

A fractal pattern with a lion's head in the center. The fractal is composed of a central black circle containing a lion's head, surrounded by a red and yellow branching structure, which is itself surrounded by a larger black circle and a red and yellow branching structure.

THE GOD THEOREM

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by Dr C.D.H. Cooper

**God seen through the eyes of a
mathematician**

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PREFACE

Throughout the centuries theologians have sought a logical proof of the existence of God and Christians have been tired of atheists ridiculing them for believing something they cannot prove. If only there was a proof, based on pure logic, then the atheists would have to shut up and leave us alone.

Before Darwin, the ‘Proof by Design’ was considered to be fairly convincing. The world is so complex it could not possibly have come about by chance. If you come across a clock, there must have been a clockmaker – cogs and wheels don’t just assemble themselves into a working mechanism.

Darwin, with his theory of evolution, pulled the plug on such an argument. He showed how complexity can arise without the need to assume a creator.

An argument that’s more in the line of a mathematical proof is ‘Argument by Definition’. We define God to be a being who is perfect in every way. Now existence is better than non-existence, and so if God didn’t exist he would be less than perfect, contradicting the definition. Therefore God exists!

Convinced? I thought not. The problem is the way existence is built into the definition. I might define a Jabberwocky as a winged creature that exists. If he didn’t exist he wouldn’t be a Jabberwocky, so Jabberwocky’s must exist. A much

better proof is the following. See if you can find the flaw in it.

Theorem: God exists.

Proof: Consider the following two statements:

- (1) God exists;
- (2) Both statements of these statements are FALSE.

Now statement (2) must be either TRUE or FALSE.

Suppose statement (2) is TRUE:

In other words both statements are FALSE. But we are supposing that (2) is TRUE. Hence we get a contradiction.

Therefore statement (2) is FALSE.

So it is false that both statements are FALSE and so at least one of them must be TRUE. But clearly it can't be statement (2) that's TRUE – we have just shown that it's FALSE.

So it has to be statement (1) which is TRUE. Therefore God exists, Q.E.D.

You might need to think about this carefully, but take it from me that the logical steps are quite sound. However you might be getting an uneasy feeling that it's all too slick. Moreover it may occur to you that you could replace statement (1) by anything at all and the proof would still work! An atheist only has to change statement (1) to read 'God does not exist' and he has a watertight proof to support his atheism. Something funny is going on here!

The problem doesn't lie in the logical steps themselves, but in the assumption that statement (2) is really a valid statement – a sentence for which it is meaningful to say that it is either TRUE or FALSE. It is *not* a valid statement because it refers to itself.

Self-referentiality must be ruled out when considering any logical statement. There's the old story of the barber who shaves everyone in town who doesn't shave himself. The question is whether he shaves himself. If he does then he doesn't and if he doesn't then he does! The most stark version of this phenomenon is the sentence:

THIS SENTENCE IS FALSE

If it is TRUE then it is FALSE and if it is FALSE then it is TRUE. Therefore it is nonsense.

So we must avoid self-referentiality. If we do, are we safe? Not really, because there's an even more subtle proof of the God theorem – one that avoids self-referentiality. If you can be bothered you will find it in the APPENDICES. But don't expect to find it to be any more convincing. It's just a more subtle logical sleight of hand.

As a mathematician I have worked with logical arguments all my life and I'm very well aware of the limitations of logic. My firm belief is that one cannot prove that God exists, but I'm also confident that the atheist cannot prove his position

either – at least not by anything that would convince a mathematician.

Not that all mathematicians believe in God – far from it. But many mathematicians do. So if there was a logical proof that there is no God there would be *no* Christian mathematicians – and no Jewish mathematicians and no Islamic mathematicians. Of course if there *was* a proof of the existence of God then all mathematicians would be have to be believers (except that the term ‘believer’ would no longer be relevant).

I believe that the question of the existence of God is logically undecidable. I believe that no-one will ever be able to prove that God exists and that no-one will ever be able to prove that God does not exist.

In the deeper realms of mathematics there are many such unprovable statements and undecidable questions. Moreover, unlike the question of God’s existence, we *know* that these mathematical statements are undecidable because we have logical proofs that they are so.

Mathematicians are the great spoil-sports of the thinking world. We love proving that certain things are impossible, that certain questions are undecidable and that certain numbers are uncomputable. This is bread and butter for us in certain branches of mathematics.

So I may not be able to prove that God exists but, as a mathematician, I believe that I have some useful things to say about belief in general, and about belief in God in particular.

Before you close this book, and throw it away saying, “I thought this was going to be a book about God, but it seems it’s just a book about mathematics and logic” let me assure you that it won’t be all like that. It is my account of how I can reconcile having a belief in God with having a very logical mind. Believing things you cannot prove is not such a silly thing as it might seem!

CHAPTER ONE:

MY LIFE

In this chapter I will lay the foundations by outlining my life, mainly from the perspective of my belief in God. My life is not a particularly interesting or important one, but it will give you an idea of the background from which I have formulated my views about God.

My earliest memory of church was the Sunday School at the Congregational Church in Tilba Street, Berala, a suburb of Sydney. I was five years old at the time, so my memories are very patchy. The only thing I can recall from this Sunday School was the sand tray, on a table, where Bible stories were acted out with cardboard figures that stood up in the sand.

A year or so later I heard of another Sunday School, at a church in nearby Lidcombe. This had the advantage of being held in the afternoon, and so I didn't have to get up so early. I managed to persuade Mum and Dad to allow me to make the switch. The fact that it was a Brethren Sunday School didn't seem to bother them. It must have been an 'open' Brethren church because they didn't seem to me to be all that different to the Congregationalists.

The only thing I remember of this Sunday School was going to my teacher's house one evening where he showed some of us his microscope. We marvelled at the beauty of the specimens that he had

mounted on the slides. Then he gently told us that the complexity of life proved that there was a God who created them.

My parents had been involved in church in their younger days but they had become, what we call in the trade, ‘backsliders’. I think I remembered a verse in the Bible that said something about God spewing backsliders out of his mouth, but I somehow didn’t think that my parents were in any danger. They were just one of those married couples who had stopped going to church because they were too busy at weekends, but who nevertheless believed that their children should attend Sunday School.

When I was ten, my parents decided that we should move. I forget why. My grandparents were getting older, so perhaps the plan was to move closer to them. They were living in Bay Street in Brighton-le-Sands and so we were looking in the St George area. One day I came across an advertisement, in the paper, for a house in Bexley – near enough to Brighton-le-Sands.

“Look,” I said excitedly, “this house has a tennis court in the backyard!” I don’t know why I thought a tennis court would be an asset. I’d never even held a tennis racket at that point. But they were persuaded and, for £5000, we became the proud owners of a house in Mimosa Street, *and* a tennis court.

I never looked back. That tennis court became an endless source of pocket money for me.

We hired it out and I was the one who got paid to maintain it. It was a clay court, so when it rained, I had to roll it dry. When the wind blew all the sand up one end I had to sweep it back. Before each hiring I had to mark the lines with whitewash.



My uncle Ken made a contraption with a tray attached to a handle, and a large, wide wheel. The whitewash went into the tray, was picked up and spread on the wheel, and then was transferred to the ground.

Being a bit of a ‘wag’ he’d painted the ‘instructions’ on the handle: PUSH TO START, AND KEEP PUSHING. I found out years later that Ken Rosewall, the famous Australian tennis player, had learnt to play tennis on our court, but this was a few years before we took it over.

My parents sent my sister and me to Sunday School (my younger brothers had not yet arrived). Being pragmatic as usual, they sent us to the nearest one so that we could walk. This happened to be West Bexley Methodist Church in St Georges Road, the street directly behind our house.

I grew up being quite a well-behaved child because I remember very few occasions when I got into trouble. The only misdemeanour that I can remember (there must have been others) was when my parents gave my five-year old sister, Cheryl, a pair of plastic scissors, telling her that she could cut paper but that they were too blunt to cut material. I promptly tested this out on my bed sheet and proudly told them that they were wrong. If you hold the plastic scissors in a certain way you *could* cut material. “Look I managed to cut my sheet completely in two!”

It’s true that parents hate it when their children prove them wrong. At least I presume that’s why I was severely punished. But that didn’t stop me trying to prove my father wrong. In fact my love of music was fostered by a bet that I once made with him.

I was 15 when I read an advertisement in the Sunday paper for a perpetual calendar. It was a device made from cardboard, with rotating wheels. To demonstrate how useful such a device was, the advertisement quoted several statements from books and magazines that declared that such and such an historical event took place on such and such a day and date. The day of week in the book, they said, didn’t match the date, and they proceeded to give the correct day of the week, using their perpetual calendar.

Now, I had created a perpetual calendar of my own. Mine was based on the slide rule. You

moved the slider until the month matched the year. Then opposite the day of the month was the day of the week. I checked the claims of the advertisement against my device and discovered that indeed the dates they quoted were wrong, but so were their ‘corrected’ dates – every one of them!

I told my father and, of course, he didn’t believe me. Naturally the advertisers would have carefully checked their claims before having the advertisement published. But I held my ground. I was convinced I was right. In fact I was so convinced that I was right I bet my father £5 that the advertisement was wrong.

If I had proved to be the one who was wrong I don’t think my father would have exacted the money from me. But it turned out that I *was* right! I wrote to the manufacturers of the calendar and got back an apologetic letter in which they explained how their mistake had come about. They included, for free, one of their calendars, which did in fact agree with my own.

With the £5 that I won I bought a second hand record player, plus a set of 78 records, including Grieg’s Piano Concerto. This has continued to be my favourite piano concerto. I would play it over and over again in my bedroom, conducting an imaginary orchestra and pianist.

But let’s wind the clock back a few years and continue with my Christian pilgrimage. One day, when I was about 14, I heard on the radio an

announcement about a Christian youth camp at Crosslands, on the Hawkesbury River. My parents were happy for me to go. I had to meet up with the group at Burwood and, as I was living in Bexley, it meant catching the 492 or 494 green double-decker bus that ran at the bottom of our street. My parents were happy for me to go on my own and, as I was now 14, I didn't mind.

I had a small bag and a rolled-up sleeping bag with me, and these I put in the space under the stairs at the back of the bus. In those days of double-decker buses there was no door.

To my horror, when we were nearly at Burwood, the bus went rather quickly around a corner and the centripetal force caused my sleeping bag to roll off. I say 'centripetal' rather than 'centrifugal'. We learnt in physics the difference between the two. I don't know whether I'm using the right word here, but '-petal' sounds so much nicer than '-fugal'.

Of course I had to go back at the next stop to retrieve my bed, which meant catching the next bus. I must have allowed plenty of time because I don't recall being late at the meeting place.

Crosslands was a youth camp-site and we had bunk beds in dormitories. There was plenty to do during the week – canoeing, hiking, swimming and campfires at night. I got my first taste of damper, which we made ourselves by wrapping the dough around the end of a stick and putting it in the embers. We filled it with honey and it was delicious.

Because it was a Christian camp we had Bible studies in the mornings and sang choruses at night. Along with the choruses were talks about how Jesus loves us and wants us to give our lives to him. So, when the inevitable appeal came one night – “if you would like to give your heart to Jesus, come forward”, I was one of the first to come out. My Sunday School teachers must have done a good job in ‘preparing the ground’.

The food was good – stews at night, and slices of sausage with the salads at lunch time. It didn’t occur to me that it wasn’t *real* meat. It was only on the second last day that I realised that I was on a Seventh Day Adventist Camp! I’m sure nothing about this was said on the radio, or if it did it must have gone right over my head! Never mind, the leaders were lovely people and I was sure that Jesus didn’t mind that I gave my heart to him among the Seventh Day Adventists.

There was no attempt made to convert me to that particular brand of Christianity, and once home I was never followed up. I joined a Christian Endeavour youth group at my own church, West Bexley Methodist. This group emphasised leadership and I became quite comfortable in doing Bible readings, saying prayers out loud and even giving little talks. There was also a youth group that held social activities, including dances. This was quite an innovation since traditionally Methodism had been against dancing until a couple of years before.

Somehow I soon found myself the youth leader, and I was planning everything from silent retreats to dances and youth camps. When the Billy Graham Crusade came to town in 1959 I was one of the hundreds of councillors trained to talk to the tens of thousands of people who came forward and 'gave their hearts to the Lord'.

I remember being somewhat amused by the training. We were given a small pack of cards, each with a Bible verse. Our job, we were told, was to show these in a certain order. They reminded me of the steps of a mathematical proof.

- (1) All have sinned and come short of the glory of God.
- (2) The wages of sin is death.
- (3) For God so loved the world that he gave his only begotten Son, so that whosoever believeth in him shall have eternal life.

Looking back I find that the Billy Graham approach to evangelism was rather simplistic. But it did a lot of good in getting many people to think about their lives. It certainly did a lot for my parents who came forward and renewed their commitment. Since it was the Kingsgrove Baptist Church whose bus had taken them to the Showground they became members of that Church. My two younger brothers, Greg and Jonathan, also went to that church while my sister Cheryl and I continued to be Methodists.

During my early years at high school, Canterbury Boys High, I developed an interest in journalism. That's what I wanted to do when I left school. In Berala, when I was seven, I had run a local newspaper called *Treasure Box*. Admittedly it had a very small circulation – just three or four copies. This was because each copy had to be written out and coloured by hand.

When we moved to Bexley I acquired a spirit duplicator, with purple stencils. It wasn't one of those where you turned a handle, but rather a flat-bed version that was rather more primitive. I used this to print another local 'newspaper'. I think this one may have had a circulation of a dozen copies.

My next venture was the *1A Times*. This was run off on a Gestetner, and it circulated, I think, to the whole class. I doubt if it went to the whole school, which is a pity because then ex Prime Minister John Howard would have probably read it. He was two years ahead of me, though I only found out about it years later. I found a photo of him as part of the debating team, in the annual school publication, *Canterbury Tales*.

My interest in journalism peaked when I was fourteen when I asked for the Kemsley *Manual of Journalism* as a Christmas present. It then plummeted as a result of a mediocre English result in the Intermediate Certificate. However my mathematics marks started to soar, so for the Leaving Certificate I got first class honours in Mathematics I and II and Physics, an A in Chemistry and only a B

in English. Clearly I had made the right decision to drop journalism. A science degree was what I was cut out for.

At Sydney University in those days, you did four subjects in first year, three in second and two in third year. If you went on to do the honours year you chose just one subject. Not being sure what I wanted to do, I operated on the principle of dropping, each year, the subject in which I had received the poorest result.

In first year I studied Pure and Applied Mathematics, Physics, Chemistry and Psychology. In second year it was Pure Maths, Physics and Mathematical Statistics. In third year I dropped the Physics and just did Maths and Stats. For my honours year I was down to Pure Mathematics.

At the end of first year I informed my father that I was going to spend the summer vacation doing ‘research’ on my own. He told me I had to get a part time job instead. I got three, each for a short period. One was at Lowes, a men’s store in Hurstville. I hated it. When we weren’t busy I had to fold the shirts. If we were still not busy I had to fold them again. I can understand what Charles Dickens went through in the blacking factory, but at least he was able to sit down.

Another job was with Otis Elevators, helping with stocktaking. This meant counting trays of small components, such as screws. Nobody had heard of counting by weighing. Come to think of it, even

banks back then were still counting coins individually.

My third job was more interesting. It was in an insurance company that printed its own stationary and leaflets. I was introduced there to the glories of offset printing. I had always had a bit of an interest in printing. There was a printery at the bottom of Mimosa Street. The printing press was in the window and I saw it thousands of times as I walked past. It was one of those old-fashioned ones that used movable type and it looked as though it was a hundred years old even then. That was in the 1950s. Amazingly it was still there when I drove past it in 2016!

In the 1970s I brought back from England a small hand-operated Adana press, which I used to print dinner party menus and other ephemera. My masterpiece was a pair of labels I printed for a couple of wine bottles. I had taken the labels off two identical bottles of a fairly good Australian red and replaced them with my own labels. One said that the wine came from Wollongong, in New South Wales, and the other claimed that the wine came from Bordeaux.



We had invited my professor, Alf van der Poorten, to dinner, with his wife Joy, and another

professorial couple. Alf had prided himself on his knowledge of wine, so I asked him to give his opinion of these ‘two’ reds. After a lot of looking at the colour, sniffing the cork, and swirling the wine and then tasting it, he declared that they were somewhat similar, but that without doubt the French one was much better! He was very good about it when he later found out what I’d done, and laughed at the incident.

After second year I knew I had to get a vacation job, so I wrote to the CSIRO and managed to get a job at the Fisheries and Oceanography Division in Cronulla. My one year of statistics came in handy. My job was to analyse data from prawn catches off the coast of Queensland.

I had a FACIT calculator to assist me. It actually ran on electricity so that you didn’t have to turn the handle. At university, in the statistics laboratories, they had machines where you pulled down pins, one for each digit, and then turned the handle – forward to add and backwards to subtract. On this electrical calculator it was done automatically once you pressed the PLUS or MINUS keys.

Division was the most fun, because it was done by repeated subtraction. The machine whirred backwards until the result became negative, went forward once and then the number being subtracted moved one position to the left. This meant that once

you pressed DIVIDE the machine went whirring around, forward back and left, for up to 20 seconds.

I was supposed to correlate the amount of prawns caught with the length of the trawl, the time of day, the weather conditions, atmospheric temperature and pressure and type of bottom of the ocean. (The prawning was only done in shallow waters.) The only useful piece of information I remember finding was that the quantity of prawns caught went down dramatically whenever the ship was near a big town. This could have been due to pollution, but my guess was that when they were near a big town they spent more time ashore than they accounted for and exaggerated the duration of the trawl.

For the long vacation at the end of third year I went to Adelaide, or Salisbury to be exact. My job, for three months, was with the Weapons Research Establishment. The associated rocket range was in the north of the state at Woomera but I never got to go there.



My memories of Salisbury were that of a very hot, dry barren place. It was very much a country area. I'm told it's very built up now. There was a reasonably good

motor rail service into Adelaide, taking about half an hour. I boarded with a family in Salisbury.

I turned up at WRE on my first day and I was assigned to Maths Services. I was given a Fortran manual and told to study it. The computer there was an IBM 7090 – state of the art. It had a whole 16 kilobytes of memory!

For those of you who are more used to the gigabytes in your mobile phone, 1GB is equal to 1,000,000kB. So you probably have 32 million kilobytes sitting in the palm of your hand. We had to do everything in just 16 kilobytes!

At that time there were only about six computers in the whole of Australia. One of them was another IBM7090 that belonged to the hospital insurance company HCF. They were so proud that they had a computer that they installed it in the shop-front window of their premises so that the world could see how efficient and progressive they were!

I never actually got to see the actual computer at WRE. It was God, secreted in the holy of holies. It was fed with punched cards, but we weren't even allowed to punch our own cards. These days you type your program into your lap-top, run it, look at the results, modify the program and run it again. We had to write our program onto a coding sheet. These were left in a hole in the wall for the punch girls to punch out cards, one for each line of the program. The next day we'd go to a different place to find a deck of punched cards with our name on it. We'd then have to check the cards, and if there were any

errors we'd send in a fresh coding sheet for the replacements.

When we were finally happy, we put a rubber band around the cards, making sure they were in the right order, and put them into yet another hole-in-the-wall. If we were lucky, the next day the deck would be returned, wrapped up in a large sheet of printout paper, with the results.

Frequently, though, the printout would say something like "too many left parentheses in line 173". We'd look at the card, compare it with the coding sheet, kick ourselves for having been so careless, order a replacement punch card and then resubmit. We quickly learnt to be meticulous with our coding.

But, I'm jumping ahead of myself. I spent my first week poring over a Fortran manual. Fortran is one of the early programming languages and you had to learn what each type of instruction did, and what format was expected for it. 'Fortran' stands for 'formula translator'. The very earliest computers had to be programmed in machine code – just a series of numbers. With Fortran you could use words – just a limited vocabulary – and the computer would automatically convert the program into machine code.

After a week of just sitting and reading the manual I was keen to actually try my hand at programming. I asked my boss if I could. "Not yet," he said, "we haven't quite worked out a project for you". Another week of poring over the manual! After

three weeks I began to get bored and started wandering around the campus to visit some of my friends who were working in other sections. I found myself spending time with a certain Dr Jim Burns who was supervising my friend, Phil Diamond. He said that he had a project I could work on – just until my section decided what they wanted me to do.

The program I wrote was called HOTAIR. It predicted the trajectory of a rocket, taking into account the altitude, temperature and pressure in the upper atmosphere. There were lots of formulae to be incorporated – formulae that dealt with the changes in chemical composition of the air under different circumstances.

After many weeks I got this working. At the start of my final week my own boss said, “oh, we’ve found a project for you, but I gather you’ve found one of your own.”

During this time I remember I was avidly reading C.S. Lewis. I visited the Methodist Book Depot in Adelaide every Saturday and bought up every C.S. Lewis book they had. I quickly exhausted all his religious books. He wrote about religion in the same logical manner that I expected as a mathematician. I read that he claimed that he wasn’t very good at mathematics, but apparently his mother had gained a first class honours degree in mathematics so his genes must have helped him.

I then discovered that, as Professor of Medieval and Renaissance Language in Oxford and later in Cambridge, Lewis had written many books

on English Literature. I took to these like a duck to water.

Then I discovered his Narnia children's books – then his science fiction, and a whole lot of other writings. C.S. Lewis wasn't a mathematician, but he spoke to me about religion as if he was. It all made real sense. Everything was argued out in a clear and logical way. But I found his interest in fantasy equally fascinating.

At the beginning of 1963 I organised a weekend camp for my youth group at West Bexley. It was held at the Wykehurst guest house in Katoomba. One of the waitresses was a Dutch girl called Fran. Some of our group invited her to join us at the dance that we were holding on the Saturday night. I vaguely remember her being at the dance, but I was preoccupied with a girl that our previous minister had sent along. She didn't know anyone so I felt obliged to look after her. Of course Fran didn't know anyone either, but she seemed to be alright and attracted quite a bit of interest from a couple of the boys!

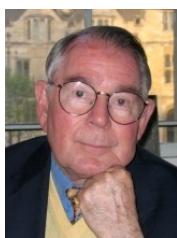
Going back to Sydney on the bus it so happened that I sat next to Fran, and by the time we reached Sydney we were good friends. We got engaged later that year and were married in 1965. She attended the Baptist church in Kogarah, which was not far from Bexley. The fact that she was

Dutch, and came to Australia at the age of nine, made her seem rather exotic.

That year I was doing my Masters in group theory. I already had plans to go to London to do my PhD when I had finished the Masters. My dream then was that somehow I would get to meet my intellectual hero, C.S. Lewis himself. And then, on the very same day that Kennedy was assassinated, Lewis died. Pop went my dreams!

In 1965 I travelled on the *Orcades*, with my wife Fran, as she was then. She later changed her name to her second name, Elisabeth. On board we met Darryl Williams and became good friends with him. Although she had only been married to me for a few months, Fran had a crush on him. He was handsome and single and very intelligent. Fortunately it was never more than a crush, and to this day Darryl doesn't know that he made her heart flutter a little!

Darryl was a Rhodes Scholar and he was travelling to Oxford to do a postgraduate degree in law. We were in London and Darryl invited us up to Oxford one weekend. He was sharing a flat with an



older man, an Episcopalian priest, with a deep drawl. Walter was from the deep south of the USA and every syllable was lovingly polished before he moved onto the next. Now imagine my delight when I discovered that Walter Hooper had been C.S. Lewis's

secretary for the last few years of his life, and had the task of preparing Lewis's unpublished manuscripts for publication.

Walter took us on a C.S. Lewis tour of Oxford. We visited Lewis's grave and we met Warnie, C.S. Lewis's older brother. Poor Major Warren Lewis, who was himself an author in the area of military history, must have felt a bit jealous when his younger brother became a household name. But he was very gracious about it, and spoke fondly of Jack, as C.S. was known to his friends.

Warnie told us that, as a boy, Clive had a dog called Jackie, and when this dog was run over, Clive was uncontrollable with grief. From that day he insisted that everyone was to call him 'Jack'.

Walter took us to The Kilns, the house in Oxford where Jack spent the last few decades of his life. When he transferred to Cambridge he still lived in Oxford and commuted. The property has a pottery kiln, which hadn't operated for a very long time. It was on about an acre of land and at the bottom of the garden was a little stream, with a tiny bridge, and a gate that led out to a park. On this gate was a message that trespassers would *not* be treated kindly. This was erected when Jack's wife, Joy, was alive. She hated walkers taking shortcuts across the property. If you have read, or seen the film, *Shadowlands*, you'll know that Joy was quite a formidable lady.

Returning to Australia I continued collecting books by C.S. Lewis, but my thinking about religion

developed beyond what I had learnt from him. Being a mathematician I began to frame my religious beliefs in the light of my mathematical training.

I spent my working life teaching mathematics at Macquarie University, in Sydney. In the early 70s I began writing some mathematics books designed for A level students in England who wanted to go beyond the A level syllabus. It was a series called *Exploring Mathematics On Your Own*. I was delighted to find that my publisher, John Murray, had also been Jane Austen's publisher! Well, she dealt with John Murray the second while I was published when John Murray the fifth or sixth was at the helm.

I began to develop a strong interest in English literature. This began with reading C.S. Lewis. But he specialised in medieval and renaissance literature, while I fell in love with eighteenth and nineteenth century writers.

In the late 80s I found myself being president of the Australian Brontë Association. My favourite Brontë novel is *Wuthering Heights* by Emily Brontë. Like C.S. Lewis she had little formal training in mathematics but she had a 'man's mind', as her teacher in Brussels once remarked – that is, she had a logical mind and a love of structure and symmetry.

In addition to finding mathematics in literature I have been very interested in the connection between mathematics and theology. As a lay preacher in the Methodist Church, and later the Uniting Church, this came through in some of my sermons.

In the early 80s I became a bell-ringer at St Mary's Cathedral in Sydney. We did the English style of bell-ringing, which means patterns and permutations rather than tunes. There's a lot of



mathematics that lies behind change ringing and this is what appealed to me. I also liked the ecumenical aspect of this hobby, and though a Protestant, I have had a lot to do with Catholics over the years, including attending some joint bible studies.

I am a great believer in stories for conveying deep concepts. In fact I have written some stories to explain difficult mathematical ideas on subjects such as infinity. Stories can also convey deep religious truths and some of the stories that I have told in my Uniting Church services over the years have probably gone over the heads of the children.

CHAPTER TWO: MATHEMATICS AND LOGIC

If you are not particularly interested in mathematics and logic feel free to skip this chapter. Because of my mathematical background my window on God is framed by logic. Other people see God through different windows, but this is a personal account of what I see from my own perspective of mathematics and logic.

We mathematicians are the custodians of logic. Oh yes, scientists use logic, philosophers use it, and even theologians use logic. In fact ordinary citizens use logic. But no-one else explores it to its uttermost depths as much as mathematicians.

Why not logicians? Surely *they* are the true specialists in logic. That's true in one respect. But they seem to spend their time investigating *alternative* logics. Yet they employ what we might call 'ordinary logic' in discussing them. Mathematicians stick to this 'ordinary' logic and, to use a horrible phrase, 'flog the guts out of it'. We stretch and bend that logic until it very nearly breaks.

For example, in mathematics we have statements that are undecidable. We can *prove* that it's logically impossible for anyone to ever prove

them true and we can prove that it's logically impossible for anyone ever to prove them false.

Mathematicians are great spoil sports. You might think that all we do is to solve equations and find solutions to problems. But one of the things we love to do is to prove that certain things are impossible. For example, long ago it was proved that it is impossible to trisect any given angle exactly, using just a ruler and compass.

You may have learnt at school how to *bisect* an angle – divide it into two equal parts. If we can bisect, why not trisect – divide an angle into three equal parts? Very accurate methods exist, using ruler and compass, but none are theoretically exact. And there are methods that are theoretically exact, but they involve more than just a ruler and compass construction.

That hasn't stopped amateur geometers claiming to have solved the problem. Most mathematics departments around the world get details of such constructions from time to time. Of course none of them is correct.

Before the invention of electronic computers, the mathematician Alan Turing discussed a problem for which we might imagine someone could write a program to solve. You see, when a computer program is written to compute something it may fail to halt. It might go around in some sort of complicated loop and never stop. Of course such programs are useless and programmers try to ensure that their program will halt in a finite time. But

sometimes a ‘bug’ gets into the program. This may have been due to the programmer not anticipating some rare event.

I was speaking to a programmer once who hadn’t anticipated that someone might press more than ten keys simultaneously and his program crashed in such cases. Why someone would attempt to play a duet on a computer keyboard is amazing. But some rare events do occur.

When a program gets into a loop (I use the word ‘loop’ to include infinite paths) the computer appears to freeze. This is because the part of the program that examines what keys are being pressed is never reached. Imagine going into a bank and the teller goes off into another room to count your coins. If every time he finished counting he started over again, he would never reappear and the teller’s window would appear to freeze.

Now a simple way of coping with this would be for the program to automatically abort when a certain length of time has expired. The problem is to decide when enough is enough. Some perfectly legitimate programs will run for days before halting. The programmer might anticipate this, but in many cases it might take him by surprise.

The obvious solution would be to put the code for the program into a very clever program that examines its structure and decides whether it will halt. After all an experienced computer science lecturer can examine a student’s program and, in

most cases, decide whether the program will eventually halt. If a human can do it then surely a very clever program can.

Turing proved mathematically that this was logically impossible. To write a program that will determine whether *any* given program will halt, when given certain data, is something that can never be done. Not that our computers are not yet powerful enough, not that no-one has been clever enough to write such a program, not that it would take even the fastest program billions of years to solve it. Logically ‘impossible’ means that even God can’t write such a program, despite being omniscient and having all eternity in which to do it!

The way mathematicians prove that something is impossible is to suppose that it *is* possible and, on the basis of that, arrive at a logical contradiction. The fundamental principle of logic is that anything that leads to a contradiction *must* be false. Turing assumed that there exists a program that would solve the Halting Problem, as it is called, and from that assumption he obtained a contradiction.

This is how we know that certain statements are undecidable. We assume that we can prove them true and show that we get a contradiction. We then assume that we can prove them false and again we obtain a contradiction.

What this shows is that we are logically free to believe the statement and we are logically free to deny it. That is, we can choose to believe in them or

we can choose to not believe them. Either choice is logically valid.

You can see where this is leading. Could it be that a belief in God falls into this category? Is faith simply making a choice between two undecidable alternatives?

These undecidable statements in mathematics are not just artificial ones dreamt up by logicians just to prove a point. Some of them are genuinely interesting statements where we would love to know the answer.

Here's an example. Bear with me – it will get a bit technical. Or, if you prefer, skip over the rest of the chapter.

Numbers can be written as decimals. Many numbers can only be written as infinite decimals, such as one third which is 0.3333 Here the decimals repeat.

The number $1/7$ is 0.14285714285714 ... where the digits 142857 repeat in a regular fashion.

Other numbers have infinite decimal expansions that don't repeat in this way. Now numbers whose decimal expansions repeat are precisely those numbers that can be written as an exact fraction, such as $22/7 = 3.14285714285714 \dots$. This is the number that we learnt at school as being approximately equal to π , the ratio of the circumference of a circle to its diameter. But the

decimal expansion of π itself is an infinite sequence that doesn't repeat.

How many counting numbers 1, 2, 3, ... are there? The answer is 'infinity'. How many fractional numbers? The answer is again 'infinity'. And how many decimal numbers exist? The simple answer is 'infinity'.

There's a story, probably apocryphal, that a certain tribe of Australian aborigines only had words for the numbers one, two and three. Any more than this they used a word that meant 'many'.

