the waiting-room, all five of whose organs are in good working order and suitable for transplanting. In this case, almost nobody can be found who is prepared to say that the moral act is to kill the one to save the five.

As with the fat man on the bridge, the intuition that most of us share is that an innocent bystander should not suddenly be dragged into a bad situation and used for the sake of others without his consent. Immanuel Kant famously articulated the principle that a rational being should never be used as merely an unconsenting means to an end, even the end of benefiting others. This seems to provide the crucial difference between the case of the fat man on the bridge (or the man in the hospital waiting-room) and the man on Denise's siding. The fat man on the bridge is being positively used as the means to stop the runaway trolley. This clearly violates the Kantian principle. The person on the siding is not being used to save the lives of the five people on the line. It is the siding that is being used, and he just has the bad luck to be standing on it. But, when you put the distinction like that, why does it satisfy us? For Kant, it was a moral absolute. For Hauser it is built into us by our evolution.

The hypothetical situations involving the runaway trolley become increasingly ingenious, and the moral dilemmas correspondingly tortuous. Hauser contrasts the dilemmas faced by hypothetical individuals called Ned and Oscar. Ned is standing by the railway track. Unlike Denise, who could divert the trolley onto a siding, Ned's switch diverts it onto a side loop which joins the main track again just before the five people. Simply switching the points doesn't help: the trolley will plough into the five anyway when the diversion rejoins the main track. However, as it happens, there is an extremely fat man on the diversionary track who is

heavy enough to stop the trolley. Should Ned change the points and divert the train? Most people's intuition is that he should not. But what is the difference between Ned's dilemma, and Denise's? Presumably people are intuitively applying Kant's principle. Denise diverts the trolley from ploughing into the five people, and the unfortunate casualty on the siding is 'collateral damage', to use the charmingly Rumsfeldian phrase. He is not being used by Denise to save the others. Ned is actually *using* the fat man to stop the trolley, and most people (perhaps unthinkingly), along with Kant (thinking it out in great detail), see this as a crucial difference.

The difference is brought out again by the dilemma of Oscar. Oscar's situation is identical to Ned's, except that there is a large iron weight on the diversionary loop of track, heavy enough to stop the trolley. Clearly Oscar should have no problem deciding to pull the points and divert the trolley. Except that there happens to be a hiker walking in front of the iron weight. He will certainly be killed if Oscar pulls the switch, just as surely as Ned's fat man. The difference is that Oscar's hiker is not being used to stop the trolley: he is collateral damage, as in Denise's dilemma. Like Hauser, and like most of Hauser's experimental subjects, I feel that Oscar is permitted to throw the switch but Ned is not. But I also find it quite hard to justify my intuition. Hauser's point is that such moral intuitions are often not well thought out but that we feel them strongly anyway, because of our evolutionary heritage.

In an intriguing venture into anthropology, Hauser and his colleagues adapted their moral experiments to the Kuna, a small Central American tribe with little contact with Westerners and no formal religion. The researchers changed the 'trolley on a line' thought experiment to locally suitable equivalents, such as crocodiles swimming towards canoes. With corresponding minor differences, the Kuna show the same moral judgements as the rest of us.

Of particular interest for this book, Hauser also wondered whether religious people differ from atheists in their moral intuitions. Surely, if we get our morality from religion, they should differ. But it seems that they don't. Hauser, working with the moral philosopher Peter Singer,⁸⁷ focused on three hypothetical dilemmas and compared the verdicts of atheists with those of religious people.

In each case, the subjects were asked to choose whether a hypothetical action is morally 'obligatory', 'permissible' or 'forbidden'. The three dilemmas were:

- 1 Denise's dilemma. Ninety per cent of people said it was permissible to divert the trolley, killing the one to save the five.
- 2 You see a child drowning in a pond and there is no other help in sight. You can save the child, but your trousers will be ruined in the process. Ninety-seven per cent agreed that you should save the child (amazingly, 3 per cent apparently would prefer to save their trousers).
- 3 The organ transplant dilemma described above. Ninety-seven per cent of subjects agreed that it is morally forbidden to seize the healthy person in the waiting-room and kill him for his organs, thereby saving five other people.

The main conclusion of Hauser and Singer's study was that there is no statistically significant difference between atheists and religious believers in making these judgements. This seems compatible with the view, which I and many others hold, that we do not need God in order to be good - or evil.

IF THERE IS NO GOD, WHY BE GOOD?

Posed like that, the question sounds positively ignoble. When a religious person puts it to me in this way (and many of them do), my immediate temptation is to issue the following challenge: 'Do you really mean to tell me the only reason you try to be good is to gain God's approval and reward, or to avoid his disapproval and punishment? That's not morality, that's just sucking up, apple-polishing, looking over your shoulder at the great surveillance camera in the sky, or the still small wiretap inside your head, monitoring your every move, even your every base thought.' As Einstein said, 'If people are good only because they fear punishment, and hope for reward, then we are a sorry lot indeed.' Michael

Shermer, in *The Science of Good and Evil*, calls it a debate stopper. If you agree that, in the absence of God, you would 'commit robbery, rape, and murder', you reveal yourself as an immoral person, 'and we would be well advised to steer a wide course around you'. If, on the other hand, you admit that you would continue to be a good person even when not under divine surveillance, you have fatally undermined your claim that God is necessary for us to be good. I suspect that quite a lot of religious people do think religion is what motivates them to be good, especially if they belong to one of those faiths that systematically exploits personal guilt.

It seems to me to require quite a low self-regard to think that, should belief in God suddenly vanish from the world, we would all become callous and selfish hedonists, with no kindness, no charity, no generosity, nothing that would deserve the name of goodness. It is widely believed that Dostoevsky was of that opinion, presumably because of some remarks he put into the mouth of Ivan Karamazov:

[Ivan] solemnly observed that there was absolutely no law of nature to make man love humanity, and that if love did exist and had existed at all in the world up to now, then it was not by virtue of the natural law, but entirely because man believed in his own immortality. He added as an aside that it was precisely that which constituted the natural law, namely, that once man's faith in his own immortality was destroyed, not only would his capacity for love be exhausted, but so would the vital forces that sustained life on this earth. And furthermore, nothing would be immoral then, everything would be permitted, even anthropophagy. And finally, as though all this were not enough, he declared that for every individual, such as you and me, for example, who does not believe either in God or in his own immortality, the natural law is bound immediately to become the complete opposite of the religion-based law that preceded it, and that egoism, even extending to the perpetration of crime, would not only be permissible but would be recognized as the essential, the most rational, and even the noblest *raison d'etre* of the human condition.⁸⁸

Perhaps naively, I have inclined towards a less cynical view of human nature than Ivan Karamazov. Do we really need policing - whether by God or by each other - in order to stop us from behaving in a selfish and criminal manner? I dearly want to believe that I do not need such surveillance - and nor, dear reader, do you. On the other hand, just to weaken our confidence, listen to Steven Pinker's disillusioning experience of a police strike in Montreal, which he describes in *The Blank Slate*:

As a young teenager in proudly peaceable Canada during the romantic 1960s, I was a true believer in Bakunin's anarchism. I laughed off my parents' argument that if the government ever laid down its arms all hell would break loose. Our competing predictions were put to the test at 8:00 A.M. on October 17, 1969, when the Montreal police went on strike. By 11:20 A.M. the first bank was robbed. By noon most downtown stores had closed because of looting. Within a few more hours, taxi drivers burned down the garage of a limousine service that competed with them for airport customers, a rooftop sniper killed a provincial police officer, rioters broke into several hotels and restaurants, and a doctor slew a burglar in his suburban home. By the end of the day, six banks had been robbed, a hundred shops had been looted, twelve fires had been set, forty carloads of storefront glass had been broken, and three million dollars in property damage had been inflicted, before city authorities had to call in the army and, of course, the Mounties to restore order. This decisive empirical test left my politics in tatters . . .

Perhaps I, too, am a Pollyanna to believe that people would remain good when unobserved and unpoliced by God. On the other hand, the majority of the population of Montreal presumably believed in God. Why didn't the fear of God restrain them when earthly policemen were temporarily removed from the scene? Wasn't the Montreal strike a pretty good natural experiment to test the hypothesis that belief in God makes us good? Or did the cynic H. L. Mencken get it right when he tartly observed: 'People say

we need religion when what they really mean is we need police.'

Obviously, not everybody in Montreal behaved badly as soon as the police were off the scene. It would be interesting to know whether there was any statistical tendency, however slight, for religious believers to loot and destroy less than unbelievers. My uninformed prediction would have been opposite. It is often cynically said that there are no atheists in foxholes. I'm inclined to suspect (with some evidence, although it may be simplistic to draw conclusions from it) that there are very few atheists in prisons. I am not necessarily claiming that atheism increases morality, although humanism - the ethical system that often goes with atheism - probably does. Another good possibility is that atheism is correlated with some third factor, such as higher education, intelligence or reflectiveness, which might counteract criminal impulses. Such research evidence as there is certainly doesn't support the common view that religiosity is positively correlated with morality. Correlational evidence is never conclusive, but the following data, described by Sam Harris in his *Letter to a Christian Nation*, are nevertheless striking.

While political party affiliation in the United States is not a perfect indicator of religiosity, it is no secret that the 'red [Republican] states' are primarily red due to the overwhelming political influence of conservative Christians. If there were a strong correlation between Christian conservatism and societal health, we might expect to see some sign of it in red-state America. We don't. Of the twenty-five cities with the lowest rates of violent crime, 62 percent are in 'blue' [Democrat] states, and 38 percent are in 'red' [Republican] states. Of the twenty-five most dangerous cities, 76 percent are in red states, and 24 percent are in blue states. In fact, three of the five most dangerous cities in the U.S. are in the pious state of Texas. The twelve states with the highest rates of burglary are red. Twenty-four of the twenty-nine states with the highest rates of theft are red. Of the twenty-two states with the highest rates of murder, seventeen are red.*

* Note that these colour conventions in America are exactly the opposite of those in Britain, where blue is the colour of the Conservative Party, and red, as in the rest of the world, is the colour traditionally associated with the political left.

Systematic research if anything tends to support such correlational data. Dan Dennett, in *Breaking the Spell*, sardonically comments, not on Harris's book in particular, but on such studies generally:

Needless to say, these results strike so hard at the standard claims of greater moral virtue among the religious that there has been a considerable surge of further research initiated by religious organizations attempting to refute them . . . one thing we can be sure of is that *if* there is a significant positive relationship between moral behaviour and religious affiliation, practice, or belief, it will soon be discovered, since so many religious organizations are eager to confirm their traditional beliefs about this scientifically. (They are quite impressed with the truth-finding power of science when it supports what they already believe.) Every month that passes without such a demonstration underlines the suspicion that it just isn't so.

Most thoughtful people would agree that morality in the absence of policing is somehow more truly moral than the kind of false morality that vanishes as soon as the police go on strike or the spy camera is switched off, whether the spy camera is a real one monitored in the police station or an imaginary one in heaven. But it is perhaps unfair to interpret the question 'If there is no God, why bother to be good?' in such a cynical way.* A religious thinker could offer a more genuinely moral interpretation, along the lines of the following statement from an imaginary apologist. 'If you don't believe in God, you don't believe there are any absolute standards of morality. With the best will in the world you may intend to be a good person, but how do you decide what is good and what is bad? Only religion can ultimately provide your standards of good and evil. Without religion you have to make it up as you go along. That would be morality without a rule book: morality flying by the seat of its pants. If morality is merely a matter of choice, Hitler could claim to be moral by his own eugenically inspired standards, and all the atheist can do is make a personal choice to live by different lights. The Christian, the Jew or

* H. L. Mencken, again with characteristic cynicism, defined conscience as the inner voice that warns us that someone may be looking.

the Muslim, by contrast, can claim that evil has an absolute meaning, true for all time and in all places, according to which Hitler was absolutely evil.'

Even if it were true that we need God to be moral, it would of course not make God's existence more likely, merely more desirable (many people cannot tell the difference). But that is not the issue here. My imaginary religious apologist has no need to admit that sucking up to God is the religious motive for doing good. Rather, his claim is that, wherever the *motive* to be good comes from, without God there would be no standard for *deciding* what is good. We could each make up our own definition of the good, and behave accordingly. Moral principles that are based only upon religion (as opposed to, say, the 'golden rule', which is often associated with religions but can be derived from elsewhere) may be called absolutist. Good is good and bad is bad, and we don't mess around deciding particular cases by whether, for example, somebody suffers. My religious apologist would claim that only religion can provide a basis for deciding what is good.

Some philosophers, notably Kant, have tried to derive absolute morals from non-religious sources. Though a religious man himself, as was almost inevitable in his time/' Kant tried to base a morality on duty for duty's sake, rather than for God's. His famous categorical imperative enjoins us to 'act only on that maxim whereby thou canst at the same time will that it should become a universal law'. This works tidily for the example of telling lies. Imagine a world in which people told lies as a matter of principle, where lying was regarded as a good and moral thing to do. In such a world, lying itself would cease to have any meaning. Lying needs a presumption of truth for its very definition. If a moral principle is something we should wish everybody to follow, lying cannot be a moral principle because the principle itself would break down in meaninglessness. Lying, as a rule for life, is inherently unstable. More generally, selfishness, or free-riding parasitism on the goodwill of others, may work for me as a lone selfish individual and give me personal satisfaction. But I cannot wish that everybody would adopt selfish parasitism as a moral principle, if only because then I would have nobody to parasitize.

* This is the standard interpretation of Kant's views. However, the noted philosopher A. C. Grayling has plausibly argued (*New Humanist*, July-Aug. 2006) that, although Kant publicly went along with the religious conventions of his time, he was really an atheist.

The Kantian imperative seems to work for truth-telling and some other cases. It is not so easy to see how to broaden it to morality generally. Kant notwithstanding, it is tempting to agree with my hypothetical apologist that absolutist morals are usually driven by religion. Is it always wrong to put a terminally ill patient out of her misery at her own request? Is it always wrong to make love to a member of your own sex? Is it always wrong to kill an embryo? There are those who believe so, and their grounds are absolute. They brook no argument or debate. Anybody who disagrees deserves to be shot: metaphorically of course, not literally - except in the case of some doctors in American abortion clinics (see next chapter). Fortunately, however, morals do not have to be absolute.

Moral philosophers are the professionals when it comes to thinking about right and wrong. As Robert Hinde succinctly put it, they agree that 'moral precepts, while not necessarily constructed by reason, should be defensible by reason'.⁸⁹ They classify themselves in many ways, but in modern terminology the major divide is between 'deontologists' (such as Kant) and 'consequentialists' (including 'utilitarians' such as Jeremy Bentham, 1748-1832). Deontology is a fancy name for the belief that morality consists in the obeying of rules. It is literally the science of duty, from the Greek for 'that which is binding'. Deontology is not quite the same thing as moral absolutism, but for most purposes in a book about religion there is no need to dwell on the distinction. Absolutists believe there are absolutes of right and wrong, imperatives whose Tightness makes no reference to their consequences. Consequentialists more pragmatically hold that the morality of an action should be judged by its consequences. One version of consequentialism is utilitarianism, the philosophy associated with Bentham, his friend James Mill (1773-1836) and Mill's son John Stuart Mill (1806-73). Utilitarianism is often summed up in Bentham's unfortunately imprecise catchphrase: 'the greatest happiness of the greatest number is the foundation of morals and legislation'.

Not all absolutism is derived from religion. Nevertheless, it is pretty hard to defend absolutist morals on grounds other than religious ones. The only competitor I can think of is patriotism, especially in times of war. As the distinguished Spanish film director

Luis Bunuel said, 'God and Country are an unbeatable team; they break all records for oppression and bloodshed.' Recruiting officers rely heavily on their victims' sense of patriotic duty. In the First World War, women handed out white feathers to young men not in uniform.

Oh, we don't want to lose you, but we think you ought to go,
For your King and your country both need you so.

People despised conscientious objectors, even those of the enemy country, because patriotism was held to be an absolute virtue. It is hard to get much more absolute than the 'My country right or wrong' of the professional soldier, for the slogan commits you to kill whomever the politicians of some future date might choose to call enemies. Consequentialist reasoning may influence the political decision to go to war but, once war is declared, absolutist patriotism takes over with a force and a power not otherwise seen outside religion. A soldier who allows his own thoughts of consequentialist morality to persuade him not to go over the top would likely find himself court-martialled and even executed.

The springboard for this discussion of moral philosophy was a hypothetical religious claim that, without a God, morals are relative and arbitrary. Kant and other sophisticated moral philosophers apart, and with due recognition given to patriotic fervour, the preferred source of absolute morality is usually a holy book of some kind, interpreted as having an authority far beyond its history's capacity to justify. Indeed, adherents of scriptural authority show distressingly little curiosity about the (normally highly dubious) historical origins of their holy books. The next chapter will demonstrate that, in any case, people who claim to derive their morals from scripture do not really do so in practice. And a very good thing too, as they themselves, on reflection, should agree.

CHAPTER 8

What's wrong with religion? Why be so hostile?

Religion has actually convinced people that there's an invisible man - living in the sky - who watches everything you do, every minute of every day. And the invisible man has a special list of ten things he does not want you to do. And if you do any of these ten things, he has a special place, full of fire and smoke and burning and torture and anguish, where he will send you to live and suffer and burn and choke and scream and cry forever and ever 'til the end of time . . . But He loves you!

GEORGE CARLIN

I do not, by nature, thrive on confrontation. I don't think the adversarial format is well designed to get at the truth, and I regularly refuse invitations to take part in formal debates. I was once invited to debate with the then Archbishop of York, in Edinburgh. I felt honoured by this, and accepted. After the debate, the religious physicist Russell Stannard reproduced in his book *Doing Away with God?* a letter that he wrote to the *Observer*:

Sir, Under the gleeful headline 'God comes a poor Second before the Majesty of Science', your science correspondent reported (on Easter Sunday of all days) how Richard Dawkins 'inflicted grievous intellectual harm' on the Archbishop of York in a debate on science and religion. We were told of 'smugly smiling atheists' and 'Lions 10; Christians nil'.

Stannard went on to chide the *Observer* for failing to report a subsequent encounter between him and me, together with the Bishop of Birmingham and the distinguished cosmologist Sir Hermann Bondi, at the Royal Society, which had *not* been staged as an adversarial debate, and which had been a lot more constructive as a result. I can only agree with his implied condemnation of the adversarial debate format. In particular, for reasons explained in *A Devil's Chaplain*, I never take part in debates with creationists.*

Despite my dislike of gladiatorial contests, I seem somehow to have acquired a reputation for pugnacity towards religion. Colleagues who agree that there is no God, who agree that we do not need religion to be moral, and agree that we can explain the roots of religion and of morality in non-religious terms, nevertheless come back at me in gentle puzzlement. Why are you so hostile? What is actually wrong with religion? Does it really do so much harm that we should actively fight against it? Why not live and let live, as one does with Taurus and Scorpio, crystal energy and ley lines? Isn't it all just harmless nonsense?

I might retort that such hostility as I or other atheists occasionally voice towards religion is limited to words. I am not going to

* I do not have the *chutzpah* to refuse on the grounds offered by one of my most distinguished scientific colleagues, whenever a creationist tries to stage a formal debate with him (I shall not name him, but his words should be read in an Australian accent): 'That would look great on your CV; not so good on mine.'

bomb anybody, behead them, stone them, burn them at the stake, crucify them, or fly planes into their skyscrapers, just because of a theological disagreement. But my interlocutor usually doesn't leave it at that. He may go on to say something like this: 'Doesn't your hostility mark you out as a fundamentalist atheist, just as fundamentalist in your own way as the wingnuts of the Bible Belt in theirs?' I need to dispose of this accusation of fundamentalism, for it is distressingly common.

FUNDAMENTALISM AND THE SUBVERSION OF SCIENCE

Fundamentalists know they are right because they have read the truth in a holy book and they know, in advance, that nothing will budge them from their belief. The truth of the holy book is an axiom, not the end product of a process of reasoning. The book is true, and if the evidence seems to contradict it, it is the evidence that must be thrown out, not the book. By contrast, what I, as a scientist, believe (for example, evolution) I believe not because of reading a holy book but because I have studied the evidence. It really is a very different matter. Books about evolution are believed not because they are holy. They are believed because they present overwhelming quantities of mutually buttressed evidence. In principle, any reader can go and check that evidence. When a science book is wrong, somebody eventually discovers the mistake and it is corrected in subsequent books. That conspicuously doesn't happen with holy books.

Philosophers, especially amateurs with a little philosophical learning, and even more especially those infected with 'cultural relativism', may raise a tiresome red herring at this point: a scientist's belief in *evidence* is itself a matter of fundamentalist faith. I have dealt with this elsewhere, and will only briefly repeat myself here. All of us believe in evidence in our own lives, whatever we may profess with our amateur philosophical hats on. If I am accused of murder, and prosecuting counsel sternly asks me

whether it is true that I was in Chicago on the night of the crime, I cannot get away with a philosophical evasion: 'It depends what you mean by "true".' Nor with an anthropological, relativist plea: 'It is only in your Western scientific sense of "in" that I was in Chicago. The Bongolese have a completely different concept of "in", according to which you are only truly "in" a place if you are an anointed elder entitled to take snuff from the dried scrotum of a goat.'¹⁵

Maybe scientists are fundamentalist when it comes to defining in some abstract way what is meant by 'truth'. But so is everybody else. I am no more fundamentalist when I say evolution is true than when I say it is true that New Zealand is in the southern hemisphere. We believe in evolution because the evidence supports it, and we would abandon it overnight if new evidence arose to disprove it. No real fundamentalist would ever say anything like that.

It is all too easy to confuse fundamentalism with passion. I may well appear passionate when I defend evolution against a fundamentalist creationist, but this is not because of a rival fundamentalism of my own. It is because the evidence for evolution is overwhelmingly strong and I am passionately distressed that my opponent can't see it - or, more usually, refuses to look at it because it contradicts his holy book. My passion is increased when I think about how much the poor fundamentalists, and those whom they influence, are *missing*. The truths of evolution, along with many other scientific truths, are so engrossingly fascinating and beautiful; how truly tragic to die having missed out on all that! Of course that makes me passionate. How could it not? But my belief in evolution is not fundamentalism, and it is not faith, because I know what it would take to change my mind, and I would gladly do so if the necessary evidence were forthcoming.

It does happen. I have previously told the story of a respected elder statesman of the Zoology Department at Oxford when I was an undergraduate. For years he had passionately believed, and taught, that the Golgi Apparatus (a microscopic feature of the interior of cells) was not real: an artefact, an illusion. Every Monday afternoon it was the custom for the whole department to listen to a research talk by a visiting lecturer. One Monday, the visitor was an American cell biologist who presented completely convincing evidence that the Golgi Apparatus was real. At the end

of the lecture, the old man strode to the front of the hall, shook the American by the hand and said - with passion - 'My dear fellow, I wish to thank you. I have been wrong these fifteen years.' We clapped our hands red. No fundamentalist would ever say that. In practice, not all scientists would. But all scientists pay lip service to it as an ideal - unlike, say, politicians who would probably condemn it as flip-flopping. The memory of the incident I have described still brings a lump to my throat.

