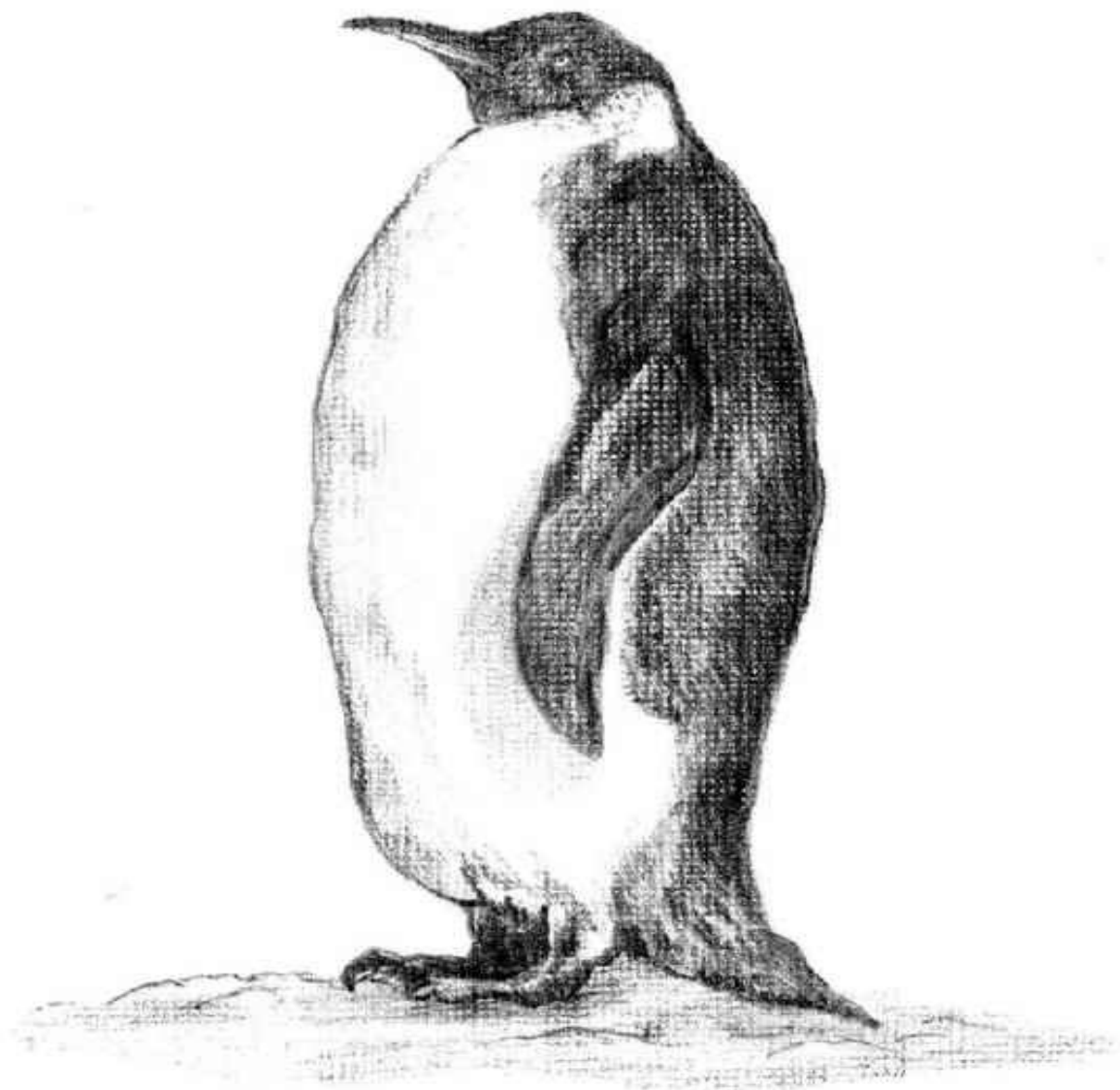


YOU CANNOT CHANGE THE WAY YOU ARE

(Determinism for Beginners)



Michael Greening

YOU CANNOT CHANGE THE WAY YOU ARE

Previously published as

FREE WILL – Life without it

Almost everyone believes they are in control of their own lives. Some of us, after a little contemplation, may be able to see that this cannot be so – yet we are unable to accept that truth.

As an explanation for this the book suggests that, although we have been told by a number of the most intelligent people who have ever lived that the concept of Free Will is only an illusion, our reason is clouded by superstition, culture and emotion, human characteristics that have evolved over many thousands of years and which are still evolving. The book also points out that those of us who are able to acknowledge this logic can find the reality liberating.

Michael Greening

‘Michael Greening’s *Free Will: Life without it* is a delightful read. It’s my favourite book on free will, I like its imaginative approach to this esoteric subject that’s likely to become much debated by pundits in the near future. Delving into Greening’s book just might change your life. And, since you don’t have any free will, you have nothing to lose.’

Cris Evatt – psychologist and writer living in California & Hawaii. Author of *The Myth of Free Will*

‘This good-natured book takes a common-sense approach to a complicated problem. Essentially it says “The world is deterministic: everyone’s actions are pre-ordained by the mechanical playing-out of the consequences of physical laws” Therefore the idea that people have free will is wrong. People do not live outside the ordinary laws of physics. Free Will is an illusion. Greening infers real-life implications from this analysis. Having thought little about the Free Will question until now, I found this a lively and engaging book.’

Richard Wrangham – Professor of Biological Anthropology at Harvard University. Leading authority on Apes and author of books on evolution

This book ‘is a clear and entertaining introduction to the idea of Determinism’.