This is how most people deal with infinity. Anything more than the finite numbers we simply call 'infinite'. This is just as illogical as referring to any number bigger than three as 'many'.

The 19th century mathematician, Georg Cantor, showed that what we call 'infinity' is made up of lots of bigger and bigger infinities. Now 'bigger' is a subtle concept when it comes to infinite collections of things. You would think that there are many more fractions than there are counting numbers. After all, the fractions include the counting numbers, but include many other ones as well. Yet the infinity of the counting numbers and the infinity of the fractions is exactly the same infinity. But when we come to the decimal numbers Cantor showed that their number is a *bigger* infinity.

I've described two of the smaller infinite numbers. The one that measures the number of counting numbers is the smallest infinite number.

Traditionally the symbol ∞ has been used for infinity but, when Cantor showed that there are infinitely many infinite numbers this was inadequate. Cantor chose the symbol \aleph_0 for that smallest infinity. It is called ‘aleph zero’ – aleph being the first letter in the Hebrew alphabet. The number of decimal numbers is definitely bigger than \aleph_0 .

Although it might seem that the number of fractions is a lot bigger than the number of counting numbers, yet there are just \aleph_0 of them. It’s possible to write out all the fractional numbers, including the negative ones, in a single infinite list just as you can with the counting numbers. It’s just that you don’t write them out in order of size.

But there are *more* decimal numbers than fractional ones, so the number of decimal numbers is definitely bigger than \aleph_0 . The question is whether there are any infinite numbers between these two. It’s a perfectly reasonable question, perhaps not one that the average person would be curious about, but certainly one that a mathematician might ask. Unfortunately we’ll never know the answer to that question. It has been proved that we can never know!

The so called Continuum Hypothesis declares that the number of decimal numbers is the very next infinite number after \aleph_0 .

Mathematicians are logically free to believe in the Continuum Hypothesis, or to deny it. It has been proved that no proof of it being TRUE is possible and it has also been proved that it is

logically impossible to prove that it is FALSE. I happen to choose to believe it to be TRUE on purely aesthetic grounds.

Now the next number after \aleph_0 is called \aleph_1 . Because I choose to believe in the Continuum Hypothesis, for me \aleph_1 is the number of decimals.

Clearly we'll never be able to find, explicitly, infinite numbers between \aleph_0 and the number of decimals for if we did this would prove that the Continuum Hypothesis is FALSE, something that has been proved to be impossible.

But that doesn't prove that there are none – simply that there are none that we can explicitly describe. However it seems reasonable to me to *assume* that there are no numbers between the number of whole numbers and the number of decimals.

My belief in God is built on rather similar grounds. For me such a belief makes sense of the world, so I *choose* to believe it. You might even say that I find it more aesthetically pleasing to believe in God than not believing.

Perhaps for you such a belief doesn't seem an imperative. Then you can take the atheist position. But neither of us can prove that we are right, just as no mathematician can prove that the Continuum Hypothesis is true or false.

You can make all sorts of arguments about how religious belief has caused so many wars. I can respond by reminding you of the number of

humanitarian institutions have been inspired by religious people. But both arguments are spurious because the moral behaviour of a believer is logically independent of the truth of that belief.

There are all sorts of plausible arguments you and I might employ to support our assertion that God exists, or that God does not exist. But, at the end of the day, none of these constitutes a proof.

Christians are sometimes ridiculed for believing in things that they can't prove. Yet all of us do it all the time. You can't live without believing in things you can't prove, for it should be obvious that you can't prove something from nothing. You have to start with some basic assumptions that must be accepted without proof.

In physics there are many such statements. They are usually called laws or principles. These laws have been supported by experiment, but what underlies everything in science is the unprovable assumption that:

**WHAT HAPPENS MANY TIMES UNDER
CERTAIN CONDITIONS WILL ALWAYS
HAPPEN AGAIN UNDER THE SAME
CONDITIONS.**

You drop a ball in a vacuum and it falls with a certain acceleration. This has been done countless times and the acceleration has always been the same.

Therefore it's common sense to say that it will *always* be the case.

Actually acceleration due to gravity is *not* always the same. On the moon it's a whole lot less. On earth it varies slightly depending on how far from the centre of the earth you are. But physicists have a law that takes all these things into account and they have come up with a gravitational constant with which they can predict the force between two masses if we know the weight (technically the mass) of each and the distance between them. But that law rests only on a finite, though large, number of measurements. We *believe* that it will *always* be the case but what *proof* do we have?

That's not how we do it in mathematics. We know, for example, that for a right-angled triangle, the square of the hypotenuse is the sum of the squares on the other two sides. This is not because we've measured thousands of right-angled triangles and have verified that Pythagoras was correct. That's how scientists are forced to work. Instead we mathematicians are able to *prove* it, using pure logic. That's why it's called Pythagoras's *Theorem* not Pythagoras's *Law*. But even in mathematics we can't prove something from nothing. We must always begin with a few assumptions from which we prove our theorems.

In ordinary life we're *always* assuming things we can't prove. We believe that every time we switch on a light it will come on. That is, we believe in the consistency of the universe. Of course

sometimes we flick the switch and the light *doesn't* come on. But we believe that there will always be an explanation. We check the bulb, we check the fuse, we ring the power company to see if there's a blackout. Suppose there's no explanation at all. Suppose the light comes on, or doesn't, in a purely random fashion. Suppose that when we step onto a concrete path it sometimes supports our weight, and sometimes we sink right through, for no apparent reason. An unpredictable world would be impossible to live in.

Yet the path has always has been solid and so we believe it always will be. But that's a *belief*, not something we can prove.

In fact physicists are now saying that we *do* live in an unpredictable world. At the atomic level, quantum physics says that particles behave unpredictably. On a macroscopic level these random events tend to average out and we appear to get consistent behaviour. But, according to quantum physics, there is no logical reason why a book on a table can't suddenly levitate because all the vibrating molecules happen to 'choose' to go upwards at the same time. The probability of this happening would be unimaginably small – but it would not be zero.

Now you would think that in mathematics *everything* can be proved, but clearly we must start with at least one assumption. Logic only establishes *relationships* between statements but it can never establish the independent truth of any one of them.

To start with, mathematics is based on logic – standard two variable logic with TRUE and FALSE. There are laws of logic, and these seem intuitively obvious, but they can't all be proved independently. Some of these laws of logic can be proved in terms of others, but you have to start somewhere.

One such law of logic is that if something is not always true then it is sometimes false. You can argue that this is intuitively obvious but if you're attempting to build all of mathematics in a logical way you must avoid saying that such and such is obvious. What might be obvious to you may not be obvious to me. I could say that the existence of God is obvious and settle the debate once and for all. You say that it is obvious that God does not exist. What would we have achieved by that?

Now mathematicians take their logic for granted. There is universal agreement among them that the laws of ordinary logic are valid and we proceed from there. However this already involves believing in things that we cannot prove.

But mathematics is more than just logic. We deal with 'things' such as numbers and triangles and sets of such things. These must all be defined. If we are to do things properly we shouldn't rely on our intuitive concepts of what such words mean. That may be alright in doing day to day mathematics, but if we're investigating the foundations of the whole subject we must make definitions.

But here there's a problem. You can't always define concepts in terms of others. You must either go round in circles, or you take the meaning of a word as being obvious. It's an interesting exercise to take a dictionary and select a definition. Then look up the definitions of the words used in that definition, and so on. Clearly, since there are only finitely many words in a dictionary, inevitably you'll find yourself going around in circles.

The definition of 'kitten' as a 'young cat' is a perfectly satisfactory one. But the definition of 'cat' is less satisfactory. "A small four legged domestic animal that drinks milk and catches mice" might be sufficient for people who have seen cats but would not be much help to an Eskimo who had never seen a cat, or even a picture of one.

The way mathematicians build up their definitions is to start with one or more undefined entities. They then make certain assumptions about the way these undefined entities behave. These they call 'axioms'. On top of this foundation they make further definitions, and prove theorems.

Euclid, the famous Greek father of geometry was the first to do that sort of thing. He started with entities such as 'point' and 'line'. He didn't define them. His readers knew what the Greek words for these things meant. In their youth these readers would have had a dot drawn on a sheet of papyrus, and a long straight stroke. "That's a point, and that's a line."

In the modern account of Euclidean Geometry these would be regarded as ‘undefined entities’. You don’t really need to know what points and lines are. You can prove all the theorems from the basic axioms. Euclidean Geometry could be understood by a disembodied angel.

I first learnt of disembodied angels from my colleague, Alan Macintosh, at Macquarie University. Unfortunately he’s no longer with us and he may, by now, be a disembodied angel himself. There’s nothing religious about such creatures. They’re imaginary constructs with two properties:

- (1) They are incredibly intelligent.
- (2) They understand logic and mathematics.
- (3) They have no concept of space.

Alan used this concept in teaching a course on Geometry. He had a pair of walkie talkies and gave one to a student, who became the disembodied angel, in another room. Then he drew a certain geometrical diagram on the blackboard. Another student was given the second walkie talkie and he had to describe the diagram to the disembodied angel. The ‘angel’ had to pretend he had no spatial intuition and didn’t even know what points and lines are.

“You’ve got these two things – I’ll call them ‘points’. Then there’s a different sort of thing that I call a ‘line’. The line passes through the two points.”

“What do you mean by ‘passes through’?”

“Well it’s a sort of relationship that lines have with points. Do you know what a relationship is?”

“Oh, yes, we all have a relationship with God. Do you mean that points are angels and the line is God? God passes through all of us because he loves us all.”

“Not exactly – it’s a different sort of relationship – but I think you get the idea of ‘relationship’. Well there’s another point that is not on this line ...”

“I understand ‘not’ but what is ‘on’?”

“Let me rephrase it. The line doesn’t pass through the third point.”

“I get it. I don’t have a mental picture of these things you call points and lines. That doesn’t matter. And I accept that there’s some sort of relationship between these points and lines.”

“Well there’s a second line that passes through that third point. That second line is parallel to the first line.”

“What’s ‘parallel’?”

“Well there’s a constant distance between them.”

“I’ve never heard of that thing called ‘distance’. What is it?”

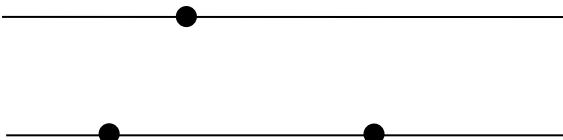
The student thought for a while and decided to rephrase his last comment. “Let me put it another way. The two lines don’t meet. That’s what I mean by ‘parallel’.”

“That’s a new concept. What is ‘meet’? Is it a second undefined relationship?”

The student thought for a bit more. “No, two lines meet if they pass through the same point.”

“I get it now. There are two undefined entities – points and lines, and one undefined relationship of a line passing through a point. So you have three points and two lines. There is no point that both lines pass through. One line passes through two of the points and the other line passes through the third. Have I got it?”

Now to bodied beings like ourselves, with spatial intuition, the whole situation can be expressed very simply with a diagram.



The only slight drawback with such a diagram is that it doesn’t show the entire length of these infinitely long lines. So, although the diagram *suggests* that these lines will never meet, it doesn’t actually *show* it. The convention that’s often used is to put little arrows on each line to indicate that they are parallel.

Now the modern approach to mathematics is to introduce undefined entities and undefined relationships between them. Then a set of axioms is given. These axioms are accepted without proof. Call

them intuitively obvious if you wish. In most cases they are not at all intuitively obvious, though mathematical intuition does play a role in formulating them.

Apart from Euclidean Geometry you may have never come across axioms. Arithmetic is usually taught by relying on a mixture of intuition and authority. But nearly all parts of advanced mathematics proceed in this axiomatic way. This means that modern advanced mathematics could be understood by disembodied angels.

Now the purpose of formulating mathematics in this abstract way is not for the benefit of disembodied angels. Their existence is still under review! The real reason for eliminating intuition is so that we can be explicit about what is being assumed.

In earlier days mathematicians got hung up on the question of whether certain things actually exist. These days we've gone beyond that concern. If we define something, then it exists. However the language from those days of doubt still persists.

Consider the decimal numbers. These are the positive and negative numbers that you can plot on a number line – negative numbers to the left and positive ones to the right – oh, and zero that sits squarely in the middle.

Now it's a fact that the square of such a number can't be negative. This comes from the rule that the product of two negative numbers is a positive one. You may remember your teacher telling

you that “two negatives make a positive” and you accepted it without question, thinking that perhaps it had something to do with the double negative of logic. If someone is not unkind, they are kind. That isn’t really why the product of two negative numbers is positive, but never mind.

But then mathematicians started to play around with numbers whose square is negative. They said “let’s make up a new number whose square is minus one”. Such numbers became very useful and were widely used. But, of course “such numbers don’t really exist”.

So they were called ‘imaginary’ numbers. The ordinary decimal numbers were called ‘real’ numbers. These days we no longer bother about existence, but the names ‘imaginary’ and ‘real’ persist. The modern approach to mathematics is that if you can define something, then it exists – that is, unless the definition contradicts itself.

Someone once said that God created the whole numbers and man created all the rest. If you don’t believe in God then you’d have to say that man created *all* the numbers. Or, perhaps, God invented *all* the numbers and we merely discovered what already existed. But to a mathematician the question of existence, or who created the entities, is totally irrelevant.

Euclid listed several axioms as the basis for what was to follow in his treatise on Geometry.

These are often considered as being ‘intuitively obvious’. The most famous of all these axioms, or postulates, is the Parallel Postulate, which states that if we’re given a straight line, and a point that doesn’t lie on that line, there’s exactly one straight line through the given point which is parallel to the given line. This is precisely the situation our student was trying to convey to the disembodied angel.

Euclid thought that this postulate was obvious, and if you play around with paper, ruler and pencil, you’ll be quickly convinced that it *is* obvious. But is it really? Drawing lots of examples doesn’t *prove* that it is true. You can only work to a certain degree of accuracy, and the lines you draw may *look* parallel, but who knows – if you extended both lines to the outer reaches of the universe, how can you be sure that they won’t eventually meet?

In the 19th century some geometers questioned whether this postulate is really true. They put forward two alternative postulates and, on the basis of this, they developed two alternative geometries: Elliptic Geometry and Hyperbolic Geometry.

Of course this was just an idle exercise by these mathematicians. They believed that the *true* geometry was the one described by Euclid. Then, in the 20th century, physicists started talking about twisted space at the atomic level, and astronomers began to believe that the universe might be finite, curving back on itself. This needed alternative geometries to describe the spatial world and, lo and

behold, these geometries were already in stock, waiting on a shelf and ready for dispatch.

This scenario has occurred many times in the history of mathematics. Something is developed purely as an academic exercise. Then many years later it has provided the basis for an entire industry. One notable example is Fourier Theory, developed in the 19th century purely as an intellectual exercise. In the 20th century it became a fundamental tool in electronics.

Another example is Number Theory, the theory of prime numbers. It has long been called the Queen of Mathematics. Like most queens, Number Theory didn't have to work for a living. It was developed just for fun. The English professor G.H. Hardy, who discovered the Indian genius Ramanujan (portrayed in the film *The Man Who Knew Infinity*) is said to have boasted that Number Theory would never be of any practical use.

But, like most women in the mid 20th century, the queen got a job. The theory of prime numbers became the basis for the computer cryptography industry. It is remarkable that something that only takes place in our imagination, and developed out of curiosity, is so extremely useful in the external world of science and technology.

In the early 20th century some mathematicians embarked on a mission to put all of mathematics onto a logically sound footing. The area that needed

most attention was basic arithmetic. How do we really know that $2 + 2 = 4$? What in fact is the number 2? We can define it as the next whole number after 1, but what really is a number anyway?

When we first learnt about number in kindergarten we were shown pictures of three ducks, and three balls, and three umbrellas. We saw the numeral 3 along side, and our teacher carefully mouthed the word “th-r-ee”. Pretty soon we caught on. It was as if the concept of number was already hard-wired into our brains and all the teacher had to do was tap into it.

The concept of number is really very difficult and abstract, and to develop arithmetic in a rigorous and logical way is really hard going. It’s lucky that God, or evolution, created, or adapted, our brains to have an intuitive concept of number. If we had to develop it from scratch, in a rigorous way, then only university graduates in mathematics would be able to do it!

As I said, in the early part of the 20th century, certain mathematicians and philosophers, attempted to put mathematics onto a really sound footing. They concentrated on the most difficult part: number and arithmetic. The philosopher Frege worked for some years to do this and, when his treatise was ready for publication, he sent the proofs to Bertrand Russell, in case there were any minor errors that needed to be corrected.

There were indeed no *minor* errors – just one really huge error that blew the whole thing out of the water! The book was never published. What was this huge error? One basic axiom on which the whole edifice depended, was that for any property there's a set of things that have this property. For every adjective there's a corresponding noun.

There are blue-eyed people and so there's the set, or collection, of blue-eyed people. There are right-angled triangles and so there's the set of all right-angled triangles. There are odd numbers and so the set of all odd numbers.

It's such an obvious assumption that it seemed to many that it hardly needed to be mentioned as an assumption at all. Frege's foundation of mathematics was built upon this 'obvious' fact. But Russell showed that free use of this principle could lead to a contradiction, known as Russell's Paradox.

It's not really all that difficult to understand this paradox, but I won't bore you with the details here. This book is supposed to be more about theology than mathematics. I'll explain it in the Appendices.

But in the spirit of the direction of this book it is fitting that I tell you of a similar paradox that can be found in the Bible. In Titus 1:12 Paul says:

One of Crete's own prophets has said it: "Cretans are always liars, evil brutes, lazy gluttons." This saying is true.

He's referring to the Cretan philosopher, Epimenides who lived around 600BC. One can infer that Epimenides is saying "I am lying". Think about this statement. Is it TRUE? If it is, it isn't and if it isn't it is.

So Russell's Paradox caused mathematicians to have to completely rethink their subject. That is, those interested in the logical foundations of the subject had a job on their hands. The vast bulk of mathematicians went quietly about their business as if nothing had happened. Mathematical intuition is considered to be stronger than rigorous foundations. Most of those who heard about the problem said, "oh, that's interesting. I hope somebody fixes it" and then they went on with what they were doing.

Some people *did* bother to fix the problem. It took a little time for the dust to settle, after the big explosion. Two people, Ernst Zermelo and Abraham Fraenkel, proposed a set of axioms that would be powerful enough to establish virtually all of mathematics, yet which avoided Russell's Paradox. These axioms are known as the Zermelo-Fraenkel Axioms, or ZF for short. Other sets of axioms have been suggested but they have all been shown to be equivalent to ZF. What can be proved from one set of axioms can be proved from each of the others.

The ZF axioms are essentially the same as a religious creed. They are a set of statements which

are taken as given – “believed in by faith” you might say.

Of course there’s one major difference. Virtually all mathematicians, or at least those who bother to think about such things, accept the ZF axioms. The Apostle’s Creed is only accepted by Christians, and then not by all of them.

This probably reflects the difference in nature of what the beliefs are about. But nevertheless the fact that one has to accept what one cannot prove is as natural to mathematicians as it is to people of faith.

Now in the ZF world the only entity is a set. This means the same as ‘collection’. But unlike the way these words are used in ordinary life, the objects in the collection don’t have to be the same sort of thing. We talk of a set of cups and saucers, but never a set that consists of an elephant, a Beethoven symphony and the number three. Yet set theory allows sets of any disparate items.

We speak of a doll collection, but not usually of a collection that consists of a shoe, a ship, some sealing wax, a cabbage and a king. The walrus, in *Alice Through the Looking Glass*, hit the nail right on the head. A set can consist of totally disparate things. But don’t forget that Lewis Carroll was a mathematics lecturer at Oxford, specialising in logic.

“The time has come,” the Walrus said,
 to talk of many things
Of shoes and ships and sealing wax
 and cabbages and kings ...”

Now if the only things in the ZF universe are sets, then the things inside those sets must themselves be sets. So we have sets of sets, and sets of sets of sets, and so on. But you have to start somewhere. There must be a set that doesn’t contain any sets. What sort of things would it contain?

The answer is simple. One of the ZF axioms asserts the existence of the empty set – that is a set with nothing in it. This might appear to stretch the normal meaning of the word ‘set’ to breaking point, but mathematicians do that sort of thing all the time.

So *your* concept of ‘set’ doesn’t allow for a set with nothing in it. Well I choose for the word ‘set’ to include this possibility and when I use a word it means what I choose it to mean.

“What about numbers?” you may ask. I wouldn’t ask that question if I were you. Just stick to your intuitive idea of number that you learnt in kindergarten. That’s enough for practical purposes. If you’re really interested in getting a glimpse of how arithmetic can be logically developed please turn to the appendices.

The ZF approach to mathematics is to start with a small number of axioms, and to prove everything else in mathematics on that basis. And the

amazing thing is that virtually all of mathematics can be built up from just the empty set. Doesn't that remind you of the Bible saying that God created the world from a void? Maybe this is a sign that the creator of the universe lies behind all of mathematics – or maybe not. It's a nice thought though!

A more scientific reader might say “doesn't that remind you of the big bang, where the universe came about from a single point of energy?”

Now there are standard ZF axioms on which all mathematicians agree, and then there are some optional ones. I mentioned the Continuum Hypothesis earlier. The Continuum Hypothesis has been proved to be undecidable. Assuming just the ZF axioms you can't prove that the Continuum Hypothesis is TRUE and it's not possible to prove that it's FALSE. We're sure that this is the case because we can *prove* that it's so. Hence it's logically valid to believe in the Continuum Hypothesis and it's logically valid to deny it. If you want to believe in the Continuum Hypothesis you just add it as an extra axiom.

A more famous example is the so-called Axiom of Choice. All it says is that if you have a non-empty set of non-empty sets then it's possible to choose exactly one out of each. (This is very slightly oversimplified statement of the Axiom of Choice but this description is near enough.)

Now if I present you with six boxes of marbles, and I show you that none of them is empty, could you choose one marble from each? Of course

you could. But what if there were infinitely many boxes and each had infinitely many marbles? It might be difficult to do this in a finite time, but leaving that aside, in principle it seems obvious that it's possible.

The Axiom of Choice says that it is *always* possible, no matter how big the sets are. Yet the Axiom of Choice has been shown to be both *consistent with*, and *independent of*, the standard ZF axioms. This means that you can't prove that it's TRUE and you can't prove that it's FALSE, in other words, you're logically free to choose to believe in it, or to deny it. You could say that it's a matter of faith.

If you wish to use the Axiom of Choice in your mathematics you simply add it as an extra axiom.

I choose to do this. It suits me to believe in it because in some cases it makes for simpler theorems. But many mathematicians refuse to accept it because one of its consequences is rather counter-intuitive.

You see, it's possible to prove, assuming the Axiom of Choice, that it's *theoretically* possible to take a solid sphere and to separate it into a dozen or more pieces, and then to reassemble them, as in a 3D jigsaw puzzle, into *two* solid spheres, *each the same size as the one we started with!*

What!! If that were true you could make a lot of money. Take a sphere of gold, do some mathematical alchemy, and you've doubled your money! Clearly this contradicts the law of

conservation of volume. But it's more subtle than that.

You see, volume can't be defined for every set of points in three dimensional space. They have to be more or less connected. The pieces in the proof of the doubling of a sphere could never be obtained by any conceivable cutting apparatus. The pieces would be clouds of infinitely many points disconnected from one another in a way that would be impossible in the material world and for which it would not be possible to calculate their volume.

There is no logical impossibility in all this, but many mathematicians feel uncomfortable with such an outcome and so they deny the Axiom of Choice. Others prefer the simpler statements of certain theorems that are possible when one adopts the Axiom of Choice. One is logically free to choose either creed.

I should point out that this is not why it's called the axiom of *choice*. There are several other statements in mathematics where we're logically free to choose, but they have other names. This one is so-called because it is a statement *about* choice.

So like a belief in God, there are the believers and the unbelievers when it comes to the Axiom of Choice. You could say it's a matter of faith. You choose one or other alternative simply because it makes better sense of things for you.

Of course there's one glaring difference between religion and mathematics. No war has ever

been fought over the Axiom of Choice. Believers in the Axiom of Choice have never gone around blowing up the infidels – those who don't believe it.

It's true that there have been far too many wars fought over religion, but don't blame the religious beliefs themselves. Religion is much closer to the bone than mathematics and is tied up with questions of culture and land and power. Mathematics has none of these.

I once saw an atheist post on Facebook that said something like this.

Christians start wars;
Muslims are terrorists;
Atheists write scientific papers.

This shows the depths to which atheism has plummeted these days. The atheists Bertrand Russell or Nietze would be turning in their graves at such nonsense. Back then there was reasoned debate, not just slogans.

To decide on the truth of a proposition by the morality of its believers is completely foreign to a mathematician. I once read a paper by a distinguished mathematician and later heard that he was accused of being a paedophile. As much as I abhorred his behaviour I believed what he had proved in the paper because I'd checked out the proof for myself.

By the way, in case that you might be worried that a bridge may collapse, or a plane may fall out of the sky, because some engineer was a believer, or a non believer, in the Axiom of Choice, let me reassure you. Both versions of mathematics will be identical when it comes to applications to our finite world.

But there is one final disquieting surprise. At least it's disquieting to one who is worried about fundamental truth. It's easy to write down a set of axioms, but in many cases the axioms will be self-contradictory. That is, assuming the axioms one can obtain a contradiction. This was the situation with the naïve set theory that Frege was using. But surely that's all been fixed now? Nothing like that can ever happen again?

I'm sorry to inform you that the ZF axioms have *never* been proved to be consistent. Given their fundamental nature it's unlikely that they ever will be. This means that it is theoretically possible that at some stage in the future, the ZF axioms will be shown to be inconsistent. That is, a successor to the Russell Paradox might emerge and the whole of mathematics will again come tumbling down!

The average mathematician will simply say, "oh, dear, I hope someone will fix it." and then go on with what they were doing. And, indeed, someone interested in the foundations of mathematics would modify the ZF axioms in some way so as to get around this problem. Mathematicians place their faith in their mathematical intuition more than in

mathematical creeds. It is like those Christians who say “I know that God exists – I feel him in my heart.” They are really annoying to atheists because there’s nowhere you can get a hold on for a proper debate.

But if such a contradiction ever arises don’t blame either the Continuum Hypothesis or the Axiom of Choice. It’s been proved that neither of them will be guilty. Any contradiction that might arise would have arisen from just the standard ZF axioms on their own.

I’ve tried to show how a mathematician’s concept of truth and logic underlies my religious thinking. Even in mathematics logic has its limitations. In fact one can almost feel the ineffable when one goes to the far boundaries, at the edge of the rational universe.

CHAPTER THREE: MY CREED

Probably you skipped over the last half of the previous chapter because it seemed to be too much about mathematics. Well, here we get to God.

I have searched my mind, perhaps even my heart, for the fundamental axioms on which I base my view of the world and, if I go right back to fundamentals, I find that the most basic axiom, the first statement of my creed, is:

AXIOM 1: I exist

Cogito ergo sum – I think, therefore I am, to quote Descartes. I'm not sure whether this should count as an axiom, because it is not really something I have to assume. I have consciousness and so in some form or another, something must exist that I call ‘me’. That ‘me’ might not necessarily have a body. The arms and legs that I see, and feel when they’re touched, might not really exist. I could be *all* mind. But it is clear that I *do* exist. Could it be that this *is* a statement whose proof does not depend on previous assumptions?

AXIOM 2: The external world exists

Here we indeed get into the realm of speculation. I see, I hear, I feel something that I

believe to be outside of my mind, and yet what I see, hear and feel are just things that I experience in my brain. Perhaps I should say ‘mind’ because although we generally believe that consciousness lives inside a mass of biological material inside my head I haven’t yet got to the stage of believing that my brain, as a physical entity, really exists.

Could it be that the external world is just an illusion? People *do* hear voices that are not there, and they see visions. The phenomenon of phantom limbs after an amputation is well-known. In dreams I see and hear things that don’t exist.

I’ve occasionally had a dream in which I woke up. “Thank goodness that was only a dream,” I thought, with some relief. Then, a little later I *really* woke up – a dream within a dream! What if, what I presently call ‘reality’, should just be a dream? Perhaps when I die I really wake up for good. It’s just a thought.

AXIOM 3: You exist

No, this isn’t just a consequence of Axiom 2. I can see and hear you, and maybe even touch you. By Axiom 2, I accept that your *body* exists. But you are not your body. Perhaps I’m the only person in the whole wide world who has consciousness. Maybe the rest of you are just robots.

Robots are getting more and more like humans. Will there come a day when they, too, will

have consciousness – an inner life? If so, how will we be able to tell?

One of Alan Turing's legacies to the world is the Turing Test. Every year a group of computer scientists sit at terminals and converse electronically. Some are conversing with real people and others are conversing with clever computer programs. The test for them is to decide whether there's a real person at the other end of the conversation.

The first year they tried it everyone could tell whether they were conversing with a real person or a computer program. But each year a larger and larger percentage of them get it wrong, as better programs have been constructed. When it gets to the stage that they perform no better than if they simply rolled a coin we'd know that a new age of computer science has arrived. But we still wouldn't know whether the computers had consciousness.

There's an assertion often made by people who purport to have some knowledge of the brain, that any computing device with more than a certain amount of complexity, automatically becomes conscious. This is often used as an argument for materialism. But I cannot conceive of any way of establishing the truth of such a statement. Why, I can't even see any way of proving that *you* have consciousness!

But isn't it very arrogant to believe that I'm the *only* person in the world to have consciousness. The rest of you are just clever machines, programmed by who knows who. You *act* like

someone who has consciousness. You *tell* me that you have consciousness. But a clever robot could be programmed to do that.

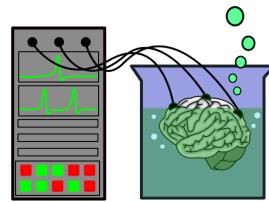
Now you might be feeling that Axioms 1 to 3 are just common sense. Of course they are. That's why they're called *common* sense – they are the axioms that everyone accepts. Most people just believe in them without a moment's thought. Those who deny any one of them are probably in some psychiatric ward. Even spending time contemplating their truth might seem strange to you, but there are some of us who like to spend a little time analysing the obvious.

AXIOM 4: Memory is continuous

We are what we remember. Every morning when I wake up I can remember what happened the day before, and last year, and even some things from my childhood. I believe that my memories are substantially accurate.

What if, during the night, someone erased my memories and replaced them by someone else's. I'd become that person! I would look at my face in the mirror and assume that someone had given me plastic surgery while I slept. Who would I really be – the person whose memory sits in my brain, or the one in whose brain those memories now reside, and in whose body my brain sits?

Another scenario is a brain transplant. This might be easier than reprogramming the original brain with another person's memories. Or I might have one person's body, a second person's brain and a third person's memories. That would create a real identity crisis!



We've all heard of false memories, and brain washing. We've also heard of split personalities, where two personalities and two sets of memories, cohabit a single brain. One morning I wake up as Dr Jekyll, with no memory of Mr Hyde. The next morning I am Mr Hyde with no memory of Dr Jekyll. To what extent can I rely on my memories as being a reliable record of what occurred to me?

I might wake up after a bout of amnesia and declare that I'm Anastasia, the daughter of the Czar of Russia. I may claim to have memories of that life but the people around me would tell me I'm mistaken. I'm just a poor peasant girl who's somehow learnt about Anastasia's life.

Such strange things do occur – well perhaps not the brain transplant – at least not yet. But, like most of you, I believe that my memories are substantially accurate. I can accept a small number of instances where I've misremembered certain things, but I am who I remember myself to be. This is another axiom that is part of the common man's creed.