As a scientist, I am hostile to fundamentalist religion because it actively debauches the scientific enterprise. It teaches us not to change our minds, and not to want to know exciting things that are available to be known. It subverts science and saps the intellect. The saddest example I know is that of the American geologist Kurt Wise, who now directs the Center for Origins Research at Bryan College, Dayton, Tennessee. It is no accident that Bryan College is named after William Jennings Bryan, prosecutor of the science teacher John Scopes in the Dayton 'Monkey Trial' of 1925. Wise could have fulfilled his boyhood ambition to become a professor of geology at a real university, a university whose motto might have been 'Think critically' rather than the oxymoronic one displayed on the Bryan website: 'Think critically and biblically'. Indeed, he obtained a real degree in geology at the University of Chicago, followed by two higher degrees in geology and paleontology at Harvard (no less) where he studied under Stephen Jay Gould (no less). He was a highly qualified and genuinely promising young scientist, well on his way to achieving his dream of teaching science and doing research at a proper university.

Then tragedy struck. It came, not from outside but from within his own mind, a mind fatally subverted and weakened by a fundamentalist religious upbringing that required him to believe that the Earth - the subject of his Chicago and Harvard geological education - was less than ten thousand years old. He was too intelligent not to recognize the head-on collision between his religion and his science, and the conflict in his mind made him increasingly uneasy. One day, he could bear the strain no more, and he clinched the matter with a pair of scissors. He took a bible and went right through it, literally cutting out every verse that would have to go if the scientific world-view were true. At the end of this ruthlessly honest and

labour-intensive exercise, there was so little left of his bible that,

try as I might, and even with the benefit of intact margins throughout the pages of Scripture, I found it impossible to pick up the Bible without it being rent in two. I had to make a decision between evolution and Scripture. Either the Scripture was true and evolution was wrong or evolution was true and I must toss out the Bible . . . It was there that night that I accepted the Word of God and rejected all that would ever counter it, including evolution. With that, in great sorrow, I tossed into the fire all my dreams and hopes in science.

I find that terribly sad; but whereas the Golgi Apparatus story moved me to tears of admiration and exultation, the Kurt Wise story is just plain pathetic - pathetic and contemptible. The wound, to his career and his life's happiness, was self-inflicted, so unnecessary, so easy to escape. All he had to do was toss out the bible. Or interpret it symbolically, or allegorically, as the theologians do. Instead, he did the fundamentalist thing and tossed out science, evidence and reason, along with all his dreams and hopes.

Perhaps uniquely among fundamentalists, Kurt Wise is honest - devastatingly, painfully, shockingly honest. Give him the Templeton Prize; he might be the first really sincere recipient. Wise brings to the surface what is secretly going on underneath, in the minds of fundamentalists generally, when they encounter scientific evidence that contradicts their beliefs. Listen to his peroration:

Although there are scientific reasons for accepting a young earth, I am a young-age creationist because that is my understanding of the Scripture. As I shared with my professors years ago when I was in college, if all the evidence in the universe turns against creationism, I would be the first to admit it, but I would still be a creationist because that is what the Word of God seems to indicate. Here I must stand.¹¹⁶

He seems to be quoting Luther as he nailed his theses to the door

of the church in Wittenberg, but poor Kurt Wise reminds me more of Winston Smith in *1984* - struggling desperately to believe that two plus two equals five if Big Brother says it does. Winston, however, was being tortured. Wise's doublethink comes not from the imperative of physical torture but from the imperative - apparently just as undeniable to some people - of religious faith: arguably a form of mental torture. I am hostile to religion because of what it did to Kurt Wise. And if it did that to a Harvard-educated geologist, just think what it can do to others less gifted and less well armed.

Fundamentalist religion is hell-bent on ruining the scientific education of countless thousands of innocent, well-meaning, eager young minds. Non-fundamentalist, 'sensible' religion may not be doing that. But it is making the world safe for fundamentalism by teaching children, from their earliest years, that unquestioning faith is a virtue.

THE DARK SIDE OF ABSOLUTISM

In the previous chapter, when trying to explain the shifting moral *Zeitgeist*, I invoked a widespread consensus of liberal, enlightened, decent people. I made the rosy-spectacled assumption that 'we' all broadly agree with this consensus, some more than others, and I had in mind most of the people likely to read this book, whether they are religious or not. But of course, not everybody is of the consensus (and not everybody will have any desire to read my book). It has to be admitted that absolutism is far from dead. Indeed, it rules the minds of a great number of people in the world today, most dangerously so in the Muslim world and in the incipient American theocracy (see Kevin Phillips's book of that name). Such absolutism nearly always results from strong religious faith, and it constitutes a major reason for suggesting that religion can be a force for evil in the world.

One of the fiercest penalties in the Old Testament is the one exacted for blasphemy. It is still in force in certain countries. Section 295-C of the Pakistan penal code prescribes the death

penalty for this 'crime'. On 18 August 2001, Dr Younis Shaikh, a medical doctor and lecturer, was sentenced to death for blasphemy. His particular crime was to tell students that the prophet Muhammad was not a Muslim before he invented the religion at the age of forty. Eleven of his students reported him to the authorities for this 'offence'. The blasphemy law in Pakistan is more usually invoked against Christians, such as Augustine Ashiq 'Kingri' Masih, who was sentenced to death in Faisalabad in 2000. Masih, as a Christian, was not allowed to marry his sweetheart because she was a Muslim and - incredibly - Pakistani (and Islamic) law does not allow a Muslim woman to marry a non-Muslim man. So he tried to convert to Islam and was then accused of doing so for base motives. It is not clear from the report I have read whether this in itself was the capital crime, or whether it was something he is alleged to have said about the prophet's own morals. Either way, it certainly was not the kind of offence that would warrant a death sentence in any country whose laws are free of religious bigotry.

In 2006 in Afghanistan, Abdul Rahman was sentenced to death for converting to Christianity. Did he kill anyone, hurt anybody, steal anything, damage anything? No. All he did was change his mind. Internally and privately, he changed his mind. He entertained certain *thoughts* which were not to the liking of the ruling party of his country. And this, remember, is not the Afghanistan of the Taliban but the 'liberated' Afghanistan of Hamid Karzai, set up by the American-led coalition. Mr Rahman finally escaped execution, but only on a plea of insanity, and only after intense international pressure. He has now sought asylum in Italy, to avoid being murdered by zealots eager to do their Islamic duty. It is still an article of the *constitution* of 'liberated' Afghanistan that the penalty for apostasy is death. Apostasy, remember, doesn't mean actual harm to persons or property. It is pure thoughtcrime, to use George Orwell's 1984 terminology, and the official punishment for it under Islamic law is death. On 3 September 1992, to take one example where it was actually carried out, Sadiq Abdul Karim Malallah was publicly beheaded in Saudi Arabia after being lawfully convicted of apostasy and blasphemy.¹¹⁷

I once had a televised encounter with Sir Iqbal Sacranie,

mentioned in Chapter 1 as Britain's leading 'moderate' Muslim. I challenged him on the death penalty as punishment for apostasy. He wriggled and squirmed, but was unable either to deny or decry it. He kept trying to change the subject, saying it was an unimportant detail. This is a man who has been knighted by the British government for promoting good 'interfaith relations'.

But let's have no complacency in Christendom. As recently as 1922 in Britain, John William Gott was sentenced to nine months' hard labour for blasphemy: he compared Jesus to a clown. Almost unbelievably, the crime of blasphemy is still on the statute book in Britain,¹¹⁸ and in 2005 a Christian group tried to bring a private prosecution for blasphemy against the BBC for broadcasting *Jerry Springer, the Opera*.

In the United States of recent years the phrase 'American Taliban' was begging to be coined, and a swift Google search nets more than a dozen websites that have done so. The quotations that they anthologize, from American religious leaders and faith-based politicians, chillingly recall the narrow bigotry, heartless cruelty and sheer nastiness of the Afghan Taliban, the Ayatollah Khomeini and the Wahhabi authorities of Saudi Arabia. The web page called 'The American Taliban' is a particularly rich source of obnoxiously barmy quotations, beginning with a prize one from somebody called Ann Coulter who, American colleagues have persuaded me, is not a spoof, invented by *The Onion*: 'We should invade their countries, kill their leaders and convert them to Christianity.'¹¹⁹ Other gems include Congressman Bob Dornan's 'Don't use the word "gay" unless it's an acronym for "Got Aids Yet?"', General William G. Boykin's 'George Bush was not elected by a majority of the voters in the United States, he was appointed by God' - and an older one, the famous environmental policy of Ronald Reagan's Secretary of the Interior: 'We don't have to protect the environment, the Second Coming is at hand.' The Afghan Taliban and the American Taliban are good examples of what happens when people take their scriptures literally and seriously. They provide a horrifying modern enactment of what life might have been like under the theocracy of the Old Testament. Kimberly Blaker's *The Fundamentals of Extremism: The Christian Right in America* is a book-length expose of the menace of the Christian Taliban (not under that name).

FAITH AND HOMOSEXUALITY

In Afghanistan under the Taliban, the official punishment for homosexuality was execution, by the tasteful method of burial alive under a wall pushed over on top of the victim. The 'crime' itself being a private act, performed by consenting adults who were doing nobody else any harm, we again have here the classic hallmark of religious absolutism. My own country has no right to be smug. Private homosexuality was a criminal offence in Britain up until - astonishingly - 1967. In 1954 the British mathematician Alan Turing, a candidate along with John von Neumann for the title of father of the computer, committed suicide after being convicted of the criminal offence of homosexual behaviour in private. Admittedly Turing was not buried alive under a wall pushed over by a tank. He was offered a choice between two years in prison (you can imagine how the other prisoners would have treated him) and a course of hormone injections which could be said to amount to chemical castration, and would have caused him to grow breasts. His final, private choice was an apple that he had injected with cyanide.¹²⁰

As the pivotal intellect in the breaking of the German Enigma codes, Turing arguably made a greater contribution to defeating the Nazis than Eisenhower or Churchill. Thanks to Turing and his 'Ultra' colleagues at Bletchley Park, Allied generals in the field were consistently, over long periods of the war, privy to detailed German plans before the German generals had time to implement them. After the war, when Turing's role was no longer top secret, he should have been knighted and feted as a saviour of his nation. Instead, this gentle, stammering, eccentric genius was destroyed, for a 'crime', committed in private, which harmed nobody. Once again, the unmistakable trademark of the faith-based moralizer is to care passionately about what other people do (or even think) in *private*.

The attitude of the 'American Taliban' towards homosexuality epitomizes their religious absolutism. Listen to the Reverend Jerry Falwell, founder of Liberty University: 'AIDS is not just God's punishment for homosexuals; it is God's punishment for the society that tolerates homosexuals.'¹²¹ The thing I notice first about such

people is their wonderful Christian charity. What kind of an electorate could, term after term, vote in a man of such ill-informed bigotry as Senator Jesse Helms, Republican of North Carolina? A man who has sneered: *'The New York Times and Washington Post are both infested with homosexuals themselves. Just about every person down there is a homosexual or lesbian.'*¹²² The answer, I suppose, is the kind of electorate that sees morality in narrowly religious terms and feels threatened by anybody who doesn't share the same absolutist faith.

I have already quoted Pat Robertson, founder of the Christian Coalition. He stood as a serious candidate for the Republican party nomination for President in 1988, and garnered more than three million volunteers to work in his campaign, plus a comparable quantity of money: a disquieting level of support, given that the following quotations are entirely typical of him: '[Homosexuals] want to come into churches and disrupt church services and throw blood all around and try to give people AIDS and spit in the face of ministers.' '[Planned Parenthood] is teaching kids to fornicate, teaching people to have adultery, every kind of bestiality, homosexuality, lesbianism - everything that the Bible condemns.' Robertson's attitude to women, too, would warm the black hearts of the Afghan Taliban: 'I know this is painful for the ladies to hear, but if you get married, you have accepted the headship of a man, your husband. Christ is the head of the household and the husband is the head of the wife, and that's the way it is, period.'

Gary Potter, President of Catholics for Christian Political Action, had this to say: 'When the Christian majority takes over this country, there will be no satanic churches, no more free distribution of pornography, no more talk of rights for homosexuals. After the Christian majority takes control, pluralism will be seen as immoral and evil and the state will not permit anybody the right to practice evil.' 'Evil', as is very clear from the quotation, doesn't mean doing things that have bad consequences for people. It means private thoughts and actions that are not to 'the Christian majority's' private liking.

Pastor Fred Phelps, of the Westboro Baptist Church, is another strong preacher with an obsessive dislike of homosexuals. When Martin Luther King's widow died, Pastor Fred organized a picket

of her funeral, proclaiming: 'God Hates Fags & C Fag-Enablers! Ergo, God hates Coretta Scott King and is now tormenting her with fire and brimstone where the worm never dies and the fire is never quenched, and the smoke of her torment ascendeth up for ever and ever.'¹²³ It is easy to write Fred Phelps off as a nut, but he has plenty of support from people and their money. According to his own website, Phelps has organized 22,000 anti-homosexual demonstrations since 1991 (that's an average of one every four days) in the USA, Canada, Jordan and Iraq, displaying slogans such as 'THANK GOD FOR AIDS'. A particularly charming feature of his website is the automated tally of the number of days a particular, named, deceased homosexual has been burning in hell.

Attitudes to homosexuality reveal much about the sort of morality that is inspired by religious faith. An equally instructive example is abortion and the sanctity of human life.

FAITH AND THE SANCTITY OF HUMAN LIFE

Human embryos are examples of human life. Therefore, by absolutist religious lights, abortion is simply wrong: full-fledged murder. I am not sure what to make of my admittedly anecdotal observation that many of those who most ardently oppose the taking of embryonic life also seem to be more than usually enthusiastic about taking adult life. To be fair, this does not, as a rule, apply to Roman Catholics, who are among the most vociferous opponents of abortion. The born-again George W. Bush, however, is typical of today's religious ascendancy. He, and they, are stalwart defenders of human life, as long as it is embryonic life (or terminally ill life) - even to the point of preventing medical research that would certainly save many lives.¹²⁴ The obvious ground for opposing the death penalty is respect for human life. Since 1976, when the Supreme Court reversed the ban on the death penalty, Texas has been responsible for more than one-third of all executions in all fifty states of the Union. And Bush presided over more executions in Texas than any other governor in the state's history, averaging one death every nine days. Perhaps he was simply

doing his duty and carrying out the laws of the state?¹²⁵ But then, *what are we to make of the famous report by the CNN journalist Tucker Carlson?* Carlson, who himself supports the death penalty, was shocked by Bush's 'humorous' imitation of a female prisoner on death row, pleading to the Governor for a stay of execution: "Please," Bush whimpers, his lips pursed in mock desperation, "Don't kill me."¹²⁶ Perhaps this woman would have met with more sympathy if she had pointed out that she had once been an embryo. The contemplation of embryos really does seem to have the most extraordinary effect upon many people of faith. Mother Teresa of Calcutta actually said, in her speech accepting the Nobel Peace Prize, 'The greatest destroyer of peace is abortion.' *What?* How can a woman with such cock-eyed judgement be taken seriously on any topic, let alone be thought seriously worthy of a Nobel Prize? Anybody tempted to be taken in by the sanctimoniously hypocritical Mother Teresa should read Christopher Hitchens's book *The Missionary Position: Mother Teresa in Theory and Practice*.

Returning to the American Taliban, listen to Randall Terry, founder of Operation Rescue, an organization for intimidating abortion providers. 'When I, or people like me, are running the country, you'd better flee, because we will find you, we will try you, and we'll execute you. I mean every word of it. I will make it part of my mission to see to it that they are tried and executed.' Terry was here referring to doctors who provide abortions, and his Christian inspiration is clearly shown by other statements:

I want you to just let a wave of intolerance wash over you. I want you to let a wave of hatred wash over you. Yes, hate is good ... Our goal is a Christian nation. We have a Biblical duty, we are called by God, to conquer this country. We don't want equal time. We don't want pluralism.

Our goal must be simple. We must have a Christian nation built on God's law, on the Ten Commandments. No apologies.¹²⁷

This ambition to achieve what can only be called a Christian fascist state is entirely typical of the American Taliban. It is an almost

exact mirror image of the Islamic fascist state so ardently sought by many people in other parts of the world. Randall Terry is not - yet - in political power. But no observer of the American political scene at the time of writing (2006) can afford to be sanguine.

A consequentialist or utilitarian is likely to approach the abortion question in a very different way, by trying to weigh up suffering. Does the embryo suffer? (Presumably not if it is aborted before it has a nervous system; and even if it is old enough to have a nervous system it surely suffers less than, say, an adult cow in a slaughterhouse.) Does the pregnant woman, or her family, suffer if she does not have an abortion? Very possibly so; and, in any case, given that the embryo lacks a nervous system, shouldn't the mother's well-developed nervous system have the choice?

This is not to deny that a consequentialist might have grounds to oppose abortion. 'Slippery slope' arguments can be framed by consequentialists (though I wouldn't in this case). Maybe embryos don't suffer, but a culture that tolerates the taking of human life risks going too far: where will it all end? In infanticide? The moment of birth provides a natural Rubicon for defining rules, and one could argue that it is hard to find another one earlier in embryonic development. Slippery slope arguments could therefore lead us to give the moment of birth more significance than utilitarianism, narrowly interpreted, would prefer.

Arguments against euthanasia, too, can be framed in slippery slope terms. Let's invent an imaginary quotation from a moral philosopher: 'If you allow doctors to put terminal patients out of their agony, the next thing you know everybody will be bumping off their granny to get her money. We philosophers may have grown out of absolutism, but society needs the discipline of absolute rules such as "Thou shalt not kill," otherwise it doesn't know where to stop. Under some circumstances absolutism might, for all the wrong reasons in a less than ideal world, have better *consequences* than naive consequentialism! We philosophers might have a hard time prohibiting the eating of people who were already dead and unmourned - say road-killed tramps. But, for slippery slope reasons, the absolutist taboo against cannibalism is too valuable to lose.'

Slippery slope arguments might be seen as a way in which

consequentialists can reimport a form of indirect absolutism. But the religious foes of abortion don't bother with slippery slopes. For them, the issue is much simpler. An embryo is a 'baby', killing it is murder, and that's that: end of discussion. Much follows from this absolutist stance. For a start, embryonic stem-cell research must cease, despite its huge potential for medical science, because it entails the deaths of embryonic cells. The inconsistency is apparent when you reflect that society already accepts IVF (in vitro fertilization), in which doctors routinely stimulate women to produce surplus eggs, to be fertilized outside the body. As many as a dozen viable zygotes may be produced, of which two or three are then implanted in the uterus. The expectation is that, of these, only one or possibly two will survive. IVF, therefore, kills conceptuses at two stages of the procedure, and society in general has no problem with this. For twenty-five years, IVF has been a standard procedure for bringing joy into the lives of childless couples.

Religious absolutists, however, can have problems with IVF. The *Guardian* of 3 June 2005 carried a bizarre story under the headline 'Christian couples answer call to save embryos left by IVF'. The story is about an organization called Snowflakes which seeks to 'rescue' surplus embryos left over at IVF clinics. 'We really felt like the Lord was calling us to try to give one of these embryos - these children - a chance to live,' said a woman in Washington State, whose fourth child resulted from this 'unexpected alliance that conservative Christians have been forming with the world of test-tube babies'. Worried about that alliance, her husband had consulted a church elder, who advised, 'If you want to free the slaves, you sometimes have to make a deal with the slave trader.' I wonder what these people would say if they knew that the majority of conceived embryos spontaneously abort anyway. It is probably best seen as a kind of natural 'quality control'.

A certain kind of religious mind cannot see the moral difference between killing a microscopic cluster of cells on the one hand, and killing a full-grown doctor on the other. I have already quoted Randall Terry and 'Operation Rescue'. Mark Juergensmeyer, in his chilling book *Terror in the Mind of God*, prints a photograph of the Reverend Michael Bray with his friend the Reverend Paul Hill, holding a banner reading: 'Is it wrong to stop the murder of

innocent babies?' Both look like nice, rather preppy young men, smiling engagingly, casually well-dressed, the very opposite of staring-eyed loonies. Yet they and their friends of the Army of God (AOG) made it their business to set fire to abortion clinics, and they have made no secret of their desire to kill doctors. On 29 July 1994, Paul Hill took a shotgun and murdered Dr John Britton and his bodyguard James Barrett outside Britton's clinic in Pensacola, Florida. He then gave himself up to the police, saying he had killed the doctor to prevent the future deaths of 'innocent babies'.

Michael Bray defends such actions articulately and with every appearance of high moral purpose, as I discovered when I interviewed him, in a public park in Colorado Springs, for my television documentary on religion.* Before coming on to the abortion question, I got the measure of Bray's Bible-based morality by asking him some preliminary questions. I pointed out that biblical law condemns adulterers to death by stoning. I expected him to disavow this particular example as obviously beyond the pale, but he surprised me. He was happy to agree that, after due process of law, adulterers should be executed. I then pointed out that Paul Hill, with Bray's full support, had not followed due process but had taken the law into his own hands and killed a doctor. Bray defended his fellow clergyman's action in the same terms as he had when Juergensmeyer interviewed him, making a distinction between retributive killing, say of a retired doctor, and killing a practising doctor as a means of preventing him from 'regularly killing babies'. I then put it to him that, sincere though Paul Hill's beliefs no doubt were, society would descend into a terrible anarchy if everybody invoked personal conviction in order to take the law into their own hands, rather than abiding by the law of the land. Wasn't the right course to try to get the law changed, democratically? Bray replied: 'Well, this is the problem when we don't have law that's really authentic law; when we have laws that are made up by people on the spot, capriciously, as we have seen in the case of the so-called law of abortion rights, that was imposed upon the people by judges . . .' We then got into an argument about the American constitution and where laws come from. Bray's attitude to such matters turned out to be very reminiscent of those militant Muslims

* The animal liberationists who threaten violence against scientists using animals for medical research would claim an equally high moral purpose.

living in Britain who openly announce themselves as bound only by Islamic law, not by the democratically enacted laws of their adopted country.

In 2003 Paul Hill was executed for the murder of Dr Britton and his bodyguard, saying he would do it again to save the unborn. Candidly looking forward to dying for his cause, he told a news conference, 'I believe the state, by executing me, will be making me a martyr.' Right-wing anti-abortionists protesting at his execution were joined in unholy alliance by left-wing opponents of the death penalty who urged the Governor of Florida, Jeb Bush, to 'stop the martyrdom of Paul Hill'. They plausibly argued that the judicial killing of Hill would actually encourage more murders, the precise opposite of the deterrent effect that the death penalty is supposed to have. Hill himself smiled all the way to the execution chamber, saying, 'I expect a great reward in heaven . . . I am looking forward to glory.'¹²⁸ And he suggested that others should take up his violent cause. Anticipating revenge attacks for the 'martyrdom' of Paul Hill, the police went on heightened alert as he was executed, and several individuals connected with the case received threatening letters accompanied by bullets.