Richard Osborne – Philosopher. Author of many books including worldwide bestseller *Philosophy for Beginners*

‘If you use terms like “determinism” then I think you have to review conventional thinking. If you leave these earlier landmarks behind, as I think you have in this work, then you are able to speak more creatively. That’s why I liked Per Bak’s sandpile with its random avalanches and your Emperor Penguin story.’

Michael Boulter – Professor of Paleobiology. Author of *EXTINCTION: Evolution & the end of Man and Darwin's Garden*

The book ‘demonstrates that relinquishing belief in free will can, for some people, be a positive experience rather than a negative one.’

Elaine Morgan – Feminist, playwright & author of many books including *The Aquatic Ape Hypothesis*

‘As an anthropologist, I was delighted to encounter this honest little book. It made me examine my own world view, and my assumptions, in a way I found both refreshing and enlightening. I can recommend it as an interesting read’

Simon Bearder – Primateologist. Professor of Anthropology at Oxford Brookes University

‘I didn’t agree with every word, but there is a core philosophy here which would provide a reasonable guide to a less stressed and more fulfilling life.’

Roger Woodley – Architectural historian. Author of *The Blue Guide for London*

‘Astonishingly, for a book subtitled *Determinism for Beginners*, there isn’t a dull page. I can warmly recommend *Free Will: Life without it* to anyone with an enquiring mind who would like to take a fresh look at the perennial argument between free will and determinism.

Richard Perceval Graves – Biographer of Robert Graves, A E Houseman, T E Lawrence, Richard Hughes & others

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Previously published as *FREE WILL – Life without it* in 2010

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Matador is an imprint of Troubador Publishing Ltd

Preface

Almost everyone believes they have Free Will; that is the ability to think what they like, say what they like, come to their own conclusions and act out their desires. This book will first of all attempt to explain why, after a few moments rational contemplation, most of us should be able to realise that what may seem so plainly obvious cannot be logically possible – that free will must be an illusion. Although a number of people, who are universally regarded as among the greatest intellects of the past four hundred years, recognised that they were not in control of their lives, I concede that most people will find this realisation impossible to accept. This is hardly surprising, as it is the way human consciousness has evolved.

Accepting that free will is a myth is usually called Determinism. For any reader who is new to this way of looking at life, I hope that what you are about to read will demonstrate that this outlook is not sad or pessimistic, but one that can be invigorating and liberating.

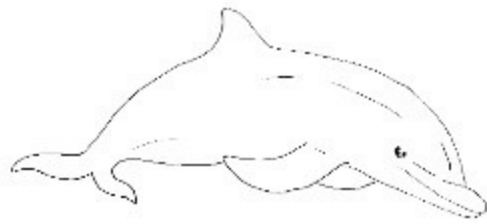
It was over two years ago, when I was writing *As It Is*, my first short book on this subject, that I came across the term Determinist and realised that I had been one for the best part of forty years. That book was written (or as I then discovered – determined) with a number of intentions, some of which are still not clear to me. The main ones – that were in my mind then and still remain – were that it was a personal endeavour to clarify the way in which I viewed my own existence. This was coupled with a fishing expedition, if I could persuade a number of ‘likely’ people to read it, to find others who held a similar conception of reality to my own.

As I am not a scientist, or an academic of any sort with a title or letters after my name, the chance of it being read by any person to whom I had sent a copy were fairly slim. By chance, as everything is, a number of people did read the book. The response, if not in bucket loads, has been encouraging. Although I suspected that there were other determinists out there, I had never met or corresponded with one. That has changed, so I am no longer alone.

Of the six and three-quarter billion people on Earth today, I would guess that determinists make up only a tiny percentage of a single per-cent. I’m sure that all of them would dismiss the word ‘belief’, but hold that our conviction about free will is the only one that answers the first question of simple logic. The reason for this little book (it is not much longer than the first), if books need to have a reason, is to explore a little more deeply some of the concepts that appeared in that first reflection. It is an attempt to explain ideas in my consciousness, that I may not have been able to express without the confidence that writing that book gave me.

I regard all people who think seriously about their lives as philosophers, especially those who like to talk or write about it. I therefore regard myself as one, although perhaps a ‘naïf’ thinker – as I have never received any instruction in this subject, and know little of the lives and writings of those with greater insights than my own. One advantage of this may be that, as I don’t understand most philosophical jargon, there is none in this book. I hope it may be helpful to others who, like myself, live outside academic circles but still want a simple answer to the

question '*What am I doing here?*'.



1

The first question

Human consciousness is a subject that is difficult to define. We all think we know what it is, yet we have only ever had the one personal example to study, so much of our understanding can only be supposition. We will never know, for certain, why some abstract ideas join up in our minds to arrive at what we consider to be logical conclusions – while the same ideas do not link together in the same way for others. But, if we are able to think, or even if we consider the process of thought to be determined, we are philosophers and the first and most important question we must ask ourselves is this; am I able to make an original choice leading to an original action? Do I have Free Will?

If the answer is yes, we share this belief with the vast majority of people living on Earth today and an even greater proportion of all of those who went before us. We are then able to consider, and perhaps discuss with others, a range of questions concerning morality and ethics. How should we treat other humans, especially those who do not belong to the same family, tribe or nation as ourselves? Does an unborn child have citizens' rights? Is war ever justified? Should euthanasia be legitimised? What principles should govern our relationship with non-human animals – those that live 'in the wild', our pets and also those we breed or which are bred for us to kill and eat? Do we have responsibilities to the government of the country or state into which we were (by chance) born and, if so, is it ever acceptable to break the laws of that land – including not paying any taxes or dues that are demanded from us? If we have answered yes, these questions and thousands of others may be turned over in our minds.