AXIOM 5: Logic is valid

Standard logic – that things are either TRUE or FALSE and nothing can be both. Logic that has ‘ands’ and ‘ors’ and ‘ifs’ and ‘thens’, and don’t forget the all important ‘not’. Logic that has ‘for alls’ and ‘for somes’. Logic that obeys the standard rules. These I accept. At least I accept them subject to the proviso that I don’t attempt to use self-referential statements like ‘THIS SENTENCE IS FALSE’.

Some logicians have challenged this standard logic and have come up with alternative versions. But I’ve noticed that when they write about their alternative logics, and in their ordinary life, they follow standard logic.

Most people accept standard logic subconsciously. They’ll say, “you couldn’t have left the key on the table because it’s not there”, without realising that they’ve used the form of reasoning that logicians and mathematicians call ‘proof by contradiction’.

AXIOM 6: There is something beyond the material world

Here’s where we might start to part company. Like all of the above axioms I can’t prove it. That’s why I call it an axiom. The materialist denies Axiom 6. He argues that all thought is simply a product of biochemical processes in the brain. Love is just due

to the biological imperative to procreate that drives evolution. Religious beliefs are due to an overactivity of a certain part of the brain. All these statements, they say, can be backed up by neuroscience.

Certainly I accept a lot of what they say. The imperative to procreate certainly *is* an important factor in falling in love. Whether it still explains the devotion of married couples in their twilight years I'm not so sure. But I expect that materialists can explain that too. They'll say that I love my wife, many years after she's ceased to be fertile, because if I do nice things for her she will do the same for me. That is, love at this age is simply a pragmatic arrangement driven by self interest.

And it *is* true that a psychosis, whose cause is a brain tumour, *can* affect a person's emotional life, and play havoc with her intellect. What worries me in accepting the materialist's doctrine completely is the realisation that their plausible arguments are simply a product of biochemical processes going on inside *their* brain. Perhaps they are materialists because of their genetics, or because of something they once ate. Or possibly they are exempt from their own doctrine. "You think in a certain way because of biological processes – but I have some link to absolute truth." I wonder why they go to so much trouble preaching their materialism? Do they think they can reprogram me?

Perhaps you've already got off the train. Perhaps you are a rusted-on materialist. I could say, "what a pity – perhaps a brain surgeon could cut out the offending bit of your brain that makes you a materialist". But it would be churlish off me to attempt apply your materialist doctrine to yourself.

But notice that we're still a long way from a belief in God, let alone a Christian faith. I find it interesting that, of late, so many physicists have rejected materialism. There has grown up in the world of physics and cosmology a widespread belief in some sort of 'force' that drives the material world, but is not part of it. They are quick to point out that they're not saying that this force is God. But in quantum physics particles behave unpredictably – not just because we don't know all the factors that affect them, but spontaneously, as if the particles themselves, or some force that directs them, are *choosing* which way they will go.

Once physicists realised that matter and energy are the same the writing was on the wall for materialism. For matter is no longer viewed by scientists as hard and solid but as something nebulous with electrons spinning around their nuclei and with empty space in between. And even those particles are made up of smaller particles which, in the end, are just manifestations of energy. How abstract and un-materialistic is that!

The big-bang theory, seems to parallel the Christian's view of creation. Physicists tell us that

time only began when a lot of highly concentrated energy exploded to become our universe. There are other cosmological theories, but they all have a strange magic about them.

Of course these theories don't prove anything theological, but my intuition tells me that there's more to existence than the running down of a huge piece of cosmological machinery, rigidly following unalterable laws.

AXIOM 7: We all have free will

I was going to say that "*I* have free will" but in the light of Axiom 3 I'm prepared to make it more general. I am the centre of the universe, but so are you.

Now I'm the first to acknowledge that this free will has constraints. I'm not completely free and nor are you. External circumstances place boundaries on what we can choose to do. There are physical constraints: I can't choose to fly like Peter Pan. There are social and political constraints: I can't choose to have dinner with the queen. There are self-imposed constraints: I can choose to murder someone but that choice is severely impacted by the thought of the consequences, not to mention my own moral code. There are biological constraints: if I'm addicted to nicotine my freedom to choose not to smoke is severely impaired. There are medical constraints: if I am a paraplegic I can't choose to run in a marathon.

Just as important are the restrictions imposed by previous choices. In most civilized countries I'm free to marry whom I want – subject to the usual constraint of them not being too closely related to me, them wanting to marry me, and their being single, or being able to become single.

But once I've made that choice my freedom to choose another wife is severely restricted. Of course I can divorce and remarry, but this is not without its inconveniences. Commitment to one person is a wonderful thing, but it impacts on one's freedom to make future choices.

I may choose to become a surgeon, subject to the obvious restriction that I'm bright enough. But once I've made that choice my ability to choose to become a night-club singer is severely impacted. It's still possible to make this choice, if I have the required talent, but the extreme drop in income will make it a very difficult choice to make.

In the novel, *The Age of Reason*, the main character is so obsessed with maintaining his freedom of choice that he refuses to choose to do many things because of the way it would limit his subsequent choices. There are those who dither so long about what girl they should marry, or what career they should embrace, that they end up alone and unemployed. Choice, like money, only has value when it's spent.

So, with these qualifications, I believe in Axiom 7. This places a great responsibility on me. Will I make the right choices? I have to be able to

foresee the consequences of my choices. It's scary! It is so much easier if one is not responsible for one's actions. If I commit a crime – well, I was programmed to do it. My moral code would be very simple – just look after myself. After all my choosing to do so was fore-ordained.

It's interesting that certain sections of the Christian religion *do* believe in predestination. "God knows the future because he has programmed it." On the one hand I see the sense in that. God is outside time and already knows how I will exercise my free will. But I just can't let the belief in free will go. It's something I have to work on. Maybe God doesn't know all about the future. Perhaps it's because we live within time and God does not. I've talked to people who believe in predestination and even *they* don't believe it in the full sense, where it denies free will.

AXIOM 8: God exists

Here we get to the heart of the matter. This 'something' that created the universe is somehow a being, a person, capable of loving his creatures and interacting with them. This is the biggest leap of faith of all. Like all the previous beliefs I can't prove it. But nor can you disprove it. It's genuinely an axiom.

By saying that God interacts with us I don't mean that we hear a voice booming down from the sky, or even an inner voice in a way that might cause

me to look around to see who is talking. Some people have claimed to have had such experiences and it is not for me to say that they're wrong. The best I've had is an inner conviction that something I hear about God resonates within me. "Yes! That must be how it is."

The thought of a mere impersonal force creating humans with their amazing personal qualities, such as love, creativity and humour is difficult for me to accept. Yes, I know that simple things can generate amazing complexity. Anyone who has seen what the equation $z_1 = z_0^2 + c$ can produce – the magnificent beauty of the Mandelbrot Set – knows this. I even accept evolution as a mechanism whereby simplicity can evolve into complexity. Yet the idea of an impersonal force somehow bringing about all the many facets of humanity is, for me, a step too far.

But I can't prove it. All I can say is that a belief in a personal God is the foundation for a world view which, for me, makes sense. That's after all why we accept any axiom. It helps us to make sense of things. Of course we don't accept any belief that we can prove is false just because it helps us to make sense of the world. But when it comes to something that's undecidable – when we have to choose between two alternatives, neither of which we can prove, then the more convenient one should be the one we choose. This is what we do in mathematics, why not in life?

You may well remind me that primitive people have always believed in some sort of God just to explain what their primitive knowledge of science has left unexplained. We once didn't understand electrical discharge from clouds so we invented an angry god who throws down spears of light to punish the sinners. But now that science is able to explain such things we can dispense with such a god as an explanation. That surely has been the case throughout history. But as the range of the inexplicable has shrunk we're tempted to believe that one day it will disappear altogether and that science will explain everything. Why not?

Well anyone brought up in a mathematical world knows that self-referentiality spells trouble. That rational thought can explain the external world is no surprise. That rational thought can explain much of our inner lives is likewise not surprising. That rational thought can explain the uttermost depths of rational thought, seems too much like a circular argument for me to be able to accept it.

So that's my choice. Feel free to reject Axiom 8 if that helps you make sense of the world. If you couldn't accept the early axioms I might question your ability to think rationally. I won't, but even atheists seem to be able to get that far. I *could* say that Axiom 8 is the *Pons Asinorum*, but that would be unkind.

In previous centuries mathematics students learnt geometry directly from a translation of Euclid's ground breaking work. The *Pons Asinorum*

(Fool’s Bridge) was one particular theorem where the level of sophistication of logical thinking takes a quantum leap. Weak students could never cross this bridge. Far be it from me to suggest that those who find themselves unable to accept Axiom 8 are fools. A belief in God is not a question of intellectual capability. There have been great thinkers who were atheists. But there have also been many great thinkers who *have* believed in God.

Now I regret to say that the quality of atheists has deteriorated over the last few decades. Great men like Nietzsche (“God is dead”) and Bertrand Russell, could mount great arguments supporting atheism. Many of today’s atheists have resorted to the tactics of today’s politicians – that of throwing mud and resorting to slogans.

I’ve heard the fact that ever so many wars have been fought over religion and the fact that many priests have been shown to be paedophiles, proves that God doesn’t exist.

Now, it is a tragic fact that rather too many wars *have* been fought in the name of religion, rather more than have been fought over the truth or otherwise, of the Axiom of Choice in mathematics. Perhaps this is because religion gets confounded with identity and culture and involves deep questions that we consider to be life or death matters. I could point out that communist Russia, an atheist state (though many of its citizens have clung to their faith) has also

started wars. But I won't. Sorry, I already have! Oh, well.

To establish whether religious people are more warlike than atheists, or are morally worse than atheists, would be a very difficult one to make. I'm certainly not equipped professionally for such a formidable task. But even if such a study gave atheists 8 out of 10 on a scale of morality and believers only 6 out of 10, that would be totally irrelevant to the truth or otherwise of Axiom 8. If God exists he does so even if his followers are rogues. Come to think of it, having read the Old Testament right through, it seems that many of his closest followers *were* extremely flawed.

Now we come to Christianity versus other religions. I'm a Christian so my Axiom 9 is as follows.

AXIOM 9: Christianity provides a reliable framework in which to know God.

Why not Judaism or Islam? Why not Buddhism? I guess the main reason is that I grew up in a Christian environment and 'if it ain't broke, don't fix it'. Christianity has proved to be a very satisfactory brand of theism for me, so there has seemed no reason to go elsewhere.

I reject the idea that one should make a study of all the major world religions to find the best one. I didn't follow this principle when choosing a wife. I

loved her dearly and she was all I would want in a wife. Yet common sense suggests that somewhere out there I might have found a wife who was a smidgen more suited to me. But life is short. The man who spends his whole life dating, in order to find the most suitable wife, ends up single all his life.

I've adopted the same principle with my house. I looked at a number of houses and settled on the one I have. I suppose there must have been a house somewhere that was maybe a fraction better for a slightly lower price. But I'm very happy with the one I've got.

If I had found myself growing out of Christianity I certainly would have gone looking elsewhere. As it is I've grown *into* Christianity and, as time goes on, it has become a more satisfactory environment for all my spiritual needs.

If I had been born into a Jewish family or in a Muslim country I may well have remained in one of those faiths. What I believe strongly, though I won't bother to list it as an axiom, is that we *all* worship the same God. I think those who say that Muslim's worship a *different* God are fooling themselves. The Muslim God is the God of Abraham – the Creator of the World. So is mine. There's no room for *two* creators of the one universe.

That's not to say that all religions are equal. As a Christian I believe that through Christ I get a clearer picture of God than if I were Jewish or

Muslim. But maybe if I was either of those I might think the same about *those* religions.

I've never been tempted to try either Judaism or Islam. For me, the New Testament is the best part of the Bible and it seems a pity to stop with the best part of the story still to come. And, with my limited experience of Islam, it seems that they focus much more on personal holiness and purity than on love and forgiveness than would suit me.

So, is one able to cherry pick and to choose whatever religion one likes? What about the one *true* religion? To a greater or less extent they're *all* true. They really don't contradict each other in any of the fundamentals. Judaism seems to be Christianity without part two. I'm sure many Jews wouldn't agree with me because, although it grew out of Judaism, Christianity threw a lot of the old customs away. But to me those things don't seem important.

I guess Islam is, in a sense, Christianity *plus* Mahomet. After all they do believe in Jesus as one of the prophets. But the emphasis on rules and ritual seems foreign to me. Besides I believe that Jesus is rather more than just one of the many prophets. All three 'religions of the book' promote love for one's neighbour and most practitioners of all three religions seem to make a serious attempt to lead a good life. I accept people from all three as fellow travellers. It's simply a personal choice for me to stick with Christianity.

CHAPTER FOUR: CREATION

If you're still reading, then either you accept the previous axioms, or you don't but you're curious to see what further intellectual mess I might get into. I won't number the following things as axioms. They're beliefs that I hold to a little less tenaciously than the previous axioms.

In this chapter, let's consider creation. I believe in creation, to the extent that I believe that God exists. This comes directly from the definition of God. God is the creator, so if I believe that God exists I must necessarily believe that God created all that is.

But I'm not a creationist. There are some Christians who are preoccupied with defending the biblical account of creation. The Bible says that God created the world in six days, and on the seventh he rested and, if it's in the Bible, it must be literally true.

The biblical account of the creation is very poetic. Whoever wrote it – and of course it was transmitted by an oral tradition for centuries before it was written down – was asserting that God is the Creator. The bit about seven days is just a poetic way of expressing it.

Of course it doesn't make sense to talk about days before the sun has been created and the earth was set spinning around in its orbit. The Jews of the

day had no idea of the physics and biology that explain the world as we know it. Today we know so much more as to how it was done, but remember, we still don't know everything.

Ever since science began to make leaps and bounds in developing our understanding of the material world, many scientists have had a sort of arrogant belief that one day we'll know it all. And such a belief has filtered down to the layman. Today we seem to be just a hairsbreadth from being omniscient. But, in fact, the more we know, the more mystery there seems to be.

Do I believe in evolution? Of course I do. The theory of evolution has been around for well over a century and has been supported by countless experiments. But I don't see any reason why God couldn't use the principle of natural selection in carrying out his creation. I can understand why, when Darwin first announced his theory, many believers became very troubled. Darwin himself was a devout Christian, and he found it difficult to reconcile his faith with his scientific discoveries.

But one difficulty vanishes if you sweep away the insistence that each stage had to be completed within 24 hours. Given millions of years, there's no reason why God could not have used evolutionary processes. But with survival of the fittest, evolution can proceed without any intervention from God. Of course – I can't see him having to tinker with his creation every step of the way. I see him having set up a world in which natural

selection can work its way through and achieve what it has achieved.

Another difficulty was that Darwin's theories mean that we 'descended from monkeys'. In fact current thinking suggests that both *homo sapiens* and the apes descended from a common ancestor.

But however it was, this seems to go against our belief that we're special. We are just one small branch of the animal kingdom. A similar objection was made to Galileo's claims that the earth is not the centre of the world. We've had to adjust to the fact that we are not at the centre of the solar system and that our solar system is one of the smaller solar systems in the universe. But how does that contradict a belief in God?

It's not the way I would have gone about it. If I was creator I would have put the human race slap in the middle of everything and created humans in a totally different way to all the rest of the animal kingdom. But God has his own ways of doing things, which I'm sure are superior to anything I could dream up.

I have a few reservations about Darwin's theory, however. I speak now as a biological layman and so I could be completely wrong. If I am, I would not be worried in the slightest. If natural selection alone can explain everything in biological evolution, that's fine. But I just have an instinct that it's a bit too simple to be the final answer.

Darwin was to biology what Newton was to physics. But biology is a much younger science than physics. I'm waiting for a biological Einstein to come along to say, "Darwin was correct up to a point but the mechanism behind evolution is a little more complicated than mere natural selection. Just as relativity and Newtonian physics coincide under ordinary circumstances, I have a hunch that this deeper theory would come down to exactly what Darwin propounded for the most part. But it would explain things that Darwin's theory can't explain.

As I say, I could be wrong, but there seem to me to be some things that natural selection alone doesn't seem to explain. If organisms evolve into more complex ones because a chance random variation makes it better able to survive, then why do the more primitive species remain? If we have evolved from cockroaches because we're better adapted for survival, why do I have to still chase them round my kitchen? It would seem to me that these creatures are far better adapted for survival than we are. Why, it has been said that they could survive a nuclear explosion!

The other thing that puzzles me is why there isn't a continuity between species. We seem able to classify species into discrete groups. Is this purely arbitrary, the way we classify colours into red, green, blue etc when there are really no boundaries on the electromagnetic scale of frequencies? Or is there something else going on?

As I said these are the musings of a mathematician, who knows a little physics but has had very little training in biology. If Darwin's theory is the final one, and can explain *everything* about evolution, I wouldn't worry. My faith doesn't depend on the details of the evolutionary process.

The Bible contains a second account of creation which, we're told by biblical scholars, had another origin and was spliced into the Genesis account at some stage. It describes how God created man and woman. Man was formed from dust and God breathed life into him. That may be hard to reconcile with what we know of biology, but you can see how such a poetic account came about – earth to earth and ashes to ashes. One day our bodies will become either dust or ashes and so it's appropriate to imagine us as having come from dust. But remember, it's just poetry.

The bit about Eve being formed from Adam's rib demonstrates that God had no direct role in writing the Bible. What I know of him leads me to believe that men and women have equal standing in his scheme of things. The rib story provides the religious justification for the patriarchal culture in which these scriptures were written.

When we come to Eve tempting Adam to sin, we get even more misogyny. "Don't blame the men. Women are the ones who brought sin into the world!" But I don't think this was the intended message of that story. And it *was* a story without any doubt.

That there was a real Adam and a real Eve is just possible. That they were formed from dust and ribs, and that they were the first humans on the earth is something I can't accept, and because of my understanding of how the Old Testament came about, I don't think I'm meant to accept it literally.

Even the writer of that account wasn't asking for us to believe in it literally. The names Adam and Eve have symbolic meanings. If they had been called Boaz and Miriam it might have been different. And that tree from which the fruit was plucked by Eve – was it an apple tree? No, it was called the Tree of Knowledge of Good and Evil. I'm no orchardist, but I've never encountered such a tree. I'd like to ask my local fruit shop for a couple of pieces of the fruit of knowledge of good and evil but I'm sure he'd just look at me. It seems that these things aren't grown in Australia!

If there was ever any doubt as to whether this passage was literal history, or imaginative poetry, that name gives the game away. To believe it as fact is like believing that Christian's journey in Pilgrim's Progress was an actual walking tour that somebody once undertook. This is not to devalue the Bible's creation story. But one should focus on what is the underlying message, not in the way they chose to dress it up.

I remember many years ago reading a book that claimed to prove that God exists purely on the basis of probability! You see, the account of creation

in Genesis shows some agreement with what scientists have come to tell us was how it happened. If you remove the bit about God, and extend the time scale to millions of years, the order of events in the beginnings of the world correlate very roughly with the order of events that we all believe today.

In the beginning God created the heaven and the earth. And the earth was without form, and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters. And God said, Let there be light:

and there was light. And God saw the light, that

it was good: and God divided the light from the darkness. And God called the light Day, and the darkness he called Night. And the evening and the morning were the first day.



And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters. And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so. And God called the firmament Heaven. And the evening and the morning were the second day.



And God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear: and it was so. And God called the dry land Earth; and the gathering together of the waters called he Seas: and God saw that it was good.

And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so. And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind: and God saw that it was good. And the evening and the morning were the third day.

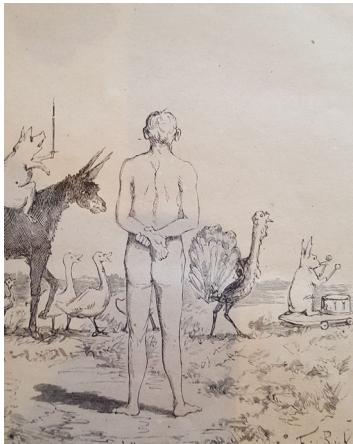
And God said, Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and years: And let them be for lights in the firmament of the heaven to give light upon the earth: and it was so. And God made two great lights; the greater light to rule the day, and the lesser light to rule the night: he made the stars also. And God set them in the firmament of the heaven to give light upon the earth, And to rule over the day and over the



night, and to divide the light from the darkness: and God saw that it was good. And the evening and the morning were the fourth day.

And God said, Let the waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the earth in the open firmament of heaven. And God created great whales, and every living creature that moveth, which the waters brought forth abundantly, after their kind, and every winged fowl after his kind: and God saw that it was good. And God blessed them, saying, Be fruitful, and multiply, and fill the waters in the seas, and let fowl multiply in the earth. And the evening and the morning were the fifth day.





And God said, Let the earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of the earth after his kind: and it was so. And God made the beast of the earth after his kind, and cattle after their

kind, and every thing that creepeth upon the earth after his kind: and God saw that it was good. And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. So God created man in his own image, in the image of God created he him; male and female created he



them. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth. And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given every green herb for meat: and it was so. And God saw every thing that he had made, and, behold, it was very good. And the evening and the morning were the sixth day.

Thus the heavens and the earth were finished, and all the host of them. And on the seventh day God ended his work which he had made; and he rested on the seventh day from all his work which he had made.



And God blessed the seventh day, and sanctified it: because that in it he had rested from all his work which God created and made.

It's only a very rough approximation to the order of events that we have come to believe in today. The sun was not supposed to be created until day 4, so the concept of the earth rotating relative to the sun as the cause of night and day was foreign to the writer of the Biblical account of creation.

The fact that plant life came first, followed by sea life and birds, and then animals were created, culminating in man, is only roughly correct. We now know that birds evolved from dinosaurs, so land animals would have preceded them. But I doubt if I could have done as well if I had lived back then.

I know that if *I* had been writing a creation story in biblical times, in the absence of any scientific knowledge, I would have created the whole lot in one go.

As a scientific document, Genesis is not very accurate. But at least it claimed that the world was created progressively, rather than all at once, which ties in with scientific thinking. Was it written directly by God? Most definitely not! But be clear that the bit about it all being done in six days wasn't a mistake. It was a poetic way of telling the story. I don't think for one moment the writer of Genesis believed in a literal six day creation. It was, after all, poetry. He probably thought of each day representing a

thousand years. He would have been a little surprised at the millions and millions of years that we accept today but he was, after all, using the day as a metaphor for an era. Those who believe in a literal six day creation are misreading the text.

Well, this book I was telling you about claimed to give a proof of the existence of God, by estimating the probability of each bit of the creation story being correct by pure chance. It then, as one does in probability theory, we multiplied all these small probabilities we'd get an *extremely small* probability – nought point many, many, zeros one. The book argued that the probability of the writer of Genesis getting so many things right by chance was so small that it must have been written by God! Therefore God exists.

I remember thinking at the time I read it that the specious argument was amusing and totally invalid, even though I agreed with its conclusion. Over the years I've seen totally fallacious proofs of many true mathematical theorems.

Proofs by probability are accepted as valid in many contexts by the scientific community. In statistics we learn that any hypothesis of an outcome that has a probability of less than 5% of having arisen by chance, is considered to be true. But to use these methods in attempting to validate the creation story is simply ludicrous.

Who hasn't heard of strange coincidences? What do they prove? I remember the morning I had

decided to write this book. That afternoon on television I came across a Woody Allan film that I had never seen. It was called *Magic in the Moonlight*, and I sat up in amazement when the main character, who was preoccupied with logic, mentioned the question of proving the existence of God. Try to work out the probability of that happening by chance! Was God interfering with the TV scheduling in order to assist my thoughts?

I could multiply together all the probabilities of the coincidences that have occurred in my life and come up with a tiny figure. What would that prove? Why it might prove that the world was created especially for me! I am the centre of the universe and all of you are simply robots put here for my own amusement! But I'm sure you too have had many strange coincidences in your life, and you could draw similar conclusions.

CHAPTER FIVE: MIRACLES

What about miracles? These are often stumbling blocks for people contemplating becoming a Christian.

A miracle is a localized event where the normal laws of science are suspended or modified for some purpose. The purpose may be to draw attention to some announcement, to assist a group of people to succeed in a battle, or to escape from their enemies. Or it may be to heal an individual.

For someone who believes that God created the world, and all the laws of physics, chemistry and biology which govern it, a miracle would be where he chooses to intervene. There's no doubt that, if he indeed set up the laws that rule the universe, he has the power to change those rules from time to time. After all he is supposed to be omnipotent.

In principle, performing a miracle is not all that difficult. Cartoonists do it all the time. Their hero can be blown up into a million pieces and in the next frame, or the next scene in the case of an animated cartoon, they've reassembled themselves and are back to normal. The cartoonist's power is limited only by his or her imagination.

For God it's somewhat more difficult, for he has created a whole universe and changes in one place can affect the rest. He's chosen to create a universe which follows certain rules and a change in

one place, and at one time, can have far reaching effects farther afield.

There was one instance where the sun was said to have stood still. With our knowledge of the relative movement of the earth and the sun this would have required God to stop the earth rotating for a couple of hours.

No big deal for an omnipotent God, but normally this would have resulted in mammoth tidal waves and the deceleration in a few seconds would have torn mountains apart, not to mention buildings being torn off their foundations and trees uprooted, not just locally but across the entire globe.

Now an omnipotent God could have changed other laws to mitigate the damage, but these laws would have further effects. Anybody who has written a computer program will know that often changing just one line of code can require many others to be changed and, in many cases, the quickest solution is to start again from scratch.

I'm not saying that God *couldn't* perform such a miracle, but if he did it too often he'd end up with an unpredictable universe. This is clearly not what he wanted.

In many cases the miracle was one of healing. Here things are somewhat different. The laws of biology allow unusual events to occur. Babies are born with six fingers or two heads, or the capacity to *see* sounds. Some people have recovered from terminal illnesses – with or without prayer.

There is still so much we don't know about biology, or medical science. What we *do* know is that big effects can often take place as a result of tiny changes. A tumour can seem to spontaneously start to shrink. I have no doubt that there is some underlying small scale biological process that has caused this, but with such events being rare it hasn't been possible to discover the cause for the sudden reversal of the condition.

Could it be that God uses quantum physics to perform this type of miracle? According to quantum physics the movement of the fundamental particles that make up the material world, is unpredictable. It is only by the law of averages with billions of such particles that the laws of physics seem to hold.

There's nothing fundamentally impossible in a book that was placed on a table suddenly levitating simply because all its fundamental particles *choose* to go upwards at the same moment. Such a phenomenon wouldn't contradict the laws of quantum mechanics. It's just that the probability of this happening would be incredibly small.

But what if one could influence the apparently random movement of these particles? Could this be the means that God has chosen to sometimes intervene in our world?

There's a deep mystery in quantum physics. There is an uncertainty principle that states that it is fundamentally impossible to know, beyond a certain level of accuracy, exactly what happens at a sub-

atomic level. There's a randomness that underlies everything.

Could it be that God created quantum mechanics as his 'back door' through which he can intervene in the world and communicate with human beings? Could it be through quantum mechanics that we have free will? Perhaps not, but it's an interesting thought. We may never know what mechanism he uses to do these things, but if ever we do I'm sure that it will use scientific principles that are at present unknown to us.

Our view of the way God interacts with the world has changed over the millennia. He was once thought to be a magician who, by merely making pronouncements, could cause earthquakes or storms. It was as if he had some sort of Siri whereby he simply has to say the word and magically it is done.

Those of us who are Brontë enthusiasts have heard of the great Crow Hill bog-burst. At Haworth, the home of the Brontës, it had been raining all week and the ground was sodden. But finally the weather cleared and the Brontë sisters went out walking with one of the servants. Suddenly the weather changed and the heavens opened.

Suddenly a loud roar could be heard and half of the hill-side, near where they were, slid down into the valley. It swept away bridges and fences and covered the land with a layer of thick mud.

Fortunately no-one was hurt, but a couple of farmers had a near miss. In a sermon he delivered a

week later, Patrick Brontë preached about the bog-burst. Though he explained how earthquakes and land slips were caused by natural forces, he saw it having been directly caused by God. God was waking his people up to their sins, though in his mercy he didn't allow anybody to get hurt.

These days very few churchmen would see it this way. God created the world, along with natural forces such as gravity, the weather cycle and geological forces, and lets things operate under them. He doesn't directly pull the levers and bring on disasters for whatever reason.

Would you have it any other way? If *you* were a creator, designing a world, would you create one where you had to be constantly intervening? It's time to transform the ape into Neanderthals – pull this lever. Now is the time for Neanderthals to evolve into *Homo Sapiens* – push that button. An earthquake is needed to wake up these people to their sins – say the word and those geological plates get pushed together.

Nevertheless, even today, some people still believe that God directly intervenes in the weather, and day to day trivial events of our daily lives.

I don't believe in an interventionist God. Not that I think him being *incapable* of constantly intervening. I just don't think it's his style. Far more wonderful is the way he created a world where things would run automatically, as a result of very clever laws.

Now I don't mean to suggest that God has bowed out of our world altogether. I believe that he *does* intervene on a daily basis. In the stillness we can hear the voice of God. I don't mean literally, but thoughts come into our brain that I believe are not simply the result of biochemical reactions. God *does* speak to us, and we call this aspect of God the Holy Spirit.

Some neurologists hold the view that *all* mental activity can be explained purely by biochemistry. Feelings of love are simply the result of hormones, awakened by the evolutionary force to procreate. Religious beliefs are simply the over-activity of some part of our brain, activated by some evolutionary imperative.

Of course, all such scientific conclusions that these scientists arrive at are themselves, if what they say is true, merely the result of the biochemical activity in *their* brains. If all thought is entirely the result of what we've eaten, or our genes, then we needn't put any weight on these materialists say. Their materialism is purely a result of the way their brains are wired up.

Materialism is self-contradictory. If it's correct then there's no such thing as truth and science is just an illusion! However some scientists are beginning to believe that the human mind doesn't exist solely in the physical brain. There's a great mystery here, both scientific and theological.

Mostly God intervenes by that still, small, voice that we hear in our thoughts when we

communicate with God – the Holy Spirit interacting with our brain cells. I would even say that conscience is a manifestation of the Holy Spirit. And since mankind has experienced the voice of conscience long before Jesus was born, I believe that the Holy Spirit has been influencing mankind long before Pentecost, and in all parts of the world.

What about the other miracles, such as the ones Jesus is supposed to have performed? Theologians have gone to great lengths to show how such and such a miracle could have occurred, within the accepted laws of science. Perhaps the disciples just made them up. Perhaps Jesus was like magicians of today, performing apparent miracles, but using some sort of clever trickery. Perhaps he was a great mesmerist. Perhaps he was able to hook into laws of physics we haven't yet discovered. Perhaps he exercised his prerogative as the Son of the Creator. I really don't care. I don't need to believe such events to convince me that Jesus was somehow special and to experience the influence of God within me. Not as a voice, but as an overwhelming conviction that such and such makes sense of the world.

CHAPTER SIX: THE BIRTH OF JESUS

Now, we're told in the Gospels, that Jesus was born to Mary and that she was a virgin. The virgin birth is held particularly strongly by our Catholic brothers and sisters, but most Christians *do* believe in the Virgin Birth, even if Protestants don't make such a big thing of it, because in our tradition Mary was a minor character in the story.

Some theologians argue that the Hebrew word that's translated as 'virgin' can mean a young woman, or perhaps a young unmarried woman. For example, this is surely the meaning in the parable of the ten virgins. It would have been absurd for Jesus to be making the point that these ten bridesmaids had never had any sexual intercourse. He was just saying that they were young unmarried girls.

Luke mentions that Mary was promised in marriage to Joseph, and she was pregnant. But he doesn't claim that she was a virgin in the modern sense of the word and Mark and John don't even mention the birth of Jesus at all. So we've only got Matthew to go by. What does he say?