This whole terrible business stems from a simple difference of perception. There are people who, because of their religious convictions, think abortion is murder and are prepared to kill in defence of embryos, which they choose to call 'babies'. On the other side are equally sincere supporters of abortion, who either have different religious convictions, or no religion, coupled with well-thought-out consequentialist morals. They too see themselves as idealists, providing a medical service for patients in need, who would otherwise go to dangerously incompetent back-street quacks. Both sides see the other side as murderers or advocates of murder. Both sides, by their own lights, are equally sincere.

A spokeswoman for another abortion clinic described Paul Hill as a dangerous psychopath. But people like him don't think of themselves as dangerous psychopaths; they think of themselves as good, moral people, guided by God. Indeed, I don't think Paul Hill was a psychopath. Just very religious. Dangerous, yes, but not a psychopath. Dangerously religious. By the lights of his religious faith, Hill was entirely right and moral to shoot Dr Britton. What

was wrong with Hill was his religious faith itself. Michael Bray, too, when I met him, didn't strike me as a psychopath. I actually quite liked him. I thought he was an honest and sincere man, quietly spoken and thoughtful, but his mind had unfortunately been captured by poisonous religious nonsense.

Strong opponents of abortion are almost all deeply religious. The sincere supporters of abortion, whether personally religious or not, are likely to follow a non-religious, consequentialist moral philosophy, perhaps invoking Jeremy Bentham's question, 'Can they *suffer*?' Paul Hill and Michael Bray saw no moral difference between killing an embryo and killing a doctor except that the embryo was, to them, a blamelessly innocent 'baby'. The consequentialist sees all the difference in the world. An early embryo has the sentience, as well as the semblance, of a tadpole. A doctor is a grown-up conscious being with hopes, loves, aspirations, fears, a massive store of humane knowledge, the capacity for deep emotion, very probably a devastated widow and orphaned children, perhaps elderly parents who dote on him.

Paul Hill caused real, deep, lasting suffering, to beings with nervous systems capable of suffering. His doctor victim did no such thing. Early embryos that have no nervous system most certainly do not suffer. And if late-aborted embryos with nervous systems suffer - though all suffering is deplorable - it is not because they are *human* that they suffer. There is no general reason to suppose that human embryos at any age suffer more than cow or sheep embryos at the same developmental stage. And there is every reason to suppose that all embryos, whether human or not, suffer far less than adult cows or sheep in a slaughterhouse, especially a ritual slaughterhouse where, for religious reasons, they must be fully conscious when their throats are ceremonially cut.

Suffering is hard to measure,¹²⁹ and the details might be disputed. But that doesn't affect my main point, which concerns the difference between secular consequentialist and religiously absolute moral philosophies.* One school of thought cares about whether embryos can suffer. The other cares about whether they are human. Religious moralists can be heard debating questions like, 'When does the developing embryo become a person - a human being?'

* This doesn't, of course, exhaust the possibilities. A substantial majority of American Christians do not take an absolutist attitude to abortion, and are pro-choice. See e.g. the Religious Coalition for Reproductive Choice, at www.rcrc.org/.

Secular moralists are more likely to ask, 'Never mind whether it is *human* (what does that even *mean* for a little cluster of cells?); at what age does any developing embryo, of any species, become capable of *suffering*!'"

THE GREAT BEETHOVEN FALLACY

The anti-abortionist's next move in the verbal chess game usually goes something like this. The point is not whether a human embryo can or cannot suffer at present. The point lies in its *potential*. Abortion has deprived it of the opportunity for a full human life in the future. This notion is epitomized by a rhetorical argument whose extreme stupidity is its only defence against a charge of serious dishonesty. I am speaking of the Great Beethoven Fallacy, which exists in several forms. Peter and Jean Medawar,* in *The Life Science*, attribute the following version to Norman St John Stevas (now Lord St John), a British Member of Parliament and prominent Roman Catholic layman. He, in turn, got it from Maurice Baring (1874-1945), a noted Roman Catholic convert and close associate of those Catholic stalwarts G. K. Chesterton and Hilaire Belloc. He cast it in the form of a hypothetical dialogue between two doctors.

'About the terminating of pregnancy, I want your opinion. The father was syphilitic, the mother tuberculous. Of the four children born, the first was blind, the second died, the third was deaf and dumb, the fourth was also tuberculous. What would you have done?'

'I would have terminated the pregnancy.'

'Then you would have murdered Beethoven.'

The Internet is riddled with so-called pro-life web sites that repeat this ridiculous story, and incidentally change factual premises with wanton abandon. Here's another version. 'If you knew a woman who was pregnant, who had 8 kids already, three of whom were deaf, two who were blind, one mentally retarded (all

* Sir Peter Medawar won the Nobel Prize for Physiology **and** Medicine, 1960.

because she had syphilis), would you recommend that she have an abortion? Then you would have killed Beethoven.¹³⁰ This rendering of the legend demotes the great composer from fifth to ninth in the birth order, raises the number born deaf to three and the number born blind to two, and gives syphilis to the mother instead of the father. Most of the forty-three websites I found when searching for versions of the story attribute it not to Maurice Baring but to a certain Professor L. R. Agnew at UCLA Medical School, who is said to have put the dilemma to his students and to have told them, 'Congratulations, you have just murdered Beethoven.' We might charitably give L. R. Agnew the benefit of doubting his existence - it is amazing how these urban legends sprout. I cannot discover whether it was Baring who originated the legend, or whether it was invented earlier.

For invented it certainly was. It is completely false. The truth is that Ludwig van Beethoven was neither the ninth child nor the fifth child of his parents. He was the eldest - strictly the number two, but his elder sibling died in infancy, as was common in those days, and was not, so far as is known, blind or deaf or dumb or mentally retarded. There is no evidence that either of his parents had syphilis, although it is true that his mother eventually died of tuberculosis. There was a lot of it about at the time.

This is, in fact, a fully fledged urban legend, a fabrication, deliberately disseminated by people with a vested interest in spreading it. But the fact that it is a lie is, in any case, completely beside the point. Even if it were not a lie, the argument derived from it is a very bad argument indeed. Peter and Jean Medawar had no need to doubt the truth of the story in order to point out the fallacy of the argument: 'The reasoning behind this odious little argument is breathtakingly fallacious, for unless it is being suggested that there is some causal connection between having a tubercular mother and a syphilitic father and giving birth to a musical genius the world is no more likely to be deprived of a Beethoven by abortion than by chaste abstinence from intercourse.'¹³¹ The Medawars' laconically scornful dismissal is unanswerable (to borrow the plot of one of Roald Dahl's dark short stories, an equally fortuitous decision *not* to have an abortion in 1888 gave us Adolf Hitler). But you do need a modicum of intelligence - or perhaps freedom from a certain kind

of religious upbringing - to get the point. Of the forty-three 'pro-life' websites quoting a version of the Beethoven legend which my Google search turned up on the day of writing, not a single one spotted the illogic in the argument. Every one of them (they were all religious sites, by the way) fell for the fallacy, hook, line and sinker. One of them even acknowledged Medawar (spelled Medawar) as the source. So eager were these people to believe a fallacy congenial to their faith, they didn't even notice that the Medawars had quoted the argument solely in order to blow it out of the water.

As the Medawars were entirely right to point out, the logical conclusion to the 'human potential' argument is that we potentially deprive a human soul of the gift of existence every time we fail to seize any opportunity for sexual intercourse. Every refusal of any offer of copulation by a fertile individual is, by this dopey 'pro-life' logic, tantamount to the murder of a potential child! Even resisting rape could be represented as murdering a potential baby (and, by the way, there are plenty of 'pro-life' campaigners who would deny abortion even to women who have been brutally raped). The Beethoven argument is, we can clearly see, very bad logic indeed. Its surreal idiocy is best summed up in that splendid song 'Every sperm is sacred' sung by Michael Palin, with a chorus of hundreds of children, in the Monty Python film *The Meaning of Life* (if you haven't seen it, please do). The Great Beethoven Fallacy is a typical example of the kind of logical mess we get into when our minds are befuddled by religiously inspired absolutism.

Notice now that 'pro-life' doesn't exactly mean *pro-life* at all. It means *pro-human-lite*. The granting of uniquely special rights to cells of the species *Homo sapiens* is hard to reconcile with the fact of evolution. Admittedly, this will not worry those many anti-abortionists who don't understand that evolution *is* a fact! But let me briefly spell out the argument for the benefit of anti-abortion activists who may be less ignorant of science.

The evolutionary point is very simple. The *humanness* of an embryo's cells cannot confer upon it any absolutely discontinuous moral status. It cannot, because of our evolutionary continuity with chimpanzees and, more distantly, with every species on the planet. To see this, imagine that an intermediate species, say

Australopithecus afarensis, had chanced to survive and was discovered in a remote part of Africa. Would these creatures 'count as human' or not? To a consequentialist like me, the question doesn't deserve an answer, for nothing turns on it. It is enough that we would be fascinated and honoured to meet a new 'Lucy'. The absolutist, on the other hand, must answer the question, in order to apply the moral principle of granting humans unique and special status *because they are human*. If it came to the crunch, they would presumably need to set up courts, like those of apartheid South Africa, to decide whether a particular individual should 'pass for human'.

Even if a clear answer might be attempted for *Australopithecus*, the gradual continuity that is an inescapable feature of biological evolution tells us that there must be *some* intermediate who would lie sufficiently close to the 'borderline' to blur the moral principle and destroy its absoluteness. A better way to say this is that there are no natural borderlines in evolution. The illusion of a borderline is created by the fact that the evolutionary intermediates happen to be extinct. Of course, it could be argued that humans are more capable of, for example, suffering than other species. This could well be true, and we might legitimately give humans special status by virtue of it. But evolutionary continuity shows that there is no *absolute* distinction. Absolutist moral discrimination is devastatingly undermined by the fact of evolution. An uneasy awareness of this fact might, indeed, underlie one of the main motives creationists have for opposing evolution: they fear what they believe to be its moral consequences. They are wrong to do so but, in any case, it is surely very odd to think that a truth about the real world can be reversed by considerations of what would be morally desirable.

HOW 'MODERATION' IN FAITH FOSTERS FANATICISM

In illustration of the dark side of absolutism, I mentioned the Christians in America who blow up abortion clinics, and the

Taliban of Afghanistan, whose list of cruelties, especially to women, I find too painful to recount. I could have expanded upon Iran under the ayatollahs, or Saudi Arabia under the Saud princes, where women cannot drive, and are in trouble if they even leave their homes without a male relative (who may, as a generous concession, be a small male child). See Jan Goodwin's *Price of Honour* for a devastating expose of the treatment of women in Saudi Arabia and other present-day theocracies. Johann Hari, one of the (London) *Independent's* liveliest columnists, wrote an article whose title speaks for itself: 'The best way to undermine the jihadists is to trigger a rebellion of Muslim women.'¹³²

Or, switching to Christianity, I could have cited those American 'rapture' Christians whose powerful influence on American Middle Eastern policy is governed by their biblical belief that Israel has a God-given right to all the lands of Palestine.¹³³ Some rapture Christians go further and actually yearn for nuclear war because they interpret it as the 'Armageddon' which, according to their bizarre but disturbingly popular interpretation of the book of Revelation, will hasten the Second Coming. I cannot improve on Sam Harris's chilling comment, in his *Letter to a Christian Nation*:

It is, therefore, not an exaggeration to say that if the city of New York were suddenly replaced by a ball of fire, some significant percentage of the American population would see a silver-lining in the subsequent mushroom cloud, as it would suggest to them that the best thing that is ever going to happen was about to happen: the return of Christ. It should be blindingly obvious that beliefs of this sort will do little to help us create a durable future for ourselves - socially, economically, environmentally, or geopolitically. Imagine the consequences if any significant component of the U.S. government actually believed that the world was about to end and that its ending would be *glorious*. The fact that nearly half of the American population apparently believes this, purely on the basis of religious dogma, should be considered a moral and intellectual emergency.

There are, then, people whose religious faith takes them right outside the enlightened consensus of my 'moral *Zeitgeist*'. They represent what I have called the dark side of religious absolutism, and they are often called extremists. But my point in this section is that even mild and moderate religion helps to provide the climate of faith in which extremism naturally flourishes.

In July 2005, London was the victim of a concerted suicide bomb attack: three bombs in the subway and one in a bus. Not as bad as the 2001 attack on the World Trade Center, and certainly not as unexpected (indeed, London had been braced for just such an event ever since Blair volunteered us as unwilling side-kicks in Bush's invasion of Iraq), nevertheless the London explosions horrified Britain. The newspapers were filled with agonized appraisals of what drove four young men to blow themselves up and take a lot of innocent people with them. The murderers were British citizens, cricket-loving, well-mannered, just the sort of young men whose company one might have enjoyed.

Why did these cricket-loving young men do it? Unlike their Palestinian counterparts, or their kamikaze counterparts in Japan, or their Tamil Tiger counterparts in Sri Lanka, these human bombs had no expectation that their bereaved families would be lionized, looked after or supported on martyrs' pensions. On the contrary, their relatives in some cases had to go into hiding. One of the men wantonly widowed his pregnant wife and orphaned his toddler. The action of these four young men has been nothing short of a disaster not just for themselves and their victims, but for their families and for the whole Muslim community in Britain, which now faces a backlash. Only religious faith is a strong enough force to motivate such utter madness in otherwise sane and decent people. Once again, Sam Harris put the point with percipient bluntness, taking the example of the Al-Qaida leader Osama bin Laden (who had nothing to do with the London bombings, by the way). Why would anyone want to destroy the World Trade Center and everybody in it? To call bin Laden 'evil' is to evade our responsibility to give a proper answer to such an important question.

The answer to this question is obvious - if only because it has been patiently articulated ad nauseam by bin Laden

himself. The answer is that men like bin Laden *actually* believe what they say they believe. They believe in the literal truth of the Koran. Why did nineteen well-educated middle-class men trade their lives in this world for the privilege of killing thousands of our neighbors? Because they believed that they would go straight to paradise for doing so. It is rare to find the behavior of humans so fully and satisfactorily explained. Why have we been so reluctant to accept this explanation?¹³⁴

The respected journalist Muriel Gray, writing in the (Glasgow) *Herald* on 24 July 2005, made a similar point, in this case with reference to the London bombings.

Everyone is being blamed, from the obvious villainous duo of George W Bush and Tony Blair, to the inaction of Muslim 'communities'. But it has never been clearer that there is only one place to lay the blame and it has ever been thus. The cause of all this misery, mayhem, violence, terror and ignorance is of course religion itself, and if it seems ludicrous to have to state such an obvious reality, the fact is that the government and the media are doing a pretty good job of pretending that it isn't so.

Our Western politicians avoid mentioning the R word (religion), and instead characterize their battle as a war against 'terror', as though terror were a kind of spirit or force, with a will and a mind of its own. Or they characterize terrorists as motivated by pure 'evil'. But they are not motivated by evil. However misguided we may think them, they are motivated, like the Christian murderers of abortion doctors, by what they perceive to be righteousness, faithfully pursuing what their religion tells them. They are not psychotic; they are religious idealists who, by their own lights, are rational. They perceive their acts to be good, not because of some warped personal idiosyncrasy, and not because they have been possessed by Satan, but because they have been brought up, from the cradle, to have total and unquestioning *faith*. Sam Harris quotes a failed Palestinian suicide bomber who said that what drove him to kill

Israelis was 'the love of martyrdom ... I didn't want revenge for anything. I just wanted to be a martyr.' On 19 November 2001 *The New Yorker* carried an interview by Nasra Hassan of another failed suicide bomber, a polite young Palestinian aged twenty-seven known as 'S'. It is so poetically eloquent of the lure of paradise, as preached by moderate religious leaders and teachers, that I think it is worth giving at some length:

'What is the attraction of martyrdom?' I asked.

'The power of the spirit pulls us upward, while the power of material things pulls us downward,' he said. 'Someone bent on martyrdom becomes immune to the material pull. Our planner asked, "What if the operation fails?" We told him, "In any case, we get to meet the Prophet and his companions, inshallah."

'We were floating, swimming, in the feeling that we were about to enter eternity. We had no doubts. We made an oath on the Koran, in the presence of Allah - a pledge not to waver. This jihad pledge is called *bayt al-ridwan*, after the garden in Paradise that is reserved for the prophets and the martyrs. I know that there are other ways to do jihad. But this one is sweet - the sweetest. All martyrdom operations, if done for Allah's sake, hurt less than a gnat's bite!'

S showed me a video that documented the final planning for the operation. In the grainy footage, I saw him and two other young men engaging in a ritualistic dialogue of questions and answers about the glory of martyrdom . . .

The young men and the planner then knelt and placed their right hands on the Koran. The planner said: 'Are you ready? Tomorrow, you will be in Paradise.'¹³⁵

If I had been 'S', I'd have been tempted to say to the planner, 'Well, in that case, why don't you put *your* neck where your mouth is? Why don't *you* do the suicide mission and take the fast track to Paradise?' But what is so hard for us to understand is that - to repeat the point because it is so important - *these people actually*

believe what they say they believe. The take-home message is that we should blame religion itself, not religious *extremism* - as though that were some kind of terrible perversion of real, decent religion. Voltaire got it right long ago: 'Those who can make you believe absurdities can make you commit atrocities.' So did Bertrand Russell: 'Many people would sooner die than think. In fact they do.'

As long as we accept the principle that religious faith must be respected simply because it is religious faith, it is hard to withhold respect from the faith of Osama bin Laden and the suicide bombers. The alternative, one so transparent that it should need no urging, is to abandon the principle of automatic respect for religious faith. This is one reason why I do everything in my power to warn people against faith itself, not just against so-called 'extremist' faith. The teachings of 'moderate' religion, though not extremist in themselves, are an open invitation to extremism.

It might be said that there is nothing special about religious faith here. Patriotic love of country or ethnic group can also make the world safe for its own version of extremism, can't it? Yes it can, as with the kamikazes in Japan and the Tamil Tigers in Sri Lanka. But religious faith is an especially potent silencer of rational calculation, which usually seems to trump all others. This is mostly, I suspect, because of the easy and beguiling promise that death is not the end, and that a martyr's heaven is especially glorious. But it is also partly because it discourages questioning, by its very nature.

Christianity, just as much as Islam, teaches children that unquestioned faith is a virtue. You don't have to make the case for what you believe. If somebody announces that it is part of his *faith*, the rest of society, whether of the same faith, or another, or of none, is obliged, by ingrained custom, to 'respect' it without question; respect it until the day it manifests itself in a horrible massacre like the destruction of the World Trade Center, or the London or Madrid bombings. Then there is a great chorus of disownings, as clerics and 'community leaders' (who elected *them*, by the way?) line up to explain that this extremism is a perversion of the 'true' faith. But how can there be a perversion of faith, if faith, lacking objective justification, doesn't have any demonstrable standard to pervert?

Ten years ago, Ibn Warraq, in his excellent book *Why I Am Not a Muslim*, made a similar point from the standpoint of a deeply knowledgeable scholar of Islam. Indeed, a good alternative title for Warraq's book might have been *The Myth of Moderate Islam*, which is the actual title of a more recent article in the (London) *Spectator* (30 July 2005) by another scholar, Patrick Sookhdeo, director of the Institute for the Study of Islam and Christianity. 'By far the majority of Muslims today live their lives without recourse to violence, for the Koran is like a pick-and-mix selection. If you want peace, you can find peaceable verses. If you want war, you can find bellicose verses.'

Sookhdeo goes on to explain how Islamic scholars, in order to cope with the many contradictions that they found in the Qur'an, developed the principle of abrogation, whereby later texts trump earlier ones. Unfortunately, the peaceable passages in the Qur'an are mostly early, dating from Muhammad's time in Mecca. The more belligerent verses tend to date from later, after his flight to Medina. The result is that

the mantra 'Islam is peace' is almost 1,400 years out of date. It was only for about 13 years that Islam was peace and nothing but peace . . . For today's radical Muslims - just as for the mediaeval jurists who developed classical Islam - it would be truer to say 'Islam is war'. One of the most radical Islamic groups in Britain, al-Ghurabaa, stated in the wake of the two London bombings, 'Any Muslim that denies that terror is a part of Islam is kafir.' A kafir is an unbeliever (i.e. a non-Muslim), a term of gross insult. . .

Could it be that the young men who committed suicide were neither on the fringes of Muslim society in Britain, nor following an eccentric and extremist interpretation of their faith, but rather that they came from the very core of the Muslim community and were motivated by a mainstream interpretation of Islam?

More generally (and this applies to Christianity no less than to Islam), what is really pernicious is the practice of teaching children

that faith itself is a virtue. Faith is an evil precisely because it requires no justification and brooks no argument. Teaching children that unquestioned faith is a virtue primes them - given certain other ingredients that are not hard to come by - to grow up into potentially lethal weapons for future jihads or crusades. Immunized against fear by the promise of a martyr's paradise, the authentic faith-head deserves a high place in the history of armaments, alongside the longbow, the warhorse, the tank and the cluster bomb. If children were taught to question and think through their beliefs, instead of being taught the superior virtue of faith without question, it is a good bet that there would be no suicide bombers. Suicide bombers do what they do because they really believe what they were taught in their religious schools: that duty to God exceeds all other priorities, and that martyrdom in his service will be rewarded in the gardens of Paradise. And they were taught *that* lesson not necessarily by extremist fanatics but by decent, gentle, mainstream religious instructors, who lined them up in their madrasas, sitting in rows, rhythmically nodding their innocent little heads up and down while they learned every word of the holy book like demented parrots. Faith can be very very dangerous, and deliberately to implant it into the vulnerable mind of an innocent child is a grievous wrong. It is to childhood itself, and the violation of childhood by religion, that we turn in the next chapter.

CHAPTER 9

Childhood, abuse
and the escape from
religion

*There is in every village a torch - the teacher:
and an extinguisher - the clergyman.*

VICTOR HUGO

I begin with an anecdote of nineteenth-century Italy. I am not implying that anything like this awful story could happen today. But the attitudes of mind that it betrays are lamentably current, even though the practical details are not. This nineteenth-century human tragedy sheds a pitiless light on present-day religious attitudes to children.

In 1858 Edgardo Mortara, a six-year-old child of Jewish parents living in Bologna, was legally seized by the papal police acting under orders from the Inquisition. Edgardo was forcibly dragged away from his weeping mother and distraught father to the Catechumens (house for the conversion of Jews and Muslims) in Rome, and thereafter brought up as a Roman Catholic. Aside from occasional brief visits under close priestly supervision, his parents never saw him again. The story is told by David I. Kertzer in his remarkable book, *The Kidnapping of Edgardo Mortara*.

Edgardo's story was by no means unusual in Italy at the time, and the reason for these priestly abductions was always the same. In every case, the child had been secretly baptized at some earlier date, usually by a Catholic nursemaid, and the Inquisition later came to hear of the baptism. It was a central part of the Roman Catholic belief-system that, once a child had been baptized, however informally and clandestinely, that child was irrevocably transformed into a Christian. In their mental world, to allow a 'Christian child' to stay with his Jewish parents was not an option, and they maintained this bizarre and cruel stance steadfastly, and with the utmost sincerity, in the face of worldwide outrage. That widespread outrage, by the way, was dismissed by the Catholic newspaper *Civiltà Cattolica* as due to the international power of rich Jews - sounds familiar, doesn't it?