If, however, we have reached the conviction that Self Determination is only apparent – that there can be no such phenomenon as Free Will – all these supplementary questions become irrelevant and there is little point in considering them. The numbers of people who have found this a logical way of looking at life are a fairly small minority and, as I am one of them, I am writing this to try and illuminate the consequences of that answer. As with all controversies, there may be some who give a third reply; 'I'm not sure' or 'I don't know'. These reflections are also for them.

Those of us who feel certain that ‘No’ is the answer to the Free Will question may sometimes wonder why most other people seem unable to share that conclusion. It seems to me that the likely reason for this is that the idea that we are in control is part of our survival instinct. This goes back far into our evolutionary past. It would appear likely that all animals with brains ‘think’ they make decisions, even if what they are doing is an automatic reflex.

We are unable to enter the thought processes of other people and can therefore only assume that they are similar to our own. We are far less able to enter the thoughts – if we can describe them as that – of other animals. If I play with my little dog Blossom and throw her a ball, she almost always runs after it. Her eyes and nose have told her that it is not a rabbit, is she compelled to run after it or does her little brain register ‘this is fun, I’ll run after that ball’? Occasionally she will not chase it. She has either become tired or bored (especially if the ball has no in-built squeak). Does Blossom think ‘I’m fed up with this, I’ll sit down on the lawn instead’ before she does it? Of course, the complex consciousness we humans possess is unique. That is unique on Earth but who can say about unique in our galaxy – never mind the universe?

It is possible that some other animals have a consciousness approaching ours. Overall brain size is not the only indicator of intelligence but, as it is the easiest one to measure, scientists have designed a formula to work out the ‘EQ’ (encephalization quotient) of different species and plotted them on a graph. In plainer English, this is known as the ‘brain-to-body mass ratio’, which is the ratio of the brain size to the average body size – of the particular animal – after a number of adjustments have been made for certain compensatory physical factors. For example, some animal individuals – especially humans (and pet dogs!) – differ widely in height and weight, so the word ‘average’ is important. Also, many animals, including humans, exhibit sexual dimorphism. Men are not only larger and physically stronger than women but, among many other differences, they have slightly larger brains. However if the EQ of each sex is calculated to include the smaller size and the higher percentage of sub-cutaneous fat to be found in the female body, men and women come out at the same place on the graph. This is confirmed by IQ tests, which show that – on average – women and men are of equal intelligence.

The nearest animals below us, on the graph, and higher than Bonobos, Chimpanzees and the other great apes, are Dolphins. I appreciate that there are around forty separate dolphin species (ranging from some that are about four foot long to the mighty thirty foot Orca – or Killer Whale). Many of these species will have, as yet, been little studied, but those that have, especially the Common Bottlenose Dolphin, have been found to measure a high EQ. (Note: the largest brain on Earth now, and probably ever, is that of a Sperm Whale – the largest toothed whale. This doesn’t make them the most intelligent mammals, although Moby Dick was fairly bright).

In my last book I suggested that human consciousness and brain size were triggered and ‘created’

by the chance evolution of language. If Dolphins don't prove this they may add a footnote. I am not an ethologist, but I understand that those who have made a lifetime study of these creatures consider that they have an audio communication system that is much more complex than that of any other non-human animal. Many of the sounds they make can only be recorded with scientific equipment, being far outside the spectrum that can be picked up by human ears. I have also read that they seem to be more polite than some of us as they take it in turns to 'speak'. They don't interrupt or 'talk-over' each other! Like ourselves, Dolphins have also been the subject of recent and comparatively rapid evolution. Have they, by chance, also evolved language? As they live in the sea, further communication evolution is constrained. They will never write books but they may be able to pass on oral information from one generation to the next.

Another – possibly slightly less 'scientific' – experiment to show intelligence, consciousness or at least self-awareness is known as the 'mirror test'. This is where an animal looks into a mirror and, by satisfying other criteria, the examiner can be convinced that the subject recognises itself. This test has been passed by Bottlenose Dolphins, Orcas, Elephants, all four of the Great Apes (and possibly Baboons) plus – rather strangely – European Magpies. Of course, most animals have not been tested, but those that have passed are all high on the EQ graph. Human children below the age of eighteen months fail the test, as do cats and dogs. Here, however – especially with dogs – it is felt that the test is unfair as sight is the least of that animal's three main senses, hearing and especially scent being its main ones. The Bottlenose and Orcas inclusion is particularly surprising as, unlike land creatures, they have never seen themselves in a good natural mirror like a shallow moonlit pond! Possibly they may be able to recognise themselves in a wave, when they come to the surface to breathe?

You may wonder what this information about the level of intelligence of some animals – and of their possible limited consciousness – has to do with Free Will and our lack of it (or otherwise). Let us for a few moments take a flight in our imagination.

If there was such a thing as Mr Wells' time machine (or Dr Who's) and we could programme it to travel back five hundred thousand years, with its fine-tuning device set to find our direct ancestors, we would probably end up by some lakeside or seashore in the region we now know as East Africa.