Matthew states explicitly that Joseph had no sexual relations with Mary before they were married. And also in Matthew, when the angel told Mary that she was to give birth to a son, Mary is reported as telling the angel "I am a virgin. How can this be?" That's a pretty clear statement, and for those who

take a literal view of the Bible, that would be the end of the matter.

As we all know, a virgin birth is biologically impossible. Was it then a great miracle that broke all the laws of biology? In fact virgin birth is not only possible, but it's really quite common in certain species. There are certain primitive creatures, such as amoeba, where this is the normal method of reproduction. In many other species, where sexual reproduction is the norm, there are many recorded cases where an unfertilised egg can sometimes spontaneously develop into a live animal – in species such as Komodo dragons, sharks, snakes and so on.

The word that describes virgin birth in the scientific literature, is **parthenogenesis**. Sorry if this seems to be a scientific lecture, but Christians are often laughed at for believing in the virgin birth and if you throw the phrase 'human parthenogenesis' at them you might shut them up!

Mice are genetically somewhat similar to humans. That's why they're often used as laboratory animals. Now *their* normal method of reproduction is like ours, with a father and a mother and, unlike other species, virgin birth doesn't seem to appear spontaneously. However scientists *have* been able to produce live virgin birth offspring from a female mouse.

In humans this spontaneous development of an unfertilised egg can, and does, occur, though very rarely. But with humans there's a chemical process whereby such embryos die in the first few days of the

pregnancy, and indeed there's no scientifically proven case of a virgin birth in humans. But then what would you expect?

Just suppose that virgin births *did* occur once in so many millions of births. Who's going to believe the poor mother?

"Sure you didn't have sex – pull the other leg." Even if a nun in a closed convent gave birth, it would be assumed that she was impregnated by some wayward priest.

So I don't see that a virgin birth necessarily breaks the laws of biology. There are so many rare occurrences that appear to break the normal pattern of human birth. We don't need to assume anything supernatural.

But there's another problem. If Mary *was* a virgin when she gave birth to Jesus, he would have had to have been a woman. Mary would only have X genes from Mary, while to be male Jesus would have had to have got a Y gene from somewhere. A virgin birth would imply that Jesus was female, with two X chromosomes. Interesting thought! So, perhaps, Jesus really *was* a woman, and that iconic beard was just a fake!

However, a virgin birth in humans, resulting in a male offspring, is technically possible. You see, in rare cases, a woman can be outwardly female, and yet carry some male genes. This has indeed occurred, even where the mother had every appearance of being a normal female.

Could Mary have had that genetic abnormality? The chemical process I referred to before would normally cause the foetus to wither away at an early stage. But isn't it possible that in extremely rare cases this process might not operate.

As I said, there's no scientifically proven account of a virgin birth in humans, but biology is full of exceptions to the general rule.

In 1995 David Bonthron, and his team from the University of Edinburgh, published an account of a boy, referred to as FD, who was conceived in the normal way, with a father and a mother – so not a virgin birth. He needed some genetic testing for some medical condition. The amazing thing was that his white blood cells had two X chromosomes. Now in the normal course of biology, one of these should have come from the father and one from the mother, which ought to have resulted in him being female. Yet he was in every outward respect a male.

But what was even more amazing was the fact that these X chromosomes were identical and were therefore *both* derived from his mother. His skin, on the other hand, had an X from the mother and a Y from the father. So genetically his blood cells were the result of a virgin birth and were female, even though his overall development was that of a male, with input from the father.

People without scientific training seem to believe that what *usually* happens will *always* happen. In biology there are so many exceptions to

the normal rules. Is it impossible for a human to be born with six fingers or a mixture of male and female genitals? We accept that such things can happen because there are rare instances that have been recorded in the scientific literature. But what about extremely rare occurrences where there is no such recorded instance?

Now, for me, it's of little significance whether or not Jesus was the result of a virgin birth. On the one hand I believe that genetics is so full of unusual possibilities and exceptions that it's indeed quite possible for Jesus to have been the outcome of a virgin birth, without any need of special divine intervention. It could have all been in accordance with biology, operating in very unusual circumstances. On the other hand it would not really make any difference to my faith in Jesus if it turned out that Mary and Joseph had both been involved.

Now here comes the real joke! Matthew, after carefully setting out the genealogy of Jesus from Abraham to King David and then from David to Joseph, then tells us about the virgin birth, thereby telling us that genetically Joseph had no part in the birth of Jesus at all!

For me the question of the virgin birth has little significance. Whether he was born of Mary, without the genetic contribution from Joseph or whether he was conceived in the normal way, is irrelevant to my understanding of God and Jesus.

What is important is that Jesus was both God and man.

The most amazing miracle of all is the Incarnation itself. This is the miracle that Jesus, part of the God-head, a spiritual being who existed before creation, was also a real flesh and blood person. For the Incarnation asserts that there's a bridge between the world of the spirit and the material world.

How can a creator get inside his or her creation? Just imagine if J. K. Rowling was able to send her daughter, Jessica, to sort out the problems at Hogwarts School of Witchcraft and Wizardry. Imagine Harry Potter being a sort of John the Baptist. "I am a great wizard but there is one coming after me who will be a greater wizard than I. Her name is Jessica and I am not worthy to undo the buckles of her shoes." How could this be possible?

We tend to think that the spiritual world is completely separate from the material world and the idea of a spiritual entity being injected into the physical universe is totally unthinkable. But scientists teach us that all matter is energy, and energy is a similar stuff to spiritual matter.

CHAPTER SEVEN: CHRISTMAS

Without a doubt the most familiar part of the whole Bible, for most people, is the Christmas story. We've read it, and heard it, and seen it performed more than any other story in the whole Bible. Surely, by now, we know it backwards and there can be no more mysteries surrounding Christmas. Yet there *are* deep mysteries in the Christmas story, some of which go to the very heart of our faith.



One of the most familiar images of Christmas are the angels. 'There were shepherds watching their flocks by night, all seated on the ground.' In the Good News translation, Luke says that a great 'army' of angels appeared. Other translations use the word 'company', which also has military overtones. Surely

it would have been more natural for him to have used the word ‘flock’ rather than ‘army’. What was it about them that made the shepherds think it was an army?

We tend to think of the angels as coming down from the sky. That’s where they’re shown on most Christmas cards. Yet Luke, the only one to talk about the shepherds, doesn’t mention *where* they came from. Describing them as an ‘army’ I can’t help thinking that they marched up over the hill to the valley where the shepherds were watching their flocks! No wonder they had to be told “do not be afraid!”

A very believable explanation for angels, though not one that I accept myself, is that they’re aliens from another planet. After all, aliens have been used to explain ancient monuments, such as the pyramids, which seem to have required much more advanced technology than was available at the time. If so, they’ve been very quiet for the last two thousand years. Perhaps they came from a distant galaxy and were just popping in on us at the time of Jesus!

Now let’s come to the story of the wise men. Only Matthew records this story. They’re often referred to as ‘kings’ – ‘We three kings of orient are’. More commonly they’re called ‘wise men’ or ‘magi’. Matthew describes them more explicitly as ‘men who studied the stars’. We could call them ‘astronomers’ but probably ‘astrologers’ would be

more correct. They would have believed that the stars were placed there to tell us about events on our own planet.

We think of them as *three* wise men, but Matthew doesn't say how many there were. We get the 'three' from the three gifts that the astrologers presented.



In all the pictures we see of the three wise men we see them arriving on camels. But Matthew doesn't say that. Camels were used to transport goods but were considered too uncomfortable for men, particularly rich men, who could afford the more comfortable Arabian horses.

Where did the wise men come from? There's a tradition that they came from far off lands such as Persia or India. But Matthew is silent on this and they more likely came from Arabia – perhaps modern day Syria or Iraq or Saudi Arabia.

Matthew explains that they followed a star. But the astrologers would have known all the stars and their movements. There's a suggestion that it was a comet, which came from apparently nowhere and moved in a quite different way to the stars themselves.

At first the star was not very explicit and merely led them to Jerusalem. They hoped to get guidance from Herod, but unwittingly they let the cat out of the bag when they asked "where is the baby

born to be the king of the Jews?" Herod thought that *he* was the king of the Jews, so he was troubled by this news. He asked his advisors and they dug up the reference to Bethlehem from the scriptures.

Bethlehem, in the land of Judah, you are by no means the least of the leading cities of Judah; for from you will come a leader who will guide my people Israel.

One wonders why the magi, who seemed to have studied the Hebrew scripture themselves, couldn't figure this out for themselves.

So Herod told the wise men that Bethlehem is where they should look and asked them to report back when they found the baby. Wonderfully, the comet, or whatever the star was, reappeared and led them, not just to Bethlehem, but to the very place where Jesus and his parents were staying. How does a star, or a comet, hover over a particular house?

Matthew indeed describes it as a house. So it is no longer the barn or shed at Bethlehem. Many scholars believe that the wise men came at least a year after the birth of Jesus and that they came to Nazareth. Jesus would have been a toddler, rather than a baby. This would explain why Herod made an edict that all children under the age of two were to be slaughtered.

The gifts they brought were gold, frankincense and myrrh. Traditionally these are thought to be symbols of Jesus and his mission.

There was gold for a king, frankincense for a priest and myrrh, which was used to embalm bodies, symbolising his crucifixion.

The wise men realised that Herod is up to no good and so they failed to return to him. They slipped away 'by another road'.

Such a massacre doesn't appear in the writings of the historian Josephus, who wrote about Herod and his many misdeeds. However it does explain why Jesus and his family fled to Egypt.

Here's interesting question. How long was the holy family in Egypt? I had always been under the impression that it was quite a number of years and that Jesus spent most of his childhood there, though we must remember that by the age of twelve the family travelled to Jerusalem. This was when Jesus got left behind when the family left. If so then Jesus must have learnt to speak Egyptian.

Joseph is said to have stayed in Egypt with his family until Herod died. Now Herod the Great died in 4 BC. Scholars place the birth of Jesus to be somewhere between 6BC and 4BC, despite the apparent contradiction. Remember that the Julian calendar, which supposedly marks the years since the birth of Jesus, wasn't put into place until a long time later.

The successor to Herod the Great was Herod Antipas, who died in AD 39, well after Jesus died. So it must have been Herod the Great that was being referred to. If the flight to Egypt took place when Jesus was 1 or 2, the Holy Family must have

returned from Egypt before Jesus was four years of age.

What about John the Baptist? His miraculous birth to aged parents Zachariah and Elizabeth is part of the Christmas story, but it seems to be missing from the secular version of Christmas.

Now John was only a few months older than Jesus so why wasn't he massacred? Well, Zachariah was a priest in the temple and so he couldn't easily flee to Egypt. At the end of chapter 1 Luke reports that John lived in the wilderness.

I'd always imagined John being a hermit, living on his own in a cave, surviving on locusts and wild honey. It's more likely that his parents, seeking a safe place for him, placed him in the care of the Essene community who lived in the desert. Locusts and wild honey was a normal part of their diet.

One wonders what sort of upbringing Jesus had. Joseph is said to have been a carpenter, though I'm told that the Greek word that describes his occupation has more the meaning of 'handyman' rather than a skilled carpenter.

Did he have brothers and sisters? There's a tradition amongst our Catholic friends that Mary remained a virgin for the whole of her life.

What about the reference in Luke, chapter 6, to the brothers and sisters of Jesus. It has been argued that 'brother' and 'sister' can mean a wider relationship than that of siblings. Indeed, once when

Jesus was preaching he was told that his brothers and sisters had arrived and he asked “who are my brothers and sisters?” He then explained that all those who believe are his brothers and sisters.

This seems to be a metaphorical twist that Jesus placed on the words ‘brother’ and ‘sister’, but the reference to his brothers and sisters was made initially by his neighbours and therefore should be taken at face value.

“Isn’t he the carpenter’s son? Isn’t Mary his mother, and aren’t James, Joseph, Simon and Judas his brothers? Aren’t all his sisters living here?” Surely there’s nothing metaphorical in this.

It’s interesting that there’s no mention here of Joseph, the father of Jesus. In fact Joseph seems to have disappeared some time after the incident in the temple when Jesus got lost. Perhaps Joseph died and Mary remarried, and these were his half brothers and sisters. But that still would contradict the suggestion that Mary remained a virgin for her whole life.

Of course it *is* possible that Joseph was a widower and these brothers and sisters were from his previous marriage. But the shepherds don’t seem to have encountered a horde of little children surrounding the manger. Perhaps they were grown up children. Perhaps, perhaps ... For me the evidence is just not there for Mary to have been a perpetual virgin.

Why, if Jesus did have younger brothers and sisters, did he give Mary to John to look after her rather than his siblings. But, then, the same could be said if they were cousins, because even if they were only cousins they certainly were close to Mary.

Also, there's a verse in Matthew chapter 1 that says that Joseph had no sexual relations with Mary *before* she gave birth to her son. This suggests that she *did* have normal sexual relations with her husband *after* Jesus was born. And there's a reference to Jesus being Mary's 'first born' son.

Perhaps the tradition of Mary's perpetual virginity grew up because of the idea that sexual relations, even in the context of a marriage, are somewhat impure. But I certainly don't think of Mary as being less Godly if she *did* have other children, conceived with Joseph in the normal way. The early Church used Mary as the great symbol of motherhood, and this would be enhanced if she did, as I believe she did, go on to bear further children. While I can see no evidence that Mary remained a virgin, it *is* possible. But I see no theological imperative in clinging to this belief and I'm happy to accept that she became a normal wife after Jesus was born and went on to have other children.

Coming from a Protestant tradition I find it difficult to understand the veneration of Mary. She is only a bit player in the Gospels and she's not treated as particularly special in the rest of the New Testament.



Of course she did play an important role in being the mother of Jesus, which certainly was a great honour. But we know very little about her as a person.

When the angel came and announced to her that she was to bear a son, though not yet married, she accepted her predicament with great graciousness. I am sure she was a good woman.

However nothing in the Bible suggests that she was without sin. That tradition grew up in the church quite a long time later. Perhaps it was because of the doctrine of Original Sin, whereby the sins of the fathers pass down to their children. If Mary had sinned then Jesus would have been born a sinner before he even had a chance to commit any of his own sins. But does that mean that Mary's mother had to be sinless?

We're not told in the Bible whether Mary was a good mother. We presume that she was, although she and Joseph were deficient as parents in leaving Jesus behind when they left him in Jerusalem.

It has been pointed out that they were travelling as a large family group – uncles and aunts and cousins – and that they had presumed he was with other relatives. But for them not to have noticed his absence for a whole day seems quite bizarre.

They went back for him and once back in Jerusalem it took two further days to find him. It didn't seem to occur to them that he might be in the temple. Jesus had to rebuke his parents. "Didn't you know that I must be about my father's business?"

Despite being told by the angel that Jesus would be special Mary didn't seem to accept that he had a special mission.

I'm sure that Jesus kept the fifth commandment, and honoured his father and mother, but he doesn't seem to be particularly close to them.

Once, when Jesus was preaching, his hearers thought that he was raving. His family arrived – mother, brothers and sisters. They tried to take him home. One can almost hear them say, “come on now Jesus, come quietly – you are upsetting all these people.”

No wonder Jesus ignored them and said, “who are my brothers and sisters?” It is quite clear that none of his family had the slightest idea of what he was doing – certainly not Mary.

Did Mary do anything to support him in his mission? Plenty of other women did, including other Marys. She may have, but the gospel writers are silent on this.

The only remaining mention of Mary is where Jesus, on the cross, asks the disciple John to look after her as if she was his own mother.

After the resurrection did she visit the tomb? As far as the Gospel record is concerned the visitors were two other Marys – Mary Magdalene and Mary the mother of James.

My Catholic friends will no doubt be getting hot under the collar at all this. What have I got against Mary? Nothing at all – I have no proof but I feel convinced that she was a godly woman. But countless other mothers have been godly women. Behind most great men and women in history there are great mothers whose deeds go unrecorded.

Catholics are quick to point out that they don't worship Mary, but they revere her. Moreover they don't pray *to* Mary, but rather pray to Jesus *through* Mary.

When someone gets sick their family often ask other people to pray for the afflicted one. Where's the harm in that? That's all Catholics are doing in asking Mary to pray on their behalf.

After all, as the mother of Jesus Mary has a special relationship with Jesus, and he is more likely to listen to her than to me. But as far as the New Testament was concerned Jesus wasn't particularly close to her. I believe that even at the foot of the Cross Mary had no concept of *why* he had to die and what his mission was.

If you have to pray to Jesus through one who was close to him, why not pray through John – the disciple 'whom Jesus loved'?

Having said all that, I believe that the church had a brilliant idea when it decided to promote Mary to the position of Saint above all other Saints. She was a woman and in the patriarchal world this gave women a role model. Women would feel more comfortable in praying to Mary than to the man, Jesus.

I think that the world has benefitted throughout the centuries by having Mary play such an exalted role. It's just that in today's world it's no longer necessary to continue in something that's unsupported by scripture.

I say all this as someone brought up a Protestant. No doubt this creates an unconscious bias in my thinking. Had I been raised a Catholic it's quite possible I may have reached other conclusions.

CHAPTER EIGHT: DOES SANTA CLAUS EXIST?

Silly question. Everyone knows that he does. The pertinent question is not “does Santa exist?” but “*who* is the real Santa?”

When you were five you believed that Santa was a bearded old man who lives at the North Pole and who, on Christmas Eve, manages to visit every chimney in the whole wide world. If your house doesn’t have a chimney, don’t worry. He has ways and means of getting presents to every boy and girl in the world!



Then at about the age of eight you began to notice that the Santa on whose lap you sat in one department store has now gone to another – and he’s not quite so fat as he was half an hour ago and

doesn't seem to remember what you said when you last saw him!

You asked your parents why this was so, and you we're assured that all these store Santas are all stand-ins for the *real* Santa. Of course, in the days leading up to Christmas, Santa is far too busy to go round shops and have his photo taken with little girls and boys sitting on his lap. You understood, of course. You wouldn't have wanted it any other way. Let him get on with his *real* job of making toys!

When you were a little older a big boy (or girl) revealed to you a big secret. "Santa is really your Dad. He buys the toys and, after you've gone to bed he wraps them up, and puts them under the Christmas tree."

I remember asking my Mum, "does Santa Claus really exist?" She answered by asking me, "how would you feel if he didn't?"

I'm not sure how she would have responded if I'd said, "I'd be devastated!" Instead I answered, "Oh, that's alright, as long as I still get my presents."

Looking back after all these years I think she could have stalled me a couple of years more if she'd said, "well it *is* Dad and I, but we have to do it because Santa's already hard at work making next year's toys". She must have thought, in her wisdom, that I'd reached an age where I could cope with knowing the truth.

I think it's interesting that on the whole children don't go on to say, "well, what about God

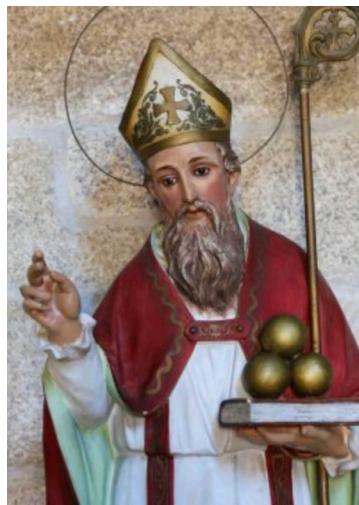
and Jesus – do they exist?” It certainly didn’t occur to me that my Sunday School teacher might have been telling harmless fibs.

But in fact there *is* a real Santa Claus who uses all these many representatives – old bearded men in red suits, and parents. His name is God.

Yes God is the reality that lies behind the myth of Santa Claus. For a start let me remind you of the origin of Santa Claus. He goes back long before Coca Cola signed him up to promote their drinks. He started out as a bishop, called Saint Nicholas.

The historical Saint Nicholas was Greek, born in 270AD and became the Bishop of Myra, in modern day Turkey, He became the patron saint of sailors, merchants, pawnbrokers, prostitutes, repentant thieves and students. That’s a motley collection of individuals!

He was renowned for secretly giving gifts. One story tells how he became aware of a poor man with three daughters of marriageable age. The father was unable to support his grown-up daughters and didn’t have the money to supply them with a dowry so that they could make respectable marriages. So he



threatened to make prostitutes of them. Nicholas, one night, dropped a sack of gold coins through their window so that they could all have dowrys.

His saint's day is 5th December and a tradition grew up for giving gifts to children on this day in many countries. In Holland he's called Sinterklaas. He's accompanied by an assistant, Zwarte Piet (black Pete) who distributes sweets to the good children and a lump of coal to the bad ones.

So Santa Claus was inspired by a man of God, who in turn was inspired by God himself. There are, in fact, many similarities between God and Santa Claus, apart from being depicted as old men with white beards.

Like God, Santa Claus is a benevolent character who displays goodwill to all. The old man doing a casual job in a department store is local. Parents are parents only of their own children. But, like God, Santa Claus is for the whole world!

Santa Claus, like God, is timeless. He's always been old but he doesn't seem to get any older.

And like God, Santa Claus wants the best for the children, though God extends his benevolence to adults as well.

Furthermore, Santa Claus is not indifferent to the moral status of the children who sit on his lap. "Have you been a good boy?" or "have you been a good girl?"

In some ways Santa depicts God better than is done in some Christian traditions where he's represented as a vengeful judge. Santa is jolly, just as God, when you really get to know him. God has a wonderful sense of humour.

The comparison can be taken a little bit further. When Santa has a small child sitting on his lap he asks "and what would you like for Christmas?" The child's reply is not unlike a prayer of intercession! "Please Santa I'd like ..."

Well, perhaps I'm stretching things a little! But I don't think it's unhealthy for a Christian parent to engage in the traditional Santa ritual with young children. OK, Santa doesn't exist in the sense that you won't find such a person if you travel to the North Pole. But he's a snapshot of someone real. He's a snapshot of God!

Just as a snapshot only displays certain aspects of the real person, so you don't learn that much about God from Santa Claus. But I believe that behind every good character in fantasy, is the face of God. Remember that Aslan in *The Lion, the Witch and the Wardrobe* is no more real, in a physical sense than Santa Claus. But he's a snapshot of Jesus, who *is* real.

Throughout history man has felt the need to create gods. Something has prompted them to go beyond the ordinary day to day world. They've asked questions about how the world works, and why

things happen the way they do. In their attempt to answer these questions they've created gods.

To a large extent science has now answered many of those 'how' questions, though every answer has thrown up four or five more questions. The universe is now even more mysterious than when we believed that the sun travelled across the sky in a chariot!

Yet science can never answer a 'why'. It's not equipped to provide a framework that gives meaning to the riddle of life. The early feeble attempts that have been made in that direction resulted in invented gods.

Even the god of the Old Testament is an invented god. If that sounds like heresy, just read on a little. The Old Testament god is a snapshot of the real God. And the god in the Old Testament is a much more complete picture of God than Santa Claus. But there are certain aspects of the Old Testament god that don't quite square with God as I've come to know him. The Old Testament god was vengeful in ways that I don't believe the real God is. And the Old Testament god was a private god – just for the nation of Israel. Even Santa Claus is more like God in that way.

Don't get me wrong. I revere the writings of the Old Testament. Its writers were searching for the truth about God and were inspired by the real God in their hearts. They got a pretty accurate picture. But Christ presented a much more accurate picture and, through the working of the Holy Spirit in the lives of

countless Christians over the ages, we have an even more complete picture.

The atheist would say that man has always created gods to satisfy certain needs. That is indeed the case. But when mathematicians create a piece of mathematics they get the uncanny feeling that they're merely discovering something that has always been there. We are like archaeologists, chipping away the rock and digging in the sand to reveal wonderful treasures. The fact that so often the same mathematical ideas come to different mathematicians independently, testifies to this fact. And just as there's a reality that lies behind my mathematics so there's a reality that lies behind the many gods that man has created. Even the God that the churches embrace is not quite the real God, but he's a pretty good likeness, probably the best we'll ever get on this side of the grave. Now we see through a glass darkly, but then we will see God face to face!

CHAPTER NINE: THE DEATH OF JESUS

“Jesus died for our sins.” This is the standard slogan of Evangelical Christians, and like most slogans it’s a very vague statement. What exactly does it mean to “die for our sins”? What is the mechanism that makes the death of Jesus on the cross something that can change our lives all these years later? The Bible doesn’t really offer a clear explanation. That hasn’t stopped theologians, over the centuries, coming up with various theories of the Atonement – the process by which mankind can become ‘at one’ with God.



One theory is the Sacrifice Theory. This arose out of the Old Testament and is based on the practice of the Sacrificial Lamb. We’ve made God angry and to appease his anger we need a sacrifice. But we’ve made him so angry that a mere lamb isn’t sufficient.

It's *our* blood that needs to be shed. But although God is really angry he shows mercy in offering his son to be a sacrifice in our place.

This shows God as having a split personality – on the one hand he's angry and on the other he wants to show mercy. Now if *we* are angry, but want to show mercy, we learn to control our anger. Yet, according to this theory, God remains angry and has to punish someone and his mercy consists in finding a scapegoat.

Needless to say I don't find this explanation very satisfying. The God I've come to know is not fixated on punishment. Sure, he hates sin, but he loves the sinner and wants to rescue the sinner from the grip of sin. Besides, the concept of a punishment being contracted out to another person is totally foreign to the way we think these days.

Another theory is the Ransom Theory. It claims that Satan has kidnapped our souls and that Jesus, by his death, has paid the ransom and has set us free. We can only be freed by the ransom being paid. A variation suggests that it was Adam and Eve who, by their original sin, sold humanity to the devil as slaves and Jesus wins our freedom by paying a price to Satan, the slave-owner.

This theory arose in the 3rd century in the writings of the scholar Origen Adamantius of Alexandria. It places little emphasis on our sins. Yes, all have sinned but “the devil made us do it” because

we were enslaved to the Evil One. Christ's death was the price paid to Satan for our release.

This theory remains popular in the Eastern Orthodox Church. The first thing I don't like about this theory is that it presupposes that Satan actually exists. Although the Bible does talk about the Evil One, I read that as a metaphor. God created us with free will and a consequence of that is that we often choose to do bad stuff. The temptation of the devil comes from within us. We don't need a red monster with a pitchfork.

The second thing I don't like about the Ransom Theory is that it suggests that God and Satan are on the same level. God has to negotiate our release and, since the devil says, "I'll release mankind from slavery if you let me kill your son", God is obliged to do so.

Just as Jesus refused to negotiate with Satan on the high mountain, so God would surely not need to bow to the wishes of the Evil One – assuming that such a being did exist.

Another theory is the Satisfaction Theory. It was propounded by Anselm. He was born in what is now Italy but he became the Archbishop of Canterbury in 1093.

The theory says that God has infinite holiness and is offended by our sin. Some inexorable law, that even God somehow has to obey, states that our sin cannot go unpunished. God has to demand

satisfaction, just as a knight who is insulted must demand satisfaction.

In those days, if one knight had a disagreement with another he would throw down the gauntlet – that is, his glove – and demand satisfaction. A duel would ensue and the winner was deemed to be the one who had been in the right.

But, according to the laws of chivalry, a knight was allowed to choose a ‘champion’ to fight on his behalf. Now God is offended by our sin and he demands satisfaction. But he is also a God of mercy and so he offers Jesus to be our champion. In effect, Jesus ‘fights’ on our behalf. He appears to lose, because he dies on the cross, but through the Resurrection he wins after all, and so we all win too. The devil thinks he’s won but God has tricked him by bringing Jesus back from the dead.

Such an explanation might have made sense in the age of chivalry, but it seems unconvincing to modern ears.

Then there is the Penal Substitution Theory. Here God isn’t angry. He’s a just judge who’s required to punish wrongdoing. But just as in the Satisfaction Theory, a substitute may take the punishment. Again, this is Jesus. Although this theory has its roots in the Old Testament it was fully developed by Martin Luther during the Reformation.

Now a human judge doesn’t make the law and so, although he can administer justice, his ability to show mercy is quite limited. But God is not only

the judge but also the creator of laws. It is within his power to show mercy and not to exact the pound of flesh. He doesn't need to resort to insisting on a substitute.

The Moral Influence Theory was put forward by Abelard in the 12th century as an alternative to the Satisfaction Theory. He focussed on changing man's perception of God as not offended, harsh, and judgemental, but as loving. According to Abelard, "Jesus died as the demonstration of God's love". This can change the hearts and minds of sinners and lead them back to God.

This theory turns the Crucifixion into a myth. Not that it claims that it never happened. There are true myths and false myths. The characteristic of a myth, whether historically true or not, is that it is a story so powerful that it changes lives. In other words the effect of the Crucifixion on sinners is psychological.

The Moral Influence theory has the advantage in that it removes the concept of an angry God and doesn't depend on making us humans feel guilty. It rather depends on us feeling shame. Guilt is falling short of another's high standards. Shame is the realisation that one has fallen short of one's *own* standards. By reflecting on the thought that 'Jesus died for my sins' one finds strength to lead a better life.

This, to my mind, is a more satisfactory theory than the others. That's not to say that the other

theories haven't benefited countless Christians over the centuries. But they don't work well for the modern Christian. The Moral Influence Theory is much more meaningful to me.

But notice that the Moral Influence Theory would work just as well if the Crucifixion was a false myth – like the Greek ones. It might help people by being a powerful story but, according to the theory, nothing real actually happens.

I believe that none of these theories is satisfactory because I don't believe that the death of Jesus in itself can change lives – except as being a really powerful story. It's the Resurrection which does something quite remarkable.

The Crucifixion is really just a necessary precursor to the Resurrection. Jesus had to die before he could become resurrected. Of course he could have died of natural causes, like Lazarus, and be raised again, but the whole story would have lost most of its drama. I don't really want to downplay the Crucifixion as being a very powerful (and true) story.

Here we have an innocent man being killed as a criminal. And it gave a very graphic opportunity for Jesus to reinforce his teaching to love one's enemies. "Forgive them Father for they know not what they do."

But despite the drama of the Crucifixion there is no way it changed the lives of the disciples. They slunk away felling very depressed. Over the centuries

many good men have been crucified, or died excruciatingly painful deaths, for no good reason. But none have been resurrected.

Before we contemplate the Resurrection let us ask what was happening during the three days that Jesus was in the tomb. Well actually it was really somewhat less than two days. He was put in the tomb at sunset on the Friday and had risen by Sunday morning.

Did he descend into hell as one of the creeds insists? If, like me, you don't believe in an actual place called Hell you'd interpret this as being separated from God. On the cross he is recorded as having cried out "my God, my God – why have you forsaken me".

It's a rather amusing thought to compare Jesus with Schrödinger's cat. Schrödinger was a theoretical physicist who researched Quantum Theory. One of the basic tenets of Quantum Theory is that a fundamental particle can be in two states at the same time.

To illustrate this theory, Schrödinger told the story of a thought experiment, whereby a cat is placed into a sealed box. Inside this box there's a phial of poison and a small piece of radioactive



material. The apparatus is arranged so that whenever the radioactive material emits a particle the phial releases the poison and the cat dies.

Now, because radioactive decay is a random process, there's no way of predicting when the first particle would be given off, and hence no way of knowing, at any given time, whether the cat was alive or dead.

The explanation is given that the cat is simultaneously dead and alive – that is until the box is opened, when it would be clearly one or the other. One can imagine such a cat being used repeatedly – sometimes alive when the box was opened and sometimes dead.

Of course this suggests that a cat is able to be resurrected – come back from the dead. But of course we know that this is possible – after all, they have nine lives!

So, perhaps, in the tomb Jesus was simultaneously both alive and dead, until the stone was rolled away. Please don't take this comparison too seriously. It's just a whimsical joke.