Apart from the publicity it aroused, Edgardo Mortara's history was entirely typical of many others. He had once been looked after by Anna Morisi, an illiterate Catholic girl who was then fourteen. He fell ill and she panicked lest he might die. Brought up in a stupor of belief that a child who died unbaptized would suffer forever in hell, she asked advice from a Catholic neighbour who told her how to do a baptism. She went back into the house, threw some water from a bucket on little Edgardo's head and said, 'I baptize you in the name of the Father and of the Son and of the Holy Ghost.' And

that was it. From that moment on, Edgardo was legally a Christian. When the priests of the Inquisition learned of the incident years later, they acted promptly and decisively, giving no thought to the sorrowful consequences of their action.

Amazingly for a rite that could have such monumental significance for a whole extended family, the Catholic Church allowed (and still allows) anybody to baptize anybody else. The baptizer doesn't have to be a priest. Neither the child, nor the parents, nor anybody else has to consent to the baptism. Nothing need be signed. Nothing need be officially witnessed. All that is necessary is a splash of water, a few words, a helpless child, and a superstitious and catechistically brainwashed babysitter. Actually, only the last of these is needed because, assuming the child is too young to be a witness, who is even to know? An American colleague who was brought up Catholic writes to me as follows: 'We used to baptize our dolls. I don't remember any of us baptizing our little Protestant friends but no doubt that has happened and happens today. We made little Catholics of our dolls, taking them to church, giving them Holy Communion etc. We were brainwashed to be good Catholic mothers early on.'

If nineteenth-century girls were anything like my modern correspondent, it is surprising that cases like Edgardo Mortara's were not more common than they were. As it was, such stories were distressingly frequent in nineteenth-century Italy, which leaves one asking the obvious question. Why did the Jews of the Papal States employ Catholic servants at all, given the appalling risk that could flow from doing so? Why didn't they take good care to engage Jewish servants? The answer, yet again, has nothing to do with sense and everything to do with religion. The Jews needed servants whose religion didn't forbid them to work on the sabbath. A Jewish maid could indeed be relied upon not to baptize your child into a spiritual orphanage. But she couldn't light the fire or clean the house on a Saturday. This was why, of the Bolognese Jewish families at the time who could afford servants, most hired Catholics.

In this book, I have deliberately refrained from detailing the horrors of the Crusades, the *conquistadores* or the Spanish Inquisition. Cruel and evil people can be found in every century and of every persuasion. But this story of the Italian Inquisition and its

attitude to children is particularly revealing of the religious mind, and the evils that arise specifically *because* it is religious. First is the remarkable perception by the religious mind that a sprinkle of water and a brief verbal incantation can totally change a child's life, taking precedence over parental consent, the child's own consent, the child's own happiness and psychological well-being . . . over everything that ordinary common sense and human feeling would see as important. Cardinal Antonelli spelled it out at the time in a letter to Lionel Rothschild, Britain's first Jewish Member of Parliament, who had written to protest about Edgardo's abduction. The cardinal replied that he was powerless to intervene, and added, 'Here it may be opportune to observe that, if the voice of nature is powerful, even more powerful are the sacred duties of religion.' Yes, well, that just about says it all, doesn't it?

Second is the extraordinary fact that the priests, cardinals and Pope seem genuinely not to have understood what a terrible thing they were doing to poor Edgardo Mortara. It passes all sensible understanding, but they sincerely believed they were doing him a good turn by taking him away from his parents and giving him a Christian upbringing. They felt a duty of *protection!* A Catholic newspaper in the United States defended the Pope's stance on the Mortara case, arguing that it was unthinkable that a Christian government 'could leave a Christian child to be brought up by a Jew' and invoking the principle of religious liberty, 'the liberty of a child to be a Christian and not forced compulsorily to be a Jew . . . The Holy Father's protection of the child, in the face of all the ferocious fanaticism of infidelity and bigotry, is the grandest moral spectacle which the world has seen for ages.' Has there ever been a more flagrant misdirection of words like 'forced', 'compulsorily', 'ferocious', 'fanaticism' and 'bigotry'? Yet all the indications are that Catholic apologists, from the Pope down, sincerely believed that what they were doing was right: absolutely right morally, and right for the welfare of the child. Such is the power of (mainstream, 'moderate') religion to warp judgement and pervert ordinary human decency. The newspaper *Il Cattolico* was frankly bewildered at the widespread failure to see what a magnanimous favour the Church had done Edgardo Mortara when it rescued him from his Jewish family:

Whoever among us gives a little serious thought to the matter, compares the condition of a Jew - without a true Church, without a King, and without a country, dispersed and always a foreigner wherever he lives on the face of the earth, and moreover, infamous for the ugly stain with which the killers of Christ are marked . . . will immediately understand how great is this temporal advantage that the Pope is obtaining for the Mortara boy.

Third is the presumptuousness whereby religious people *know*, without evidence, that the faith of their birth is the one true faith, all others being aberrations or downright false. The above quotations give vivid examples of this attitude on the Christian side. It would be grossly unjust to equate the two sides in this case, but this is as good a place as any to note that the Mortaras could at a stroke have had Edgardo back, if only they had accepted the priests' entreaties and agreed to be baptized themselves. Edgardo had been stolen in the first place because of a splash of water and a dozen meaningless words. Such is the fatuousness of the religiously indoctrinated mind, another pair of splashes is all it would have taken to reverse the process. To some of us, the parents' refusal indicates wanton stubbornness. To others, their principled stand elevates them into the long list of martyrs for all religions down the ages.

'Be of good comfort Master Ridley and play the man: we shall this day by God's grace light such a candle in England, as I trust shall never be put out.' No doubt there are causes for which to die is noble. But how could the martyrs Ridley, Latimer and Cranmer let themselves be burned rather than forsake their Protestant Little-endianism in favour of Catholic Big-endianism - does it really matter all that much from which end you open a boiled egg? Such is the stubborn - or admirable, if that is your view - conviction of the religious mind, that the Mortaras could not bring themselves to seize the opportunity offered by the meaningless rite of baptism. Couldn't they cross their fingers, or whisper 'not' under their breath while being baptized? No, they couldn't, because they had been brought up in a (moderate) religion, and therefore took the whole ridiculous charade seriously. As for me, I think only of poor little

Edgardo - unwittingly born into a world dominated by the religious mind, hapless in the crossfire, all but orphaned in an act of well-meaning but, to a young child, shattering cruelty.

Fourth, to pursue the same theme, is the assumption that a six-year-old child can properly be said to have a religion at all, whether it is Jewish or Christian or anything else. To put it another way, the idea that baptizing an unknowing, uncomprehending child can change him from one religion to another at a stroke seems absurd - but it is surely not more absurd than labelling a tiny child as belonging to any particular religion in the first place. What mattered to Edgardo was not 'his' religion (he was too young to possess thought-out religious opinions) but the love and care of his parents and family, and he was deprived of those by celibate priests whose grotesque cruelty was mitigated only by their crass insensitivity to normal human feelings - an insensitivity that comes all too easily to a mind hijacked by religious faith.

Even without physical abduction, isn't it always a form of child abuse to label children as possessors of beliefs that they are too young to have thought about? Yet the practice persists to this day, almost entirely unquestioned. To question it is my main purpose in this chapter.

PHYSICAL AND MENTAL ABUSE

Priestly abuse of children is nowadays taken to mean sexual abuse, and I feel obliged, at the outset, to get the whole matter of sexual abuse into proportion and out of the way. Others have noted that we live in a time of hysteria about pedophilia, a mob psychology that calls to mind the Salem witch-hunts of 1692. In July 2000 the *News of the World*, widely acclaimed in the face of stiff competition as Britain's most disgusting newspaper, organized a 'name and shame' campaign, barely stopping short of inciting vigilantes to take direct violent action against pedophiles. The house of a hospital pediatrician was attacked by zealots unacquainted with the difference between a pediatrician and a pedophile.¹³⁶ The mob hysteria over pedophiles has reached epidemic proportions and

driven parents to panic. Today's Just Williams, today's Huck Finns, today's Swallows and Amazons are deprived of the freedom to roam that was one of the delights of childhood in earlier times (when the actual, as opposed to perceived, risk of molestation was probably no less).

In fairness to the *News of the World*, at the time of its campaign passions had been aroused by a truly horrifying murder, sexually motivated, of an eight-year-old girl kidnapped in Sussex. Nevertheless, it is clearly unjust to visit upon all pedophiles a vengeance appropriate to the tiny minority who are also murderers. All three of the boarding schools I attended employed teachers whose affection for small boys overstepped the bounds of propriety. That was indeed reprehensible. Nevertheless if, fifty years on, they had been hounded by vigilantes or lawyers as no better than child murderers, I should have felt obliged to come to their defence, even as the victim of one of them (an embarrassing but otherwise harmless experience).

The Roman Catholic Church has borne a heavy share of such retrospective opprobrium. For all sorts of reasons I dislike the Roman Catholic Church. But I dislike unfairness even more, and I can't help wondering whether this one institution has been unfairly demonized over the issue, especially in Ireland and America. I suppose some additional public resentment flows from the hypocrisy of priests whose professional life is largely devoted to arousing guilt about 'sin'. Then there is the abuse of trust by a figure in authority, whom the child has been trained from the cradle to revere. Such additional resentments should make us all the more careful not to rush to judgement. We should be aware of the remarkable power of the mind to concoct false memories, especially when abetted by unscrupulous therapists and mercenary lawyers. The psychologist Elizabeth Loftus has shown great courage, in the face of spiteful vested interests, in demonstrating how easy it is for people to concoct memories that are entirely false but which seem, to the victim, every bit as real as true memories.¹³⁷ This is so counter-intuitive that juries are easily swayed by sincere but false testimony from witnesses.

In the particular case of Ireland, even without the sexual abuse, the brutality of the Christian Brothers,¹³⁸ responsible for the

education of a significant proportion of the male population of the country, is legendary. And the same could be said of the often sadistically cruel nuns who ran many of Ireland's girls' schools. The infamous Magdalene Asylums, subject of Peter Mullan's film *The Magdalene Sisters*, continued in existence until as late as 1996. Forty years on, it is harder to get redress for floggings than for sexual fondlings, and there is no shortage of lawyers actively soliciting custom from victims who might not otherwise have raked over the distant past. There's gold in them thar long-gone fumbles in the vestry - some of them, indeed, so long gone that the alleged offender is likely to be dead and unable to present his side of the story. The Catholic Church worldwide has paid out more than a billion dollars in compensation.¹³⁹ You might almost sympathize with them, until you remember where their money came from in the first place.

Once, in the question time after a lecture in Dublin, I was asked what I thought about the widely publicized cases of sexual abuse by Catholic priests in Ireland. I replied that, horrible as sexual abuse no doubt was, the damage was arguably less than the long-term psychological damage inflicted by bringing the child up Catholic in the first place. It was an off-the-cuff remark made in the heat of the moment, and I was surprised that it earned a round of enthusiastic applause from that Irish audience (composed, admittedly, of Dublin intellectuals and presumably not representative of the country at large). But I was reminded of the incident later when I received a letter from an American woman in her forties who had been brought up Roman Catholic. At the age of seven, she told me, two unpleasant things had happened to her. She was sexually abused by her parish priest in his car. And, around the same time, a little schoolfriend of hers, who had tragically died, went to hell because she was a Protestant. Or so my correspondent had been led to believe by the then official doctrine of her parents' church. Her view as a mature adult was that, of these two examples of Roman Catholic child abuse, the one physical and the other mental, the second was by far the worst. She wrote:

Being fondled by the priest simply left the impression (from the mind of a 7 year old) as 'y^{uc}ky' while the

memory of my friend going to hell was one of cold, immeasurable fear. I never lost sleep because of the priest - but I spent many a night being terrified that the people I loved would go to Hell. It gave me nightmares.

Admittedly, the sexual fondling she suffered in the priest's car was relatively mild compared with, say, the pain and disgust of a sodomized altar boy. And nowadays the Catholic Church is said not to make so much of hell as it once did. But the example shows that it is at least possible for psychological abuse of children to out-class physical. It is said that Alfred Hitchcock, the great cinematic specialist in the art of frightening people, was once driving through Switzerland when he suddenly pointed out of the car window and said, 'That is the most frightening sight I have ever seen.' It was a priest in conversation with a little boy, his hand on the boy's shoulder. Hitchcock leaned out of the car window and shouted, 'Run, little boy! Run for your life!'

'Sticks and stones may break my bones, but words can never hurt me.' The adage is true as long as you don't really *believe* the words. But if your whole upbringing, and everything you have ever been told by parents, teachers and priests, has led you to believe, *really believe*, utterly and completely, that sinners burn in hell (or some other obnoxious article of doctrine such as that a woman is the property of her husband), it is entirely plausible that words could have a more long-lasting and damaging effect than deeds. I am persuaded that the phrase 'child abuse' is no exaggeration when used to describe what teachers and priests are doing to children whom they encourage to believe in something like the punishment of unshriven mortal sins in an eternal hell.

In the television documentary *Root of All Evil?* to which I have already referred, I interviewed a number of religious leaders and was criticized for picking on American extremists rather than respectable mainstreamers like archbishops.* It sounds like a fair criticism - except that, in early 21st-century America, what *seems*

* The Archbishop of Canterbury, the Cardinal Archbishop of Westminster and the Chief Rabbi of Britain were all invited to be interviewed by me. All declined, doubtless for good reasons. The Bishop of Oxford agreed, and he was as delightful, and as far from being extremist, as they surely would have been.

extreme to the outside world is actually mainstream. One of my interviewees who most appalled the British television audience, for example, was Pastor Ted Haggard of Colorado Springs. But, far from being extreme in Bush's America, 'Pastor Ted' is president of the thirty-million-strong National Association of Evangelicals, and he claims to be favoured with a telephone consultation with President Bush every Monday. If I had wanted to interview real extremists by modern American standards, I'd have gone for 'Reconstructionists' whose 'Dominion Theology' openly advocates a Christian theocracy in America. As a concerned American colleague writes to me:

Europeans need to know there is a traveling theo-freak show which actually advocates reinstatement of Old Testament law - killing of homosexuals etc. - and the right to hold office, or even to vote, for Christians only. Middle class crowds cheer to this rhetoric. If secularists are not vigilant, Dominionists and Reconstructionists will soon be mainstream in a true American theocracy. *

Another of my television interviewees was Pastor Keenan Roberts, from the same state of Colorado as Pastor Ted. Pastor Roberts's particular brand of nuttiness takes the form of what he calls Hell Houses. A Hell House is a place where children are brought, by their parents or their Christian schools, to be scared witless over what might happen to them after they die. Actors play out fearsome tableaux of particular 'sins' like abortion and homosexuality, with a scarlet-clad devil in gloating attendance. These are a prelude to the *piece de resistance*, Hell Itself, complete

* The following seems to be real, although I at first suspected a satirical hoax by *The Onion*: www.talk2action.org/story/2006/5/29/195855/959. It is a computer game called *Left Behind: Eternal Forces*. P. Z. Myers sums it up on his excellent Pharyngula website. 'Imagine: you are a foot soldier in a paramilitary group whose purpose is to remake America as a Christian theocracy and establish its worldly vision of the dominion of Christ over all aspects of life . . . You are on a mission - both a religious mission and a military mission - to convert or kill Catholics, Jews, Muslims, Buddhists, gays, and anyone who advocates the separation of church and state . . .' See http://scienceblogs.com/pharyngula/2006/05/gta_meet_lbef.php; for a review, see <http://select.nytimes.com/gst/abstract.html?res=F1071FFD3C550C718CDDAA0894DE404482>.

with realistic sulphurous smell of burning brimstone and the agonized screams of the forever damned.

After watching a rehearsal, in which the devil was suitably diabolical in the hammed-up style of a villain of Victorian melodrama, I interviewed Pastor Roberts in the presence of his cast. He told me that the optimum age for a child to visit a Hell House is twelve. This shocked me somewhat, and I asked him whether it would worry him if a twelve-year-old child had nightmares after one of his performances. He replied, presumably honestly:

I would rather for them to understand that Hell is a place that they absolutely do not want to go. I would rather reach them with that message at twelve than to not reach them with that message and have them live a life of sin and to never find the Lord Jesus Christ. And if they end up having nightmares, as a result of experiencing this, I think there's a higher good that would ultimately be achieved and accomplished in their life than simply having nightmares.

I suppose that, if you really and truly believed what Pastor Roberts says he believes, you would feel it right to intimidate children too.

We cannot write off Pastor Roberts as an extremist wingnut. Like Ted Haggard, he is mainstream in today's America. I'd be surprised if even they would buy into the belief of some of their co-religionists that you can hear the screams of the damned if you listen in on volcanoes,¹⁴⁰ and that the giant tube worms found in hot deep-ocean vents are fulfilments of Mark 9: 43-4: 'And if thy hand offend thee, cut it off: it is better for thee to enter into life maimed, than having two hands to go into hell, into the fire that never shall be quenched: where their worm dieth not, and the fire is not quenched.' Whatever they believe hell is actually like, all these hell-fire enthusiasts seem to share the gloating *Schadenfreude* and complacency of those who know they are among the saved, well conveyed by that foremost among theologians, St Thomas Aquinas, in *Summa Theologica*: 'That the saints may enjoy their beatitude and the grace of God more abundantly they are permitted

to see the punishment of the damned in hell.' Nice man.*

The fear of hell-fire can be very real, even among otherwise rational people. After my television documentary on religion, among the many letters I received was this, from an obviously bright and honest woman:

I went to a Catholic school from the age of five, and was indoctrinated by nuns who wielded straps, sticks and canes. During my teens I read Darwin, and what he said about evolution made such a lot of sense to the logical part of my mind. However, I've gone through life suffering much conflict and a deep down fear of hell fire which gets triggered quite frequently. I've had some psychotherapy which has enabled me to work through some of my earlier problems but can't seem to overcome this deep fear.

So, the reason I'm writing to you is would you send me please the name and address of the therapist you interviewed on this week's programme who deals with this particular fear.

I was moved by her letter, and (suppressing a momentary and ignoble regret that there is no hell for those nuns to go to) replied that she should trust in her reason as a great gift which she - unlike less fortunate people - obviously possessed. I suggested that the extreme horribleness of hell, as portrayed by priests and nuns, is inflated to compensate for its implausibility. If hell were plausible, it would only have to be moderately unpleasant in order to deter. Given that it is so unlikely to be true, it has to be advertised as very very scary indeed, to balance its implausibility and retain some deterrence value. I also put her in touch with the therapist she mentioned, Jill Mytton, a delightful and deeply sincere woman whom I had interviewed on camera. Jill had herself been raised in a more than usually odious sect called the Exclusive Brethren: so unpleasant that there is even a website, www.peebs.net, entirely devoted to caring for those who have escaped from it.

Jill Mytton herself had been brought up to be terrified of hell, had escaped from Christianity as an adult, and now counsels and

* Compare Ann Coulter's charming Christian charity: 'I defy any of my co-religionists to tell me they do not laugh at the idea of Dawkins burning in hell' (Coulter 2006: 268).

helps others similarly traumatized in childhood: 'If I think back to my childhood, it's one dominated by fear. And it was the fear of disapproval while in the present, but also of eternal damnation. And for a child, images of hell-fire and gnashing of teeth are actually very real. They are not metaphorical at all.' I then asked her to spell out what she had actually been told about hell, as a child, and her eventual reply was as moving as her expressive face during the long hesitation before she answered: 'It's strange, isn't it? After all this time it still has the power to . . . affect me . . . when you . . . when you ask me that question. Hell is a fearful place. It's complete rejection by God. It's complete judgement, there is real fire, there is real torment, real torture, and it goes on for ever so there is no respite from it.'

She went on to tell me of the support group she runs for escapees from a childhood similar to her own, and she dwelt on how difficult it is for many of them to leave: 'The process of leaving is extraordinarily difficult. Ah, you are leaving behind a whole social network, a whole system that you've practically been brought up in, you are leaving behind a belief-system that you have held for years. Very often you leave families and friends . . . You don't really exist any more for them.' I was able to chime in with my own experience of letters from people in America saying they have read my books and have given up their religion as a consequence. Disconcertingly many go on to say that they daren't tell their families, or that they have told their families with terrible results. The following is typical. The writer is a young American medical student.

I felt the urge to write you an email because I share your view on religion, a view that is, as I'm sure you're aware, isolating in America. I grew up in a Christian family and even though the idea of religion never sat well with me I only recently got up the nerve to tell someone. That someone was my girlfriend who was . . . horrified. I realize that a declaration of atheism could be shocking but now it's as if she views me as a completely different person. She can't trust me, she says, because my morals don't come from God. I don't know if we'll get past this, and I don't

particularly want to share my belief with other people who are close to me because I fear the same reaction of distaste . . . I don't expect a response. I only write to you because I hoped you'd sympathize and share in my frustration. Imagine losing someone you loved, and who loved you, on the basis of religion. Aside from her view that I'm now a Godless heathen we were perfect for each other. It reminds me of your observation that people do insane things in the name of their faith. Thanks for listening.

I replied to this unfortunate young man, pointing out to him that, while his girlfriend had discovered something about him, he too had discovered something about her. Was she really good enough for him? I doubted it.

I have already mentioned the American comic actor Julia Sweeney and her dogged and endearingly humorous struggle to find some redeeming features in religion and to rescue the God of her childhood from her growing adult doubts. Eventually her quest ended happily, and she is now an admirable role model for young atheists everywhere. The *denouement* is perhaps the most moving scene of her show *Letting Go of God*. She had tried everything. And then . . .

. . . as I was walking from my office in my backyard into my house, I realized there was this little teeny-weenie voice whispering in my head. I'm not sure how long it had been there, but it suddenly got just one decibel louder. It whispered, 'There is no god.'

And I tried to ignore it. But it got a teeny bit louder. 'There is no god. There is no god. *Oh my god, there is no god*:...

And I shuddered. I felt I was slipping off the raft.

And then I thought, 'But I can't. I don't know if I *can* not believe in God. I need God. I mean, we have a history' . . .

'But I don't know how to not believe in God. I don't know how you do it. How do you get up, how do you get through the day?' I felt unbalanced . . .

I thought, 'Okay, calm down. Let's just try on the

not-believing-in-God glasses for a moment, just for a second. Just put on the no-God glasses and take a quick look around and then immediately throw them off.' And I put them on and I looked around.

I'm embarrassed to report that I initially felt dizzy. I actually had the thought, 'Well, how does the Earth stay up in the sky? You mean, we're just hurtling through space? That's so vulnerable!' I wanted to run out and catch the Earth as it fell out of space into my hands.

And then I remembered, 'Oh yeah, gravity and angular momentum is gonna keep us revolving around the sun for probably a long, long time.'

When I saw *Letting Go of God* in a Los Angeles theatre I was deeply moved by this scene. Especially when Julia went on to tell us of her parents' reaction to a press report of her cure:

My first call from my mother was more of a scream. 'Atheist? ATHEIST?!?!'