In evolutionary terms half a million years is not so very long ago and, to get a better idea of how long, we must put this passage of time into context. Counting backwards, our very first primate ancestors had started to arrive about eighty-five million years before now, their placental mammal forbears around forty million before then and the earliest four legged amphibians – the Tetrapods – in the region of one hundred and sixty-five million years further back still (a total of 390 million from now). The first vertebrates, from whom these land invaders had evolved, were bony fish. These, still making up the majority of all species with backbones, were swimming around five hundred and twenty five million years before today. Skipping all the stages that

brought evolution that far, our oldest fossil records show that certain types of bacteria have been on Earth for three thousand five hundred million years. Although there is no proof, as no evidence has as yet been discovered, or is ever likely to be, some scientists suggest that bacteria took over one billion years to evolve from the original living organism. This start of 'Life' is currently estimated to have occurred as long ago as 4.4 billion years before now, which was only one hundred and fifty million years after our planet was formed and two hundred million after our star – the Sun – materialised in the Milky Way Galaxy.

Our knowledge of the hominid family group, that the time machine has discovered foraging near the water's edge – and who were the ancestors of every human living on Earth today, might be thought to be extremely sketchy. The number of fossil finds from that period is very limited as it is for most periods in our pre-history. However with the information gained from the totality of finds, dating from much earlier eras and from later ones right up to the emergence of our Middle Paleolithic forebears, coupled with quite a lot of intuitive but sensible reasoning – some of it gained from the archaic hunter-gatherer peoples that are still with us now – we are able to build up probable pictures in our minds. We are able to envisage what these proto-humans were like and have some idea of how their lives were lived. In addition to the small number of fossilised hominid bones and teeth, we have found a wealth of their stone tools, some other artifacts, traces of their habitations, of fires and of the fossilised remnants of a selection of the food they consumed.

Although modern man – Homo Sapiens – did not evolve on the world stage until three hundred thousand years later, these early stone age people would not have been so very different from us in a surprising number of ways. They may have had slightly larger mouths and teeth than we do, and would have had much more powerful hands, arms and legs but, like us, they had little body hair except on their heads and with their large hooded noses we would have recognised them as of our own kind. Scientists have given them a separate species designation, Homo Erectus, but they were no less than early editions of ourselves.

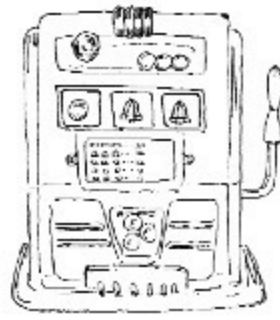
They were skilled makers of tools and hunting weapons from stone, certainly also from wood and bone although these have long since perished. They enjoyed an expansive omnivorous diet, in which hunting and fishing (with their hands and spears) played major roles. They had been the peak predators for about a million years since they had discovered how to control fire and now, as they had also learnt how to make it, they had little to fear from other animals. They were as tall as an average member of our taller nations today, a height which we have only recently regained, following thousands of years during which we became smaller (although more complex than this, the simple explanation must be that following the arrival of warmer weather and the beginnings of agriculture, life became a little easier for the early farmers. More children were born, including weaker and smaller ones who were now able to survive and produce offspring of their own. With hunter-gatherers, only the strong and tall outlived childhood and reached puberty). Their ancestors had been walking upright for four million years or more, allowing them free use of their front limbs and hands. However, the main difference between

them and their ape distant cousins, which they had left far behind (current opinion suggests that our last common ancestor with that of Bonobos and Chimpanzees lived little more than five million years ago), was that they could utter words. Although this will not yet have matured into free flowing language, they had already acquired a sophisticated method of communicating with each other.

Supplementing speech and the dexterity that bi-pedalism had given them, their use of fire gave these early stone-age people an enormous pre-eminence over all other animals. Before they had become hunters they had been scavengers and it seems likely that they had first used fire to drive off other carnivores from their kills. Fire had brought them additional advantages in their cultural pre-history. They were able to see in the dark, so tasks like toolmaking could be carried on at night as well as in the day. Much more important, gathering around fires had helped them to bond as family groups, create an interval when they could teach skills to their young, improve their speech and keep themselves warm in times of poor weather (clothing was still more than three hundred and fifty thousand years in the future). The sight of fires will have also shown them where there were families or other groups of their own kind when they needed to acquire new mates, as it seems likely that their sense of smell had already diminished. The advent of cooking – the forerunner of today's family Sunday lunch, the business breakfast and the romantic dinner for two – also happened around this period in our evolutionary history. Although speech was by far the premier by-product of our biological evolution, the control of fire – which led to eating cooked food – were certainly most important milestones in early homo's cultural advancement. Cooking was also responsible for physical changes: smaller teeth, smaller mouths, reductions in stomach and intestine dimensions followed through Natural Selection. The nutritional benefits arising from the better digestion of meat and other foods undoubtedly helped power our ancestor's brain expansion, as well as being a major influence in our cultural divergence from other apes. Eating took up far less time, allowing new pursuits which required more brain usage. Heat processed food probably also triggered the division of labour between the sexes that we still witness in hunter-gatherer societies today. Males do most of the hunting, the females the gathering and the cooking. This, in turn, would have led to cooperation between individuals and organised food sharing – unique to our species.

Richard Wrangham in his 2009 book *Catching Fire – how cooking made us human*, suggests that cooking more likely started 1.8 million years ago and was the major propagator of our large brains. He may well be correct in the date. Although evidence of 'hearths' start only about five hundred thousand years before now, it is hardly surprising that there would be no proof today of smaller temporary cooking fires in use before then. It is true that from the start of the Old Stone Age with the arrival of *Homo erectus*, teeth were already smaller than those of the proto-humans that preceded them. However, if fish made up a substantial portion of our ancestors' diet, that could be another reason. Almost certainly, prior to the cooking era, our distant forebears would have tenderized meat and a variety of other foods that required lengthy chewing by pounding it with stone hammers. Professor Wrangham does not mention fish or the aquatic hypothesis in his book. A later chapter explains this possibility.