CHAPTER TEN: THE RESURRECTION

The Resurrection is indeed a miracle and I believe that it actually took place. *How* it was done remains a mystery to me. Was it done with smoke and mirrors? Probably not. Did some disciples steal the body to give the impression that he had risen? If that was the case they wouldn't have shown so much despair, and wouldn't have been so completely surprised when they saw him risen.

Was it mass hysteria? That's faintly believable, but I don't believe so. Mass hysteria usually lasts a matter of hours – it doesn't continue for two thousand years.

But what is very interesting is that there was something strange about the body of Jesus. He is reported to have materialised into a locked room, like a ghost. Yet once, when he appeared to his disciples, he insisted that he was no ghost and said, “hey guys – what’s for breakfast?” And indeed he *did* eat fish with his disciples.

He invited doubting Thomas to touch the wounds in his hands and his feet, but Thomas said he didn’t



need to do so. Jesus told Mary *not* to touch him because he had not yet risen. The risen Christ had a body but, according to the accounts in the gospels, it was not an ordinary sort of body.

Now the resurrection of a body seems to defy common sense. Mind you, the resurrection of Lazarus was even less believable. He is supposed to have been dead for several days and he'd even started decomposing when Jesus brought him back to life. That I *do* find hard to believe and, as far as I am concerned, the jury is still out on that one!

But I don't have such absolute faith in the laws of science as to allow me to scoff at the reports of the resurrection. Mass hysteria it might have been, but I've never heard of any other instance of mass hysteria that has lasted two thousand years and for which millions of people have been prepared to die. If it wasn't a miracle in the medical sense you must allow it was a miracle in the sociological sense.



It seems to me that perhaps we give a little too much emphasis to the Crucifixion and not enough to the Resurrection. If the story had stopped with the Crucifixion there would be no such thing as Christianity. After Jesus breathed his last, the disciples snuck away and

started to go back to their normal occupations. They were despondent – they were defeated. What changed their lives profoundly was the Resurrection. This is what gave them the enthusiasm and the courage to go into all the world and preach the good news – Christ has risen. He has risen indeed!

We have symbols in our churches to represent the Crucifixion. Catholics have their crucifixes.

Protestants use an empty cross in an attempt to proclaim that Jesus has risen. But actually it doesn't quite achieve that end. Jesus was taken down from the cross just a few hours after he died. The empty cross was there already on Good Friday. It doesn't really celebrate Easter Sunday.



The central rite of the Catholic Church is the mass where, supposedly, the body and blood of Jesus are consumed.

The doctrine of Transubstantiation is the belief that when the priest blesses the bread and wine these items somehow magically become the *actual* body and blood of Jesus.

This is a very powerful thought. By taking his flesh and blood into our own bodies we are somehow getting the spirit of Jesus right inside us. Cannibals have long believed that eating the flesh of a warrior

somehow transfers that warrior's physical prowess to the one who eats. Or drinking the blood of a maiden can somehow imbue the drinker with the poor girl's purity.

I acknowledge that there is no real thought of cannibalism in the Catholic Eucharist and that it is a very powerful and moving rite. Somehow the Protestant communion service, where we are simply remembering the death of Jesus, seems pale by comparison.

Yet I cannot bring myself to believe that the consecrated bread is the *actual* body of Jesus. For example I don't believe that it would be possible to extract his DNA from a consecrated wafer.

Besides, when the Last Supper was first instituted in that upper room, Jesus handed the disciples some bread and said, "This is my body, broken for you." This cannot have been taken literally, because at that stage his body was intact. And when he said, "this is my blood, shed for you", none of his blood had yet been spilt. Surely he was speaking figuratively. He said, "this do in remembrance of me."

This suggests that all we are doing when we take the bread and wine is remembering the death of Jesus. Yet, as I said, there seems to be more to it than merely recalling the event. Even as a Protestant I have found the communion service deeply moving – more than if it was simply a case of just remembering. Yet I cannot accept the literal

Transubstantiation doctrine. For me there is a deep mystery but it's not a chemical transformation.

In both the Catholic mass and in the Protestant communion we are celebrating the death of Jesus – a very important event but not the most important.

In the Catholic Church we see the crucifix – Jesus, nailed to the cross. Protestants use the empty cross and think that this represents the Resurrection. But it doesn't.

But I'm not suggesting that we abandon the cross in our churches or communion in our services. After all didn't Jesus instruct us to "do this in remembrance of me"? They are very powerful and moving symbols in a Christian's life. But they are only relevant to the first part of the story. It is the second part – the Resurrection – that transforms lives.

It's true that most Christian churches make a big thing of Easter Day, and celebrate the joy of the Resurrection. But what *symbol* can we employ as a symbol for the Resurrection? An empty tomb? Yes, but what sort of icon would be instantly recognisable as an empty tomb? A rock with a hole in it?

You know, this might sound a bit crass, but we already have an Easter symbol that portrays both the empty tomb and the new life of the Resurrection – the chocolate Easter egg!

The Easter egg has never been embraced by the Christian Church. It's just a part of the commercialisation of Easter that we deplore. But most of us nevertheless still give Easter eggs to our children.



Think about it. though. What does an egg represent? New life? And what does a hollow chocolate Easter egg remind you of, once you've broken it open? Why, the empty tomb! I'm not sure how practical it would be to incorporate Easter eggs into an Easter Sunday service. Could be a bit messy!

But there's another meaning to the phrase 'Easter egg' that IT nerds might have heard of. An 'Easter egg' in the world of computing is an unexpected phenomenon that, in rare circumstances, occurs when a computer program is run. It's not a bug or an error. It is something that has been deliberately put into the code by the manufacturer of the software, or one of its employees. You could call it a 'miracle'.

No doubt you've used Google to find websites. You type in a word, or a phrase, and you get a list of websites that are relevant to that entry. But try typing the phrase "do a barrel roll" into Google (without the quotes). Something really weird happens. The whole screen rotates slowly. It isn't

supposed to do that, but it does. You could call it a miracle.

Many other computer programs have these undocumented phenomena. Sometimes you get a list of the people who have written the code. Sometimes you get a nerdy joke. Whatever it is, it breaks the rule as to what should happen.

Next time you're are writing a document in Microsoft Word[©], type: ‘=rand(3,7)’ at the beginning of a paragraph (without the quotes), and then press ENTER. A ‘miracle’ will happen. A whole page of text about formatting will be inserted into your document.

Scientists make experimental observations and come up with certain laws. These describe what *usually* happens under such and such circumstances. The trouble is that many people, including some scientists themselves, think that these laws are immutable – that they describe what must *always* happen.

We all know that light travels in straight lines. Countless experiments have proved it. So, if light bent in a curve, that would be a miracle, right? Yet in certain circumstances, it does just that.

Interestingly, this phenomenon was prophesied by that great Jewish prophet, Albert Einstein, when he devised his Theory of Relativity. The phenomenon of light bending in strong

gravitational, or magnetic, fields has been subsequently observed experimentally.

I'm sure that many of the so-called miracles in the Old Testament were simply poetic descriptions. But other miracles in the Bible may have been very rare phenomena that defied the laws of science as we know them by virtue of the fact that such things are extremely rare. You don't need to imagine a God up there pulling levers. These miracles might be Easter Eggs that God has programmed into the universe at the time of Creation.

The miracle of the Resurrection is a miracle in which I very firmly believe. "People don't come back from the dead," you might say. Yes, there is no other well-documented case in history. But this doesn't mean that it's impossible – simply that it's extremely rare. Probably *no* other instance has ever occurred – but for something that happened two thousand years ago, the Resurrection of Jesus is very well documented.

So I believe that the Crucifixion was a means to an end. Yes it has great positive psychological benefits as we contemplate the sacrifice of Jesus. But without the Resurrection the Crucifixion would be nothing.

In the Resurrection, Jesus demonstrated that there is more than just the material world. There is life beyond the grave. Not just a continuation of life,

but a new type of life. And Jesus claimed that we can share this Eternal Life.

“But a belief in life after death is merely wishful thinking,” you might say. The fact that we hunger for life beyond the grave doesn’t prove that there is such a thing. But, by the same token, it doesn’t prove that there isn’t. As a *proof* that life after death doesn’t exist, merely throwing around the phrase ‘wishful thinking’ doesn’t achieve much.

I remember, when I was a teenager, I longed to go to London. I had read so much about it, from Christopher Robin visiting Buckingham Palace, to the London of Dickens. I underwent a lot of wishful thinking about going to London one day. That didn’t mean that London doesn’t exist, just because of my wishful thinking. Eventually I visited London and I knew for myself that such a place really exists.

Of course my analogy isn’t perfect because I had spoken to people who had returned from London and told me about it. Not so many people have returned after visiting Heaven! But just because we wish for something we’ve heard about is no guarantee that it doesn’t exist.

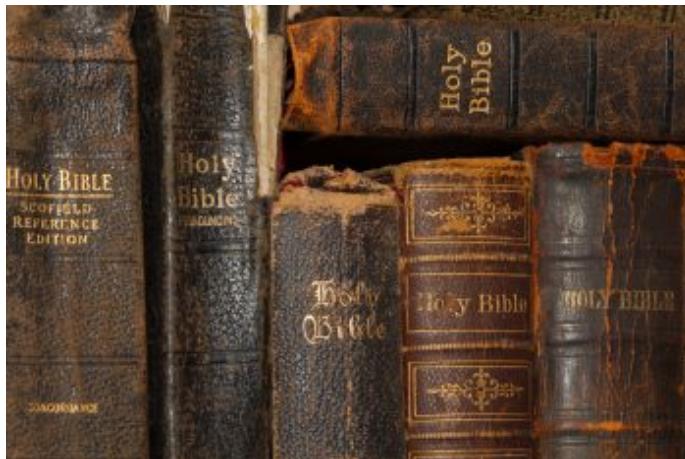
I base my belief in Heaven on my firm belief that there is something beyond the material world, on my experience of ‘sweet desire’ a desire for something beyond anything that can be found in this world, on the teachings of Jesus, and more importantly on the eyewitness accounts of the risen Christ. Pretty flimsy evidence you might say.

Certainly it falls short of what mathematicians would call a proof.

You are logically justified in believing that this is all there is – that science can explain everything and that human thought is purely a biochemical process. Just don't expect me to be swayed by your arguments which, according to you, are the result of the purely biochemical processes that happen to be operating in *your* brain.

CHAPTER ELEVEN: THE BIBLE

What about the Bible? Do I believe in the infallibility of the Bible? Well no, just as I don't believe in the infallibility of the Pope. I respect the current Pope and I think he is a wise and good man. But he is only a man and only God is infallible. Many Protestants give the same unthinking trust to the Bible that many Catholics do to the Pope.



What I *do* believe is that the Bible is a more or less accurate guide to the nature of God and how he wants us to live. The 'more or less accurate' phrase will offend many fellow Christians. "The Bible is the word of God and is true down to the last detail," is strongly held by many Protestant Christians. "If you start saying *this* bit is true, and

this *other* bit is false, your faith is just wishy-washy. You can't just cherry-pick out the bits that suit you!"

I guess I treat the Bible like I treat a mathematics text-book. I respect it as an excellent guide to God, and as a guide for life, just as I respect a classic introduction to Abstract Algebra. But in either case I only believe what it tells me if it resonates within me. If the steps of the mathematical proof agree with my logical thought I can accept the theorem. If something that the Bible says resonates within me, I accept it. I believe that God, in some mysterious way, operates inside of a person if they allow themselves to be receptive. Christians call this 'the workings of the Holy Spirit' but that's technical jargon.

Just as I know a mathematical statement is true because I've followed every step of the proof, so I know that something in the Bible is true because it somehow rings a little bell inside me – not an actual bell but a feeling of certainty.

You may not have felt this certainty in relation to religious matters but I'm sure you have felt certain about something else because of an internal resonance.

"I know that you love me," I might say to my loved one as I look into her eyes. "Prove it," she might say. "I can't – I just know!"

A lot of what we believe we have to accept on authority. We read books and generally believe what we read. But there are some things, such as the right way to teach mathematics, or the best way to

prune roses, where we say “yes – that really makes sense!”

Now the Bible is a weird book as books go. It’s a hotch-potch of writings, by many different writers over many different centuries. Even the genre is not uniform. There are purely religious writings, historical writings, poetry, a hymn book, a mildly erotic love poem, four novelettes called the Gospels, and a whole bunch of letters, some to congregations while others are personal correspondence. It’s often described as a library in a single book. By comparison the Koran is so much more uniform – one author, one period, one genre.

That uniformity might appeal to you – it certainly does to Muslims, with the Koran. But I regard the untidiness of the Bible to be one of its strong points. If I was going to invent a religion I would write a holy book. It would all be uniform in style, and consistent in content. I would have someone proof read it carefully so that there were no inconsistencies in the minor details.

The Bible, by contrast is full of minor errors – especially in the four gospels where insignificant details vary from one gospel to the other. In the Old Testament there are places where some books have had inserts by other authors. It’s the very untidiness of the Bible that makes it ring true. But in important matters there *is* consistency – the broader picture makes good sense.

Now I believe that we must remember three things about the Bible. Firstly we don't have the original manuscripts of any part of it. All we have are copies of copies of copies. So we should not be upset if it is a little untidy around the edges. Secondly it was not written for us in our 21st century society. It was written to faith communities of their time, be they Jewish or Christian, and other parts were written to individual people.

We must read it in the context in which it was written. This requires us to understand something of the culture of the times. And we must also remember that it was a *developing* story. There are parts of the New Testament that over-ride parts of the old.

Thirdly, the very act of selecting which writings would become part of the official canon of scripture was not done directly by God. At least no-one heard a voice from the clouds listing which books were to be included. Nor was it a decision of the Pope or any other single man. It was a committee decision, made in the Council of Trent several centuries after the time of Jesus.

“All those in favour of the Gospel of Matthew, raise your hands. Good, Matthew gets in. All those in favour of the Gospel of Thomas? No, that vote is lost. Thomas is out.” I can believe that in some way God might have been guiding their decision, but the whole process of choice was delightfully human.

All this doesn't diminish the power of the Bible. It has remained a powerful resource over two

millennia. And though some parts of it need an expert to enlighten us on the context, and to interpret the meaning, countless people have become Christians solely by reading the Bible on their own. So much of it is direct and very readable, especially in a modern translation. Even the humour comes through in several places. It might be a holy book but it can be quite funny too.

Jesus appears to have been a lively and down to earth person who had a wry sense of humour. In the Sermon on the Mount there are lines such as “don’t think about tomorrow – God knows there’ll be enough troubles to worry about then”.

He loved deliberate exaggeration. He said, “it’s easier for a rich man to enter the kingdom of God than for a camel to pass through the eye of a needle”. Some scholars have said that this referred to a narrow gate in Jerusalem, called ‘The Eye of the Needle’. But the general opinion leans towards it to be taken literally – well not literally, but we’re supposed to laugh at the exaggeration.

When once he met a woman at a well, Jesus asked, “where is your husband?” She answered by telling him that she had no husband. He replied, “yes, you speak the truth – you’ve been married nine times and the man you’re with at the moment isn’t your husband”. Of course we’re meant to respond to this as a demonstration that Jesus had some degree of omniscience. But I believe we’re also meant to smile at the cheeky way in which Jesus responded. He was having a dig at her, though not in a malicious way.

And she was not at all offended by his remark. She went off in great excitement to tell all her friends that she had met the Messiah.

So the Bible is an amazing resource indeed. But we should be careful not to worship it as the final authority. Everything should be measured against the resonance within one's own thinking. I believe that this is where we find God.

On many other subjects that have been of concern to Christians I'm fairly neutral. Adult Baptism? I think it's a nice idea, but then so is the act of washing one another's feet. Jesus told his disciples to do both but I believe that we have freedom of choice in such matters.

I remember years ago, when I was a youth leader, I devised a liturgy for washing each other's feet. We tried it out, but I'm afraid to say we couldn't stop laughing!

I agree with the Baptists that children don't know what's going on if they are baptised. Where child baptism is practised, the sacrament of baptism is for the parents, and the church, to promise to help bring the children up in a godly environment. When the child becomes of an age to decide for themselves, there's another special service which confirms the promises of the parents.

The Baptists on the other hand prefer to have a service for parents to dedicate a child to God, and

they prefer to use the act of baptism only when the person is old enough to choose for themselves.

It's true that John the Baptist only baptised adults, but in the early church the entire household was baptised. Whether this included the children is not clear, but I don't see any special imperative to do it one way or the other.

Transubstantiation – whether the bread and wine become the actual body and blood of Jesus – has long been a contentious issue between Catholics and Protestants. My view, for what it's worth, is that the communion, or mass, is a symbolic act, not a magic trick. At the original supper, in the upper room when this sacrament was created, the bread and wine were certainly not the actual body and blood of Jesus because he was still alive.

And so, if ordinary bread and wine was good enough for the original last supper I don't understand why it has to be any different whenever we re-enact it. "This do in remembrance of me." Or have we misinterpreted Jesus when he said "this is my body"?

I remember, as a young child, being taught to say "this is the church, this is the steeple, open the doors and here's all the people" as we shaped church, steeple and people with our hands. Of course what was meant was "*this represents* the church" etc. Why wouldn't Jesus have meant "*this represents* my body and blood – do this to remember me"?

Having said this I am in somewhat of a dilemma. On the one hand I cannot believe that through some holy magic the bread and wine actually

become, not just human flesh and blood, but the actual flesh and blood of the historical Jesus. Why, if this were so he must have been a giant! If you calculate the weight of all the wafers and the wine that have been consumed in churches all over the world in the last two thousand years Jesus must have weighed many thousands of tons.

Do the Catholics believe that the communion elements actually become real flesh and blood. If so then why don't we do a DNA test before they are consumed?

Whenever I have spoken to devout Catholics they have usually responded in a way that leads me to believe that they don't believe in a literal transubstantiation. But they seem to find much more spiritual meaning in the mass than just a memorial.

In the mass, Catholics have found something very deep in the mass that we Protestants have missed. It is the central rite of the Catholic Church.

Protestant church services often become like chatty get-togethers where we sing a few hymns, listen to a sermon and that is all. Every month, or even less frequently we tack on a quick communion as an add-on.

The Catholic and Protestant churches have had some different insights that the other side has learnt to value. A Catholic priest I know admitted that his church had placed too little importance to Bible study. I think he was right. In the past fifty years this has changed enormously and if anything they study the Bible more than we Protestants.

In turn I have seen rite of Tennebrae entering mainstream Protestant churches. This is a re-enacts the Last Supper on the evening before Good Friday and is carried out in a space where the light is gradually reduced until it culminates in the blackness of the tomb. I have found this ritual very meaningful.

I would really like the Protestant churches to embrace the concept of the mass, if only I could think of a way that avoided a starkly literal interpretation of what is happening.

On the one hand we humans like to understand things and to use our intellect. But there is something inside of us that appreciates mystery, and the Catholic mass can achieve this. If only I could get away from any sense of cannibalism!

The Trinity? I wonder if Jesus himself would have understood the doctrine of the Trinity! He certainly never expounded it as such. Yes, he referred to God as his Father, and he promised to send the Holy Spirit after he'd gone. And yes, these are one and the same person. But he himself didn't seem to feel the need to wrap it up in a complicated doctrine and nor did his disciples. There's no explicit mention of the Trinity in the Bible.

It was only the church fathers, who much later felt the need to explain it, that a doctrine of the Trinity was created. Over the years I've heard various explanations such as the fact that I am a son to my father, a father to my children and a husband to my wife. So I am three persons in one.

Like most Christians I am happy to declare my belief in the Trinity, but mostly I never think about it.

Far more important, and a real problem that most Christians wrestle with, is the problem of pain. I will discuss this in a later chapter.

CHAPTER TWELVE: THE HISTORY OF THE BOOK

This chapter is an aside, and can be safely skipped. It has nothing to do with God, or mathematics or logic. It is merely an indulgence of mine since I happen to be interested in antiquarian books.

However, as the story of the Bible is closely tied up with the history of the printed book, this seems to be an appropriate place to talk about my hobby of collecting old books.

The earliest books were the papyrus scrolls. Prior to this there had been writing on bark and on stone but these didn't lend themselves to an extended work. Some ancient monuments had panels which collectively could be called a 'book' but its lack of portability left a lot to be desired.

Papyrus is a coarse paper which, like all papers, is made from plant fibre. What makes it different to paper as we know it is that the beating of the central pith of the papyrus plant only partially defibres it. Papyrus was first made in Egypt where the papyrus plants grew in abundance along the Nile. Of course our word 'paper' is comes from the word 'papyrus'.

A typical papyrus scroll was perhaps 40cm wide and 10 to 50 metres long. It was made by

joining many pieces of papyrus together. These rolls were called 'volumes' because they revolved around the central of wood or ivory.



The writing ran parallel to the long side and so was divided into columns. Because only one side of papyrus can be used the writing was on the inside.

The writing tool was a brush and the inks were made from carbon or red ochre. These substances were mixed with water and dried into small cakes. They were used the way we used to use water colour paints. The brush would be dipped into water and rubbed over the cakes. Being water soluble the inks could be washed off if one wanted to re-use the papyrus.

The obvious advantage of papyrus technology over stone tablets was the fact that they were much more portable. A less obvious advantage is that it allows a cursive form of writing while letters chipped into stone had to be made up of pieces

of straight lines. Also writing was very much quicker.

The Greeks introduced an innovation which could double the writing speed. They replaced the reed brush with a pen, made by splitting a hard reed. The Greeks imported papyrus from Egypt but when it became hard to get they experimented with using animal skins – parchment and vellum.

Vellum is a particularly high quality parchment made from calfskin. The word ‘veal’ for the meat of young calves, and ‘vellum’ are probably related. Vellum gradually took over from papyrus and by the 6th century had completely replaced it. It would be the medium of books for the next thousand years. One particularly important advantage of parchment over papyrus, apart from its durability, is that it can be used on both sides.

But around 100 to 200 AD another major development took place that completely changed the shape of the book. The roll gave way to the codex format. The codex book is the style of book that we know where there are pages joined along one edge and here it was particularly useful that parchment allowed one to use both sides.

About two thousand years BC a thing called a ‘polyptych’ was used as notebooks. These consisted of two or more wooden plates in which a large rectangular recess was made and filled with wax. It was possible to write on this surface with a stylus. The other end of the stylus was flattened out to

provide a tool for smoothing out the wax so as to erase what was written and prepare the surface for new writing. These were never used for permanent records.

The separate plates were hinged together to make the whole collection easier to carry around. Sometimes they were hinged so that they folded up like a concertina. Sometimes they were all joined at one edge like a book.

A polyptych with two parts was called a 'diptych' and one with three parts was called a 'triptych'. These formats were used up into the middle ages for religious art.

At some stage some unknown person decided that one could use papyrus sheets, or better still parchment, in place of the plates of wax. But despite the obvious advantages of this, the codex form of book, it was used only for ephemera – things that had only a temporary significance. It was unthinkable to use it for a book, and especially not for sacred writings.

To get some idea of the attitude to the codex you could imagine being in a cathedral, watching the reader walk solemnly up to the lectern, and lay out what appeared to be the Daily Telegraph newspaper from which to read the scriptures. The newspaper format is appropriate for today's news but tomorrow it is used to wrap up the rubbish. One would never use it for the holy scriptures. Such was the attitude towards the codex format up to the first couple of centuries in the Christian era.

The people who latched onto the codex book with great enthusiasm was the early Christian Church. Perhaps fuelled by the influence Greek culture and its emphasis on rational thought the early Christian Church was characterised by disputes and discussion and the codex format for the scriptures and other sacred writings made it easier to find the chapter and verse with which to squash one's opponents argument. I don't mean to imply that the early Christian Church squabbled unduly, but you must remember that it was as yet a young movement and had many important theological matters to hammer out.

Certainly it is the case that up to about 400 AD the vast majority of codex books were Christian writings of one form or another. The Christian Church embraced this new technology wholeheartedly while everyone else took much, much longer to warm to it. In fact it was not until about 600AD that the scroll gave way completely to the codex.

It was from about this time the practice of illuminating the manuscript began to be practiced. As more and more monks dedicated their lives to copying the scriptures and other works so the practice of embellishing the text began to become more highly developed. The Book of Kells in about 800 AD is perhaps the best known production of this era. It and the Lindisfarne Gospels are huge books weighing about 10 kilograms and they necessitated better binding techniques. Books continued to be

illuminated long after the introduction of printing in the 15th century.

Up to about the 12th century reading was a purely oral activity. A book was simply a script and could only be read aloud. Of course this made sense when books were scarce – one person reading aloud to a whole group.

But even in the 10th century a monk or scholar could only read by reading aloud. Silent reading began to appear until the 12th century among scholars but it took another century or two before it became widespread amongst the upper middle class and nobility. Of course, working class people didn't learn to read at all until much later and even in the 19th century such people were only able to read aloud.

Silent reading changed the interior design of libraries. In monastic communities the libraries were places where books were stored. You had to do your reading in your own cell so as not to disturb others. Some libraries had small cells adjacent to them such as university libraries provide little rooms for small discussion groups. But once silent reading had taken hold the libraries began to have a much more open plan.

Another significant development in the history of the book was the invention of spectacles in 1280. Although life expectancy wasn't then what it is today a large majority of those who had learnt to read were unable to continue reading after about age 45. The invention of the spectacle was a significant

factor in the increasing demand for books. And while it is true that the printed book really helped literacy to take off, it was during the 1300's and early 1400's the increasing literacy of the population that put such a load on the scribes.

Prior to 1200 a few centres of copying were sufficient to satisfy the demand for books. By 1440 the demand was so great that many monasteries were undertaking copying on a factory scale. The invention of printing came, as most inventions do, at exactly the right time.

Copying was a joy to some scribes but sheer drudgery to many others. The conditions under which they worked has been compared to the oppressive factory conditions in Victorian times. It was the practice of a scribe to add a colophon at the end of his work which identified who was the scribe and perhaps when the work was completed. But often they would add their own commentary on the job they were required to perform. One said "writing is excessive drudgery. It crooks you back and dims your sight, it twists your stomach, and your sides." Another wrote "Now I've written the whole thing: for Christ's sake give me a drink". Perhaps, because they were tucked away at the back of the book, these personal items went unnoticed.

With the advent of printing the details of where, when and by whom the book was printed began to appear in this place – on the last page. Perhaps even the title and author might appear too.

A title page at the front of the book, giving the name of the book, author, place and date of publication did not appear till 1470 and didn't become common place until the 1530's. Prior to this works tended to be known by their opening words and this is how they were indexed in library catalogues.

Books printed before 1500 are known as Incunabula. A few of these had numbered pages, but these were the exceptions. At first only the folios (sheets) were numbered, on their recto side (the right-hand page). If you had to refer to a page of folio 42 you referred to it as 42 recto (front) or 42 verso (back). Eventually this gave way to numbering every page, but it wasn't until the end of the 16th century that most books numbered their pages in the modern fashion. Running heads, that is having the title at the top of every page, first appeared in 1490 but, as with pagination, only caught on slowly.

It is commonly held that printing was invented by Gutenberg. Of course that's not true. Printing was invented by the Chinese thousands of years before it was rediscovered in the West. But there was no demand for it beyond purely decorative printing so it never developed beyond a primitive level.

Printing from woodcuts was known and practised in Europe for some centuries before Gutenberg. A particular industry was the printing of

playing cards. The church objected to the way this encouraged gambling and encouraged printers to print pieties instead. These were devotional cards, rather like cigarette cards of famous sportsmen, except these ones depicted saints, and pilgrims would purchase these when they visited the holy shrines. They were the postcards of their day, except they couldn't mail them back to their friends with "wish you were here" written on the back.

These, of course, are not books, but a little before Gutenberg block books were developed. These consisted of a number of pages of woodcuts. The woodcuts generally had some picture with a couple of lines of text underneath, just like children's picture books. But the work of carving out the text was too great to use it for works requiring large amounts of text so it wasn't suitable for most works. Generally block books were printed one copy at a time on demand.

Gutenberg was not even the inventor of printing by movable type. A Dutchman, William Coster, attempted printing a book from movable type carved from wood a few years before Gutenberg. His endeavours weren't successful because of the difficulty in getting the wooden type to have a consistent height. Also, while in principle, the wooden type could be



reused, in practice after being used on one page they were too worn to be used on another. Gutenberg's genius lay in printing from movable *metal* type.

Apart from living at a time when the demand for books was threatening to outstrip what the scribes and copyists were able to produce, Johannes Gutenberg had two important special skills – he was a jeweller and goldsmith. This meant that he was a precision worker in metal. He not only had the skills to mould his type very precisely, but he also had metallurgical skills.

One of his ventures, before he turned his attention to printing, was making devotional mirrors. These were to sell to pilgrims who would go to Aachen where the sacred garments of the Virgin and Christ were to be displayed. There was a belief that the small circular mirrors would capture the magical powers issuing from the garments.

The mirrors were made of speculum metal which traditionally was 75% copper and 25% tin with a dash of antimony. But there's evidence that about this time one of his associates bought a large quantity of lead so it is possible that he had found a way of replacing the expensive copper with the much cheaper and easier to work with lead.

He used a similar alloy for type – mostly lead, a certain amount of tin and enough antimony for hardness. Virtually the same proportions that he devised were used in the printing industry right into the 20th century.

Until the beginning of the 19th century books were always bought unbound. You sent them off to be bound in a uniform style to match your other books. That's why old libraries have such a tidy uniform appearance. The pages came in signatures, generally a group of pages that were printed on one sheet and folded. To assist the binder a 'signature' identified each group. These were usually the letters A, B, C, ... and were often accompanied by initials of the book title. So the book *Wuthering Heights* would have at the bottom of the first page of each signature, WH A, WH B, etc. This arrangement is still used in many modern books, but with numbers for the successive signatures.

Another device which was very common in the 15th and 16th centuries was to reproduce the first word of each page, or the first part of that word, at the bottom of the previous page. This was done even if, as was frequently the case, that this fragment was "CHAP—" because the next page began a new chapter. While this may have assisted the binder it was probably designed to provide a smooth passage from one page to the next, especially if the book was being read aloud.

The most famous old book is surely the Gutenberg Bible. In the early years of printing bibles, in different translations, were one of the most frequent books to be published. It can be said that the fact that the scriptures became available to the common people in their own language helped to set

off the Reformation. However the situation is more complicated than that. It could equally be said that the forces that were leading up to the Reformation created the demand which made the invention of printing inevitable. It's interesting that the staunch Protestant monarch Elizabeth I was against the widespread dissemination of the Bible and placed strict controls on their production and importation.

Another very famous book was the *Liber Chronicarum*, better known as the *Nuremberg Chronicle*. This was a work containing historical and geographical information by Hartmann Schedel and illustrated by Michael Wolgemut. It was printed in 1493 by Anton Koberger. Koberger's printing and publishing establishment in Nuremberg was the largest such enterprise during the 15th and 16th centuries. He had 24 presses and a staff of over 100 compositors, proof-readers, press-men, illuminators



and binders. In the period 1473-1513, when Koberger died, they published over 200 titles.

The *Nuremberg Chronicle* is profusely illustrated with about 1800 woodcuts. A large number of these illustrated famous historical figures or the skyline of important European towns. These were only notional illustrations however and bore no relationship to the actual appearance of the person or place. Indeed many of the woodcuts were used to illustrate different people or towns on other pages. For example there were 96 blocks illustrating emperors, kings and popes. These were used to represent as many as 598 different individuals, suggesting that on average each of these illustrious leaders was one of half-a-dozen clones.

After that interesting detour, let us get back onto the main road.

CHAPTER THIRTEEN: WAS JESUS MAD?

In his book, *Mere Christianity*, C.S. Lewis puts forward a fairly convincing argument for the foundations of Christianity. It's not a proof, but it's an argument that should at least make the atheist stop and think, even if he can find arguments against it.