My dad called and said, 'You have betrayed your family, your school, your city.' It was like I had sold secrets to the Russians. They both said they weren't going to talk to me any more. My dad said, 'I don't even want you to come to my funeral.' After I hung up, I thought, 'Just try and stop me.'

Part of Julia Sweeney's gift is to make you cry and laugh at the same time:

I think that my parents had been mildly disappointed when I'd said I didn't believe in God any more, but being an *atheist* was another thing altogether.

Dan Barker's *Losing Faith in Faith: Front Preacher to Atheist* is the story of his gradual conversion from devout fundamentalist minister and zealous travelling preacher to the strong and confident atheist he is today. Significantly, Barker continued to go through the motions of preaching Christianity for a while after he had become an atheist,

because it was the only career he knew and he felt locked into a web of social obligations. He now knows many other American clergymen who are in the same position as he was but have confided only in him, having read his book. They dare not admit their atheism even to their own families, so terrible is the anticipated reaction. Barker's own story had a happier conclusion. To begin with, his parents were deeply and agonizingly shocked. But they listened to his quiet reasoning, and eventually became atheists themselves.

Two professors from one university in America wrote to me independently about their parents. One said that his mother suffers permanent grief because she fears for his immortal soul. The other one said that his father wishes he had never been born, so convinced is he that his son is going to spend eternity in hell. These are highly educated university professors, confident in their scholarship and their maturity, who have presumably left their parents behind in all matters of the intellect, not just religion. Just think what the ordeal must be like for less intellectually robust people, less equipped by education and rhetorical skill than they are, or than Julia Sweeney is, to argue their corner in the face of obdurate family members. As it was for many of Jill Mytton's patients, perhaps.

Earlier in our televised conversation, Jill had described this kind of religious upbringing as a form of mental abuse, and I returned to the point, as follows: 'You use the words religious abuse. If you were to compare the abuse of bringing up a child really to believe in hell . . . how do you think that would compare in trauma terms with sexual abuse?' She replied: 'That's a very difficult question . . . I think there are a lot of similarities actually, because it is about abuse of trust; it is about denying the child the right to feel free and open and able to relate to the world in the normal way . . . it's a form of denigration; it's a form of denial of the true self in both cases.'

IN DEFENCE OF CHILDREN

My colleague the psychologist Nicholas Humphrey used the 'sticks and stones' proverb in introducing his Amnesty Lecture in Oxford

in 1997.¹⁴¹ Humphrey began his lecture by arguing that the proverb is not always true, citing the case of Haitian Voodoo believers who die, apparently from some psychosomatic effect of terror, within days of having a malign 'spell' cast upon them. He then asked whether Amnesty International, the beneficiary of the lecture series to which he was contributing, should campaign against hurtful or damaging speeches or publications. His answer was a resounding no to such censorship in general: 'Freedom of speech is too precious a freedom to be meddled with.' But he then went on to shock his liberal self by advocating one important exception: to argue in favour of censorship for the special case of children . . .

. . . moral and religious education, and especially the education a child receives at home, where parents are allowed - even expected - to determine for their children what counts as truth and falsehood, right and wrong. Children, I'll argue, have a human right not to have their minds crippled by exposure to other people's bad ideas - no matter who these other people are. Parents, correspondingly, have no God-given licence to enculturate their children in whatever ways they personally choose: no right to limit the horizons of their children's knowledge, to bring them up in an atmosphere of dogma and superstition, or to insist they follow the straight and narrow paths of their own faith.

In short, children have a right not to have their minds addled by nonsense, and we as a society have a duty to protect them from it. So we should no more allow parents to teach their children to believe, for example, in the literal truth of the Bible or that the planets rule their lives, than we should allow parents to knock their children's teeth out or lock them in a dungeon.

Of course, such a strong statement needs, and received, much qualification. Isn't it a matter of opinion what is nonsense? Hasn't the appellation of orthodox science been upset often enough to chasten us into caution? Scientists may think it is nonsense to teach astrology and the literal truth of the Bible, but there are others who

think the opposite, and aren't they entitled to teach it to their children? Isn't it just as arrogant to insist that children should be taught science?

I thank my own parents for taking the view that children should be taught not so much *what* to think as *how* to think. If, having been fairly and properly exposed to all the scientific evidence, they grow up and decide that the Bible is literally true or that the movements of the planets rule their lives, that is their privilege. The important point is that it is *their* privilege to decide what they shall think, and not their parents' privilege to impose it by *force majeure*. And this, of course, is especially important when we reflect that children become the parents of the next generation, in a position to pass on whatever indoctrination may have moulded them.

Humphrey suggests that, as long as children are young, vulnerable and in need of protection, truly moral guardianship shows itself in an honest attempt to second-guess what they *would* choose for themselves if they were old enough to do so. He movingly quotes the example of a young Inca girl whose 500-year-old remains were found frozen in the mountains of Peru in 1995. The anthropologist who discovered her wrote that she had been the victim of a ritual sacrifice. By Humphrey's account, a documentary film about this young 'ice maiden' was shown on American television. Viewers were invited

to marvel at the spiritual commitment of the Inca priests and to share with the girl on her last journey her pride and excitement at having been selected for the signal honour of being sacrificed. The message of the television programme was in effect that the practice of human sacrifice was in its own way a glorious cultural invention - another jewel in the crown of multiculturalism, if you like.

Humphrey is scandalized, and so am I.

Yet, how dare anyone even suggest this? How dare they invite us - in our sitting rooms, watching television - to feel uplifted by contemplating an act of ritual murder: the murder of a dependent child by a group of stupid, puffed

up, superstitious, ignorant old men? How dare they invite us to find good for ourselves in contemplating an immoral action against someone else?

Again, the decent liberal reader may feel a twinge of unease. Immoral by our standards, certainly, and stupid, but what about Inca standards? Surely, to the Incas, the sacrifice was a moral act and far from stupid, sanctioned by all that they held sacred? The little girl was, no doubt, a loyal believer in the religion in which she was brought up. Who are we to use a word like 'murder', judging Inca priests by our own standards rather than theirs? Perhaps this girl was rapturously happy with her fate: perhaps she really believed she was going straight to everlasting paradise, warmed by the radiant company of the Sun God. Or perhaps - as seems far more likely - she screamed in terror.

Humphrey's point - and mine - is that, regardless of whether she was a willing victim or not, there is strong reason to suppose that she would not have been willing if she had been in full possession of the facts. For example, suppose she had known that the sun is really a ball of hydrogen, hotter than a million degrees Kelvin, converting itself into helium by nuclear fusion, and that it originally formed from a disc of gas out of which the rest of the solar system, including Earth, also condensed . . . Presumably, then, she would not have worshipped it as a god, and this would have altered her perspective on being sacrificed to propitiate it.

The Inca priests cannot be blamed for their ignorance, and it could perhaps be thought harsh to judge them stupid and puffed up. But they can be blamed for foisting their own beliefs on a child too young to decide whether to worship the sun or not. Humphrey's additional point is that today's documentary film makers, and we their audience, can be blamed for seeing beauty in that little girl's death - 'something that enriches *our* collective culture'. The same tendency to glory in the quaintness of ethnic religious habits, and to justify cruelties in their name, crops up again and again. It is the source of squirming internal conflict in the minds of nice liberal people who, on the one hand, cannot bear suffering and cruelty, but on the other hand have been trained by postmodernists and relativists to respect other cultures no less than

their own. Female circumcision is undoubtedly hideously painful, it sabotages sexual pleasure in women (indeed, this is probably its underlying purpose), and one half of the decent liberal mind wants to abolish the practice. The other half, however, 'respects' ethnic cultures and feels that we should not interfere if 'they' want to mutilate 'their' girls.* The point, of course, is that 'their' girls are actually the girls' *own* girls, and their wishes should not be ignored. Trickier to answer, what if a girl says she wants to be circumcised? But *would* she, with the hindsight of a fully informed adult, wish that it had never happened? Humphrey makes the point that no adult woman who has somehow missed out on circumcision as a child volunteers for the operation later in life.

After a discussion of the Amish, and their right to bring up 'their own' children in 'their own' way, Humphrey is scathing about our enthusiasm as a society for

maintaining cultural diversity. All right, you may want to say, so it's tough on a child of the Amish, or the Hasidim, or the gypsies to be shaped up by their parents in the ways they are - but at least the result is that these fascinating cultural traditions continue. Would not our whole civilization be impoverished if they were to go? It's a shame, maybe, when individuals have to be sacrificed to maintain such diversity. But there it is: it's the price we pay as a society. Except, I would feel bound to remind you, we do not pay it, *they* do.

The issue came to public attention in 1972 when the US Supreme Court ruled on a test case, *Wisconsin versus Yoder*, which concerned the right of parents to withdraw their children from school on religious grounds. The Amish people live in closed communities in various parts of the United States, mostly speaking an archaic dialect of German called Pennsylvania Dutch and eschewing, to varying extents, electricity, internal combustion engines, buttons and other manifestations of modern life. There is, indeed, something attractively quaint about an island of seventeenth-century life as a spectacle for today's eyes. Isn't it worth preserving, for the sake of the enrichment of human diversity? And the only way to preserve

* It is a regular practice in Britain today. A senior Schools Inspector told me of London girls in 2006 being sent to an 'uncle' in Bradford to be circumcised. Authorities turn a blind eye, for fear of being thought racist in 'the community'.

it is to allow the Amish to educate their own children in their own way, and protect them from the corrupting influence of modernity. But, we surely want to ask, shouldn't the children themselves have some say in the matter?

The Supreme Court was asked to rule in 1972, when some Amish parents in Wisconsin withdrew their children from high school. The very idea of education beyond a certain age was contrary to Amish religious values, and scientific education especially so. The State of Wisconsin took the parents to court, claiming that the children were being deprived of their right to an education. After passing up through the courts, the case eventually reached the United States Supreme Court, which handed down a split (6:1) decision in favour of the parents.¹⁴² The majority opinion, written by Chief Justice Warren Burger, included the following: 'As the record shows, compulsory school attendance to age 16 for Amish children carries with it a very real threat of undermining the Amish community and religious practice as they exist today; they must either abandon belief and be assimilated into society at large, or be forced to migrate to some other and more tolerant region.'

Justice William O. Douglas's minority opinion was that the children themselves should have been consulted. Did they really want to cut short their education? Did they, indeed, really want to stay in the Amish religion? Nicholas Humphrey would have gone further. Even if the children had been asked and had expressed a preference for the Amish religion, can we suppose that they would have done so if they had been educated and informed about the available alternatives? For this to be plausible, shouldn't there be examples of young people from the outside world voting with their feet and volunteering to join the Amish? Justice Douglas went further in a slightly different direction. He saw no particular reason to give the *religious* views of parents special status in deciding how far they should be allowed to deprive their children of education. If religion is grounds for exemption, might there not be secular beliefs that also qualify?

The majority of the Supreme Court drew a parallel with some of the positive values of monastic orders, whose presence in our society arguably enriches it. But, as Humphrey points out, there is a crucial difference. Monks volunteer for the monastic life of their

own free will. Amish children never volunteered to be Amish; they were born into it and they had no choice.

There is something breathtakingly condescending, as well as inhumane, about the sacrificing of anyone, especially children, on the altar of 'diversity' and the virtue of preserving a variety of religious traditions. The rest of us are happy with our cars and computers, our vaccines and antibiotics. But you quaint little people with your bonnets and breeches, your horse buggies, your archaic dialect and your earth-closet privies, you enrich our lives. Of course you must be allowed to trap your children with you in your seventeenth-century time warp, otherwise something irretrievable would be lost to us: a part of the wonderful diversity of human culture. A small part of me can see something in this. But the larger part is made to feel very queasy indeed.

AN EDUCATIONAL SCANDAL

The Prime Minister of my country, Tony Blair, invoked 'diversity' when challenged in the House of Commons by Jenny Tonge MP to justify government subsidy of a school in the north-east of England that (almost uniquely in Britain) teaches literal biblical creationism. Mr Blair replied that it would be unfortunate if concerns about that issue were to interfere with our getting 'as diverse a school system as we properly can'.¹⁴³ The school in question, Emmanuel College in Gateshead, is one of the 'city academies' set up in a proud initiative of the Blair government. Rich benefactors are encouraged to put up a relatively small sum of money (£2 million in the case of Emmanuel), which buys a much larger sum of government money (£20 million for the school, plus running costs and salaries in perpetuity), and also buys the benefactor the right to control the ethos of the school, the appointment of a majority of the school governors, the policy for exclusion or inclusion of pupils, and much else.

Emmanuel's 10 per cent benefactor is Sir Peter Vardy, a wealthy car "salesman with a creditable desire to give today's children the education he wishes he had had, and a less creditable desire to imprint his personal religious convictions upon them.* Vardy has

* H. L. Mencken was prophetic when he wrote: 'Deep within the heart of every evangelist lies the wreck of a car salesman.'

unfortunately become embroiled with a clique of American-inspired fundamentalist teachers, led by Nigel McQuoid, sometime headmaster of Emmanuel and now director of a whole consortium of Vardy schools. The level of McQuoid's scientific understanding can be judged from his belief that the world is less than ten thousand years old, and also from the following quotation: 'But to think that we just evolved from a bang, that we used to be monkeys, that seems unbelievable when you look at the complexity of the human body ... If you tell children there is no purpose to their life - that they are just a chemical mutation - that doesn't build self-esteem.'¹⁴⁴

No scientist has ever suggested that a child is a 'chemical mutation'. The use of the phrase in such a context is illiterate nonsense, on a par with the declarations of 'Bishop' Wayne Malcolm, leader of the Christian Life City church in Hackney, east London, who, according to the *Guardian* of 18 April 2006, 'disputes the scientific evidence for evolution'. Malcolm's understanding of the evidence he disputes can be gauged from his statement that 'There is clearly an absence in the fossil record for intermediate levels of development. If a frog turned into a monkey, shouldn't you have lots of fronkies?'

Well, science is not Mr McQuoid's subject either, so we should, in fairness, turn to his head of science, Stephen Layfield, instead. On 21 September 2001, Mr Layfield gave a lecture at Emmanuel College on 'The Teaching of Science: A Biblical Perspective'. The text of the lecture was posted on a Christian website (www.christian.org.uk). But you won't find it there now. The Christian Institute removed the lecture the very day after I had called attention to it in an article in the *Daily Telegraph* on 18 March 2002, where I subjected it to a critical dissection.¹⁴⁵ It is hard, however, to delete something permanently from the World Wide Web. Search engines achieve their speed partly by keeping caches of information, and these inevitably persist for a while even after the originals have been deleted. An alert British journalist, Andrew Brown, the *Independent's* first religious affairs correspondent, promptly located the Layfield lecture, downloaded it from the Google cache and posted it, safe from deletion, on his own website, <http://www.darwinwars.com/lunatic/liars/layfield.html>. You will notice that the words chosen by Brown for the URL make enter-

taining reading in themselves. They lose their power to amuse, however, when we look at the content of the lecture itself.

Incidentally, when a curious reader wrote to Emmanuel College to ask why the lecture had been removed from the website, he received the following disingenuous reply from the school, again recorded by Andrew Brown:

Emmanuel College has been at the centre of a debate regarding the teaching of creation in schools. At a practical level Emmanuel College has had a huge number of press calls. This has involved a considerable amount of time for the Principal and senior Directors of the College. All of these people have other jobs to do. In order to assist we have temporarily removed a lecture by Stephen Layfield from our website.

Of course, the school officials may well have been too busy to explain to journalists their stance on teaching creationism. But why, then, remove from their website the text of a lecture that does precisely that, and to which they could have referred the journalists, thereby saving themselves a great deal of time? No, they removed their head of science's lecture because they recognized that they had something to hide. The following paragraph is from the beginning of his lecture:

Let us state then right from the start that we reject the notion popularised, perhaps inadvertently, by Francis Bacon in the 17th century that there are 'Two Books' (i.e. the Book of nature & the Scriptures) which may be mined independently for truth. Rather, we stand firm upon the bare proposition that God has spoken authoritatively and inerrantly in the pages of holy Scripture. However fragile, old-fashioned or naive this assertion may ostensibly appear, especially to an unbelieving, TV-drunk modern culture, we can be sure that it is as robust a foundation as it is possible to lay down and build upon.

You have to keep pinching yourself. You are not dreaming. This

is not some preacher in a tent in Alabama but the head of *science* at a school into which the British government is pouring money, and which is Tony Blair's pride and joy. A devout Christian himself, Mr Blair in 2004 performed the ceremonial opening of one of the later additions to the Vardy fleet of schools.¹⁴⁶ Diversity may be a virtue, but this is diversity gone mad.

Layfield proceeds to itemize the comparison between science and scripture, concluding, in every case where there seems to be a conflict, that scripture is to be preferred. Noting that earth science is now included in the national curriculum, Layfield says, 'It would seem particularly prudent for all who deliver this aspect of the course to familiarise themselves with the Flood geology papers of Whitcomb & Morris.' Yes, 'Flood geology' means what you think it means. We're talking Noah's Ark here. Noah's Ark! - when the children could be learning the spine-tingling fact that Africa and South America were once joined, and have drawn apart at the speed with which fingernails grow. Here's more from Layfield (the head of science) on Noah's flood as the recent and rapid explanation for phenomena which, according to real geological evidence, took hundreds of millions of years to grind out:

We must acknowledge within our grand geophysical paradigm the historicity of a world-wide flood as outlined in Gen 6-10. If the Biblical narrative is secure and the listed genealogies (e.g. Gen 5; 1 Chro 1; Matt 1 & Lu 3) are substantially full, we must reckon that this global catastrophe took place in the relatively recent past. Its effects are everywhere abundantly apparent. Principal evidence is found in the fossil-laden sedimentary rocks, the extensive reserves of hydrocarbon fuels (coal, oil and gas) and the 'legendary' accounts of just such a great flood common to various population groups world-wide. The feasibility of maintaining an ark full of representative creatures for a year until the waters had sufficiently receded has been well documented by, among others, John Woodmorrappe.

In a way this is even worse than the utterances of know-nothings like Nigel McQuoid or Bishop Wayne Malcolm quoted above,

because Layfield is educated in science. Here's another astonishing passage::

As we stated at the beginning, Christians, with very good reason, reckon the Scriptures of the Old & New Testaments a reliable guide concerning just what we are to believe. They are not merely religious documents. They provide us with a true account of Earth history which we ignore at our peril.

The implication that the scriptures provide a literal account of geological history would make any reputable theologian wince. My friend Richard Harries, Bishop of Oxford, and I wrote a joint letter to Tony Blair, and we got it signed by eight bishops and nine senior scientists.¹⁴⁷ The nine scientists included the then President of the Royal Society (previously Tony Blair's chief scientific adviser), both the biological and physical secretaries of the Royal Society, the Astronomer Royal (now President of the Royal Society), the director of the Natural History Museum, and Sir David Attenborough, perhaps the most respected man in England. The bishops included one Roman Catholic and seven Anglican bishops - senior religious leaders from all around England. We received a perfunctory and inadequate reply from the Prime Minister's office, referring to the school's good examination results and its good report from the official schools inspection agency, OFSTED. It apparently didn't occur to Mr Blair that, if the OFSTED inspectors give a rave report to a school whose head of science teaches that the entire universe began after the domestication of the dog, there just might be something a teeny weeny bit wrong with the standards of the inspectorate.

Perhaps the most disturbing section of Stephen Layfield's lecture is his concluding 'What can be done?', where he considers the tactics to be employed by those teachers wishing to introduce fundamentalist Christianity into the science classroom. For example, he urges science teachers to

note every occasion when an evolutionary/old-earth paradigm (millions or billions of years) is explicitly

mentioned or implied by a text-book, examination question or visitor and courteously point out the fallibility of the statement. Wherever possible, we must give the alternative (always better) Biblical explanation of the same data. We shall look at a few examples from each of Physics, Chemistry & Biology in due course.

The rest of Layfield's lecture is nothing less than a propaganda manual, a resource for religious teachers of biology, chemistry and physics who wish, while remaining just inside the guidelines of the national curriculum, to subvert evidence-based science education and replace it with biblical scripture.

On 15 April 2006, James Naughtie, one of the BBC's most experienced anchormen, interviewed Sir Peter Vardy on radio. The main subject of the interview was a police investigation of allegations, denied by Vardy, that bribes - knighthoods and peerages - had been offered by the Blair government to rich men, in an attempt to get them to subscribe to the city academies scheme. Naughtie also asked Vardy about the creationism issue, and Vardy categorically denied that Emmanuel promotes young-Earth creationism to its pupils. One of Emmanuel's alumni, Peter French, has equally categorically stated,¹⁴⁸ 'We were taught that the earth was 6000 years old.'* Who is telling the truth here? Well, we don't know, but Stephen Layfield's lecture lays out his policy for teaching science pretty candidly. Has Vardy never read Layfield's very explicit manifesto? Does he really not know what his head of science has been up to? Peter Vardy made his money selling used cars. Would you buy one from him? And would you, like Tony Blair, sell him a school for 10 per cent of its price - throwing in an offer to pay all his running costs into the bargain? Let's be charitable to Blair and assume that he, at least, has not read the Layfield lecture. I suppose it is too much to hope that his attention may now be drawn to it.

Headmaster McQuoid offered a defence of what he clearly saw as his school's open-mindedness, which is remarkable for its patronizing complacency:

the best example I can give of what it is like here is a sixth-form philosophy lecture I was giving. Shaquille was sitting

* To get an idea of the scale of this error, it is equivalent to believing that the distance from New York to San Francisco is 700 yards.

there and he says, 'The Koran is correct and true.' And Clare, over here, says, 'No, the Bible is true.' So we talked about the similarities between what they say and the places where they disagree. And we agreed that they could not both be true. And eventually I said, 'Sorry Shaquille, you are wrong, it is the Bible that is true.' And he said, 'Sorry Mr McQuoid, you are wrong, it is the Koran.' And they went on to lunch and carried on discussing it there. That's what we want. We want children to know why it is they believe what they believe and to defend it.¹⁴⁹

What a charming picture! Shaquille and Clare went to lunch together, vigorously arguing their cases and defending their incompatible beliefs. But is it really so charming? Isn't it actually rather a deplorable picture that Mr McQuoid has painted? Upon what, after all, did Shaquille and Clare base their argument? What cogent evidence was each one able to bring to bear, in their vigorous and constructive debate? Clare and Shaquille each simply asserted that her or his holy book was superior, and that was that. That is apparently all they said, and that, indeed, is all you *can* say when you have been taught that truth comes from scripture rather than from evidence. Clare and Shaquille and their fellows were not being educated. They were being let down by their school, and their school principal was abusing, not their bodies, but their minds.

CONSCIOUSNESS-RAISING AGAIN

And now, here's another charming picture. At Christmas-time one year my daily newspaper, the *Independent*, was looking for a seasonal image and found a heart-warmingly ecumenical one at a school nativity play. The Three Wise Men were played by, as the caption glowingly said, Shadbreet (a Sikh), Musharaff (a Muslim) and Adele (a Christian), all aged four.