Let us now return in our imaginary time machine and go back to the first question about free will. If we had been able to work out the brain-to-body mass ratio of some of the members of this stone-age group, we would hardly be surprised to find that they come out lower on the graph than we do. They would probably be placed on a line a little higher than that of the dolphins. It seems unlikely that dolphins are able to make choices, or my dog Blossom. Did the first self-replicating molecules have free will, or the first bacteria, or the first plant, or the first fungi? Perhaps self-determination started with the first independently moving animal or perhaps the first fish with a backbone and a brain, or the first amphibian that came out of the sea, or the first cold-blooded reptile, or the first warm-blooded mammal? Did the first primate have free will, or the first ape, or were our stone-age ancestors the first to have it? I think it unlikely – there is no way they could have inherited it or acquired it. As with all living things, our lives can only be the product of what we are ourselves and the chance circumstances outside ourselves. We are unable individually to determine our future or, indeed, any thought we have or action we make.



2

Chance

In my first chapter, I use the word ‘chance’ – and it is sure to crop up many times in the rest of this book. Random is an associated word, an adjective used to describe an event that appears to be unscheduled in any way. The scientific qualifier stochastic has the same meaning. How can there be such a thing as chance if everything is determined?

The answer here is that ultimately there would appear to be no such thing, certainly at the atomic level and above. Yet failing to have any other way to describe what has happened, it is simpler to use the word for any event when the causes are so multifarious and so complex that, were we able to start thinking about them – never mind listing them – we would not know where to start. A few occurrences in our lives or in the world around us may have a small number of major causes, or even a single one, but even then they are adjusted by many other factors. Most things that effect every moment of our existence happen by such a vast combination of circumstance that, although every individual element is determined, we can only say the whole is chance. We have no other word.

One of the more elementary gambling games, with its uncomplicated ‘random’ apparatus, came into use in Britain after the passing of the *1960 Betting and Gaming Act*. This was the parliamentary law, which permitted the opening of properly inspected and licensed casinos and cash bingo halls and the introduction of gaming machines into private clubs. The prime requirement for these establishments, where these forms of gambling could take place, was that they were for members only and were not open to the general public. Later amending legislation laid down that membership had to be applied for a least 48 hours before club facilities could be used. This was to protect the public from joining and gambling on impulse.

Although this was not originally intended by those who drafted it, the 1960 law also allowed modified versions of the ‘fruit machines’ to appear in public places – like public houses, cafes, fish and chip shops and hotels. This was providing that the player could only win goods rather

than money, and that permission had been obtained from the local administrative authority. This, less socially serious type of gambling, was termed AWP (Amusement with Prizes). Subsequent acts of parliament have changed or restricted this activity in many ways and – of course – taxed it.

The first gaming machines, usually known as ‘one-armed bandits’, were entirely mechanical and ingeniously designed so that the player, pulling the handle or ‘arm’, had some input into how far and how fast the reels spun. There were usually three reels, each with twenty simple symbols (often depicting ‘fruits’) so that winning the jackpot – if there was only one representation for this on each reel – became an 8,000 to one chance for the gambler. Although there was a British manufacturer, most of the early 1960 machines in the UK came from America, until supplanted by the products of two companies in Australia. Before the 1970s, to enable more interesting and complicated games to evolve, the machines, most of them by then made in Britain, had become electro-mechanical. This resulted in the player taking no part whatsoever in the functioning of the device, except for completing an electric circuit by pressing a bar or button. Today all fruit machines are computerised.

In the same way as AWP machines being allowed in places open to the general public, the game of Bingo was permitted in amusement arcades, as long as the prizes were not in cash. ‘Prize Bingo’ stalls can still be found at most of Britain’s seaside resorts, and some of them still retain the original machine used for selecting the sequence of numbers needed to play the game. This is known as a ‘Bingo Blower’ and it must be one of the simplest ‘chance’ contraptions ever designed.

The blower consists of a square box with clear perspex front and sides, so that all the players can see for themselves that everything is above board, filled with 75 (or 90) numbered ping-pong balls. There is a short plastic tube in the roof of the box to allow the balls to exit one by one, with a small wire hoop to catch them as they do so. The top of the box supports a display tray, where the game manager can house the balls in their corresponding holes as the game proceeds. When the machine is turned off, gravity ensures the balls lie in the random order in which they have fallen on the floor of the box. When switched on, the blow motor at the bottom of the machine sends the balls into the air and swirls them around for a second or so until the first one – quite by chance – is forced through the exit.

The game of Bingo most likely goes back a couple of hundred years and is so well known that I will not bother to explain it. There are very many variations, including a plethora now played online, but most of us will be aware of its basic structure. It was very popular as a voyage time filler and as a charity fund-raising activity in the earlier part of the last century, when it was usually called Housey Housey. At that time, prior to the simple machine I have attempted to describe, the numbers were usually drawn out of a dark cloth bag. This method of random selection was hardly transparent and could lead to manipulation, so the Bingo Blower was a

welcome advance. Today we have gone backwards again. Instead of ping-pong balls being blown around by an inverted vacuum cleaner, most of the cash bingo halls and some of the little seaside stalls now use an electronic 'Random Number Generator'. The public have a lot of trust in technology. In the UK National Lottery draw, a rather more sophisticated 'ball' machine is used which is itself 'drawn' out of a pool of eleven similar ones. The Premium Bond winning numbers come via the generator route from a device called ERNIE, short for Electronic Random Number Indicator Equipment.