Lewis wasn't the first to think of it, but he certainly popularised it. The argument goes something like this.

- (1) Jesus claimed that God exists, and he claimed to be the Son of God.
- (2) Therefore, either he was truly the Son of God, or he was a delusional madman.
- (3) But to read about his life, and his teachings one cannot easily dismiss him as a madman. Therefore he was the Son of God.

The atheist is faced here with a very difficult decision. He doesn't want to admit that what Jesus claimed, was indeed true. And yet he would find it hard to believe that he was a madman.

Many people are against the church – and there is certainly plenty of ammunition to support that view, but most people believe that Jesus was a good teacher – even most atheists. Reading what he

is reported to have said it is hard to classify him as a madman. So much of what he taught makes really good sense. And the way he put his finger on the hypocrisy and corruption of the religious leaders of his day, show that he was indeed an original and fearless thinker.

There have been countless other men, over the centuries, who have claimed to be the Messiah. Most of them were confined to mental institutions. None of them has had a lasting following. Even Mahomet, though he claimed to be a great prophet, never made the claim to be God.

Of course the easy way out of this dilemma, for the atheist, is to claim that there was no historical person called Jesus – that the gospels are just a myth. Jesus, they say, was like the mythical King Arthur.

Historical truth is a rather different thing to mathematical truth or even scientific truth. Mathematicians reach truth through logic alone. Scientists use the scientific method – hypothesis and experiment. None of these work for historical truth. Historians rely mainly on written documents. They have to face two problems. Firstly they have to consider the veracity of those documents. Secondly, in the case of early history, the manuscripts we have are only copies of copies. This doesn't just apply to religious history, but to *any* history.

What historians look for are multiple documents referring to the same events. Even with

copies they can infer whether one document came before another, and whether one influenced another.

We believe that Julius Caesar existed and that he did certain things. As far as I know we don't have anything by his own hand. We have copies of documents that are purported to have been written by him as well as copies of contemporary records of his deeds. Nevertheless we have built up what we believe to be a fairly accurate record of his life.

As far as we know Jesus never left anything behind in his own hand, or copies of anything that was supposed to have been written by him, even though he was obviously literate.

The first writings in the New Testament were written well after Jesus died. Many were first-hand accounts that relied on the disciples memories. Others were written later. But in no case do we have the original manuscript. We only have copies of copies. However Biblical scholars are able to compare these early copies and make educated conclusions about those places where the copies vary slightly.

Having said all this, there is at least as much documentary evidence for the existence of the historical Jesus as there is for Julius Caesar, or any of the other great figures of ancient history. There is no mathematical proof that any of them ever lived, and the scientific method is useless in such cases. Yet most of us have faith in the methodology of historians so that we don't doubt that the events of

history are pretty much as they are written in history books.

Atheists are happy to accept the existence of Alexander the Great and Plato, yet they sometimes have trouble accepting the historical Jesus, for if they do they are compelled to say that he was mad and didn't know what he was saying.

But was Jesus mad? We're told in the Gospel of Matthew (chapter 12) that perhaps at one point his friends and relatives *thought* he was mad.

And when his friends heard of it, they went out to lay hold on him: for they said, he is mad, "We'd better take him away." Then his brothers and his mother came to persuade him to come with them. But he appeared not to know who they were.

The scribes from Jerusalem said that if he could drive out devils he must be himself possessed by devils. In those days, those who suffered mental illness were considered to be possessed by devils. These days, the accusation of the scribes would be more like "he cures mental illness, so he must be mad himself".

This form of reasoning reminds me of when I studied psychology. We students used to be amused at the rather eccentric psychology lecturers and joked that teaching psychology had made them a little mad. But we were young and didn't know the difference between madness and eccentricity.

The teachings of Jesus are pretty radical, and people who are very different to the norm are sometimes considered to be mad. But I can't see how one can read his teachings and conclude that these are the ravings of a madman. You only have to read his replies to the difficult questions posed by the Pharisees. His answers were so clever that they were left open-mouthed.

"So if you are the son of God, should your followers pay taxes?" Jesus took a coin and asked whose image was on it. "Give to Caesar the things that are Caesar's and to God the things that are God's."

No, Jesus wasn't mad, but he said some pretty outlandish things.

"If you have sufficient faith and say to that mountain 'rise up and go into the sea' it will be done!"

We must remember that Jesus was the master of hyperbole – of deliberate exaggeration. He came from a culture where exaggeration was widespread, but perhaps he took it to the limit. Exaggeration is one way of creating emphasis.

In our culture we are more literal in what we say, but we still have some phrases such as 'I could kill you' when someone has merely taken the last cake. Even that horrible word 'awesome' that gets trotted out whenever someone kicks a difficult goal is hyperbole. We've forgotten that 'awe' meant

something that sends shivers down your spine. Angels descending from on high would be awesome – not just a mere sporting triumph. Here are some more examples of his hyperbole:

(1) Blessed are the meek, for the whole world will be theirs.

Well, of course Jesus wouldn't be offering the *whole* world. But he clearly meant that if you have humble expectations then you will end up with more than you bargained for. Remember he also suggested that you should sit at the back at a celebration so that you might be honoured by being asked to come forward to the seat of honour. Perhaps that's why, in church, everyone sits in the back pews!

(2) Anyone who looks down on his brother is heading straight for the fire of destruction.

True, one should treat everybody as an equal and never look down on anybody. But to suggest that this is the worst crime in the book, warranting the fiery pits, is a bit of an exaggeration. Indeed it was. Jesus loved to make deliberate exaggerations to attract the attention of his listeners.

(3) If your right eye leads you astray, pluck it out and if your right hand leads you astray cut it off.

I'm not sure if he was referring to pornography, but it is handy to know that when viewing pornography you should close your right eye and only look with your left! The same thing goes for hands.

It sounds like a pretty drastic cure. Indeed it is. There is no way Jesus would have encouraged anybody to mutilate themselves as a cure for sin – another exaggeration.

But it is true that sometimes you have to take drastic steps to avoid temptation. If you have a friend who constantly leads you into mischief, it might be wise to break the friendship.

(4) If a man hits you on your right cheek, turn the other one to him.

(5) If a man wants your jacket, let him have your overcoat as well.

Jesus might well have said, “take off all your clothes and let him have them too”. But he wasn’t expecting us to take this literally. Rather, he was suggesting that we should err on the side of generosity in all we do.

(6) If anyone makes you go a mile with him, go two miles.

So if you help an old lady to cross the street you should make her cross back again, with your

assistance of course. Again the message is to be generous, rather than stingy.

(7) Don't worry about what you are going to eat or drink or what you are going to wear. Look at the birds – your heavenly father feeds them.

What an invitation to laziness! Did Jesus really mean this? Of course not! We should make all the necessary preparations to provide for life's necessities. But some people become preoccupied with such things. Jesus is exhorting us to do what we can in preparing for tomorrow, but then to leave the rest to God.

(8) Why look at the speck of sawdust in your brother's eye and fail to notice that you have a plank in your own.

Here Jesus is using an image from his own experience as a carpenter. He probably had many specks of sawdust fly into his eyes while he was working with his father. You or I might have said 'you fail to notice that you have a woodchip in your own,' but Jesus goes the whole way with a 'plank'!

Is Jesus saying that if you notice that a real speck of sawdust has landed in someone's eye, or somebody has a smudge on her face, you should pretend it isn't there? Of course not. He's attacking those who are constantly critical of others. But the picturesque way of putting it – the offender

balancing a plank of timber in his eye – makes us smile and helps us to remember the saying.

(9) Follow me now and let the dead bury the dead.

What image does this conjure up? A corpse as a gravedigger? A priest in a shroud officiating at a funeral? A potential disciple said that he would follow Jesus, but first he had to bury his father. Jesus said, “let the dead bury the dead”.

That seems out of character for someone who reinforced the ten commandments, especially the one about honouring your father and mother. I have heard someone explain this by suggesting that the man’s father was alive and well, and the delay in following Jesus would be many years. I don’t read it that way. Again Jesus is deliberately exaggerating. He’s suggesting that many people find one excuse after another in order to delay following him.

“I’ll start going to church when the kids grow up and move out and I’ll have less work to occupy my Sundays.”

“I’ll give up being a burglar after this one last job.”

(10) Sell all you have and give the money away to the poor.

A noble sentiment. Then you’ll be as poor as they were and they will now have to look after you! The rich young ruler that Jesus was talking to was

obviously preoccupied with wealth. He would be happier with less, and the poor could benefit. But if the rich young ruler had taken Jesus literally, Jesus would be the first to reprimand him for not using common sense. As it was, the man went away sorrowful. He couldn't bear to divest himself of so much as one penny.

(11) If you have faith you can tell the mountain to throw itself into the sea.

Too bad for anyone who happens to be on the mountain at the time! If you ask a fundamentalist about this he will say that this saying is literally true, but the fact that it never happens shows that nobody has sufficient faith.

This is yet another hyperbole. Don't be fainthearted. Most people can achieve more than they think they can.

(12) You have heard that you should forgive someone seven times, but I say you should forgive them seventy times seven.

Emily Brontë turned this injunction into a hilarious dream sequence in *Wuthering Heights*, where Reverend Branderham preached on this text. His sermon was divided into four hundred and ninety parts, each describing a separate sin. And he took it literally, suggesting that if someone offends more than seventy times seven times it is no longer

necessary to forgive them. But Lockwood, in his dream, rises out of his seat and declares that “you are the man”. He accuses the minister of having committed the four hundred and ninety-first sin – that of preaching an interminably long sermon. And being the four hundred and ninety first sin, this one was unforgivable!

Of course there is nothing special in the number 490. Jesus was saying we must continue to forgive.

CHAPTER FOURTEEN: FOOD AND SEX

Among all the ‘Thou Shalt Nots’ in the Bible, the matters of diet and sex are the most prominent. There are many dictates about sex and many rules about what we should eat, and how. Practically every circumstance is explored.

When it comes to ‘Thou Shalt Not Kill’ detailed rules are much scarcer. Reading the Ten Commandments you’d think that there are no exceptions, such as capital punishment and killing in warfare. But elsewhere in the Old Testament we find that capital punishment, and killing the enemies of one’s country, are fully sanctioned.

Moreover nothing is said there against giving our enemy a good old beating within an inch of his life. In fact, elsewhere in the Old Testament, the ‘eye-for-an-eye’ principle indicates that if we have a valid provocation we’re permitted to do just that.

Fortunately we have some clarification in the New Testament, in this regard, where Jesus summarises the law in two brief commandments: love God and love your neighbour as yourself.

On the matter of capital punishment, Jesus never said anything explicitly, but we can infer his stance on the matter when he interrupted a ritual stoning of an adulterous woman with the command “let he who is without sin cast the first stone”.

But the vast majority of the rules in the Old Testament have to do with things that can't come under the heading of 'love your neighbour'. They deal with just two aspects of life – eating and sex.

When you think about it, these two have a lot in common with one another. Both have to do with important bodily functions. Both involve substances being absorbed into the body and playing a part in the workings of that body. It's been said that "what you eat today, walks and talks tomorrow". And the exchange of bodily fluids can make substantial physical changes.



FOOD



SEX

In today's society, unless we're Jewish or Muslim, we completely ignore the dietary rules of the Bible. Those fundamentalist Christians who claim that every Biblical injunction in the Bible is binding for all time have a lot of trouble explaining to do when it comes to why they ignore these dietary rules.

Likewise, in Western societies, the rules about sex are also largely ignored. The difference is that while we are only faintly aware of dietary restrictions, we're fully aware of most of the sexual rules, even if we choose not to follow them.

There's a standard of sexuality that everyone is aware of, perhaps even aspire to – two people, of opposite sexes, having never had sex, fall in love and marry, have children and stay married for their entire lives. Yet quite a small minority of sexual relationships actually fit that description. But it would be very wrong to say that any sexual relationship that did not fit this description is less than perfect.

I once imagined a world in which the attitudes to food and sex were reversed. Imagine if eating was considered to be such a personal and intimate thing that it was only supposed to be carried out by married couples, in private. On the other hand, in this world of my imagination, sexual activity with a group of friends were considered to be just as normal as in our society we share a meal with our mates.

Clearly there's an important difference between eating and having sex. But exactly why is one to be shared and the other to be reserved for someone special?

Well, clearly sex involves children. I'm not a sociologist, but I believe that, other things being equal, a nuclear family – with just two, or even just

one, parent is better for children than having them raised in a free-love commune.

But medical science has managed to uncouple having sex and having children. So the argument about the effect on children is not really applicable.

Venereal disease was often advanced as a reason for not being promiscuous – but modern medicine is well on the way to dealing with that too. If there is to be an argument against promiscuity it has to be something else.

In the Old Testament there are countless rules about eating. The list of forbidden foods in Leviticus is long. It goes way beyond the obvious pork. Don't eat camels, rock badgers, rabbits, pigs, eagles, shellfish (actually anything that swims in water that doesn't have a fin and scales), owls, hawks, falcons, buzzards, vultures, crows, ostriches, seagulls, storks, herons, pelicans, cormorants, hoopoes or bats.

It is permitted to eat locusts, especially with wild honey – the staple food of John the Baptist. And crickets and grasshoppers – indeed any winged insect that hops is kosher. But please, no moles, rats, mice or lizards.

And don't eat milk and meat at the same meal. There are strict rules as to how food is to be prepared. The basic principle behind these rules is the distinction between 'clean' and 'unclean'. Christians have happily abandoned these rules, encouraged by Paul who suggested that they no longer apply.

But let's turn our attention to the matter of sexual morality. Now, by 'sex' I mean the full breadth of sexuality. I can discern four distinct aspects of sexuality.

- (1) Sex as a biological device for mixing up genes.
- (2) Sex as a device for nurturing and parenting.
- (3) Sex as an enjoyable experience.
- (4) Sex as in 'gender', that is as a way of having two different types of beings coming together in a complementary relationship.
 - (1) Thinking about sex in the sort of analytical way that's natural to a mathematician, I'm led to consider the question of 'why *two* sexes?' I can conceive of a creation in which life might have evolved with more than two sexes – or just one.

Biologically, there *are* hermaphroditic organisms in our own world that seem to get along quite happily with just one sex. They're mainly worms and slugs. Strictly speaking their DNA is binary, just like ours, but they can either convert between being male and female, or are both at the same time.

However, having two sexes appears to be an efficient device for mixing up the genes, which seems to be good for evolutionary purposes. But then why not three sexes?

Copulation might be unduly complicated with three sexes, and any additional benefit may be minimal. So, perhaps two sexes might be the optimal number. But I'd better stop discussing biology before my relative ignorance of the subject becomes too apparent.

(2) Having two sexes involved in procreation allows for having two individuals with a vested interest in nurturing the offspring. However not all species avail themselves of this opportunity. In many cases the offspring are on their own from day one.

A long period of infancy, which seems to go with an advanced species, requires a certain amount of parenting. Yet, as we see in today's society, single parenting can be just as successful as joint parenting, even if it does involve rather more hard work on the part of the parent. But would not *three* parents be better than two?

(3) As a physical activity, most people who engage in sex find it very enjoyable. Of course we think we can see why God made it so, or why evolution proceeded along those lines. In order for sex to be a biological imperative to succeed perhaps it needs some sort of incentive. What better than to make it extremely pleasurable?

But is that really necessary? With most species copulation is more an instinctive behaviour rather than as a conscious desire. Those male spiders

that get eaten by their female partners never have time to reflect on whether it was a pleasurable.

Most instinctive behaviour is independent of pleasure, even with humans. For example, parenting might be rewarding in its own way but it could hardly be called pleasurable in the same way as having sex. Yet there seems to be an instinctive drive to care for one's own.

Now Adam presumably had twenty-four ribs, like the rest of us. So why didn't God raise a harem of wives for Adam, each born of a different rib! I suppose he needed most of his ribs to support life, but he could easily have been given *four* wives.

Polygamy was considered normal in the early years of the Old Testament. Those who could afford it had many wives and even more concubines.

There's no hint of condemnation by the writers of the Old Testament in men having multiple wives and concubines. At what stage did monogamy come about, and why?

If I had to give reasons why monogamy is to be preferred I might discuss the jealousy that must arise in such polygamous households. But these early communities seemed to cope with jealousy. Besides isn't jealousy supposed to be a selfish emotion – one that we should learn to overcome?

Perhaps a significant argument against polygamy is that it only seems to work one way. A woman having multiple husbands and lovers, living harmoniously in one household, is practically

unheard of! And clearly it couldn't work if all men had many wives and all women had many husbands – not unless you considered free-love communities – so polygamy is intrinsically sexist. What I do believe in strongly is the equality of the sexes.

Personally I go along with the concept and practice of monogamy. I don't think I'd be happy if laws were to be passed in Western countries allowing polygamy, but I'm not sure I could give a convincing argument as to why it should not be allowed – provided that women had equal opportunity to be polygamous.

A man having sex with a married woman is clearly an adulterous situation. The arguments that are given against it in the Bible make mention of the fact that a man's wife is part of his goods and chattels and so there's an element of theft in such an action.

A woman having sex with a married man is often included under the heading of adultery, though the penalties for the man and the woman are rather different.

What about sex between two unmarried people? This is less clear. Certainly it was frowned upon, which is why Joseph, who was betrothed to Mary but was not yet married to her, was embarrassed that Mary was pregnant even though he accepted that she was still a virgin.

Then there are all the injunctions as to who one was *not* permitted to marry or have intercourse with – the rules of incest.

Don't have sex with your mother, your father's other wives, your sister, stepsister, half-sister, grand-daughter, aunt, daughter-in-law, other men's wives, other men or animals. What is somewhat surprising is that there is no specific injunction to not have sexual intercourse with your daughter. You have to infer it from the injunction not to have intercourse with the daughter of a woman with whom you've had intercourse.

These rules in Leviticus, chapter 18, are framed from the point of view of the male. Was the implication that the mirror images, with males and females reversed, were also outlawed?

Leviticus spells out the punishment for various forms of incest, ranging from banishment in some cases, to being killed in others. Marrying one's sister, or half-sister, only meant banishment and disgrace, while having sex with one's daughter-in-law, leads to both being put to death.

Sexual relations between a man and his mother-in-law doesn't appear to be outlawed, but if they marry, all three of them – husband, wife and wife's mother must be burnt to death.

Despite these heavy proclamations against incest, examples are given where it appears to be sanctioned because those committing it believed that without it the human race would disappear. If one

adopts the strict view that Adam and Eve were literally the first people on earth, which I don't, then incest in the next generation was necessary for the human race to even begin.

After escaping from the destruction of Sodom, Lot shelters in a cave with his two daughters. (Lot's wife has been mineralized because she looked back at the eruption.) They believe that they're the only three humans left on earth, and so the daughters get their father drunk and, on two successive nights, they sleep with him. In the course of time they each present a son to their father. The impression given by the writers of Genesis is that they did well.

The Bible *does* have strong things to say about homosexuality. Homosexuality is considered to be an abomination. But it is treated as if it is a life-style choice that a man chooses (the Bible is silent on lesbianism) whereas it is clear to me that the vast majority of homosexuals and lesbians are born that way.

In many cases the discovery is made at a very early age – even before puberty. In other cases a person doesn't discover his or her homosexual nature until he or she has married. But it seems to be a discovery, rather than a choice.

So why is the Bible so hard on homosexuality? You have to remember that in the Roman world, and probably in the Jewish world at the time of Jesus, homosexuality was synonymous with licentiousness and orgies. The phenomenon of

two gay guys living together in a faithful relationship for their whole life is something that just didn't happen in the ancient world or, if it did exist, it was kept secret.

Today there is a section of the homosexual community that desires to flaunt their homosexuality and engage in casual sex and orgies. I have no difficulty in believing that Jesus would have been very unhappy with such activities, though he would probably have not been afraid to make friends with such people, and so be criticized by the godly people who felt that mixing with such 'sinners' would make them 'unclean'.

But these days, large numbers of the gay community are in long-lasting relationships that are just as permanent as in the heterosexual world. I can't see that God looks on them as 'sinners' just because he created them differently.

This is not to say that I don't have deep-seated prejudices. If one of my grandchildren announced that they were gay I have to admit that I'd have difficulty in coming to terms with the fact.

But one can fight one's prejudices, and I know of parents and grandparents who've been in such a situation and they've learnt to deal with their prejudices and have come to love their child's or grandchild's partner. I'm confident that if I was ever placed in such a situation I'd be the same.

It is easy to be homophobic from a distance, but when it impacts closely on one's family I believe

that such prejudices can melt away if you allow God's love to have its way.

What about gay marriage? I've long had the view that gays, in a long term stable relationship should have all the rights and privileges of a married couple. But it should have a different name. The word 'marriage' means a man and a woman. You can't change language!

Can't you? We do it all the time. The word 'money' once meant coins. And then the meaning was extended to include paper money. These days 'money' is mostly an abstract concept whose existence is just so many electrons in a computer arranged in a certain way.

But why do gays want us to change the meaning of the word 'marriage' so that it includes their deeply committed relationships? I think the reason is that the word 'marriage' declares to the world that the two parties have chosen to commit their lives to one another. And they want their relationship to be considered by the world as being just as special, and holy, as a heterosexual marriage. So I've come to the belief that those gays who want to separate themselves from the licentiousness end of the gay spectrum, and embrace commitment, should be allowed to do so within the word 'marriage'.

We welcome Chinese immigrants as fellow countrymen and allow them to call themselves Australians. So the meaning of the word 'Australian' has been broadened to include those who have chosen to live here.

We don't refrain from calling our adopted child 'son' or 'daughter' just because those words once meant a biological connection. Let those of us who are married, be proud to share the word 'marriage' with those gays who aspire to the same sort of relationship.

There will be those who say, "if you allow gay marriage, next thing you'll get people wanting to marry their pet dog". This is the slippery slope argument.

Well, I suppose that if I could ever believe that a relationship between a man and a dog could have the depth of that between a husband and wife, I might be prepared to allow 'pet marriage'. Of course, I'm joking. No matter how much a man may love his dog their relationship would always be on an entirely different plane to that of traditional marriage or gay marriage. But it's amazing how many people get taken in by the specious 'slippery slope' argument.

God invented sex, and I wonder what made him think of it. After all, procreation and nurturing were unnecessary for him and, being a spiritual being, physical gratification would be irrelevant. So how did God come to think of sex in the first place?

Well that's a silly question, isn't it? How did God come to think of anything? We're familiar with creative people getting inspiration from some predecessor but God, the source of all creativity, is the giant on whose back we stand.

Yet there's a vague hint of a sexual union in the Trinity. Not 'sex' in the sense of procreation, or physical gratification, or even in the sense of nurturing. But in so far as God is one God in three persons, there's a faint hint of the joy of a union of different, but parallel, beings complementing each other in a holy relationship. This is sex in the fourth sense.

Continuing this fanciful speculation, could it be that God the Father and God the Son are male, while the Holy Spirit may be female. In the novel, and subsequent film, *The Shack*, God is depicted as a middle-aged black woman and the Holy Spirit is a young Asian woman. Only Jesus is represented as male – and, of course, he's a carpenter.

There's a sense of nurturing in the work of the Holy Spirit that might be appropriate if she was female, but then that's trying to make the Godhead conform to our limited notions.

(4) That man and woman are different is something that has been noticed for a long time. I'm not just talking about their physical differences but rather in their personalities and their different strengths.

Branwell Brontë was once asked by his father, "what is the best way of knowing the difference between the intellects of a man and a woman?" Branwell replied, "I think the best way is to consider the difference between them as to their bodies."

These days many feminists will tell you that there's no intrinsic difference between the intellects of men and women, or their personalities either. It's all cultural conditioning. Give a young boy some dolls and a young girl guns and they'll play with them as happily as if the gifts were reversed.

Yet in my opinion there *are* such differences. Men are from Mars and women from Venus! That is not to say that there's not a large overlap. On any scale, the distributions of male and female will overlap to a considerable extent.

Branwell's response was probably just a young boy's cheeky idea – I can see him tracing out the shape of a woman's body as he gave his answer. But I believe that he may have been right. Man is physically stronger, on average, and this has made him assume leadership in most cultures. Woman has the sort of body that can give birth and this makes her more naturally the nurturer.

Now these descriptions – man is the leader and woman is the nurturer – have been the stereotypes throughout the centuries. While I believe there to be some truth in this, like most stereotypes it is extremely simplistic.

There are many women who display great leadership. If you consider the female heads of state in recent history you may have your reservations about some of them. But you can't say that they were on the whole any worse than their male counterparts.

Some women do display the same ruthless and aggressive leadership that you can find in many

male leaders. Yet society overlooks the excesses in the males but criticises the females. It would appear that society has much higher expectations of women.

Winston Churchill and Margaret Thatcher had rather similar forms of leadership, yet Churchill has fared better in posterity's opinion than Thatcher.

Many men have the nurturing personalities that we often attribute to women. (And I'm not just talking about gay men.) There are now many male kindergarten teachers, male nurses, and men caring for the mentally disabled, who are as compassionate as their female colleagues.

On the average men *are* different to women. You only have to look at crime statistics. There are far fewer women than men in jail for murder, or violent crimes. And there are far fewer men than women arrested for shop-lifting.

However we must resist the temptation to translate these differences into a judgment that one sex is superior to the other. It's regrettable that the writers of the Bible didn't resist this temptation. Of course they were products of their cultures, but this fact clearly indicates to me that the Bible was not written in God's own hand. Inspired by God, yes, in many respects – but not inspired by God when it comes to attitudes to women!

The Genesis account of the creation of Adam and Eve reflects the patriarchal culture of the Old Testament. Eve was created from Adam's rib. The natural biological precedence of women – men are born of women – is reversed in this account.

Adam is not shown as having been born of a woman. No, that would detract from his supremacy. And Eve was born of Adam in a rather unusual way.

The teaching in the Old Testament reinforces the fact that man is to be considered superior to women, although many examples of godly women are chronicled.

When it comes to the New Testament, Matthew is in a dilemma. He must show the lineage of Jesus, back through Joseph to King David, in order to fulfil certain prophesies. Yet he makes it clear that Joseph had no biological input into the birth of Jesus. We know of the maternal grandmother of Jesus, but Mary's lineage seems to be lost, or was it? Perhaps the rather different genealogy in Luke, compared to the one in Matthew, actually follows the lineage through Mary. Joseph is the son of Heli etc. Often the word for 'son' meant son-in-law.

Such inconsistencies show that the Bible wasn't written directly by God but these inconsistencies don't invalidate it. It's a record of men who have in some sense been inspired by God and have attempted to chronicle what God seems to be saying to them. Inaccuracies and inconsistencies creep in, but the important facts shine through.

Now Jesus paid a lot of attention to women. They feature strongly in his story and it's no surprise that the women were the ones with the stronger faith. The disciples gave up, when Jesus died, and withdrew into depression. Mary Magdalene was the

one who went to the tomb and discovered the risen Christ.

But when we come to the letters of Paul we are in real trouble when it comes to gender equality. He had a somewhat skewed view of women in the church.

To the church at Corinth he wrote:

Let women be quiet in church. They aren't allowed to speak. There is something unseemly about a woman speaking in church.

And in a letter to his special protégé, Timothy, he wrote:

Women in church should be dressed conservatively, and they should appear modest and serious. They shouldn't try to show off with elaborate hairdos, expensive clothes and jewelry. A woman should learn quietly and with humility.

I don't permit women to teach, or allow them to have leadership positions where they have authority over men. Their role is to be receptive. My reasons are that, firstly, Adam was created before Eve, and secondly it was Eve who tempted Adam.

There are some parts of Christendom that adhere to these 'rules' strictly. But even those churches who rely on these passages to explain why they don't ordain women, mostly allow women to do

readings and prayers in church. Paul would be horrified!

My view is that Paul was addressing specific problems with some women in the early church. Jesus made it clear that men and women are equal in the eyes of God – equal but different.

I think that in most areas of life there are always going to be more men in leadership than women because, other things being equal, women tend not aspire to leadership.

But let me hasten to say that many women have a natural gift for leadership and there is nothing unseemly about a woman having authority over a man. But perhaps having strict 50-50 quotas is not appropriate. There should be no barriers placed in the way of women. If the choice of a leader was to be made purely on the basis of merit probably a female applicant would have the same chance as a man. But if women aspire to leadership a little less strongly than men one should accept that fact and not try to force a strict quota.

St Paul appears to have had a somewhat misogynist streak. He wrote to one of the churches that women should be seen but not heard in church. On the strength of that, several strands of Christianity have decided that women can't be ordained as priests or ministers. They shouldn't even be allowed to preach.

This is in direct contrast to the attitude that Jesus had to women. True, he only had men as his disciples. But that was probably just as well because

they travelled, and ate and slept in the same places, and there would have been a huge scandal if some of them had been women!

But other than that, Jesus embraced women. No, I don't mean literally, but he treated them as being equal to men. It's amazing that society has taken so long for his message of gender equality to sink in.

Meantime, what about St Paul? In one of his letters he refers to a "thorn in my side". Some biblical scholars have suggested that this might refer to a wife and that it is this that accounts for his misogyny. There is also a suggestion that he was addressing a particular church where there had been a problem with the women. Either way, it seems bizarre to me to use this as an excuse for treating women differently, in stark contradiction to the teachings of Jesus.

Those who bar women from leadership positions will say that they believe that women are equal to men, but in a different way: men are ordained as leaders and women are not. Perhaps they are ordained to provide the meals and make the tea – an equal but different role. Even today many churches have men's breakfasts, where they allow a few women to attend – just to do the cooking! Yet in the early church there are accounts of women taking on leadership roles.

CHAPTER FIFTEEN:

PAIN AND DEATH

C. S. Lewis wrote a book called *The Problem of Pain*. In it he wrestles with the following problem, which I will set out as if it was a piece of mathematics.

- (1) God is omnipotent – he has all power.
- (2) God is all loving.
- (3) A God of love would not wish to inflict pain and suffering.
- (4) Pain and suffering exist.

Statements (1) to (4), taken together, lead to a contradiction. How can an all powerful God of love allow pain and suffering? This has been trotted out by atheists for centuries as an unanswerable proof that there is no God. And countless Christian theologians have wrestled with it over the centuries. C.S. Lewis was certainly not the first to raise it, and certainly he won't be the last.

As an argument against the existence of God, this is a formidable one. The simple argument about how many wars have been fought over religion is a feeble one. God exists or not, irrespective of what his believers have done.

Then there are the shallow atheists who set up what they might have learnt at Sunday school – creation in six days, a bloodthirsty God damning those who don't believe in him etc – and then proceed to ridicule this.

But any atheist who confronts a Christian with the Problem of Pain is likely to witness a pained expression on their face. “Well, I agree that's a difficulty, but ...”

There are those who offer the explanation that pain and suffering are good for us – they help us to grow. And pain is there to help us avoid danger. Pain and suffering in others gives us an opportunity to display our compassion to them. But try telling all these things to someone who undergoes torture or whose child has died in a bush fire. No, it's not as simple as that.

Anyone with the most elementary knowledge of logic will know that one of these three propositions has to go. The fact that pain and suffering exist is hard to deny. I believe that the branch of Christianity called Christian Science maintains that pain and suffering and illness are all illusions. They only appear to be real if our faith is not sufficiently strong. If that's so, then my faith is not sufficiently strong, for I believe that pain and suffering *do* exist, and I'd be surprised if you didn't agree with me.

Well, God is all loving. Of course if you believe that God doesn't exist then this is an empty proposition. But I believe that he does, and I cannot

do other than believe proposition (2). If the Creator of the universe was a nasty, scheming rogue, then I want out. Let me find another universe, created by another God!

I can't back away from propositions (2) to (4) and so I have to back down on (1). I suppose it must mean that he isn't quite all powerful.