Charming? Heart-warming? No, it is not, it is neither; it is grotesque. How could any decent person think it right to label four-year-old children with the cosmic and theological opinions of their

parents? To see this, imagine an identical photograph, with the caption changed as follows: 'Shadbreet (a Keynesian), Musharaff (a Monetarist) and Adele (a Marxist), all aged four.' Wouldn't this be a candidate for irate letters of protest? It certainly should be. Yet, because of the weirdly privileged status of religion, not a squeak was heard, nor is it ever heard on any similar occasion. Just imagine the outcry if the caption had read, 'Shadbreet (an Atheist), Musharaff (an Agnostic) and Adele (a Secular Humanist), all aged four.' Mightn't the parents actually be investigated to see if they were fit to bring up children? In Britain, where we lack a constitutional separation between church and state, atheist parents usually go with the flow and let schools teach their children whatever religion prevails in the culture. 'The-Brights.net' (an American initiative to rebrand atheists as 'Brights' in the same way as homosexuals successfully rebranded themselves as 'gays') is scrupulous in setting out the rules for children to sign up: 'The decision to be a Bright must be the child's. Any youngster who is told he or she must, or should, be a Bright can NOT be a Bright.' Can you even begin to imagine a church or mosque issuing such a self-denying ordinance? But shouldn't they be compelled to do so? Incidentally, I signed up to the Brights, partly because I was genuinely curious whether such a word could be memetically engineered into the language. I don't know, and would like to, whether the transmutation of 'gay' was deliberately engineered or whether it just happened.¹⁵⁰ The Brights campaign got off to a shaky start when it was furiously denounced by some atheists, petrified of being branded 'arrogant'. The Gay Pride movement, fortunately, suffers from no such false modesty, which may be why it succeeded.

In an earlier chapter, I generalized the theme of 'consciousness-raising', starting with the achievement of feminists in making us flinch when we hear a phrase like 'men of goodwill' instead of 'people of goodwill'. Here I want to raise consciousness in another way. I think we should all wince when we hear a small child being labelled as belonging to some particular religion or another. Small children are too young to decide their views on the origins of the cosmos, of life and of morals. The very sound of the phrase 'Christian child' or 'Muslim child' should grate like fingernails on a blackboard.

Here is a report, dated 3 September 2001, from the Irish Radio station KPFT-FM.

Catholic schoolgirls faced protests from Loyalists as they attempted to enter the Holy Cross Girls' Primary School on the Ardoyne Road in north Belfast. Royal Ulster Constabulary (RUC) officers and British Army (BA) soldiers had to clear the protestors who were attempting to blockade the school. Crash barriers were erected to allow the children to get through the protest to the school. Loyalists jeered and shouted sectarian abuse as the children, some as young as four years of age, were escorted by the parents into the school. As children and parents entered the front gate of the school Loyalists threw bottles and stones.

Naturally, any decent person will wince at the ordeal of these unfortunate schoolgirls. I am trying to encourage us to wince, too, at the very idea of labelling them 'Catholic schoolgirls' at all. ('Loyalists', as I pointed out in Chapter 1, is the mealy-mouthed Northern Ireland euphemism for Protestants, just as 'Nationalists' is the euphemism for Catholics. People who do not hesitate to brand children 'Catholics' or 'Protestants' stop short of applying those same religious labels - far more appropriately - to adult terrorists and mobs.)

Our society, including the non-religious sector, has accepted the preposterous idea that it is normal and right to indoctrinate tiny children in the religion of their parents, and to slap religious labels on them - 'Catholic child', 'Protestant child', 'Jewish child', 'Muslim child', etc. - although no other comparable labels: no conservative children, no liberal children, no Republican children, no Democrat children. Please, please raise your consciousness about this, and raise the roof whenever you hear it happening. A child is not a Christian child, not a Muslim child, but a child of Christian parents or a child of Muslim parents. This latter nomenclature, by the way, would be an excellent piece of consciousness-raising for the children themselves. A child who is told she is a 'child of Muslim parents' will immediately realize that

religion is something for her to choose - or reject - when she becomes old enough to do so.

A good case can indeed be made for the educational benefits of teaching comparative religion. Certainly my own doubts were first aroused, at the age of about nine, by the lesson (which came not from school but from my parents) that the Christian religion in which I was brought up was only one of many mutually incompatible belief-systems. Religious apologists themselves realize this and it often frightens them. After that nativity play story in the *Independent*, not a single letter to the Editor complained of the religious labelling of the four-year-olds. The only negative letter came from 'The Campaign for Real Education', whose spokesman, Nick Seaton, said multi-faith religious education was extremely dangerous because 'Children these days are taught that all religions are of equal worth, which means that their own has no special value.' Yes indeed; that is exactly what it means. Well might this spokesman worry. On another occasion, the same individual said, 'To present all faiths as equally valid is wrong. Everybody is entitled to think their faith is superior to others, be they Hindus, Jews, Muslims or Christians - otherwise what's the point in having faith?'¹⁵¹

What indeed? And what transparent nonsense this is! These faiths are mutually incompatible. Otherwise what is the point of thinking your faith superior? Most of them, therefore, cannot be 'superior to others'. Let children learn about different faiths, let them notice their incompatibility, and let them draw their own conclusions about the consequences of that incompatibility. As for whether any are 'valid', let them make up their own minds when they are old enough to do so.

RELIGIOUS EDUCATION AS A PART OF LITERARY CULTURE

I must admit that even I am a little taken aback at the biblical ignorance commonly displayed by people educated in more recent

decades than I was. Or maybe it isn't a decade thing. As long ago as 1954, according to Robert Hinde in his thoughtful book *Why Gods Persist*, a Gallup poll in the United States of America found the following. Three-quarters of Catholics and Protestants could not name a single Old Testament prophet. More than two-thirds didn't know who preached the Sermon on the Mount. A substantial number thought that Moses was one of Jesus's twelve apostles. That, to repeat, was in the United States, which is dramatically more religious than other parts of the developed world.

The King James Bible of 1611 - the Authorized Version - includes passages of outstanding literary merit in its own right, for example the Song of Songs, and the sublime Ecclesiastes (which I am told is pretty good in the original Hebrew too). But the main reason the English Bible needs to be part of our education is that it is a major source book for literary culture. The same applies to the legends of the Greek and Roman gods, and we learn about them without being asked to believe in them. Here is a quick list of biblical, or Bible-inspired, phrases and sentences that occur commonly in literary or conversational English, from great poetry to hackneyed cliché, from proverb to gossip.

Be fruitful and multiply • East of Eden • Adam's Rib •
 Am I my brother's keeper? • The mark of Cain • As old
 as Methuselah • A mess of potage • Sold his birthright •
 Jacob's ladder • Coat of many colours • Amid the alien
 corn • Eyeless in Gaza • The fat of the land • The fatted
 calf • Stranger in a strange land • Burning bush • A land
 flowing with milk and honey • Let my people go • Flesh
 pots • An eye for an eye and a tooth for a tooth • Be
 sure your sin will find you out • The apple of his eye •
 The stars in their courses • Butter in a lordly dish • The
 hosts of Midian • Shibboleth • Out of the strong came
 forth sweetness • He smote them hip and thigh •
 Philistine • A man after his own heart • Like David and
 Jonathan • Passing the love of women • How are the
 mighty fallen? • Ewe lamb • Man of Belial • Jezebel •
 Queen of Sheba • Wisdom of Solomon • The half was
 not told me • Girded up his loins • Drew a bow at a

venture • Job's comforters • The patience of Job • I am
 escaped with the skin of my teeth • The price of wisdom
 is above rubies • Leviathan • Go to the ant thou
 sluggard; consider her ways, and be wise • Spare the
 rod and spoil the child • A word in season • Vanity of
 vanities • To everything there is a season, and a time to
 every purpose • The race is not to the swift, nor the
 battle to the strong • Of making many books there is no
 end • I am the rose of Sharon • A garden inclosed • The
 little foxes • Many waters cannot quench love • Beat
 their swords into plowshares • Grind the faces of the
 poor • The wolf also shall dwell with the lamb, and the
 leopard shall lie down with the kid • Let us eat and
 drink; for tomorrow we shall die • Set thine house in
 order • A voice crying in the wilderness • No peace for
 the wicked • See eye to eye • Cut off out of the land of
 the living • Balm in Gilead • Can the leopard change his
 spots? • The parting of the ways • A Daniel in the lions'
 den • They have sown the wind, and they shall reap the
 whirlwind • Sodom and Gomorrah • Man shall not live
 by bread alone • Get thee behind me Satan • The salt of
 the earth • Hide your light under a bushel • Turn the
 other cheek • Go the extra mile • Moth and rust doth
 corrupt • Cast your pearls before swine • Wolf in sheep's
 clothing • Weeping and gnashing of teeth • Gadarene
 swine • New wine in old bottles • Shake off the dust of
 your feet • He that is not with me is against me •
 Judgement of Solomon • Fell upon stony ground • A
 prophet is not without honour, save in his own country •
 The crumbs from the table • Sign of the times • Den of
 thieves • Pharisee • Whited sepulchre • Wars and
 rumours of wars • Good and faithful servant • Separate
 the sheep from the goats • I wash my hands of it • The
 sabbath was made for man, and not man for the sabbath
 • Suffer the little children • The widow's mite •
 Physician heal thyself • Good Samaritan • Passed by on
 the other side • Grapes of wrath • Lost sheep • Prodigal
 son • A great gulf fixed • Whose shoe latchet I am not

worthy to unloose • Cast the first stone • Jesus wept •
 Greater love hath no man than this • Doubting Thomas
 • Road to Damascus • A law unto himself • Through a
 glass darkly • Death, where is thy sting? • A thorn in the
 flesh • Fallen from grace • Filthy lucre • The root of all
 evil • Fight the good fight • All flesh is as grass • The
 weaker vessel • I am Alpha and Omega • Armageddon •
 De profundis • Quo vadis • Rain on the just and on the
 unjust

Every one of these idioms, phrases or cliches comes directly from the King James Authorized Version of the Bible. Surely ignorance of the Bible is bound to impoverish one's appreciation of English literature? And not just solemn and serious literature. The following rhyme by Lord Justice Bowen is ingeniously witty:

The rain it raineth on the just,
 And also on the unjust fella.
 But chiefly on the just, because
 The unjust hath the just's umbrella.

But the enjoyment is muffled if you can't take the allusion to Matthew 5: 45 ('For he maketh his sun to rise on the evil and on the good, and sendeth rain on the just and on the unjust'). And the fine point of Eliza Dolittle's fantasy in *My Fair Lady* would escape anybody ignorant of John the Baptist's end:

'Thanks a lot, King,' says I in a manner well bred,
 'But all I want is 'Enry 'Iggins' 'ead.'

P. G. Wodehouse is, for my money, the greatest writer of light comedy in English, and I bet fully half my list of biblical phrases will be found as allusions within his pages. (A Google search will not find all of them, however. It will miss the derivation of the short-story title 'The Aunt and the Sluggard', from Proverbs 6: 6.) The Wodehouse canon is rich in other biblical phrases, not in my list above and not incorporated into the language as idioms or proverbs. Listen to Bertie Wooster's evocation of what it is like to

wake up with a bad hangover: 'I had been dreaming that some boulder was driving spikes through my head - not just ordinary spikes, as used by Jael the wife of Heber, but red-hot ones.' Bertie himself was immensely proud of his only scholastic achievement, the prize he once earned for scripture knowledge.

What is true of comic writing in English is more obviously true of serious literature. Naseeb Shaheen's tally of more than thirteen hundred biblical references in Shakespeare's works is widely cited and very believable.¹⁵² The *Bible Literacy Report* published in Fairfax, Virginia (admittedly financed by the infamous Templeton Foundation) provides many examples, and cites overwhelming agreement by teachers of English literature that biblical literacy is essential to full appreciation of their subject.¹⁵³ Doubtless the equivalent is true of French, German, Russian, Italian, Spanish and other great European literatures. And, for speakers of Arabic and Indian languages, knowledge of the Qur'an or the Bhagavad Gita is presumably just as essential for full appreciation of their literary heritage. Finally, to round off the list, you can't appreciate Wagner (whose music, as has been wittily said, is better than it sounds) without knowing your way around the Norse gods.

Let me not labour the point. I have probably said enough to convince at least my older readers that an atheistic world-view provides no justification for cutting the Bible, and other sacred books, out of our education. And of course we can retain a sentimental loyalty to the cultural and literary traditions of, say, Judaism, Anglicanism or Islam, and even participate in religious rituals such as marriages and funerals, without buying into the supernatural beliefs that historically went along with those traditions. We can give up belief in God while not losing touch with a treasured heritage.

CHAPTER 10

A much needed gap?

What can be more soul shaking than peering through a 100-inch telescope at a distant galaxy, holding a 100-million-year-old fossil or a 500,000-year-old stone tool in one's hand, standing before the immense chasm of space and time that is the Grand Canyon, or listening to a scientist who gazed upon the face of the universe's creation and did not blink? That is deep and sacred science.

MICHAEL SHERMER

'This book fills a much needed gap.' The jest works because we simultaneously understand the two opposite meanings. Incidentally, I thought it was an invented witticism but, to my surprise, I find that it has actually been used, in all innocence, by publishers. See <http://www.kcl.ac.uk/kis/schools/hums/french/pgr/tqr.html> for a book that 'fills a much needed gap in the literature available on the post-structuralist movement'. It seems deliciously appropriate that this avowedly superfluous book is all about Michel Foucault, Roland Barthes, Julia Kristeva and other icons of haute francophonyism.

Does religion fill a much needed gap? It is often said that there is a God-shaped gap in the brain which needs to be filled: we have a psychological need for God - imaginary friend, father, big brother, confessor, confidant - and the need has to be satisfied whether God really exists or not. But could it be that God clutters up a gap that we'd be better off filling with something else? Science, perhaps? Art? Human friendship? Humanism? Love of this life in the real world, giving no credence to other lives beyond the grave? A love of nature, or what the great entomologist E. O. Wilson has called *Biophilia* }

Religion has at one time or another been thought to fill four main roles in human life: explanation, exhortation, consolation and inspiration. Historically, religion aspired to *explain* our own existence and the nature of the universe in which we find ourselves. In this role it is now completely superseded by science, and I have dealt with it in Chapter 4. By *exhortation* I mean moral instruction on how we ought to behave, and I covered that in Chapters 6 and 7.1 have not so far done justice to *consolation* and *inspiration*, and this final chapter will briefly deal with them. As a preliminary to consolation itself, I want to begin with the childhood phenomenon of the 'imaginary friend', which I believe has affinities with religious belief.

BINKER

Christopher Robin, I presume, did not believe that Piglet and Winnie the Pooh really spoke to him. But was Binker different?

Binker - what I call him - is a secret of my own,
 And Binker is the reason why I never feel alone.
 Playing in the nursery, sitting on the stair,
 Whatever I am busy at, Binker will be there.
 Oh, Daddy is clever, he's a clever sort of man,
 And Mummy is the best since the world began,
 And Nanny is Nanny, and I call her Nan -
 But they can't See Binker.
 Binker's always talking, 'cos I'm teaching him to speak
 He sometimes likes to do it in a funny sort of squeak,
 And he sometimes likes to do it in a hoodling sort of roar ...
 And I have to do it for him 'cos his throat is rather sore.
 Oh, Daddy is clever, he's a clever sort of man,
 And Mummy knows all that anybody can,
 And Nanny is Nanny, and I call her Nan -
 But they don't Know Binker.
 Binker's brave as lions when we're running in the park;
 Binker's brave as tigers when we're lying in the dark;
 Binker's brave as elephants. He never, never cries . . .
 Except (like other people) when the soap gets in his eyes.
 Oh, Daddy is Daddy, he's a Daddy sort of man,
 And Mummy is as Mummy as anybody can,
 And Nanny is Nanny, and I call her Nan ...
 But they're not Like Binker.
 Binker isn't greedy, but he does like things to eat,
 So I have to say to people when they're giving me a sweet,
 'Oh, Binker wants a chocolate, so could you give me two?'
 And then I eat it for him, 'cos his teeth are rather new.
 Well, I'm very fond of Daddy, but he hasn't time to play,
 And I'm very fond of Mummy, but she sometimes goes away,
 And I'm often cross with Nanny when she wants to brush my
 hair . . .
 But Binker's always Binker, and is certain to be there.

A. A. MILNE, *NOW We Are Six**

Is the imaginary-friend phenomenon a higher illusion, in a different category from ordinary childhood make-believe? My own experience is not much help here. Like many parents, my mother

kept a notebook of my childish sayings. In addition to simple pretendings (now I'm the man in the moon ... an accelerator ... a Babylonian) I was evidently fond of second-order pretendings (now I'm an owl pretending to be a waterwheel) which might be reflexive (now I'm a little boy pretending to be Richard). I never once believed I really was any of those things, and I think that is normally true of childhood make-believe games. But I didn't have a Binker. If the testimony of their adult selves is to be believed, at least some of those normal children who have imaginary friends really do believe they exist, and, in some cases, see them as clear and vivid hallucinations. I suspect that the Binker phenomenon of childhood may be a good model for understanding theistic belief in adults. I do not know whether psychologists have studied it from this point of view, but it would be a worthwhile piece of research. Companion and confidant, a Binker for life: that is surely one role that God plays - one gap that might be left if God were to go.

Another child, a girl, had a 'little purple man', who seemed to her a real and visible presence, and who would manifest himself, sparkling out of the air, with a gentle tinkling sound. He visited her regularly, especially when she felt lonely, but with decreasing frequency as she grew older. On a particular day just before she went to kindergarten, the little purple man came to her, heralded by his usual tinkling fanfare, and announced that he would not be visiting her any more. This saddened her, but the little purple man told her that she was getting bigger now and wouldn't need him in the future. He must leave her now, so that he could look after other children. He promised her that he would come back to her if ever she *really* needed him. He did return to her, many years later in a dream, when she had a personal crisis and was trying to decide what to do with her life. The door of her bedroom opened and a cartload of books appeared, pushed into the room by ... the little purple man. She interpreted this as advice that she should go to university - advice that she took and later judged to be good. The story makes me almost tearful, and it brings me as close as I shall probably come to understanding the consoling and counselling role of imaginary gods in people's lives. A being may exist only in the imagination, yet still seem completely real to the child, and still give real comfort and good advice. Perhaps even better: imaginary

friends - and imaginary gods - have the time and patience to devote all their attention to the sufferer. And they are much cheaper than psychiatrists or professional counsellors.

Did gods, in their role as consolers and counsellors, evolve from binkers, by a sort of psychological 'paedomorphosis'? Paedomorphosis is the retention into adulthood of childhood characteristics. Pekinese dogs have paedomorphic faces: the adults look like puppies. It is a well-known pattern in evolution, widely accepted as important for the development of such human characteristics as our bulbous forehead and short jaws. Evolutionists have described us as juvenile apes, and it is certainly true that juvenile chimpanzees and gorillas look more like humans than adult ones do. Could religions have evolved originally by gradual postponement, over generations, of the moment in life when children gave up their binkers - just as we slowed down, during evolution, the flattening of our foreheads and the protrusion of our jaws?

I suppose, for completeness, we should consider the reverse possibility. Rather than gods evolving from ancestral binkers, could binkers have evolved from ancestral gods? This seems to me less likely. I was led to think about it while reading the American psychologist Julian Jaynes's *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, a book that is as strange as its title suggests. It is one of those books that is either complete rubbish or a work of consummate genius, nothing in between! Probably the former, but I'm hedging my bets.

Jaynes notes that many people perceive their own thought processes as a kind of dialogue between the 'self and another internal protagonist inside the head. Nowadays we understand that both 'voices' are our own - or if we don't we are treated as mentally ill. This happened, briefly, to Evelyn Waugh. Never one to mince words, Waugh remarked to a friend: 'I haven't seen you for a long time, but then I've seen so few people because - did you know? - I went mad.' After his recovery, Waugh wrote a novel, *The Ordeal of Gilbert Pinfold*, which described his hallucinatory period, and the voices that he heard.

Jaynes's suggestion is that some time before 1000 BC people in general were unaware that the second voice - the Gilbert

Pinfold voice - came from within themselves. They thought the Pinfold voice was a god: Apollo, say, or Astarte or Yahweh or, more probably, a minor household god, offering them advice or orders. Jaynes even located the voices of the gods in the opposite hemisphere of the brain from the one that controls audible speech. The 'breakdown of the bicameral' mind was, for Jaynes, a historical transition. It was the moment in history when it dawned on people that the external voices that they seemed to be hearing were really internal. Jaynes even goes so far as to define this historical transition as the dawning of human consciousness.

There is an ancient Egyptian inscription about the creator god Ptah, which describes the various other gods as variations of Ptah's 'voice' or 'tongue'. Modern translations reject the literal 'voice' and interpret the other gods as 'objectified conceptions of [Ptah's] mind'. Jaynes dismisses such educated readings, preferring to take the literal meaning seriously. The gods were hallucinated voices, speaking inside people's heads. Jaynes further suggests that such gods evolved from memories of dead kings, who still, in a manner of speaking, retained control over their subjects via imagined voices in their heads. Whether or not you find his thesis plausible, Jaynes's book is intriguing enough to earn its mention in a book on religion.

Now, to the possibility I raised of borrowing from Jaynes to construct a theory that gods and binkers are developmentally related, but the opposite way around from the paedomorphosis theory. It amounts to the suggestion that the breakdown of the bicameral mind didn't happen suddenly in history, but was a progressive pulling back into childhood of the moment when hallucinated voices and apparitions were rumbled as not real. In a kind of reversal of the paedomorphosis hypothesis, the hallucinated gods disappeared from adult minds first, then were pulled back earlier and earlier into childhood, until today they survive only in the Binker or little purple man phenomenon. The problem with this version of the theory is that it doesn't explain the persistence of gods into adulthood today.

It might be better not to treat gods as ancestral to binkers, or vice versa, but rather to see both as by-products of the same psychological predisposition. Gods and binkers have in common the power to comfort, and provide a vivid sounding board for

trying out ideas. We have not moved far from Chapter 5's psychological by-product theory of the evolution of religion.

CONSOLATION

It is time to face up to the important role that God plays in consoling us; and the humanitarian challenge, if he does not exist, to put something in his place. Many people who concede that God probably doesn't exist, and that he is not necessary for morality, still come back with what they often regard as a trump card: the alleged psychological or emotional *need* for a god. If you take religion away, people truculently ask, what are you going to put in its place? What have you to offer the dying patients, the weeping bereaved, the lonely Eleanor Rigbys for whom God is their only friend?

The first thing to say in response to this is something that should need no saying. Religion's power to console doesn't make it true. Even if we make a huge concession; even if it were conclusively demonstrated that belief in God's existence is completely essential to human psychological and emotional well-being; even if all atheists were despairing neurotics driven to suicide by relentless cosmic angst - none of this would contribute the tiniest jot or tittle of evidence that religious belief is true. It might be evidence in favour of the desirability of convincing yourself that God exists, even if he doesn't. As I've already mentioned, Dennett, in *Breaking the Spell*, makes the distinction between belief in God and belief in belief: the belief that it is desirable to believe, even if the belief itself is false: 'Lord, I believe; help thou mine unbelief (Mark 9: 24). The faithful are encouraged to *profess* belief, whether they are convinced by it or not. Maybe if you repeat something often enough, you will succeed in convincing yourself of its truth. I think we all know people who enjoy the idea of religious faith, and resent attacks on it, while reluctantly admitting that they don't have it themselves.