Although the sequence in which numbered bingo balls come out of a blower is deemed to be completely random – it is not too difficult for us to appreciate that the path of each ball, forced into the air by the blow motor, must be entirely determined. We can see this in action, when we look through the perspex and watch it happening. We may also be able to comprehend that, not completely outside the realm of practicability, it might be possible for the ball exit sequence to be predicted by an intricate computer programme. If all the relevant facts could be ascertained and coded, including the dimensions of the box, the position of the air outlet and the exit tube and – perhaps from a tiny micro-chip on each one – the location of each numbered ping-pong ball in its inert position before the machine was switched on. With this information, showing all the possibilities that could determine the outcome, our computer should come up with the number of the ball that would reach the exit first.

Although slightly more complicated, a prediction might even be realisable with a mechanical one-armed bandit. If, after a measured short sharp pull of the handle, we knew the tautness of the spring that starts the reels spinning, the position of each of the sixty symbols at the end of the previous game and the tension on the simple braking mechanism that stops each of the three free rotations in turn, a computer might be able to tell us when the jackpot emblems are to line up together on the pay-out line. This is providing an unscrupulous owner of the machine had not fixed a washer on the corresponding slotted pay-out disc, so that the brake would 'ride-over' onto the symbol above the winning one!

With roulette, where the 'ball' is spun in the opposite direction to that of the wheel, this human element would certainly make any prediction incalculable. Likewise, any number that an electronic RNG (random number generator) displayed would need an impossibly complex programme to predict the digits a much simpler computer had come up with. I hope that my examples of these well known gambling activities show that, although all random results must be determined, when the contributing influences are so tortuously labyrinthine – as they almost always are – we can only use the word chance. Yet, as I hope I can illustrate, these familiar betting games are far far more predictable than your life or mine.

Although we may differ on the degree, most of us will accept that our life's course is fixed at the moment – and by the chance – of our conception. After all, it is at that moment when we, as individuals, come into being. Almost all the really important factors of our existence, our sex, our race and colour, our level of intelligence, our looks, our physical strength or weakness, are

set in flesh and blood if not in stone at that instant. Thousands of other elements of our make-up, some of which might seem secondary but turn out to be more important than anything else, are also determined by the genetic mix from our two parents. Perhaps we have red hair, or maybe a predisposition to a certain illness which will control everything we do. Perhaps, when we have grown to an adult male, we are scheduled to have a high testosterone level, which might be a blessing or more likely a curse. Or, when we become an adult woman, we turn out to be short and fat – or very tall with large feet. Perhaps we will have poor eyesight, be deaf, be artistic, have an aptitude for foreign languages, be in possession of a unique musical ability. The list is endless, but everything is the result of the chance fertilisation of one particular egg.

Everything we are comes from this chance distribution of the genes that made us by the random raffle of who our parents are and how they came together. They may have been a couple for years prior to our conception, met twenty minutes before or never – if we started life in a laboratory. As children growing up they may have lived next door to each other or, more likely, their meeting was completely accidental. I like to term this chance occurrence as the ‘missing the bus by two minutes’ syndrome. However, our lives did not start there with the perfect randomness of our parents’ conjunction. Both of them were also the product of life’s lottery, as were their parents, their parents’ parents and all their long line of ancestors – right back to the start of our species.

If we go back just five generations, we find we have thirty-two separate great, great, great grandparents (although sometimes two or more of these may be the same person). Depending on how old we are, they are likely to have been living in the middle or early part of the nineteenth century. All of them would have fascinating stories to tell, including how they survived childhood at a time when many children died. If we go back to the eighteenth century our direct antecedents number over one thousand and by the sixteenth century this rises to over a million. Of course, at this far removed and long before then, our family trees will have started to look extremely incestuous. Many of the people in them, with all their individual lines preceding them, will be making multiple appearances on our ancestral charts. Yet there will always be some new branches where strangers are arriving.

Most people, like myself, with an English surname and looking as if we might be descended from Anglo Saxons, probably are. But we also carry the genes from dozens and dozens of other ethnic groups. Within the last thousand years our family trees are likely to include all types and conditions of men and women. There will certainly be agricultural labourers and serfs, but there will also be princes and parsons as well as paupers. There is likely to be a maid servant seduced by her employer (and her employer), a serious criminal and a religious refugee, probably a Spanish lady, an African slave, a Flemish weaver, a Chinese sailor, a German mercenary, a royal courtesan and certainly a number who – after their children were born – died of the Bubonic Plague. We know that if we go back far enough we are related to everyone else on Earth. We are also related, much more recently, to a high proportion of other people that we have just passed in the street throughout our lives.

The random combinations that were served up by the bingo blower, the fruit machine and the roulette wheel seem practically certainties when compared with the infinite collection of chances that resulted in us. All these throws of the dice happened before and at the moment of our conception, preceding the next cycle of chance that led up to our birth. At this juncture, as you may now realise, much of the course of our lives has already been mapped out. We are now subject to the haphazard circumstances of events and influences external to us, all again completely outside our control, until the moment our lives come to an end.

At the start of my second paragraph in this chapter, I qualified the ‘common sense’ proposition that every effect or result must have a cause or – more usually – a multiplicity of causes. My proviso was the phrase ‘at the atomic level and above’. Below the atomic level, in the world of particle physics, it might not seem to be so. At first glance this minute universe within a universe looks to be partly stochastic. Quantum theory is difficult to comprehend by laymen like myself, but the behaviour of electrons, for example, that seem to appear, disappear and ‘jump’ from one location to another (by quantum leaps), looks somewhat random.