So what are some things he can't do? Well, I can't see that he could do anything that's logically impossible. For a start he can't make an object so big that he can't lift it.

Come to think about it, *I* can – I can make an object so big that I can't lift it. Wow! Would you believe it? I can do something God can't do!

Can God make 2 plus 2 equal 5? Surely not – it's illogical. But then God created logic, along with the universe. If he didn't then who did? Such a being would be greater than God. Of course God could make me *believe* that two plus two is five. Even *I* could make *you* believe that two plus two is five, if I was a good enough hypnotist.

If God was able to circumvent logic then it wouldn't be fair. He created me to think logically, and if we can't, God and I, agree to abide by the same logic then again I'd go and look for another universe and another God.

So if God can do everything, except those things that contradict logic we have an escape clause. It must be that it is logically impossible to create a universe without pain and suffering. But I'm sure

that if *I* was able to create a world at all, I could create one that avoided pain and suffering.

Why, cartoonists do it all the time. They draw characters who get blown into pieces, and a few seconds later they reassemble themselves, just so they can suffer some other indignity. I'm sure if I knew that I'd always revert back to the way I was I wouldn't mind being cut in half, be blown to pieces or fall off a high cliff. It would just be a matter of devising the laws of physics so that nothing bad could ever really happen.

However, probably two thirds of the pain and suffering in the world is caused by man (and woman). This all comes about because God was so short-sighted as to allow human beings free will. Couldn't God have thrown out free will and programmed his creatures appropriately so that they never inflicted pain or suffering on anyone?

Clearly God must have thought of this, and yet he chose to give us free will. He must value free will pretty highly. But surely that's a small price to pay if we can avoid pain and suffering. And after all, those people who endure the most pain and suffering are the ones who have the least free will.

If only God were to remove our free will for a time we could decide whether we preferred to be a programmed robot or whether we wanted to regain our previous freedom. But come to think of it – deciding and voting wouldn't be possible if we didn't have free will.

So pain and suffering are inevitable consequences of free will, and free will is a gift that God was determined to bestow upon us. It's not a very good explanation. It only partly convinces me. Yet I'm not prepared to deny what I appear to have direct experience of – that God exists, and God is love. I suppose I take heart from the fact that many other minds, much greater than mine, have wrestled with this problem and have remained Christians.

Now Death is not quite the same as pain and suffering. It does involve some pain and suffering but, in many cases, it's a blessed relief. How often have you heard, at a funeral, "she is now at peace". It may have been a difficult fight with cancer, and now she can relax.

I've often wondered whether resting in peace is such an attractive prospect. It might be alright for a while – recovering from the stress of life, not to mention the stress of dying from a protracted illness – but my preference for a life after death would be one where I could have some excitement.

I do believe in life after death. This is one of the central tenets of the Christian faith. It's true that I can't claim that this belief awakens something within me that confirms this belief, except perhaps for a vague feeling that this can't be all.

C.S. Lewis goes to great lengths to expound on something called *Sehnsucht*. This he translates as 'sweet desire' – a longing for something that doesn't

seem to exist in this world. Desire is a very deep aspect of the human condition.

There are some religions that preach that inner peace can only come from getting rid of all our desires. While I believe that in some ways there's some truth in this, I can't believe that desire is wrong in itself. Desire is a God-given feeling – perhaps it's more than a feeling.

Of course desire *can* lead to bad behaviour. Sexual desire is not a bad thing in itself, but if it leads to rape then of course it becomes bad. Desire for power is a natural wish to exercise God given talents, yet so often it leads to tyranny. Even desire for wealth has some positive elements – if it's translated into a desire for good experiences that wealth can bring. Many people have acquired great wealth only to use it to benefit others. But, as Jesus once said, it is harder for a rich man to enter the kingdom of God, than for a camel to pass through the eye of a needle.

Desire is good, but it's powerful stuff. It's a lively stallion that needs to be tightly reined. The odd thing about desire, as Lewis points out, is that once you achieve what you desire you realise that what you really wanted was something beyond. To wallow in the goal of our desire, to become preoccupied with it, is a hollow experience.

The object of our desire is highly elusive. It's a rainbow which always seems to be moving away from us. We hear a sublime piece of music and it awakens in us a desire to be able to hear it again and

again. But if we play the same piece over and over it becomes banal. A glorious sunset that we've stumbled across may awaken a great pleasurable feeling within us. But if we go out at sunset every evening to try to recreate that feeling, we find it has become 'stale, flat and unprofitable', as some prince of Denmark once remarked.

Now that is a sentiment that echoes within me. It's an experience that I've had. Lewis suggests that *all* our desires are the desire for God in disguise. What, even a man's desire for a woman's body? Yes, even that. Beyond the crudely procreative drive, and the selfish wish to 'pleasure oneself' there's the desire for beauty, for vitality, for the excitement of sharing an experience with another. But even these more noble aspects of sexual desire are not ends in themselves. If we wallow in them we come to find that they don't really satisfy. Of course sexual desire is one of the most unruly of all desires and so easily corrupts. But it's not bad in itself.

A desire for adventure and new experiences is a worthy desire but again, if one believes that ultimate happiness can be found there, one comes to find that it alone doesn't satisfy. A desire for fame is worthy in so far as it's a sign that one has been able to exercise a God given talent. But when one chases fame for its own sake, it doesn't work. So many famous actors and actresses and popular musicians have found that fame no longer satisfies them and life is no longer worth living. I firmly believe that all our desires in life, ultimately point to God.

So if there's a life after death, what will it be like? This is a subject I often reflect on when attending funerals. If you listen to the homilies and eulogies you build up a picture of what many people believe that life after death will be like. The most often voiced message is that we will be reunited with our loved ones.

It's interesting that this is a belief that one can't find in the Bible. Where did it come from? Is it just wishful thinking? It is a belief that helps to soften the pain felt by those who are left behind. But is it true?

A more basic question is whether we will even *remember* our loved ones. Does memory persist after death? After all, our memories are stored in a certain part of our brain so, when the brain becomes dust, there go all the memories. If there is such a thing as a soul that survives death, will it contain a back-up copy of our memories?

I don't know the answer to this. I know there have been reports of near-death experiences where somebody claims to have seen a loved one, at the end of a bright tunnel, beckoning. But it has to be admitted that the person, who's returned to life, had never been brain dead.

All I can say is that if one doesn't retain one's memories to some extent, in some form or another, then life after death is a big confidence trick. Memory is vital to identity. If I can't remember this life in the next then am I really the same person? I've often felt this with the belief in reincarnation. If all I

can remember of a previous life are some vague glimpses and a feeling of *dejus vu* then I'm no longer who I was.

So perhaps we *can* take it with us – not our wealth, but our memories. But, just as important as memories, are one's personality and one's view of the world that has been honed after a lifetime of experience and thinking. In that case I suppose we will recognise our loved ones. But oh, dear, there are some potential problems.

If I've been married three times and I meet up with all three wives on the other side of the pearly gates, it will be very embarrassing. Jesus once said, in response to a trick question posed by the Pharisees, that there's no marriage in heaven. Here's a clue. Relationships will be on a rather different footing.

The atheist will say, in response to all this, that this shows that a belief in life after death is just nonsense. My view is that there's something further after the grave, and that something will be good beyond our wildest dreams, but that it is futile to try to fathom what that will be.

Is it just wishful thinking? Just giving such a label to something doesn't prove it isn't real. The yearning in my heart for something more than life in this world is perhaps wishful thinking. But I believe that the God who created me in such a way that I feel such deep sweet desire, must have done so for a purpose and that there will be fulfilment.

CHAPTER SIXTEEN: HEAVEN AND HELL

A major belief in the Christian world view refers to what lies above the world and what lies beneath – Heaven and Hell. Heaven is where God is, and where we all hope to spend eternity. Hell is the underworld.

It's understandable that in a primitive view of things God had to be located geographically. What better place than in the sky? As our understanding of things developed we've realised that to put God within his own creation doesn't make sense – though in the birth of Jesus he did just that. But normally God is not located within our three dimensional world.

Since man went into space there have been some atheists with smug looks on their faces saying, “man has gone into space and he didn't find God”, as if this proves their point. If God was really located within the universe it's unlikely he would be living between the earth and the moon! We've explored such a tiny fraction of the known universe that we can't be sure what's out there.

But many of these scientific atheists are familiar with modern science and the concept that you need 17 dimensions, or some such number, to explain quantum physics. Have they ever looked for God in those other dimensions? However it's highly likely that God is beyond any number of dimensions.

We say, “I have God in my heart” but I don’t think we regard the heart as the seat of anything like that. It’s just a pump! I suppose the fiction that love is experienced in the heart is a convenient one because the thought of seeing so many pictures of brains on Valentine’s Day would be a little unnerving. Hearts are much better symbols. And, of course, the traditional heart shape has very little resemblance to the anatomical heart.

If Heaven is thought of being ‘up there’ then it stands to reason that Hell must lie under our feet. But I’ve never heard anyone say, “man has gone down into the bowels of the earth and never found Satan”.

Of course Satan *could* be somewhere down there because, if you think about it, we know so much more about what lies out beyond earth than what lies beneath our feet. But I doubt that, if you could really journey to the centre of the earth, you’d find Satan there. Perhaps we’d better ask first whether Satan exists at all – it’s not one of my axioms.

If God is the source of love in the world then surely there has to be a source of hate. If God is the origin of Good then there must be a being who has created Evil. The dualist view of the world seems very reasonable.

But you can’t have two creators of the same world, one good and the other evil. It’s just too messy. It’s like having two kings ruling the same kingdom. The Biblical writers saw this and made

Satan as one of God's creatures who went horribly wrong.

There are many opposites in life, such as black and white. In fact, as we all know, black is not a colour. It's the *absence* of colour. Actually white is not a colour either – it's a mixture of all the colours in the visible spectrum.

Why does there have to be such a thing as evil, other than as an absence of good? True, we have seen such horrible evil in this world that it looks like there's an evil being at war with God. To describe the 'evil' as simply an 'absence of good' seems to let it off lightly. There *does* seem to be active evil, not just passive 'absence of good'. But it seems to me that the worst evils in this world are not just an absence of good but rather good that has been horribly distorted.

Absence of good can explain selfishness, and petty crime. The evils of terrorism, or what was perpetrated by the Nazis, have arisen because of a thoroughly misguided and distorted view of what is good. Those who carried out such evil acts did what they perceived to be good. Of course in both cases there are weak, selfish people, who just go along for the ride. But real evil needs strong men of vision – the totally wrong vision – men who can inspire others to do evil.

The concept of evil being good gone wrong was something which the writers of the Bible believed. Satan is not described as an independent being, but as a fallen angel – a creature who got too

big for his boots and rebelled. I don't see the need to invent a being to explain evil – men can become evil enough on their own!

If there is a Heaven and a Hell, what are they like? I must confess that the biblical accounts of Heaven leave me cold. For a start Heaven is depicted as a city. John Bunyan called it the Celestial City. The gates are made of pearls and the streets are made of gold.



Now urban life has become the norm for the vast majority of the world's population and it's a very efficient way to organise human life. I'm very happy to live in a big city. But it's not an environment that sets my heart on fire. We all yearn for a rural, pastoral existence even if we'd hate to actually live in the country.

As cities go, the biblical Heaven is very unappealing. There's no mention of trees, or gardens, or ponds, or other little oases of the country that we like to find within a modern city. If you were able to prove to me that a city, encrusted with jewels, is what Heaven is really like I'd have second thoughts about wanting to go there.

C.S. Lewis has a much more appealing view. In his book, *The Great Divorce*, he imagines that Heaven and Hell are actual places. Hell is a dark and dirty, overcrowded city – like one of the industrial cities in the nineteenth century.

Heaven is depicted as a pastoral place – light and airy and refreshing, and vitally real.

These places are served by a daily bus service. Those in Hell are free to migrate to Heaven, and vice versa. The story opens at the bus queue in Hell. The people in the queue are jostling each other, and snarling at each other. You can easily see why they ended up in Hell. Yet, they're free to go to 'the other place'. All of them grumble that some stupid administrator has bungled their papers and put them into Hell by mistake.

The bus comes and the conversation on the way reveals that they were correctly classified in the first place. When they get to Heaven they find it so real that it's uncomfortable. The light is too blinding, the fresh air hurt their lungs. The grass is so real that it cuts their feet to walk on. (I'm not sure why they had to go barefoot.) Hell is not a very nice place to live in, but Heaven is just impossible. The implication is that, after a lifetime of selfishness and sin, they had become adapted to the shadows of Hell and were totally unsuited for Heaven. They were all queuing up for the very next bus back to Hell!

I like that story. It echoes inside of me. I don't expect Heaven and Hell are quite like that. In fact I have difficulty in believing in an actual Hell no matter where it might be. But the story gives me brief glimpses of what it might be like. Heaven is a state of being with God. Hell is the state of being estranged from God. And far from the traditional view of the Day of Judgement with an angry God

sentencing bad people to a Hell of sulphurous flames, with weeping and gnashing of teeth, it is something we choose ourselves, or at least is the consequence of our choices.

Regret is a terrible punishment for the wrong choices we make in this world. If only I had studied I



wouldn't now be working as a waitress all my life instead of becoming a paediatrician as I had always hoped. If only I hadn't allowed myself to be caught up with drugs I wouldn't have committed that crime and I wouldn't have a police record. If only I hadn't been a fool, showing off on my motor bike I wouldn't now be a paraplegic. If there is anything approaching the biblical gnashing of teeth, it will be the realisation that one has become unable to enjoy Heaven.

God is a god of love, and it must cause him great pain when someone rejects him and ends up in whatever state Hell is – a state of being alienated from God. Although I don't see him as a strict, but benign magistrate – "I sentence you to fifteen years prison – but believe me, it hurts me more than it

hurts you to have to do this” – I think I can get a glimpse of what it must be like.

Having been a university lecturer for many years I believe I can suggest how it might really be. I set the exams, I mark the exams and I decide whether a student passes or fails. In effect I’m God – in a very limited way. With the small courses, where I know the students individually, I often feel pain when I have to put an F against a student’s name, especially if I liked them as a person. There’s a strong temptation to say, “oh poor Timmy Chang, he’ll be so upset. Why don’t I just push him through?”

In case I get accused of racism for having made the dunce an Asian, let me tell you from my experience that the many Asian students we get at university are all either distinction students or they are at the very bottom. For some reason they’re rarely just middling students.

Often in such cases I look at the exam script again to see if I’ve overlooked anything, or if a wrong solution had some redeeming feature. Occasionally, if he was on the borderline and I can find something of merit, I’ve allowed the student to pass. More usually I have kept the F grade.

I have to keep reminding myself that I must maintain standards. If I let everyone pass, just because they’re nice people, I’m doing a disservice to the other students. What’s more I’m doing a disservice to future employers.

Sometimes the failure comes about because the student lacks mathematical talent. These are the hardest ones to fail – the ones who work hard but still can't get it. But for every one of those there are four or five who have the talent but who believe they can take shortcuts and don't put in the work. In neither case would I like an employer to be landed with such a person. “I'm never going to employ a Macquarie graduate if this fellow is the sort of student they graduate.”

I believe that God is in this difficult situation. He'd like everyone to share an eternity with him. But a person who thumbs his nose at God is sending himself to Hell.

So what will eternal life be like? Is it just some sort of abstract state where we float around as disembodied angels? Here's a deep mystery. From what I read in the Bible I believe that Heaven is more than just an abstract state. The Bible teaches us that the resurrection of the faithful is a resurrection of the *body*. Exactly *which* body is not made clear.

If I die as an old man, blind and crippled with arthritis, I don't want to be resurrected like that. If I was blown to pieces by an explosion, I don't want to be resurrected as a collection of fragments.

But the risen Christ went to a lot of trouble to show that he was no mere ghost. Whatever body he had, it was somehow different to the one with which he died. Yes, he had the marks of the wounds from the crucifixion. Yet there were several accounts of him not being recognised at first.

There will be those who say that my view of Heaven and Hell conflicts with what it says in the Bible. I don't care. I believe that if something contradicts what I've come to learn about God, by listening to his voice within me, it's not true, even if it is in the Bible. Call it arrogant, if you like. But that's simply the principle that I apply when I read a mathematical proof. I have to be able to follow the proof before I can really accept the theorem.

Of course there are many facts in mathematics where I believe the theorem on the authority of the mathematicians who've proved it. There's one notable theorem in my area of group theory where the proof runs to 200 pages. I probably could have followed the proof if I had taken enough trouble but I've never bothered. Yet I'm happy to use the theorem in my own work.

But belief by authority is only a conditional belief. There are many things in the Bible that I believe simply because it says so in the Bible. But I hold these beliefs more lightly than those that are supported by an inner conviction. I don't think this is arrogance.

As I said earlier, my vision of Hell is not a place – certainly not the sort of place described in the Bible as being incredibly hot – pits of burning sulphur. The Biblical writers wanted to describe something extremely unpleasant and used the metaphor of fire and the torment of unquenchable thirst.

I believe that they chose the wrong metaphor. I'd use the metaphor of a very cold place. After all, heat is energy and cold is simply the absence of energy. Love is a spiritual energy and Hell is a state, and not a place, of the absence of love. Above all my vision of Hell is that of an incredibly lonely place. I use this in one of my stories, called *The Man Who Lost God*.

CHAPTER SEVENTEEN: LONLINESS



I want to ask a very deep question – what is the ultimate meaning of life? What is the central idea that explains everything about our human existence? In *The Hitchhiker's Guide to the Universe* the answer to all of life's mysteries is said to be the number 42. If you'd asked a nineteenth century preacher he'd probably have said "sin and redemption". Someone in the Uniting Church may well say "social justice". St Paul mentions faith, hope and love but goes on to say that "the greatest of these is love."

Now I don't want to contradict any of these answers – certainly not St Paul's. There are many answers to the riddle of life – many ideas where one can make the case for it being the central idea of life,

from which all others radiate out like the spokes on a bicycle wheel. I want to make a case for loneliness as being that central idea – loneliness as the fundamental human predicament.

Loneliness is hell and Hell is loneliness. Certainly everyone has had lonely experiences. I remember as a boy, my dog followed me to school and for reasons of hygiene I was made to eat my lunch, with my dog, at the far end of the playground instead of in the lunch shed with all the other children. I felt like Adam must have felt being thrown out of the Garden of Eden and being made to eat his apple somewhere else.

You might say that loneliness is one of many sources of pain in this painful world – but I want to make the rather over the top claim that loneliness is *the* fundamental pain in our human lives. What, more painful than dying of cancer or being shot to pieces on the battlefield? Is loneliness worse than a crippling disability or disloyalty from a trusted one, or guilt for something you've done that can't be undone? On what scale can we weigh one pain against another?

Some people would call themselves lonely and yet wouldn't consider themselves unhappy. Joan of Arc was a popular leader of the French against the English. But in the end, just before she was burnt at the stake, her friends and supporters deserted her. She reflected on her loneliness and it's claimed that she said "my loneliness is my strength."

Not everyone could give such a positive spin to loneliness. For many it's a hunger that draws all their strength. In the book *The Self Alone* the journalist Angela Rossmanith describes the feeling of loneliness:

In the pit of the stomach, a deep hunger gnaws for something that can hardly be expressed. It is as if you are lying at the bottom of a well, alone, unable to raise anyone with your cries. It is as if you are lost and have no-one to light the way. It is feeling invisible in the middle of a crowd. It is losing all sense of meaning in life, seeing only shallowness all round. It is feeling quite sure that there is nobody out there, no God, no Great Spirit, no Guardian Angel, no Wise Person, no Eternal and Loving Mother, no Compassionate Father, no Other, no anything. It is as if you are entirely on your own, adrift and rudderless, for the term of your natural life. That's loneliness, they say.

I recently saw the new version of *Charlotte's Web* and I had tears in my eyes when Wilbur, the little pig, tried to make friends in the barn and no-one had any time for him. Loneliness is a terrible thing, even for a pig.

Loneliness is like an insidious disease. You can be in a crowd and feel dreadfully lonely. You may have a successful career, have numerous friends and go to lots of parties and still be lonely. You can even wake up in the middle of the night, with your partner snoring away beside you, and still feel incredibly lonely.

Loneliness isn't just something that affects single people. Many married couples grow apart. They might consider their marriage to be a happy one and at a certain level it may well be. But they find they can no longer share their deepest feelings with their partner.

Shy and sensitive people are often more lonely than others, not just because they find it hard to make friends but also because they're more aware when friendships are superficial.

Becoming sensitive to the loneliness around you is an important Christian activity. That person you never talk to because they seem to have their nose in the air and think you're beneath their notice may well be someone who is simply shy. Being sensitive to the loneliness of others might mean spending a bit of time talking to that person at work who seems to be on the outer. It might even mean tearing yourself away from the football and going for a walk with your wife, just to talk about things.

Of course the really lonely person may not be the one who seems to have few friends. Many popular singers or actors who are surrounded by adoring fans have taken to drugs or suicide because of their loneliness.

And many people are dreadfully lonely but cannot or will not acknowledge the fact. The world today has invented many ways of drowning out loneliness. That little device full of songs with little bud phones you stick your ear is great for blocking

out the external world. The TV is great company. Who needs people?

Silence is considered a dangerous thing. We must be constantly bombarded with sounds and images to keep our minds occupied. We have music in the lifts, or while we're waiting for an operator on the phone.

Electronics is a wonderful thing and the internet has actually removed loneliness from many people's lives. But electronics can also isolate us and make us lonely without realising it. Advertisers know how to use even the most insignificant moments of down time in our lives to bombard us with sounds and images. We have advertising on every conceivable surface. They're now starting to fit advertising video screens on those machines in public toilets where you dry your hands with warm air. Can't have you spending those few moments in free thought. If every second of every day is filled with some activity or something to occupy your mind you might never realise the deep seated loneliness in your soul.

Our Lord knew loneliness. Sure there were busy times when he was surrounded by his disciples and when he preached he drew large crowds. Yet there were moments, such as in the Garden of Gethsemane, when he asked his disciples to watch and pray and then he discovered them fast asleep. They were well-meaning men, but they just didn't

get it – they didn't really understand his mission. He had company yet he felt very much alone.

Then on the cross he cried out in anguish “my God, my God, why have you forsaken me”. The terror of the cross wasn't so much the pain, or the death. For some reason that we'll never understand God deserted him at this time. As the creed says, he descended into hell. Jesus experienced the ultimate loneliness – to be cut off from God.

Now people cut themselves off from God all the time – it's no big deal we might say. But for the Son of God, who has known his father's love more closely than we will ever experience and to have known that love from all eternity, to be cut off from him was agony.

Loneliness is a hunger for company, for someone to have around – to do stuff with. But it's more than that. Loneliness is a hunger for someone with whom to share your innermost feelings. But it goes even beyond that. At its heart, loneliness is a hunger for God.

Spiritually we're born with this deep hunger for God, just as physically we're born with a hunger for our mother's milk. Theologians have described this innate hunger for God as 'original sin'. After all, they argue, sin is separation from God – when we disobey God we turn our backs on him and suffer separation. This hunger for God is something we're born with so it must be due to sin, but since it wasn't a sin that we committed coming down the birth canal

it must have been someone else's sin – perhaps that original sin in the Garden of Eden.

I'm not a theologian so I'm not equipped to explore the doctrine of original sin. And, to tell you the truth I don't think it really matters greatly to know what brought about our separation from God. Was it Adam's sin or simply the inevitable result of being born into this world? The simple fact is that we're born with a deep seated, instinctive, hunger for God just as a new-born baby has an instinctive hunger for its mother's milk. Of course there comes a time when the baby grows out of wanting maternal milk and a time when beer tastes so much better. Our desire for God, on the other hand, is an ultimate desire.

And the baby very early on knows what it is that will satisfy his hunger. It could find its way to its mother's breast blindfolded by the second day. But when it comes to our hunger for God we may go through the whole of our lives without realising that the empty hole in our lives is God shaped.

We may desire a satisfying career, or sporting success, or lots of money. But even if we achieve these things we find that they don't satisfy our spiritual hunger. Perhaps we desire someone to love someone, or to have a happy family. These will go much further towards satisfying our deep hunger. But still, in the quiet moments if we're really honest with ourselves, we can have the feeling that there's something beyond all earthly desires. C.S. Lewis describes it as 'sweet desire' a desire that nothing on

earth can satisfy. This, he says, is the surest proof that God and Heaven exist. Of course to have a hunger doesn't mean that this hunger will ever be satisfied. But it does suggest that what is being desired must be there somewhere.

If you understand loneliness you can really understand the Christian gospel. God created us in such a way that we can only find fulfilment by being one with him. But in our earthly life we've become separated from him and as a result we feel a deep loneliness in our hearts. The lives of those around us provide little windows through which we can get glimpses of God and they help to make us feel a little less lonely. All of our desires in this life are forms of a desire for our ultimate destiny to be fulfilled, a desire to be united with God and to be lonely no more.

Sin is our refusal to be one with God. It's a denial that we are lonely, and a declaration to God, "who needs you anyway?" Salvation is what God has done to reach out to us in our loneliness. Repentance is an acknowledgement of our loneliness – our desire to be with God after the separation of sin. Heaven is the state of being one with God – of never being lonely again. Hell is eternal loneliness – the state of being forever separated from God.

Of course, unless we're a great saint or a Christian mystic, it's hard to feel emotional excitement in being close to God isn't it? We obey God, we worship him as best we can – but we don't feel the same emotional warmth towards God that we

do towards real people. Of course God understands this. He knows that we can learn to love him by the love we have for those around us – and not just love in a one to one sense, but also in the sense of community.

Christianity is unique among religions in the way it combines individuality with community. On the one hand it's the individual who has to find salvation. God sent the Holy Spirit to reveal himself not to the Church, but to the individual. But this revelation reveals that you can only learn to love God in the full sense as an individual in a community.

We don't come to Church to learn to be good people. You can do that on your own. We come to Church to worship God. But even that you can do on your own. We come to Church to be a community – to care about one another – to love one another. That you can't do on your own.

And as we learn to love one another we learn to know and love God – at the end of the day that's all that matters. At a certain time yet to come God may say to you "inasmuch you did this unto the least of my people you did it unto me". Or, could it be that He'll say to you "I never knew you: depart from me". Those are pretty harsh words.

"But Lord" we might say, "I've been going to church all my life. I've been on many church committees. I even used to teach Sunday School." "I'm sorry", he may say, "I've seen your face somewhere but I really don't know who you are."

Being been part of the Church, doesn't guarantee that you'll learn to love God in a personal way. The student who fails the exam may protest that he attended every class and attempted every question, but the examiner may have to say "Nevertheless you don't know the work."

There will be weeping and gnashing of teeth. Not because of physical torment, though the tradition grew up of sulphur pits and fire and brimstone. It will be the spiritual torment – of suddenly realising what you should have realised before. That you were lonely and you did nothing about it. That God held his hand out to you and you looked the other way.

But surely God wouldn't be that cruel? Surely, even at that late stage he'd give us another chance? Just reflect on this. It may well be that the thing we call free will can only operate in our earthly life. Perhaps that's why we're here on earth. We're writing a novel and we can choose how it will end. But once it is written there's no going back.

CHAPTER EIGHTEEN: ANGELS

The subject of angels seems to me to be a theological minefield. You hear little bits about angels in church from time to time and you often sing about them, especially at Christmas.



Angels.

Where do I start?

Christians have many, very different attitudes to angels. Some say that they've had personal experience of them. Others say that, like miracles, appearances of angels on earth only happened in the past, while yet others say that they only come in dreams. And to many Christians, angels are just the things you put at the top of Christmas trees, part of the mythology that has attached itself to the otherwise historical Christmas story.

Now I don't think I'm theologically qualified to judge between these different beliefs. Let me simply lead you in a meditation on angels and share with you some of the insights I've gained while looking into the subject.

I had never given much thought to the subject when a fellow member of my church, when I told him I'd be taking a service in a few weeks time, said, "Chris – tell us about the angels."

It was a challenge, but it made me do some serious thinking. I even wrote a story called *The Little Black Angel* which, if you're interested, you can find in my book *Stories About God*.

Let's begin by assembling some of the facts, or beliefs we have about angels. Many of these are firmly rooted in biblical history, others have been added by later tradition.

We all know what they look like – shining white robes with a pair of wings. However they can also appear in human form. Jacob wrestled with one all night without realising it was an angel. And Paul in his letter to the Hebrews says that we should not forget to entertain strangers in case they turn out to be angels of the plain-clothed variety.

We frequently sing of cherubim and seraphim. I must confess that I never knew the difference between them. I'd always vaguely thought of them both as being synonyms for 'angel' and that the repetition was purely for poetic effect, just like flotsam and jetsam.

But apparently cherubim are noted for excellence in knowledge. So those silly little cupids that adorn some forms of sentimental art are quite wrongly referred to as cherubs.

And ‘seraph’ literally means ‘burning one’. The seraphim are the highest order of the angels and are distinguished by the fervour of their love. They are described as having six wings and have eyes that burn as bright as live coals, emphasising the intensity of their inner fire.

So, far from being just the flotsam and jetsam of heaven, cherubim and seraphim reflect the two most important qualities of God – knowledge and love.

Now what are angels for? The word ‘angel’ comes from the Latin ‘angelus’ and a closely related Greek word. It means something like a ‘bringer of a message’. In fact even in modern Greek, the word for advertisement is ‘angeleea’. So when angels appeared to men it was as if God was saying “and now, here’s a message from your Maker”. Whenever God had an important announcement to make he generally did so via an angel.

The angel Gabriel came to Mary to announce that she would conceive a son. An angel warned Joseph to escape to Egypt. And a pair of angels announced, at the empty tomb, that Jesus is risen.

Collectively, as heavenly hosts or choirs of angels, they filled the skies on a number of occasions to make some great announcement.

Today whenever an angel appears in a TV. show it’s generally an ordinary guardian variety angel. I’m sure the tradition of guardian angels wasn’t invented by TV script writers but I don’t think it goes all the way back to the Bible. According to

this tradition each of us is assigned our own guardian angel whose job it is to keep us from falling, both physically and spiritually and to assist us in praising God.

Now the idea that there's a being, close to God, who looks after us, is a comforting one. However for those who know that God himself can be closer to us than our hands and feet we have little need for an intermediary. If you like, God himself is our guardian angel.

And when they're not running around after us humans and bringing God's messages to us, we're told that angels surround God's throne in ceaseless praise.

You know I think that this is perhaps the hardest part for us to accept about angels. Guardian angels seem a sensible idea for us frail humans. But a celestial cheer squad seems totally bizarre for a God who promotes humility.

And yet it is the fact that angels constantly praising God has proper biblical backing while the idea of guardian angels seems to be mere tradition.

Why is it then that God is so preoccupied with being praised? He's not content with just us part-timers praising him while we have breath. He employs a full-time praise team who do nothing but praise him! This seems to have overtones of the worst kind of pop star who surrounds himself with an idolising throng of fans. And it reminds one of a dictator who has his group of cronies constantly patting him on his back.

Praise is something which is often misunderstood. We seem to have down-played it in our own church's traditions. We're big on social and moral responsibility, and rightly so. But do we perhaps feel a little self-conscious about the need for praise? We've lost the ability to sing praises to God with the gusto of the early Methodists when there was danger of doing real structural damage to the roof.

Where once we built masterpieces of church architecture to the glory of God we tend to think today in terms of functional multi-purpose buildings. It's a difficult question with arguments on both sides and I'm certainly not suggesting we revert to pouring all our church's wealth into beautiful buildings at the expense of the needy. But we must constantly remember the need for balance and to remember what Jesus said to Martha.

The mystery and drama of worship has gone out of many of our churches as we've made our services more informal and friendly. Yes, of course it's important for us to make people feel at home in church. But at the same time we need to remind them that they aren't at home and that though God is everywhere, he's especially near in worship.