Since reading of Dennett's distinction, I have found occasion to use it again and again. It is scarcely an exaggeration to say that the

majority of atheists I know disguise their atheism behind a pious facade. They do not believe in anything supernatural themselves, but retain a vague soft spot for irrational belief. They believe in belief. It is amazing how many people seemingly cannot tell the difference between 'X is true' and 'It is desirable that people should believe that X is true'. Or maybe they don't really fall for this logical error, but simply rate truth as unimportant compared with human feelings. I don't want to decry human feelings. But let's be clear, in any particular conversation, what we are talking about: feelings, or truth. Both may be important, but they are not the same thing.

In any case, my hypothetical concession was extravagant and wrong. I know of no evidence that atheists have any general tendency towards unhappy, angst-ridden despond. Some atheists are happy. Others are miserable. Similarly, some Christians, Jews, Muslims, Hindus and Buddhists are miserable, while others are happy. There may be statistical evidence bearing on the relationship between happiness and belief (or unbelief), but I doubt if it is a strong effect, one way or the other. I find it more interesting to ask whether there is any good *reason* to feel depressed if we live without God. I shall end this book by arguing, on the contrary, that it is an understatement to say that one can lead a happy and fulfilled life without supernatural religion. First, though, I must examine the claims of religion to offer consolation.

Consolation, according to the *Shorter Oxford Dictionary*, is the alleviation of sorrow or mental distress. I shall divide consolation into two types.

1. *Direct physical consolation.* A man stuck for the night on a bare mountain may find comfort in a large, warm St Bernard dog, not forgetting, of course, the brandy barrel around its neck. A weeping child may be consoled by the embrace of strong arms wrapped around her and reassuring words whispered in her ear.
2. *Consolation by discovery of a previously unappreciated fact, or a previously undiscovered way of looking at existing facts.* A woman whose husband has been killed in war may be

consoled by the discovery that she is pregnant by him, or that he died a hero. We can also get consolation through discovering a new way of thinking about a situation. A philosopher points out that there is nothing special about the moment when an old man dies. The child that he once was 'died' long ago, not by suddenly ceasing to live but by growing up. Each of Shakespeare's seven ages of man 'dies' by slowly morphing into the next. From this point of view, the moment when the old man finally expires is no different from the slow 'deaths' throughout his life.¹⁵⁴ A man who does not relish the prospect of his own death may find this changed perspective consoling. Or maybe not, but it is an example of consolation through reflection. Mark Twain's dismissal of the fear of death is another: 'I do not fear death. I had been dead for billions and billions of years before I was born, and had not suffered the slightest inconvenience from it.' The *aperçu* changes nothing about the fact of our inevitable death. But we have been offered a different way of looking at that inevitability and we may find it consoling. Thomas Jefferson, too, had no fear of death and he seems to have believed in no kind of afterlife. By Christopher Hitchens's account, 'As his days began to wane, Jefferson more than once wrote to friends that he faced the approaching end without either hope or fear. This was as much as to say, in the most unmistakable terms, that he was not a Christian.'

Robust intellects may be ready for the strong meat of Bertrand Russell's declaration, in his 1925 essay 'What I Believe':

I believe that when I die I shall rot, and nothing of my ego will survive. I am not young and I love life. But I should scorn to shiver with terror at the thought of annihilation. Happiness is nonetheless true happiness because it must come to an end, nor do thought and love lose their value because they are not everlasting. Many a man has borne himself proudly on the scaffold; surely the same pride should teach us to think truly about man's place in the world. Even if the open windows of science at first make

us shiver after the cosy indoor warmth of traditional humanizing myths, in the end the fresh air brings vigour, and the great spaces have a splendour of their own.

I was inspired by this essay of Russell's when I read it in my school library at the age of about sixteen, but I had forgotten it. It is possible that I was paying unconscious homage to it when I wrote, in *A Devil's Chaplain* in 2003,

There is more than just grandeur in this view of life, bleak and cold though it can seem from under the security blanket of ignorance. There is deep refreshment to be had from standing up and facing straight into the strong keen wind of understanding: Yeats's 'Winds that blow through the starry ways'.

How does religion compare with, say, science in providing these two types of consolation? Looking at Type 1 consolation first, it is entirely plausible that the strong arms of God, even if they are purely imaginary, could console in just the same kind of way as the real arms of a friend, or a St Bernard dog with a brandy cask around its neck. But of course scientific medicine can also offer comfort - usually more effectively than brandy.

Turning now to Type 2 consolation, it is easy to believe that religion could be extremely effective. People caught up in a terrible disaster, such as an earthquake, frequently report that they derive consolation from the reflection that it is all part of God's inscrutable plan: no doubt good shall come of it in the fullness of time. If someone fears death, sincere belief that he has an immortal soul can be consoling - unless, of course, he thinks he is going to hell or purgatory. False beliefs can be every bit as consoling as true ones, right up until the moment of disillusionment. This applies to non-religious beliefs too. A man with terminal cancer may be consoled by a doctor who lies to him that he is cured, just as effectively as another man who is told truthfully that he is cured. Sincere and wholehearted belief in life after death is even more immune to disillusionment than belief in a lying doctor. The

doctor's lie remains effective only until the symptoms become unmistakable. A believer in life after death can never be ultimately disillusioned.

Polls suggest that approximately 95 per cent of the population of the United States believe they will survive their own death. I can't help wondering how many people who claim such belief really, in their heart of hearts, hold it. If they were truly sincere, shouldn't they all behave like the Abbot of Ampleforth? When Cardinal Basil Hume told him that he was dying, the abbot was delighted for him: 'Congratulations! That's brilliant news. I wish I was coming with you.'¹⁵⁵ The abbot, it seems, really was a sincere believer. But it is precisely because it is so rare and unexpected that his story catches our attention, almost provokes our amusement - in a fashion reminiscent of the cartoon of a young woman carrying a 'Make love not war' banner, stark naked, and with a bystander exclaiming, 'Now that's what I call sincerity!' Why don't all Christians and Muslims say something like the abbot when they hear that a friend is dying? When a devout woman is told by the doctor that she has only months to live, why doesn't she beam with excited anticipation, as if she has just won a holiday in the Seychelles? 'I can't wait!' Why don't faithful visitors at her bedside shower her with messages for those that have gone before? 'Do give my love to Uncle Robert when you see him . . .'

Why don't religious people talk like that when in the presence of the dying? Could it be that they don't really believe all that stuff they pretend to believe? Or perhaps they do believe it but fear the *process* of dying. With good reason, given that our species is the only one not allowed to go to the vet to be painlessly put out of our misery. But in that case, why does the most vocal opposition to euthanasia and assisted suicide come from the religious? On the 'Abbot of Ampleforth' or 'Holiday in the Seychelles' model of death, wouldn't you expect that religious people would be the least likely to cling unbecomingly to earthly life? Yet it is a striking fact that, if you meet somebody who is passionately opposed to mercy killing, or passionately against assisted suicide, you can bet a good sum that they will turn out to be religious. The official reason may be that all killing is a sin. But why deem it to be a sin if you sincerely believe you are accelerating a journey to heaven?

My attitude to assisted suicide, by contrast, takes off from Mark Twain's observation, already quoted. Being dead will be no different from being unborn - I shall be just as I was in the time of William the Conqueror or the dinosaurs or the trilobites. There is nothing to fear in that. But the process of dying could well be, depending on our luck, painful and unpleasant - the sort of experience from which we have become accustomed to being protected by a general anaesthetic, like having your appendix out. If your pet is dying in pain, you will be condemned for cruelty if you do not summon the vet to give him a general anaesthetic from which he will not come round. But if your doctor performs exactly the same merciful service for you when you are dying in pain, he runs the risk of being prosecuted for murder. When I am dying, I should like my life to be taken out under a general anaesthetic, exactly as if it were a diseased appendix. But I shall not be allowed that privilege, because I have the ill-luck to be born a member of *Homo sapiens* rather than, for example, *Canis familiaris* or *Felis catus*. At least, that will be the case unless I move to a more enlightened place like Switzerland, the Netherlands or Oregon. Why are such enlightened places so rare? Mostly because of the influence of religion.

But, it might be said, isn't there an important difference between having your appendix removed and having your life removed? Not really; not if you are about to die anyway. And not if you have a sincere religious belief in life after death. If you have that belief, dying is just a transition from one life to another. If the transition is painful, you should no more wish to undergo it without anaesthetic than you would wish to have your appendix removed without anaesthetic. It is those of us who see death as terminal rather than transitional who might naively be expected to resist euthanasia or assisted suicide. Yet we are the ones who support it.*

In the same vein, what are we to make of the observation of a senior nurse of my acquaintance, with a lifetime's experience in running a home for old people, where death is a regular occurrence? She has noticed over the years that the individuals who

* One study of attitudes to death among American atheists found the following: 50 per cent wanted a memorial celebration of their life; 99 per cent supported physician-assisted suicide for those who want it, and 75 per cent wanted it for themselves; 100 per cent wanted no contact with hospital staff who promote religion. See <http://nursestoner.com/myresearch.html>.

are most afraid of death are the religious ones. Her observation would need to be substantiated statistically but, assuming she is right, what is going on here? Whatever it is, it doesn't, on the face of it, speak strongly of religion's power to comfort the dying.* In the case of Catholics, maybe they are afraid of purgatory? The saintly Cardinal Hume said farewell to a friend in these words: 'Well, goodbye then. See you in purgatory, I suppose.' What / suppose is that there was a sceptical twinkle in those kind old eyes.

The doctrine of purgatory offers a preposterous revelation of the way the theological mind works. Purgatory is a sort of divine Ellis Island, a Hadean waiting room where dead souls go if their sins aren't bad enough to send them to hell, but they still need a bit of remedial checking out and purifying before they can be admitted to the sin-free-zone of heaven. In medieval times, the Church used to sell 'indulgences' for money. This amounted to paying for some number of days' remission from purgatory, and the Church literally (and with breathtaking presumption) issued signed certificates specifying the number of days off that had been purchased. The Roman Catholic Church is an institution for whose gains the phrase 'ill-gotten' might have been specially invented. And of all its money-making rip-offs, the selling of indulgences must surely rank among the greatest con tricks in history, the medieval equivalent of the Nigerian Internet scam but far more successful.

As recently as 1903, Pope Pius X was still able to tabulate the number of days' remission from purgatory that each rank in the hierarchy was entitled to grant: cardinals two hundred days, archbishops a hundred days, bishops a mere fifty days. By his time, however, indulgences were no longer sold directly for money. Even in the Middle Ages, money was not the only currency in which you could buy parole from purgatory. You could pay in prayers too, either your own before death or the prayers of others on your behalf, after your death. And money could buy prayers. If you were rich, you could lay down provision for your soul in perpetuity. My own Oxford College, New College, was founded in 1379 (it was new then) by one of that century's great philanthropists, William of Wykeham, Bishop of Winchester. A medieval bishop could become

* An Australian friend coined a wonderful phrase to describe the tendency for religiosity to increase in old age. Say it with an Australian intonation, going up at the end like a question: 'Cramming for the final?'

the Bill Gates of the age, controlling the equivalent of the information highway (to God), and amassing huge riches. His diocese was exceptionally large, and Wykeham used his wealth and influence to found two great educational establishments, one in Winchester and one in Oxford. Education was important to Wykeham, but, in the words of the official New College history, published in 1979 to mark the sixth centenary, the fundamental purpose of the college was 'as a great chantry to make intercession for the repose of his soul. He provided for the service of the chapel by ten chaplains, three clerks and sixteen choristers, and he ordered that they alone were to be retained if the college's income failed.' Wykeham left New College in the hands of the Fellowship, a self-electing body which has been continuously in existence like a single organism for more than six hundred years. Presumably he trusted us to continue to pray for his soul through the centuries.

Today the college has only one chaplain* and no clerks, and the steady century-by-century torrent of prayers for Wykeham in purgatory has dwindled to a trickle of two prayers per year. The choristers alone go from strength to strength and their music is, indeed, magical. Even I feel a twinge of guilt, as a member of that Fellowship, for a trust betrayed. In the understanding of his own time, Wykeham was doing the equivalent of a rich man today making a large down payment to a cryogenics company which guarantees to freeze your body and keep it insulated from earthquakes, civil disorder, nuclear war and other hazards, until some future time when medical science has learned how to unfreeze it and cure whatever disease it was dying of. Are we later Fellows of New College renegeing on a contract with our Founder? If so, we are in good company. Hundreds of medieval benefactors died trusting that their heirs, well paid to do so, would pray for them in purgatory. I can't help wondering what proportion of Europe's medieval treasures of art and architecture started out as down payments on eternity, in trusts now betrayed.

But what really fascinates me about the doctrine of purgatory is the *evidence* that theologians have advanced for it: evidence so spectacularly weak that it renders even more comical the airy confidence with which it is asserted. The entry on purgatory in the *Catholic Encyclopedia* has a section called 'proofs'. The essential

* Female - what would Bishop William have made of that?

evidence for the existence of purgatory is this. If the dead simply went to heaven or hell on the basis of their sins while on Earth, there would be no point in praying for them. 'For why pray for the dead, if there be no belief in the power of prayer to afford solace to those who as yet are excluded from the sight of God.' And we do pray for the dead, don't we? Therefore purgatory must exist, otherwise our prayers would be pointless! Q.E.D. This seriously is an example of what passes for reasoning in the theological mind.

That remarkable *non sequitur* is mirrored, on a larger scale, in another common deployment of the Argument from Consolation. There must be a God, the argument goes, because, if there were not, life would be empty, pointless, futile, a desert of meaninglessness and insignificance. How can it be necessary to point out that the logic falls at the first fence? Maybe life *is* empty. Maybe our prayers for the dead really *are* pointless. To presume the opposite is to presume the truth of the very conclusion we seek to prove. The alleged syllogism is transparently circular. Life without your wife may very well be intolerable, barren and empty, but this unfortunately doesn't stop her being dead. There is something infantile in the presumption that somebody else (parents in the case of children, God in the case of adults) has a responsibility to give your life meaning and point. It is all of a piece with the infantilism of those who, the moment they twist their ankle, look around for someone to sue. Somebody else must be responsible for my well-being, and somebody else must be to blame if I am hurt. Is it a similar infantilism that really lies behind the 'need' for a God? Are we back to Binker again?

The truly adult view, by contrast, is that our life is as meaningful, as full and as wonderful as we choose to make it. And we can make it very wonderful indeed. If science gives consolation of a non-material kind, it merges into my final topic, inspiration.

INSPIRATION

This is a matter of taste or private judgement, which has the slightly unfortunate effect that the method of argument I must employ is

rhetoric rather than logic. I've done it before, and so have many others including, to name only recent examples, Carl Sagan in *Pale Blue Dot*, E. O. Wilson in *Biophilia*, Michael Shermer in *The Soul of Science* and Paul Kurtz in *Affirmations*. In *Unweaving the Rainbow* I tried to convey how lucky we are to be alive, given that the vast majority of people who could potentially be thrown up by the combinatorial lottery of DNA will in fact never be born. For those of us lucky enough to be here, I pictured the relative brevity of life by imagining a laser-thin spotlight creeping along a gigantic ruler of time. Everything before or after the spotlight is shrouded in the darkness of the dead past, or the darkness of the unknown future. We are staggeringly lucky to find ourselves in the spotlight. However brief our time in the sun, if we waste a second of it, or complain that it is dull or barren or (like a child) boring, couldn't this be seen as a callous insult to those unborn trillions who will never even be offered life in the first place? As many atheists have said better than me, the knowledge that we have only one life should make it all the more precious. The atheist view is correspondingly life-affirming and life-enhancing, while at the same time never being tainted with self-delusion, wishful thinking, or the whingeing self-pity of those who feel that life owes them something. Emily Dickinson said,

That it will never come again
Is what makes life so sweet.

If the demise of God will leave a gap, different people will fill it in different ways. My way includes a good dose of science, the honest and systematic endeavour to find out the truth about the real world. I see the human effort to understand the universe as a model-building enterprise. Each of us builds, inside our head, a model of the world in which we find ourselves. The minimal model of the world is the model our ancestors needed in order to survive in it. The simulation software was constructed and debugged by natural selection, and it is most adept in the world familiar to our ancestors on the African savannah: a three-dimensional world of medium-sized material objects, moving at medium speeds relative to one another. As an unexpected bonus, our brains turn out to be

powerful enough to accommodate a much richer world model than the mediocre utilitarian one that our ancestors needed in order to survive. Art and science are runaway manifestations of this bonus. Let me paint one final picture, to convey the power of science to open the mind and satisfy the psyche.

THE MOTHER OF ALL BURKAS

One of the unhappiest spectacles to be seen on our streets today is the image of a woman swathed in shapeless black from head to toe, peering out at the world through a tiny slit. The burka is not just an instrument of oppression of women and claustal repression of their liberty and their beauty; not just a token of egregious male cruelty and tragically cowed female submission. I want to use the narrow slit in the veil as a symbol of something else.

Our eyes see the world through a narrow slit in the electromagnetic spectrum. Visible light is a chink of brightness in the vast dark spectrum, from radio waves at the long end to gamma rays at the short end. Quite *how* narrow is hard to appreciate and a challenge to convey. Imagine a gigantic black burka, with a vision slit of approximately the standard width, say about one inch. If the length of black cloth above the slit represents the short-wave end of the invisible spectrum, and if the length of black cloth below the slit represents the long-wave portion of the invisible spectrum, how long would the burka have to be in order to accommodate a one-inch slit to the same scale? It is hard to represent it sensibly without invoking logarithmic scales, so huge are the lengths we are dealing with. The last chapter of a book like this is no place to start tossing logarithms around, but you can take it from me that it would be the mother of all burkas. The one-inch window of visible light is derisively tiny compared with the miles and miles of black cloth representing the invisible part of the spectrum, from radio waves at the hem of the skirt to gamma rays at the top of the head. What science does for us is widen the window. It opens up so wide that the imprisoning black garment drops away almost completely, exposing our senses to airy and exhilarating freedom.

Optical telescopes use glass lenses and mirrors to scan the heavens, and what they see is stars that happen to be radiating in the narrow band of wavelengths that we call visible light. But other telescopes 'see' in the X-ray or radio wavelengths, and present to us a cornucopia of alternative night skies. On a smaller scale, cameras with appropriate filters can 'see' in the ultraviolet and take photographs of flowers that show an alien range of stripes and spots that are visible to, and seemingly 'designed' for, insect eyes but which our unaided eyes can't see at all. Insect eyes have a spectral window of similar width to ours, but slightly shifted up the burka: they are blind to red and they see further into the ultraviolet than we do - into the 'ultraviolet garden'.*

The metaphor of the narrow window of light, broadening out into a spectacularly wide spectrum, serves us in other areas of science. We live near the centre of a cavernous museum of magnitudes, viewing the world with sense organs and nervous systems that are equipped to perceive and understand only a small middle range of sizes, moving at a middle range of speeds. We are at home with objects ranging in size from a few kilometres (the view from a mountaintop) to about a tenth of a millimetre (the point of a pin). Outside this range even our imagination is handicapped, and we need the help of instruments and of mathematics - which, fortunately, we can learn to deploy. The range of sizes, distances or speeds with which our imaginations are comfortable is a tiny band, set in the midst of a gigantic range of the possible, from the scale of quantum strangeness at the smaller end to the scale of Einsteinian cosmology at the larger.

Our imaginations are forlornly under-equipped to cope with distances outside the narrow middle range of the ancestrally familiar. We try to visualize an electron as a tiny ball, in orbit around a larger cluster of balls representing protons and neutrons. That isn't what it is like at all. Electrons are not like little balls. They are not like anything we recognize. It isn't clear that 'like' even means anything when we try to fly too close to reality's further horizons. Our imaginations are not yet tooled-up to penetrate the neighbourhood of the quantum. Nothing at that scale behaves in

* 'The Ultraviolet Garden' was the title of one of my five Royal Institution Christmas Lectures, originally televised by the BBC under the general title 'Growing Up in the Universe'. The whole series of five lectures will be made available at www.richarddawkins.net, the website of the Richard Dawkins Foundation.

the way matter - as we are evolved to think - ought to behave. Nor can we cope with the behaviour of objects that move at some appreciable fraction of the speed of light. Common sense lets us down, because common sense evolved in a world where nothing moves very fast, and nothing is very small or very large.

At the end of a famous essay on 'Possible Worlds', the great biologist J. B. S. Haldane wrote, 'Now, my own suspicion is that the universe is not only queerer than we suppose, but queerer than we can suppose . . . I suspect that there are more things in heaven and earth than are dreamed of, or can be dreamed of, in any philosophy.' By the way, I am intrigued by the suggestion that the famous Hamlet speech invoked by Haldane is conventionally mis-spoken. The normal stress is on 'your':

There are more things in heaven and earth, Horatio,
Than are dreamt of in *your* philosophy.

Indeed, the line is often plonkingly quoted with the implication that Horatio stands for shallow rationalists and sceptics everywhere. But some scholars place the stress on 'philosophy', with 'your' almost vanishing: '. . . than are dreamt of in *ya philosophy*.' The difference doesn't really matter for present purposes, except that the second interpretation already takes care of Haldane's 'any' philosophy.

The dedicatee of this book made a living from the strangeness of science, pushing it to the point of comedy. The following is taken from the same extempore speech in Cambridge in 1998 from which I have already quoted: 'The fact that we live at the bottom of a deep gravity well, on the surface of a gas-covered planet going around a nuclear fireball ninety million miles away and think this to be *normal* is obviously some indication of how skewed our perspective tends to be.' Where other science-fiction writers played on the oddness of science to arouse our sense of the mysterious, Douglas Adams used it to make us laugh (those who have read *The Hitchhiker's Guide to the Galaxy* might think of the 'infinite improbability drive', for instance). Laughter is arguably the best response to some of the stranger paradoxes of modern physics. The alternative, I sometimes think, is to cry.

Quantum mechanics, that rarefied pinnacle of twentieth-century

scientific achievement, makes brilliantly successful predictions about the real world. Richard Feynman compared its precision to predicting a distance as great as the width of North America to an accuracy of one human hair's breadth. This predictive success seems to mean that quantum theory has got to be true in some sense; as true as anything we know, even including the most down-to-earth common-sense facts. Yet the *assumptions* that quantum theory needs to make, in order to deliver those predictions, are so mysterious that even the great Feynman himself was moved to remark (there are various versions of this quotation, of which the following seems to me the neatest): 'If you think you understand quantum theory . . . you don't understand quantum theory.'*

Quantum theory is so queer that physicists resort to one or another paradoxical 'interpretation' of it. Resort is the right word. David Deutsch, in *The Fabric of Reality*, embraces the 'many worlds' interpretation of quantum theory, perhaps because the worst that you can say of it is that it is preposterously *wasteful*. It postulates a vast and rapidly growing number of universes, existing in parallel and mutually undetectable except through the narrow porthole of quantum-mechanical experiments. In some of these universes I am already dead. In a small minority of them, you have a green moustache. And so on.