Electrons are the tiniest ‘elementary’ particles of which we are aware (together with their anti-matter counterparts Positrons). As they have no known substructure, they are regarded as ‘point’ particles with zero dimensions. They only make up a fraction of one per-cent of an Atom, of which the main component is the nucleus, composed of Protons and Neutrons. Each of these particles has approximately two thousand times the mass of an electron and they vary in numerical combinations according to the chemical element and the isotope of that element. Protons and neutrons are not elementary particles as they are made up of smaller constituents called Quarks. These come in a number of changeable manifestations, which are colourfully known as ‘flavours’, and, although much larger, are thought to be elementary particles like the electrons.

It is difficult for us to comprehend how small an electron is. They are far far too minuscule to be seen through an electron microscope and a hundred, billion, billion, trillion of them would not quite tip a gram weight on the scales. If we can mentally enlarge the nucleus of an atom to the size of a cherry, the atom’s diameter would be about two miles. Electrons, going round the nucleus at speeds similar to that of light, would then be as large as tiny grains of sand. Scientists who study this Quantum world tell us that, like everything else, electrons follow natural laws. They orbit the nuclei of atoms at different distances, according to the amount of energy they possess and their ‘leap’ from one altitude to another is caused by the addition or reduction of that energy. Of course this whole area of study is exceptionally complex and, although much has been discovered, far more remains to be explained.

The human mind cannot contemplate results without causes or – indeed – something from nothing. However, unlike the ancients, we now know a great deal about the reasons for why

things are as they are. For the questions where we have yet to find answers, like the origin of biological life and the 'cause' of the Big Bang with its commencement of 'our' time, a number of hypotheses have been proposed. To accommodate what has been observed with what we know, and keep us in our world of logic and rationality, there may be only one way to square this particular circle. This could be that we, and all matter, exist in a universe of more dimensions than the three plus 'our' time with which we are familiar. Possibly there are other parallel, perhaps super-imposed, dimensions – both of space and time – to explain some of these unknowns and also show them to be deterministic.

Your mind will have already considered this way of looking at life – or it may not. The coin dropping cognisance arrived for me some time ago and it may or may not for you. If your brain does not come to the same conclusions as mine that is also determined. It is a part of your individual heritage and a product of your own kaleidoscope of occurrences, pressures and persuasions that have made up your journey thus far. For me the knowledge that everything, from the movement of galaxies in the universe to that of an electron in a single atom, is both chance and determined convinces me that nothing can be changed. If this is correct, Human free will can only be an illusion.



3

Numbers

Before we think about time and space, as there is still some confusion among people who were at school in Britain over thirty-five years ago (or who read British books published before then), it would be sensible to clarify a couple of numerical terms – Billion and Trillion. Before December 1974 there would have been no Pound or Dollar billionaires in the world according to the usage of that word on this side of the Atlantic, which at that time meant a million million. As larger numbers were getting a bigger airing, in areas other than cosmology, the then British Prime Minister, Harold Wilson, demoted the term shortly before Christmas that year for use in government statistics to mean a thousand million. This brought the UK in line with the US, which had used that denotation for billion from the early 19th century. Likewise a trillion (a word little used except by people discussing the Universe – but which now crops up in financial circles following the Credit Crunch) now means a thousand billion. To simplify, a thousand has three noughts, a million six, a billion nine and a trillion (which in Britain previously had 18 noughts) has twelve.

Those who have worked it out tell us that ‘our’ time started nearly fourteen billion years ago – thirteen and three quarters to be a little more accurate. This is the time from the beginning (I’ll avoid the word creation) of the Universe in which we exist. The question about what happened before then is pointless, as it can never be answered. Perhaps there were previous times, previous Big Bangs and previous Universes – expanding and then contracting for ‘ever’. There might also be unlimited numbers of other Universes, a Multiverse, who can say? It may be better to avoid too much mental activity here as no conclusions are likely to be reached in present generations. However, our minds will decide what they want to do. To make matters more complex, as Albert Einstein pointed out, Space is curved so the Universe is both expanding and contracting at the same time – and time itself is only relative to the point from which it is observed and measured.

Our galaxy, usually known as the Milky Way, is the smaller sister in a binary system with the Andromeda Galaxy, which – with a gathering of lesser galaxies – makes up ‘The Local Group’,

in turn a part of the Virgo Super Cluster. Yet that is only our small corner of the Universe. The Milky Way has an estimated 400 million stars*, Andromeda perhaps a billion. Our little Solar System centre, a yellow dwarf fourth magnitude star, is on one of the spurs of one of the Milky Way's spiral arms. Being only about 25,000 light years away from the galactic hub (fairly close in) it orbits that midpoint once every 250 million years. Although we are unable to see it, it is postulated that the hub of the Milky Way – and that of most if not all other galaxies – consists of an extremely large or 'Supermassive' Black Hole.

Although, unlike our planet, the Sun is not solid and so its boundaries are not definite, its mass accounts for about ninety-nine percent of the Solar System. Almost all of the remaining one percent is made up of the giant gas planets like Jupiter and Saturn. Our Earth, the third planet from the Sun, makes up only a tiny fraction of a percent of what is left – although it is the largest of the system's solid planets. The Solar System was a late arrival in the Milky Way. It is estimated to be about 4,600 million years old with the Earth forming about 60 million years after the Sun's entrance.