God doesn't *need* our praise. We do. Praise is the natural resonance of a heart that's in tune with God, the effervescent bubbling over of a heart that's filled with God's love.

God loves our praise, not because he feels insecure and needs to have his ego constantly

boosted. He loves our praise because it's a sign of a healthy soul – a soul that's in a right relationship with him.

What mother doesn't thrill to the sound of her child, even her grown-up child, saying, "I love you Mummy."

What father doesn't warm to hear his little boy say, "you're the best daddy in all the world!". It's not vanity which is fed by this praise – it's love.

And finally, you can't make an appointment with an angel. Imagine saying, "no, I can't make it Friday – I have an appointment with my angel!" No, angels are unexpected visitors. They drop in with some piece of shattering news that will turn the hearer's world upside down. Usually it's good news but it is not always seen to be good news at first. The person to whom the angel has come is often more troubled by the news itself than by the strange appearance of its bearer.

Mary wasn't exactly thrilled by the prospect of becoming an unmarried mother until the circumstances were explained. And Mary Magdalene was troubled at first by the angel announcing that Jesus was no longer in the tomb. "Where have you moved him to?"

Angels seem have been one of God's ways of breaking through into our lives and turning them upside down. But God has many other, and far less dramatic, ways to break into our lives and bowl us over. He doesn't need angels to let us know that he

has a plan for our life which will stand the world as we know it completely on its head! The moment may not always be dramatic but the results often are.

The film, *Shadowlands*, is a love story between the middle-aged Oxford academic C.S. Lewis and a sharp-humoured American writer, Joy Davidman. Many of you will know Lewis for his many Christian books and for his children's stories of the Land of Narnia.

Lewis wrote that he could remember the very moment of his conversion. It took place in a bus going up Headingly Hill in Oxford – nothing particularly dramatic about that. The only person he spoke to on the journey was the conductor as he collected the fare. No angels, no visions. Lewis was an agnostic who had thought deeply about the Christian faith. He'd come to believe that, though not true, Christianity was a powerful myth like the great Norse myths and as such was something worth being taken seriously – just as a myth, mind you – until his conversion.

He couldn't even recall what the deciding factor was – the piece that finally completed the picture. All he knew was that he was a confirmed agnostic when he got on the bus and an equally confirmed believer in God when he got off twenty minutes later.

God seems to delight in reaching down and shaking up our lives from time to time. He seems to

use angels less now than he once did – perhaps because we've become too sophisticated. But shake us up he continues to do.

Many world religions embrace some form of reincarnation. Christianity has its own distinctive version. It's called being 'born again'. Instead of being reborn into different lives each with little or no memory of the others, Christian Reincarnation means being born again within the same life.

Being born again is a powerful concept that's central to the Christian message. It's there at the moment, or in the process, of Christian conversion. But there are many other ways in which we are called upon to be reborn. How many times have you had to completely re-make some major portion of your life? Marriage is like being born again. So is divorce, leaving your parents' home, migrating to another country, being retrenched or just retiring. All of these experiences require us to be born again. Something dies and something new rises up from the ashes.

Think about marriage. Your single life dies. If you're the bridegroom your mates take you out on a wake to help you bury you bachelor days. But as with all death there comes the resurrection. The day dawns on your wedding day and the start of a new married life.

Divorce is also like death. A part of us dies. There's the mourning and the pain. But as with all death there comes the resurrection. We find that God is able to make some sense of it all. He leads us on to a new life.

Retrenchment from a long-held job will knock us off our feet. It forces us to re-evaluate our lives. It's a death. We mourn. But at last comes the resurrection. A new purpose emerges, a new life. God hasn't finished with us yet even if Westpac or Ford Motors have.

When a child leaves home or you move house, something dies. But after death comes the resurrection. Death in all these forms is God shaking us up. He knows that it is not good for us to get too comfortable. We're called to be nomads, always folding up our tents and moving on, pilgrims on a journey.

Sometimes he calls us to remain while others move on. In Oscar Wilde's story *The Happy Prince*, little swallow wanted to fly south for the winter but the statue of the happy prince asks him to stay "just one more night" to go on just one more errand of mercy. Of course he stays too long and at last the mayor finds a dead bird at the foot of the once beautiful statue. The statue is broken down and thrown onto a tip with the dead bird. But when God asks for the two most precious things in the city to be

brought to him, they are the swallow and the heart of the statue. New life is given to both.

I've always thought that the weakness of the usual belief in reincarnation is not being able to remember the previous lives. In what sense then were those lives *us*? The Christian version of reincarnation is that of reincarnation within our one life.

C.S. Lewis the agnostic and C.S. Lewis the Christian writer were two quite different people in many ways. And yet in many other ways they were the same. The fact that he had once been such an outspoken agnostic added an ingredient to his Christian writing that he'd not otherwise have had.

When a long-standing relationship or a job suddenly ends it may seem to be like a building that has collapsed under an earthquake. As a loving Father, God is there to help us pick up the pieces. And as he helps us build a new life he re-uses most of them, often in quite different ways so that the building which arises from the rubble, our new life, may have a totally different architecture, yet its distinctive character is due to ingredients from the old.

Often we fight against this rebuilding. Like one of his angels, God steps unexpectedly into our lives and we are troubled. We all tend to resist change. We must let go and let him do his will. In a sense we must live with our bags packed, ready to go onto the next stage of our journey at a moment's notice. I guess one of the most important things we

get out of reading about the intervention of the angels in the Bible is to EXPECT THE UNEXPECTED.

CHAPTER NINETEEN: THE QUANTUM GOD

Here I'm going out on a limb. I only half believe what I've written in this chapter. The question I am asking is "what is the mechanism by which I communicate with God?"

In Christian circles we talk about "finding God in our heart" and we pray to God. By what mechanism are we able to communicate?

As I said earlier, I believe that something lies beyond a deterministic material universe. If not, then there's no room for free will, no room for truth and no room for love. If I'm a biochemical robot I cannot choose, what I claim to be true is something I'm programmed to believe is true and love is just a hormonal, chemical process.

Of course the quantum physicists say that the world is not deterministic. At the atomic level, particles can act in a purely random way and we get the illusion of determinism by the law of averages. To me this makes things worse. So truth is based on random events? Perhaps mostly $2 + 2$ is 4 but on rare days it's 5.

Believing that there's something that lies beyond the material world, I'll call that something the 'spiritual world'. Now if there's no window between the two then it's just as if there is no spiritual world. My objections to there being only a material world still stands.

Clearly the gateway between the material world and the spiritual goes on inside our brain. Traditionally we talk about finding God in our heart, but that's using ancient ideas. Where else? I hardly think that God would choose to speak to me through my big toe!

So inside the brain it is. It has been postulated that religious people are religious because they have a religious lobe – a tiny part of the brain that generates religious thoughts. Atheists are missing this piece of tissue through some genetic cause.

That's an interesting idea. Perhaps some of us are born without souls! Perhaps you don't have consciousness and free will. Perhaps you're purely a very clever robot that lacks a soul. Poor thing!

But the people who make such a claim seem to feel that it's those who have a religious lobe who are the aberration. God doesn't exist but this pathological deformity in my brain makes me think he does. It's not unlike hallucinations being traced back to a malignant piece of tissue.

For a start, the "God Spot" has never been located. But perhaps one day it will. But secondly, those who suggest that such a thing exists don't think of it as a gateway to the beyond, but simply another piece of deterministic machinery that dictates our thoughts. In that case we're still back in a material world that has no room for truth.

Okay, so if this G-Spot is a window, how does it escape being determined by the biochemistry of our brain? Here's where I get really speculative.

But don't blame me for having such thoughts, you materialist. I was programmed by my biochemistry to think like this.

What if it's not free will that's an illusion, but randomness! Certainly it's been long known that it is impossible for a computer to produce a random sequence of numbers. The best we can do is to generate a sequence of *pseudo* random numbers – a sequence that only appears to be random.

It's been suggested that our computers should include a small piece of radio-active material to assist in generating random numbers since it is well-known that radio-active decay takes place in a random manner – or so it appears.

But what if this randomness is only an illusion? It appears to be independent of material processes. But what if it's controlled by something beyond the material world?

So am I saying that it's God who controls all the apparent randomness that quantum physicists have discovered? I don't think it is as simple as that. But I have a hunch, no more than a hunch, that if ever we get to understand things better, what we observe as quantum randomness will be somehow connected to free will. Perhaps our minds can control some of these supposedly random events. Perhaps God controls them.

Of course I can't prove any of this. I'm not even sure whether neurologists will ever be able to locate a G-spot in the brain. And I'm not sure that I believe the above speculation myself. But what I do

believe is that God does interact with our thoughts in some way. Knowing God in my heart is not an illusion. And one doesn't have to be a Christian for this to take place. I believe that every human being has a conscience and that this is a small part of the way God speaks to us.

So pagans can know God, and Muslims too. What we call “giving your heart to Jesus” is simply tuning our God antenna so that we hear him more clearly.

Certainly countless Christians over the centuries (and probably Muslims too) have reported the experience of God speaking to them. In a small minority of cases, such as Joan of Arc, there are claims of hearing actual voices. Perhaps this was as a result of some medical condition. Perhaps not. In my experience sometimes when I've been thinking about something I get an overwhelming conviction that something is true, or some action is the right thing to do. And when it's a conviction that I should do a certain thing it's not always what I'd like to do. Sometimes I've been pushed outside my comfort zone so I'd be surprised if it could be put down to just wishful thinking. Anyway I just have to report my inner feelings and thought, and if you've never felt like that I can't convince you that it does happen.

On the other hand you might say “Oh, I've had those sorts of convictions too but my interpretation is ...” That's OK. I could just conclude that you had a birth defect in not having a soul, and

God can't get through to you because the receiver isn't there! Perhaps I'm being a bit unkind. It could be that I'm the one who's wrong in all this, but if I'm deluded it's a very satisfying delusion.

CHAPTER NINETEEN: LOVE



“And the greatest of these is Love.” In this final chapter we come to the very heart of the Gospel.

In a newspaper some years ago the following advertisement appeared.

Don't just like – love!
Like is watered down love.
Like is mediocre.
Like is the wishy-washy emotion of the content.
Romeo didn't just *like* Juliet.

Love. Now that's powerful stuff.
Love changes things.
Upsets things.

Conquers things.

Love is at the root of everything good that has happened and will ever happen.

What profound words for an advertisement for the Blackberry mobile phone!

Jesus left us two great commandments – love God, and love your neighbour as yourself. Great teaching like this is one of the reasons that he's often referred to as the great teacher.

Of course, for us he's much more than that. In fact much of his teaching was around long before he was born. We remember “an eye for an eye” from the Old Testament, but those scriptures also contain the message that we should love our neighbours. The teachings of Jesus were by and large not all that new. He merely emphasised them and clarified them. Jesus may be the greatest teacher that ever lived but as a teacher on how to live he's by no means unique. The Muslims regard him as a great prophet among other great prophets.

It's being the Son of God that makes him unique. He doesn't just *teach* us how we should live – he's able to *help* us to achieve a more holy life. He can provide the strength to enable us to love our neighbours as ourselves.

But, going back to his teachings, he did go beyond the Old Testament commandments to love our family and those who live near us. When asked, “who is my neighbour?” Jesus told the story of the

Good Samaritan. Your neighbour is not just someone who lives in your street, or in your suburb. For Jesus, the term ‘neighbour’ includes those who live on the other side of the tracks, it includes the normally despised Samaritans. For those who live in the more affluent suburbs of Sydney it includes those who live in the more working class Western Suburbs, those who live in aboriginal settlements at the edge of Alice Springs and it includes those who live in Indonesia and Iran and Afghanistan. The shocking thing is that ‘neighbour’ even includes our enemies! Jesus said, in the Sermon on the Mount:

You've heard that it has been said, "Love your neighbour, and hate your enemy." But I say to you, "Love your enemies, bless those who curse you, do good to those who hate you, and pray for those who despitefully use you, and persecute you."

This is so you may be the children of your Father in heaven: for doesn't he make his sun to rise on bad people as well as the good? And doesn't he send the rain on the just and unjust alike?

For if you only love those who love you, what's so special about that? Even drug dealers do that. And if you only greet your friends, what are you doing more than terrorists? I want you to be perfect, just as your Father in heaven is perfect.

Love your enemies. Wow! That includes all sorts of people that we ought not to have to love. It includes suicide bombers, and drug barons, and

paedophiles and serial killers. It includes that person at work who keeps making things difficult for you, it includes that kid at school who keeps bashing you up. It even includes your brother, or your wife. Even those we love become our enemies from time to time.

Now I don't propose to tackle the difficult question of turning the other cheek. Pacifism requires a very serious moral debate. No, I want to consider another aspect.

It's a pity that in English we only have one word for love. Oh, yes there's 'like' but, as the advertisement says, "like is watered-down love". I remember my English teacher telling me that you love people and like things, never the other way round.

Greek has several words for love and, when Paul's writings were translated, many different words he uses come out as 'love'. C.S. Lewis has written a book called *The Four Loves* in which he explores these different levels of love.

We love our wives and husbands and partners. That sort of love has elements of romance, and even passion. We love our family, but in a somewhat different way. We love our friends, but differently again. And we love our neighbours.

No-one expects you to go up to someone in the street and embrace them as you might embrace your spouse. No-one expects you to go round the

carriage on the train shaking everybody's hands as you might do for your friends.

At the heart of love, as it relates to our neighbours, is acceptance – accepting that someone has the same right to walk this earth as oneself, accepting that someone who looks different, who dresses differently, or even someone who simply has different views to ourselves, has the right to be respected.

There's a myth that's been around for thousands of years that sin is contagious. Do the wrong thing in my eyes and I'll have nothing to do with you. You might infect me with your sin.

How many times have you come across, in a novel or a film, the words "because you've done such and such, or because you refuse to do such and such, you are no longer a son of mine. I cut you off completely from the family".

Now I know that there are circumstances where sin must be isolated, where the sinner must be incarcerated, to protect the community. I know that there are extreme cases when it's justified in asking a son or daughter to leave the family home. There are bitter divorces where it's necessary for the two parties never to meet again, or where there's a need to take out a court order preventing someone from coming within a hundred metres of some place.

But for every such case there are hundreds of others where some minor family dispute has resulted in relatives not speaking to one another for years. I've come across cases where grandparents have not

been permitted to have contact with their grandchildren because of some real or imagined transgression, where Christmas gifts are sent and are returned unopened.

The writer Charles Dickens sent his wife of many years out of the family home and set her up in an establishment on the other side of London. He paid for her upkeep, but Catherine Dickens was never again allowed to see her children. She had to resort to extreme measures to even glimpse them. When she learnt that one of them was learning the piano from a teacher across the road from a friend she arranged to visit that friend every week just so she could look out of the front window and watch her daughter arrive and depart from the music teacher.

Even in a church there are often cases of a refusal to accept someone else. Of course we can't be good friends with everyone. But are there any people here that you avoid – people you'll grudgingly greet if you can't help it but whom you make a conscious effort to avoid?

How accepting are churchgoers? I heard of two ministers in neighbouring towns, of different denominations, getting together and concocting a plan to test out the level of acceptance of their respective congregations. They each dressed up as if they were homeless. They wore dirty, ragged clothes, and then went to each other's church, when there were visiting preachers.

They contrived to arrive about ten minutes late, perhaps during the first prayer, and tried to find

a seat. One of them reported that although the church he visited wasn't quite full, it was amazing how many aisle seats became occupied as people slid across to deter him from sitting in their row.

Finally he reached the front and, finding no seats that seemed to be open to him, he sat down on the steps. Just then one of the elders, someone who had a reputation for being very straight-laced and not overly friendly, walked slowly down the aisle with the aid of his walking stick. "Good," thought some of the members of the congregation, "he's going to ask that hobo to leave."

But no. When the elder reached the front, with great difficulty, he lowered himself to the floor and sat next to the man. Wouldn't Jesus have done the same?

Jesus created a scandal by associating with people on the edges of society – that tax collector, the prostitute, he even spoke to the thief on the cross. We tend to think that we can only stay good by only associating with good people. But if our goodness is so precarious then we're in a very dangerous state.

Children, even young people, are easily influenced and there's often good reason for protecting them from bad influences. But we, who should be mature Christians, ought to be able to live dangerously and accept those whose lifestyle is quite different to ours without any danger of becoming like them.

Tied up with acceptance is patience, another ingredient of love. There are numerous references to patience in the Bible. Many of these involve stoicism, remaining calm when bad things happen or not becoming depressed when good things seem to be taking a long time to come. We hope we'll eventually recover from this illness, but Oh God, how long it's taking! We expect to eventually find another job, but why is it taking so long?

But Paul also exhorts the believers, in the various churches he's set up around the Mediterranean, to be patient *with one another*.

The fruit of the Spirit is love, joy, peace, longsuffering, gentleness, goodness, faith, meekness and temperance.

If acceptance is at the heart of love, so patience is an important ingredient of acceptance. If we're impatient with somebody we're not truly accepting them. And if we don't accept them, how can we love them?

It's easy to become impatient about that member of church council who's got a bee in his bonnet about something and is always wasting time in the meeting about some issue that's obviously a stupid idea. Remember that without that person who has a bee in his bonnet and who's always promoting some far-fetched, seemly impractical, idea, we'd always be stuck doing the same old thing. Progress only comes about because someone has a vision that the rest of us haven't yet seen.

Of course not every hair-brained scheme is worth pursuing. That's what the boring old majority is there for. But every such scheme is worth listening to – listening with patience. We should accept the person even if we can't accept his ideas.

How many times have we said, "look I told you that already". Or perhaps we've been on the receiving end of such a comment. Patience involves answering a question a second or third time without grumbling. And I don't just mean when we're talking to people with some form of dementia. I may think I've explained something perfectly, but your question, asking for clarification, reflects on my performance just as much as on yours.

In teaching you learn to be patient. When you know your subject well you only need to be told once. But when you're grappling with a new concept you need to be told it many times, in different ways. A good teacher is above all a *patient* teacher.

We probably become impatient more with those we are close to than with other people. That little thing you insist on doing, almost without thinking, can infuriate your wife. "How many times have I told you ..."

Driving is a great source of impatience. I keep telling myself that the driver who's just cut in front of me may only result in my receiving a two seconds delay, but my impatience burns inside of me. I've even been known to blow my horn to tell them how much he has cost me in time.

That driver in front of me, who's not yet noticed that the light has changed to green, gets on my goat and might have delayed me three whole seconds. But I must learn patience. I remember times when I was also too distracted to notice that the lights had changed.

I've noticed that I'm most impatient with other drivers when I've stupidly not allowed myself enough time to get to my destination and I'm riding on the edge of my nerves the whole way. Oh, Lord, give me the sense to leave early enough so that I'll not be tempted to become impatient.

We've all become impatient when the sermon seems to go on too long, and on some occasions my wife has quietly said to me afterwards, "darling, don't you think you preached for too long?" So before you begin to feel this sort of impatience I'll finish with the words of Paul.

Now we exhort you brothers and sisters, warn those that are unruly, comfort the feeble-minded, support the weak, and be patient to *all* men – and to *all* women.

APPENDICES:

These three appendices are not for the faint-hearted.
You'll probably want to skip these!

(1) 'PROOF' THAT GOD EXISTS

Consider the following infinite sequence of statements:

- (1) All of the following statements are false.
- (2) God exists.
- (3) All of the following statements are false.
- (4) God exists.
- (5) All of the following statements are false.
- (6) God exists.

.....

It's clear that the even numbered statements are all the same. But the odd numbered statements, though they look alike, are actually different because 'following' refers to a different set of statements in each case.

Now it's clear that no statement refers to itself, either directly or indirectly. The even numbered statements say nothing about any of the

other statements in the list and the odd numbered statements only refer to the following ones. So there is nothing circular going on here.

Theorem: God exists

Proof: Suppose that (1) is TRUE.

Then (2), (3), (4), ... are FALSE.

But (3) says that (4), (5), (6), ... are FALSE, which is TRUE.

Hence (3) is both TRUE and FALSE, a contradiction.

Hence (1) must be FALSE.

But if it's FALSE that all of (2), (3), (4), ... are FALSE then at least one of them must be TRUE.

Suppose an odd numbered statement is TRUE, let's say that (17) is TRUE.

Then (18), (19), (20), ... are all FALSE.

But (19) says that (20), (21), (22) are all FALSE, which is TRUE.

Hence (19) is both TRUE and FALSE, a contradiction.

So it must be that an even numbered statement is TRUE. Hence God exists!

You might need to read through this proof very carefully. But you won't find any step that is logically wrong! However, once again, you can

argue that I could have replaced all the even numbered statements by ‘God does not exist’.

So once again logic lets us down. The error doesn’t lie in contemplating an infinite number of things – we mathematicians do it all the time. It comes about because of the nature of this infinite list. In logic we must not only avoid having statements that refer to themselves, or go round in circles. We must also avoid infinite sequences of statements where each refers to subsequent ones.

As explained in the text there’s no mathematically rigorous proof of the existence of God. Moreover one cannot prove the existence of God by any scientific argument. The same is true of the claims of the atheists. The existence of God is undecidable.

It could be argued that the existence of unicorns, or other imaginary beings, is undecidable. I can’t prove that unicorns exist, but you can’t prove that unicorns don’t exist. Yet very few people believe that they do. So what’s so special about God?

My answer is that although I can’t prove that God exists, the belief that he *does* exist makes better sense of the world for me than otherwise.

You can’t prove that anyone else has consciousness, but you choose to believe it because it seems to make sense of the world. That’s an axiom that you, and I, find useful. For me the axiom that God exists makes sense of my experience of the

world. It may not help you to believe in God. Never mind. But remember, there's nothing illogical about my belief. Logic can only take you so far in this world.

(2) RUSSELL'S PARADOX

There's a naïve belief that for every property there is a set of things that satisfy that property. There are intelligent people so there is the set of all intelligent people.

It's convenient to use some notation. If P is a property then we can define Px to denote the statement that the object x has the property P . So if P is the property of being an intelligent human and x is me, the author of this book, then Px would be my claim that 'I am intelligent'.

The set of all things that have the property P would be written as

$$\{x \mid Px\}.$$

You read this as 'the set of all x such that Px is TRUE'. So if P denotes the property of being a fraction then $\{x \mid Px\}$ would denote the set of all fractions. And $\{x \mid x \text{ is an odd number}\}$ would denote the set of all odd numbers.

Have I lost you yet? Of course not, because you belong to $\{x \mid x \text{ is an intelligent human}\}$.

Read this as ‘the set of all x such that x is an intelligent human’, or simply, ‘the set of all intelligent humans’.

Now belonging is a fundamental relationship between things and sets. We use the strange symbol ‘ \in ’ to denote membership. If x is a thing and S is a set then $x \in S$ denotes the assertion that ‘ x is a member of the set S ’. And we use the symbol ‘ \notin ’ to denote the assertion that ‘ x is NOT a member of the set S ’.

To give you practice with this notation here are some assertions and their translations. Now please note that these are assertions that can be made. I’m not claiming any of them to be TRUE or FALSE.

Donald Trump $\in \{x \mid x \text{ is an intelligent human}\}$

This asserts that Donald Trump is an intelligent human.

Donald Trump $\notin \{x \mid x \text{ is an intelligent human}\}$

This asserts that Donald Trump is NOT an intelligent human.

I leave it to you to decide which of these is TRUE.

Let’s stick to statements about numbers.

$2 \in \{x \mid x \text{ is an odd number}\}$

This asserts that 2 is an odd number. This assertion is clearly FALSE.

$$2 \notin \{x \mid x \text{ is an odd number}\}$$

This asserts that 2 is NOT an odd number. This assertion is clearly TRUE.

More complicated statements can be built up by nesting one set inside another.

$$\{x \mid x + 1 \in \{x \mid x \text{ is an odd number}\}\}:$$

This is the set of all numbers such that if you add 1 you get an odd number. This is clearly the set of all even numbers, which is more simply written as

$$\{x \mid x \text{ is even}\}.$$

So are you ready for Russell's Paradox?

RUSSELL'S PARADOX:

Let $S = \{x \mid x \notin x\}$. This is the set of all sets which are not members of themselves. Can a set be a member of itself? Well, surely the set of all sets, if such a thing exists, is a set, and so is a member of itself.

We ask the question 'is S a member of itself?', that is, is it TRUE that $S \in S$? Clearly the answer has to be either YES or NO.

Suppose $S \in S$:

Then, since $S = \{x \mid x \notin x\}$, we conclude that since $S \in S = \{x \mid x \notin x\}$ it follows that S is one of those sets that are not members of themselves. That is, $S \notin S$. This is clearly a contradiction.

Suppose $S \notin S$:

Then S must be one of those sets that are not members of themselves. Therefore it has the property that defines S . Hence $S \in S$. This is also a contradiction.

The conclusion is that if $S \in S$ is TRUE then it's FALSE and if it's FALSE then it's TRUE.

The only way out of this mess is to deny the existence of $\{x \mid x \notin x\}$. In other words here's a property that cannot be allowed to correspond to a set – an adjective that can have no corresponding noun.

Frege, and other mathematicians at the time, assumed that it was obvious that any property can be translated into a set. This is clearly not the case. Well, if some adjectives can't be converted into nouns, clearly many can. So we're faced with the problem of deciding which ones can and which ones can't. For which properties P is $\{x \mid Px\}$ a legitimate set – one that won't lead to a contradiction. This is what the ZF theory attempts to do.

Now you will perhaps have noticed the self-referentiality in considering $x \notin x$. It's very similar to the sentence 'This sentence is FALSE'. But remember, as we showed above, self-referentiality isn't the only logical mine-field.

(3) ZF MATHEMATICS

We all know basic arithmetic but most people would be unable to prove what they believe to be true. To the cynic who says that they only believe what they can prove, let me offer the challenge to prove things about basic arithmetic.

For example we all know that in multiplying two numbers it doesn't matter what order you multiply them in. For example $3 \times 5 = 5 \times 3$.

You might say, well both are equal to 15. I'll refrain from asking you to prove this and instead say "but how do you know that it always works for *any* two numbers?"

You might say that "it's obvious" but that's not a proof. You might say that you believe it because Mrs Brown in third grade told you it always works, but that's 'proof by authority' which is a pretty shaky sort of proof!

You might prattle on about a table with rows and columns and rotating it through ninety degrees, so that rows become columns and vice versa. That may be a fairly convincing argument but it falls well short of a mathematical proof. "What's a table," the disembodied angel might say, "and what does 'rotate' mean?" The trouble with that 'proof' relies on geometric intuition. It is only a little better than saying "it's obvious".

Yet this fact can be rigorously proved within ZF set theory. Even the disembodied angel would be forced to believe it – that is, if they accepted all the ZF axioms as a starting point.

I've refrained from listing these basic assumptions. If I took the trouble of explaining them I'm sure you'd consider them intuitively obvious. But you wouldn't have to *believe* in them – just agree to take them as the basis for your mathematics.

One such axiom is that there is a set with nothing in it, which we write as $\{ \}$. The curly braces are read as ‘the set consisting of’ and what it contains is written between them.

Another ZF axiom is that for any sets x and y there's a set that contains x and y , and nothing else, which we write as $\{x, y\}$. In particular, if $x = y$, this states that if x is a set the set $\{x\}$ exists.

If we want to describe the set that consists of just a cabbage and a king we write it as $\{\text{cabbage, king}\}$. Or we could write it as $\{\text{king, cabbage}\}$. The order we choose doesn't matter.

Let's stick to mathematical examples. The set that consists of just the numbers 2, 4 and 6 is written $\{2, 4, 6\}$. Of course infinite sets can't be written in this way but there's another notation that's used in that case.

As I've said, a very important set is $\{\}$. This is called the Empty Set. It's the set with nothing in it! Now this may appear absurd but mathematicians have found that 'nothing', and the number 'zero', are vitally important concepts in mathematics. Without the number zero we'd still be writing numbers in Roman numerals. Even Shakespeare wrote a whole play about 'nothing' and he made much ado about it.

Arithmetic, done in the ZF way, begins by defining the number 0 to be the empty set, $\{\}$, which exists because of one of the ZF axioms.

The number 1 is then defined to be $\{\{\}\}$. This exists because of two of the ZF axioms. Notice that this is not the same as the empty set itself. It's the set that consists just of the empty set. The clearest way to see the difference is to ask how many items each of these sets contain. The empty set has zero things in it while $\{\{\}\}$ has one, namely the empty set itself! In fact we define the counting numbers in such a way that the ZF definition of the number is a set with that size.

Now you might think that we might define 2 as:

$$\{\{\{\}\}\}.$$

But that set only has one thing in it, namely $\{\{\}\}$. In fact the number 2 is defined to be:

$$\{\{\}, \{\{\}\}\}.$$

I told you it would be messy! Again this exists because of the ZF axioms.

Perhaps it would look simpler if we used these definitions as we go along. So 0 is $\{\}$, 1 is $\{0\}$, 2 is $\{0, 1\}$ and so on. So the number 5 would be defined to be $\{0, 1, 2, 3, 4\}$.

We then have to define addition and multiplication. It's possible to do this in a way that gives us a working model of the counting numbers. Then we have to extend this to include all other numbers – fractions, decimal numbers etc. This can be done, but it takes a lot of work! We can then prove all the accepted facts of arithmetic.

Perhaps you'd like to crawl back into the simplicity of kindergarten arithmetic. It was so much simpler back then. You just believed what the teacher told you.

All this ZF nonsense isn't going to make your arithmetic quicker or more reliable. The difference is that the kindergarten approach relies on intuition, and on accepting a lot of things on the basis of authority. The teacher says that minus times minus is plus and you accept it on her authority – after all she's the teacher. This is no different to believing things about God simply because the Bible says it is so.

It's a rare person who would find all this interesting. In the unlikely event that you $\in \{x \mid x \text{ is a rare person}\}$ there's a full-blown account of this in my notes on *Set Theory*. Or, if you just want these ideas

to blow over in the context of a fantasy, you might like to read my book *Alison's Axioms*. This is a bit like Alice in Wonderland but it tells of a quest for the Ring of Ramanujan – a ring of great mathematical power. On the search for this ring, Alison and her friends find a number of pieces of jewellery. Each one represents one of the ZF axioms of set theory that I've just been talking about.

(4) THE WORLD OF INFINITE NUMBERS

I mentioned only two infinite numbers:

\aleph_0 = the number of counting numbers 1, 2, 3, ...

\aleph_1 = the number of decimal numbers

Because I believe the unprovable axiom, called the Continuum Hypothesis, there is no number between \aleph_0 and \aleph_1 . But there are plenty of infinite numbers after \aleph_1 .

There are, in fact, infinitely many infinite numbers.

\aleph_2 = the number of sets of decimal numbers,

\aleph_3 = the number of sets of sets of decimal numbers,
and so on.

So we have the sequence of infinite numbers:

$\aleph_0, \aleph_1, \aleph_2, \aleph_3, \dots$

Actually there are infinite numbers even bigger than all of these. I won't bother you with the notation for these.

Mathematicians do make use of a couple of these alephs for certain mathematical results. But only \aleph_0 , \aleph_1 , and occasionally \aleph_2 ever get used.

As in the universe God seems to have been over abundant in his creation. Of all the billions of planets in the universe, only a tiny fraction would ever be useful to man. Of course here I'm taking a parochial view that the whole universe was created for our benefit! In the same way God has created a huge system of infinities of which only two or three will ever be useful. Perhaps out there, billions of light years from Earth, there are creatures, far more intelligent than humans, who have devised an area of mathematics which uses all the countless higher alephs. It's wonderful where the human imagination can take us. But then, the human imagination was created in God's image!