The alternative 'Copenhagen interpretation' is equally preposterous - not wasteful, just shatteringly paradoxical. Erwin Schrödinger satirized it with his parable of the cat. Schrödinger's cat is shut up in a box with a killing mechanism triggered by a quantum-mechanical event. Before we open the lid of the box, we don't know whether the cat is dead. Common sense tells us that, nevertheless, the cat must be either alive or dead inside the box. The Copenhagen interpretation contradicts common sense: all that exists before we open the box is a probability. As soon as we open the box, the wave function collapses and we are left with the single event: the cat is dead, or the cat is alive. Until we opened the box, it was neither dead nor alive.

The 'many worlds' interpretation of the same events is that in some universes the cat is dead; in other universes the cat is alive. Neither interpretation satisfies human common sense or intuition. The more macho physicists don't care. What matters is that the

* A similar remark is attributed to Niels Bohr: 'Anyone who is not shocked by quantum theory has not understood it.'

mathematics work, and the predictions are experimentally fulfilled. Most of us are too wimpish to follow them. We seem to *need* some sort of visualization of what is 'really' going on. I understand, by the way, that Schrodinger originally proposed his cat thought-experiment in order to expose what he saw as the absurdity of the Copenhagen interpretation.

The biologist Lewis Wolpert believes that the queerness of modern physics is just the tip of the iceberg. Science in general, as opposed to technology, does violence to common sense.¹⁵⁶ Here's a favourite example: every time you drink a glass of water, the odds are good that you will imbibe at least one molecule that passed through the bladder of Oliver Cromwell. It's just elementary probability theory. The number of molecules per glassful is hugely greater than the number of glassfuls in the world. So every time we have a full glass, we are looking at a rather high proportion of the molecules of water that exist in the world. There is, of course, nothing special about Cromwell, or bladders. Haven't you just breathed in a nitrogen atom that was once breathed out by the third iguanodon to the left of the tall cycad tree? Aren't you glad to be alive in a world where not only is such a conjecture possible but you are privileged to understand why? And publicly explain it to somebody else, not as your opinion or belief but as something that they, when they have understood your reasoning, will feel compelled to accept? Maybe this is an aspect of what Carl Sagan meant when he explained his motive in writing *The Demon-Haunted World: Science as a Candle in the Dark*: "Not explaining science seems to me perverse. When you're in love, you want to tell the world. This book is a personal statement, reflecting my lifelong love affair with science."

The evolution of complex life, indeed its very existence in a universe obeying physical laws, is wonderfully surprising - or would be but for the fact that surprise is an emotion that can exist only in a brain which is the product of that very surprising process. There is an anthropic sense, then, in which our existence should not be surprising. I'd like to think that I speak for my fellow humans in insisting, nevertheless, that it is desperately surprising.

Think about it. On one planet, and possibly only one planet in the entire universe, molecules that would normally make nothing

more complicated than a chunk of rock, gather themselves together into chunks of rock-sized matter of such staggering complexity that they are capable of running, jumping, swimming, flying, seeing, hearing, capturing and eating other such animated chunks of complexity; capable in some cases of thinking and feeling, and falling in love with yet other chunks of complex matter. We now understand essentially how the trick is done, but only since 1859. Before 1859 it would have seemed very very odd indeed. Now, thanks to Darwin, it is merely very odd. Darwin seized the window of the burka and wrenched it open, letting in a flood of understanding whose dazzling novelty, and power to uplift the human spirit, perhaps had no precedent - unless it was the Copernican realization that the Earth was not the centre of the universe.

'Tell me,' the great twentieth-century philosopher Ludwig Wittgenstein once asked a friend, 'why do people always say it was natural for man to assume that the sun went round the Earth rather than that the Earth was rotating?' His friend replied, 'Well, obviously because it just *looks* as though the Sun is going round the Earth.' Wittgenstein responded, 'Well, what would it have looked like if it had looked as though the Earth was rotating?' I sometimes quote this remark of Wittgenstein in lectures, expecting the audience to laugh. Instead, they seem stunned into silence.

In the limited world in which our brains evolved, small objects are more likely to move than large ones, which are seen as the background to movement. As the world rotates, objects that seem large because they are near - mountains, trees and buildings, the ground itself - all move in exact synchrony with each other and with the observer, relative to heavenly bodies such as the sun and stars. Our evolved brains project an illusion of movement onto them rather than the mountains and trees in the foreground.

I now want to pursue the point mentioned above, that the way we see the world, and the reason why we find some things intuitively easy to grasp and others hard, is that *our brains are themselves evolved organs*: on-board computers, evolved to help us survive in a world - I shall use the name Middle World - where the objects that mattered to our survival were neither very large nor very small; a world where things either stood still or moved slowly compared with the speed of light; and where the very improbable

could safely be treated as impossible. Our mental burka window is narrow because it didn't *need* to be any wider in order to assist our ancestors to survive.

Science has taught us, against all evolved intuition, that apparently solid things like crystals and rocks are really composed almost entirely of empty space. The familiar illustration represents the nucleus of an atom as a fly in the middle of a sports stadium. The next atom is right outside the stadium. The hardest, solidest, densest rock, then, is 'really' almost entirely empty space, broken only by tiny particles so far apart that they shouldn't count. So why do rocks look and feel solid and hard and impenetrable?

I won't try to imagine how Wittgenstein might have answered that question. But, as an evolutionary biologist, I would answer it like this. Our brains have evolved to help our bodies find their way around the world on the scale at which those bodies operate. We never evolved to navigate the world of atoms. If we had, our brains probably *would* perceive rocks as full of empty space. Rocks feel hard and impenetrable to our hands because our hands can't penetrate them. The reason they can't penetrate them is unconnected with the sizes and separations of the particles that constitute matter. Instead, it has to do with the force fields that are associated with those widely spaced particles in 'solid' matter. It is useful for our brains to *construct* notions like solidity and impenetrability, because such notions help us to navigate our bodies through a world in which objects - which we call solid - cannot occupy the same space as each other.

A little comic relief at this point - from *The Men who Stare at Goats* by Jon Ronson:

This is a true story. It is the summer of 1983. Major General Albert Stubblebine III is sitting behind his desk in Arlington, Virginia, and he is staring at his wall, upon which hang his numerous military awards. They detail a long and distinguished career. He is the United States Army's chief of intelligence, with sixteen thousand soldiers under his command . . . He looks past his awards to the wall itself. There is something he feels he must do even though the thought of it frightens him. He thinks about

the choice he has to make. He can stay in his office or he can go into the next office. That is his choice. And he has made it. He is going into the next office . . . He stands up, moves out from behind his desk, and begins to walk. I mean, he thinks, what is the atom mostly made up of anyway? Space! He quickens his pace. What am I mostly made of? He thinks. Atoms! He is almost at a jog now. What is the wall mostly made up of? He thinks. Atoms! All I have to do is merge the spaces. . . . Then General Stubblebine bangs his nose hard on the wall of his office. Damn, he thinks. General Stubblebine is confounded by his continual failure to walk through his wall.

General Stubblebine is appropriately described as an 'out of the box thinker' on the website of the organization which, in retirement, he now runs with his wife. It is called HealthFreedomUSA, and it is dedicated to 'supplements (vitamins, minerals, amino acids, etc.), herbs, homeopathic remedies, nutritional medicine and clean food (untainted by pesticides, herbicides, antibiotics), without corporations (through the use of government coercion) dictating to you what dosages and treatments you are allowed to use'. There is no mention of precious bodily fluids.*

Having evolved in Middle World, we find it intuitively easy to grasp ideas like: 'When a major general moves, at the sort of medium velocity at which major generals and other Middle World objects do move, and hits another solid Middle World object like a wall, his progress is painfully arrested.' Our brains are not equipped to imagine what it would be like to be a neutrino passing through a wall, in the vast interstices of which that wall 'really' consists. Nor can our understanding cope with what happens when things move at close to the speed of light.

Unaided human intuition, evolved and schooled in Middle World, even finds it hard to believe Galileo when he tells us that a cannon ball and a feather, given no air friction, would hit the ground at the same instant when dropped from a leaning tower. That is because, in Middle World, air friction is always there. If we had evolved in a vacuum, we would *expect* a feather and a cannonball to hit the ground simultaneously. We are evolved denizens of Middle World,

* www.healthfreedomusa.org/aboutus/president.shtml. For what looks like a very characterful portrait of General Stubblebine, see www.mindcontrolforums.com/images/Mind94.jpg.

and that limits what we are capable of imagining. The narrow window of our burka permits us, unless we are especially gifted or peculiarly well educated, to see only Middle World.

There is a sense in which we animals have to survive not just in Middle World but in the micro-world of atoms and electrons too. The very nerve impulses with which we do our thinking and our imagining depend upon activities in Micro World. But no action that our wild ancestors ever had to perform, no decision that they ever had to take, would have been assisted by an understanding of Micro World. If we were bacteria, constantly buffeted by thermal movements of molecules, it would be different. But we Middle Worlders are too clumsily massive to notice Brownian motion. Similarly, our lives are dominated by gravity but are almost oblivious to the delicate force of surface tension. A small insect would reverse that priority and would find surface tension anything but delicate.

Steve Grand, in *Creation: Life and How to Make It*, is almost scathing about our preoccupation with matter itself. We have this tendency to think that only solid, material 'things' are 'really' things at all. 'Waves' of electromagnetic fluctuation in a vacuum seem 'unreal'. Victorians thought that waves had to be waves 'in' some material medium. No such medium was known, so they invented one and named it the luminiferous ether. But we find 'real' matter comfortable to our understanding only because our ancestors evolved to survive in Middle World, where matter is a useful construct.

On the other hand, even we Middle Worlders can see that a whirlpool is a 'thing' with something like the reality of a rock, even though the matter in the whirlpool is constantly changing. In a desert plain in Tanzania, in the shadow of Ol Donyo Lengai, sacred volcano of the Masai, there is a large dune made of ash from an eruption in 1969. It is carved into shape by the wind. But the beautiful thing is that it *moves* bodily. It is what is technically known as a barchan (pronounced bahkahn). The entire dune walks across the desert in a westerly direction at a speed of about 17 metres per year. It retains its crescent shape and creeps along in the direction of the horns. The wind blows sand up the shallower slope. Then, as each sand grain hits the top of the ridge, it cascades down the steeper slope on the inside of the crescent.

Actually, even a barchan is more of a 'thing' than a wave. A wave *seems* to move horizontally across the open sea, but the molecules of water move vertically. Similarly, sound waves may travel from speaker to listener, but molecules of air don't: that would be a wind, not a sound. Steve Grand points out that you and I are more like waves than permanent 'things'. He invites his reader to think ...

... of an experience from your childhood. Something you remember clearly, something you can see, feel, maybe even smell, as if you were really there. After all, you really were there at the time, weren't you? How else would you remember it? But here is the bombshell: you *weren't* there. Not a single atom that is in your body today was there when that event took place . . . Matter flows from place to place and momentarily comes together to be you. Whatever you are, therefore, you are not the stuff of which you are made. If that doesn't make the hair stand up on the back of your neck, read it again until it does, because it is important.

'Really' isn't a word we should use with simple confidence. If a neutrino had a brain which had evolved in neutrino-sized ancestors, it would say that rocks 'really' do consist mostly of empty space. We have brains that evolved in medium-sized ancestors, who couldn't walk through rocks, so our 'really' is a 'really' in which rocks are solid. 'Really', for an animal, is whatever its brain needs it to be, in order to assist its survival. And because different species live in such different worlds, there will be a troubling variety of 'reallys'.

What we see of the real world is not the unvarnished real world but a *model* of the real world, regulated and adjusted by sense data - a model that is constructed so that it is useful for dealing with the real world. The nature of that model depends on the kind of animal we are. A flying animal needs a different kind of world model from a walking, a climbing or a swimming animal. Predators need a different kind of model from prey, even though their worlds necessarily overlap. A monkey's brain must have software capable

of simulating a three-dimensional maze of branches and trunks. A water boatman's brain doesn't need 3D software, since it lives on the surface of the pond in an Edwin Abbott Flatland. A mole's software for constructing models of the world will be customized for underground use. A naked mole rat probably has world-representing software similar to a mole's. But a squirrel, although it is a rodent like the mole rat, probably has world-rendering software much more like a monkey's.

I've speculated, in *The Blind Watchmaker* and elsewhere, that bats may 'see' colour with their ears. The world-model that a bat needs, in order to navigate through three dimensions catching insects, must surely be similar to the model that a swallow needs in order to perform much the same task. The fact that the bat uses echoes to update the variables in its model, while the swallow uses light, is incidental. Bats, I suggest, use perceived hues such as 'red' and 'blue' as internal labels for some useful aspect of echoes, perhaps the acoustic texture of surfaces; just as swallows use the same perceived hues to label long and short wavelengths of light. The point is that the nature of the model is governed by how it is to be *used* rather than by the sensory modality involved. The lesson of the bats is this. The general form of the mind model - as opposed to the variables that are constantly being inputted by sensory nerves - is an adaptation to the animal's way of life, no less than its wings, legs and tail are.

J. B. S. Haldane, in the article on 'possible worlds' that I quoted above, had something relevant to say about animals whose world is dominated by smell. He noted that dogs can distinguish two very similar volatile fatty acids - caprylic acid and caproic acid - each diluted to one part in a million. The only difference is that caprylic acid's main molecular chain is two carbon atoms longer than the main chain of caproic acid. A dog, Haldane guesses, would probably be able to place the acids 'in the order of their molecular weights by their smells, just as a man could place a number of piano wires in the order of their lengths by means of their notes'.

There is another fatty acid, capric acid, which is just like the other two except that it has yet two more carbon atoms in its main chain. A dog that had never met capric acid would perhaps have no more trouble imagining its smell than we would have trouble

imagining a trumpet playing one note higher than we have heard a trumpet play before. It seems to me entirely reasonable to guess that a dog, or a rhinoceros, might treat mixtures of smells as harmonious chords. Perhaps there are discords. Probably not melodies, for melodies are built up of notes that start or stop abruptly with accurate timing, unlike smells. Or perhaps dogs and rhinos smell in colour. The argument would be the same as for the bats.

Once again, the perceptions that we call colours are tools used by our brains to label important distinctions in the outside world. Perceived hues - what philosophers call qualia - have no intrinsic connection with lights of particular wavelengths. They are internal labels that are *available* to the brain, when it constructs its model of external reality, to make distinctions that are especially salient to the animal concerned. In our case, or that of a bird, that means light of different wavelengths. In a bat's case, I have speculated, it might be surfaces of different echoic properties or textures, perhaps red for shiny, blue for velvety, green for abrasive. And in a dog's or a rhino's case, why should it not be smells? The power to imagine the alien world of a bat or a rhino, a pond skater or a mole, a bacterium or a bark beetle, is one of the privileges science grants us when it tugs at the black cloth of our burka and shows us the wider range of what is out there for our delight.

The metaphor of Middle World - of the intermediate range of phenomena that the narrow slit in our burka permits us to see - applies to yet other scales or 'spectrums'. We can construct a scale of improbabilities, with a similarly narrow window through which our intuition and imagination are capable of going. At one extreme of the spectrum of improbabilities are those would-be events that we call impossible. Miracles are events that are extremely improbable. A statue of a madonna could wave its hand at us. The atoms that make up its crystalline structure are all vibrating back and forth. Because there are so many of them, and because there is no agreed preference in their direction of motion, the hand, as we see it in Middle World, stays rock steady. But the jiggling atoms in the hand *could* all just *happen* to move in the same direction at the same time. And again. And again . . . In this case the hand would move, and we'd see it waving at us. It could happen, but the odds

against are so great that, if you had set out writing the number at the origin of the universe, you still would not have written enough zeroes to this day. The power to calculate such odds - the power to quantify the near-impossible rather than just throw up our hands in despair - is another example of the liberating benefactions of science to the human spirit.

Evolution in Middle World has ill equipped us to handle very improbable events. But in the vastness of astronomical space, or geological time, events that seem impossible in Middle World turn out to be inevitable. Science flings open the narrow window through which we are accustomed to viewing the spectrum of possibilities. We are liberated by calculation and reason to visit regions of possibility that had once seemed out of bounds or inhabited by dragons. We have already made use of this widening of the window in Chapter 4, where we considered the improbability of the origin of life and how even a near-impossible chemical event must come to pass given enough planet years to play with; and where we considered the spectrum of possible universes, each with its own set of laws and constants, and the anthropic necessity of finding ourselves in one of the minority of friendly places.

How should we interpret Haldane's 'queerer than we can suppose'? Queerer than can, *in principle*, be supposed? Or just queerer than we can suppose, given the limitation of our brains' evolutionary apprenticeship in Middle World? Could we, by training and practice, emancipate ourselves from Middle World, tear off our black burka, and achieve some sort of intuitive - as well as just mathematical - understanding of the very small, the very large, and the very fast? I genuinely don't know the answer, but I am thrilled to be alive at a time when humanity is pushing against the limits of understanding. Even better, we may eventually discover that there are no limits.

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Notes

Preface

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Chapter 1: A deeply religious non-believer

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Chapter 3: Arguments for God's existence

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Chapter 4: Why there almost certainly is no God***The Ultimate Boeing 747***

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Chapter 5: The roots of religion*The Darwinian imperative*

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Group selection

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Religion as a by-product of something else

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Chapter 6: The roots of morality: why are we good?

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Chapter 7: The 'Good' Book and the changing moral *Zeitgeist*

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The Old Testament

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The moral Zeitgeist

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107 Bullock (2005).

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109 http://homepages.paradise.net.nz/mischedj/ca_hitler.html.

110 Bullock (2005: 96).

111 Adolf Hitler, speech of 12 April 1922. In Baynes (1942: 19-20).

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<http://www.ffrf.org/fttoday/back/hitler.html>.

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Chapter 8: What's wrong with religion? Why be so hostile?

Fundamentalism and the subversion of science

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116 Both my quotations from Wise come from his contribution to the 1999 book *In Six Days*, an anthology of essays by young-Earth creationists (Ashton 1999).

The dark side of absolutism

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- 118 John William Gott's imprisonment for calling Jesus a clown is mentioned in *The Indypedia*, published by the *Independent*, 29 April 2006. The attempted prosecution of the BBC for blasphemy is in BBC news, 10 Jan. 2005: http://news.bbc.co.uk/1/hi/entertainment/tv_and_radio/4161109.stm.
- 119 http://adultthought.ucsd.edu/Culture_War/The_American_Taliban.html.

Faith and homosexuality

- 120 Hodges (1983).
- 121 This and the remaining quotations in this section are from the American Taliban site already listed; http://adultthought.ucsd.edu/Culture_War/The_American_Taliban.html.
- 122 http://adultthought.ucsd.edu/Culture_War/The_American_Taliban.html.
- 123 From Pastor Phelps's Westboro Baptist Church official website, [godhatesfags.com](http://www.godhatesfags.com): http://www.godhatesfags.com/fliers/jan2006/20060131_coretta-scott-king-funeral.pdf.

Faith and the sanctity of human life

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- 125 For an interesting analysis of what makes Texas different in this respect, see <http://www.pbs.org/wgbh/pages/frontline/shows/execution/readings/texas.html>.
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134 Harris (2004: 29).

135 Nasra Hassan, 'An arsenal of believers', *New Yorker*, 19 Nov. 2001. See also http://www.bintjbeil.com/articles/en/011119_hassan.html.

Chapter 9: Childhood, abuse and the escape from religion***Physical and mental abuse***

136 Reported by BBC news:

<http://news.bbc.co.Uk/1/hi/wales/901723.stm>.

137 Loftus and Ketcham (1994).

138 See John Waters in the *Irish Times*:

<http://oneinfour.org/news/news2003/roots/>.

139 Associated Press, 10 June 2005: <http://www.rickcross.com/reference/clergy/clergy426.html>.

140 <http://www.avl611.org/hell.html>.

In defence of children

141 N. Humphrey, 'What shall we tell the children?', in Williams (1998); repr. in Humphrey (2002).

142 <http://www.law.umkc.edu/faculty/projects/ftrials/conlaw/yoder.html>.

An educational scandal

143 *Guardian*, 15 Jan. 2005:

<http://www.guardian.co.uk/weekend/story/0,,1389500,00.html>.

144 *Times Educational Supplement*, 15 July 2005.

145 <http://www.telegraph.co.uk/opinion/main.jhtml?xml=/opinion/2002/03/18/dol801.xml>

- 146 *Guardian*, 15 Jan. 2005: <http://www.guardian.co.uk/weekend/story/0,,1389500,00.html>.
- 147 The text of our letter, drafted by the Bishop of Oxford, was as follows:

Dear Prime Minister,

We write as a group of scientists and Bishops to express our concern about the teaching of science in the Emmanuel City Technology College in Gateshead. Evolution is a scientific theory of great explanatory power, able to account for a wide range of phenomena in a number of disciplines. It can be refined, confirmed and even radically altered by attention to evidence. It is not, as spokesmen for the college maintain, a 'faith position' in the same category as the biblical account of creation which has a different function and purpose.

The issue goes wider than what is currently being taught in one college. There is a growing anxiety about what will be taught and how it will be taught in the new generation of proposed faith schools. We believe that the curricula in such schools, as well as that of Emmanuel City Technical College, need to be strictly monitored in order that the respective disciplines of science and religious studies are properly respected.

Yours sincerely

- 148 *British Humanist Association News*, March-April 2006.
- 149 *Observer*, 22 July 2004: <http://observer.guardian.co.uk/magazine/story/0,11913,1258506,00.html>.

Consciousness-raising again

- 150 The Oxford Dictionary takes 'gay' back to American prison slang in 1935. In 1955 Peter Wildeblood, in his famous book *Against the Law*, found it necessary to define 'gay' as 'an American euphemism for homosexual'.
- 151 <http://uepengland.com/forum/index.php?showtopic=184&mode=linear>.

Religious education as a part of literary culture

- 152 Shaheen has written three books, anthologizing biblical references in the comedies, tragedies and histories separately. The summary count of 1,300 is mentioned in
<http://www.shakespearefellowship.org/virtualclassroom/StritmatterShaheenRev.htm>.
- 153 [http://www.bibleliteracy.org/Secure/Documents/BibleLiteracyReport2005 .pdf](http://www.bibleliteracy.org/Secure/Documents/BibleLiteracyReport2005.pdf).

Chapter 10: A much needed gap?***Consolation***

- 154 From memory, I attribute this argument to the Oxford philosopher Derek Parfitt. I have not researched its origins thoroughly because I am using it only as a passing example of philosophical consolation.
- 155 Reported by BBC News:
http://news.bbc.co.uk/1/hi/special_report/1999/06/99/cardinal_hume_funeral/376263.stm.

The mother of all burkas

- 156 Wolpert (1992).