In comparison with the rest of the Universe what a strange – and many say unique – place the Earth is. About four or more (in May 2009 some scientists now estimate 4.4) billion years ago an as yet unknown chemical reaction produced a self-replicating molecule and life in its most primitive form followed. Yet this must also be considered in context. Is the Earth unique? As the 'observable' part of the Universe is thought to contain around fifty sextillion stars (that is fifty billion trillion, or 5 with 22 noughts) in about eighty billion galaxies, there are likely to be quite a number of planets! Scientists who study these matters suggest that a planet with life must be very rare but with these numbers, how rare is rare?

The first planet outside the Solar System was only detected in late 1995 and in three and a half years from then (when I write this) that number has gone up to about three hundred and fifty. Most of those detected so far have been large, Jupiter-sized planets and in the orbit of 'nearby' stars. Maybe, as technology improves, Earth-sized planets going round their stars at a similar distance as we are from the Sun, with liquid water and a similar chemical make-up, may be discovered. Life, if it exists elsewhere, may of course be quite different from ours. Yet some scientists suggest that if life starts and survives, evolution – in the end – will always lead up to intelligent beings.

There have been many attempts made to estimate the number of people who have ever lived. That is a total figure for our species – so far, since *Homo sapiens* first appeared on Earth between 250,000 and 150,000 years ago. The sums proposed range from less than 30 billion to over 100 billion. Some calculations have been made by multiplying the likely number of generations by some unspecified average population figure which any mathematician, used to working out compound interest rates, will tell us is bound to give us the wrong answer. I would suggest that at a reasonable guess the number of humans who have drawn breath since 1800,

when there was about a billion of us – and our numbers explosion began – until today (2009) when there are six and three quarter billion, might be around twenty billion. If we multiply this by two, to take account of our long innings before 209 years ago, although completely arbitrary, we should have arrived at as good a solution as any other. For much of our sojourn here, until ten thousand years ago at least, we know that there were not very many of us. Indeed, there were so few of us that we are likely to have faced extinction on a collection of occasions.

Forty billion could be high but, if it seems a little low, shall we say that this does not include the very large number of children who died, or who were killed at birth or before they were a year old. This would probably adjust a higher estimate by between fifty and ninety per cent. I have inserted the word ‘killed’ as humans have always indulged in infanticide.

What is my interest in discovering how many of us there have ever been? It is simply to compare two unrelated statistics that may give us a better understanding of our place in the Universe. When I was quite a young boy, there was a period when I cycled to preparatory school with a friend who, years later, became a well known bishop. Sadly we never met in adult life and he died some years ago, so I was never able to ask him a question which I’ve had in my head for a long time. I’m certain that he would have given me an interesting answer to ‘why was God so generous?’

I would like to point out here that I am not in any way against religion (or indeed anti-anything). I am extremely aware that religion plays an important, sometimes central, role in very many peoples’ lives. I can also see that it not only enriches their existence and gives them a wide circle of friends, but probably makes them happier than they might otherwise be. However, I will leave my thoughts about religion until a later chapter, this one is about numbers, so it is a pity that I was never able to ask my old school friend my question.

Although, far from being a creationist, I would assume that the bishop believed that there was a supreme being who controlled the universe and that man, evolved if not created in God’s image, had a central place in it. If this was so, forgetting the Genesis fable of man having dominion over the stars, why was God so generous? Why is there, for every human who has ever lived until now (if there were forty billion of us), two galaxies each? Or, to make this sound even more ridiculous, one point two trillion stars each? If, like children choosing their team for a tug-of-war, we could pick our own stars – the person who won the toss and had first choice might, for sentimental reasons, plump for the sun. This friendly face would be a fairly measly selection and not much good on the rope. If we picked the largest *known* star for our anchor, we would end up with VY Coris Majoris which (although less dense) has a volume about a billion times greater than our little personal source of life. Its diameter being approximately nine times the distance between the Earth and the Sun. I should explain here why the word ‘*known*’ is in italics. In cosmic terms, VYCM is quite close at only 4,900 light years. This is because it lies in our own galaxy, the Milky Way. Stars in most of the other galaxies are so far away that we do not yet have

telescopes large enough to measure their dimensions. It seems therefore possible that there may be larger stars, probably much larger ones, in some of the other eighty billion galaxies.

This silly question just highlights our relationship with our known surroundings. Our world is but a grain of sand on the shore of some vast sea, with the sea just a raindrop in an enormous ocean. If planets and the stars and the galaxies and the clusters and the universe have no free will, we are hardly likely to have it.



4

Parallels

The Hollywood Foreign Press Association has run its main charity fund raising event, the Golden Globes Awards ceremony, for nearly seventy years and – since the very early 1960s – this annual celebrity occasion has taken place at the Beverly Hilton Hotel on Wilshire Boulevard, Beverly Hills. A little further down the same boulevard, in the centre of the Los Angeles’ financial district, is arguably the best site on Earth for the preservation of fossilised animals from the last 38 thousand years. This is the *La Brea Tar Pits* (Brea is Spanish for tar). The pits are now protected in Hancock Park, which is also the home of the Page Museum with its excellent display of some of the many fossilised skeletons that have been found. The ‘Tar Pits’ are really small ‘heavy oil’ or Asphalt lakes and attracted wildlife, as they would have held a shallow upper layer of rainwater. Some creatures would have come to drink, become stuck and gradually drowned. As they were submerging and dying, many of them attracted predators who suffered the same fate.

The fossils of most creatures that have been preserved, are as a consequence of the subject dying and being engulfed in sea, lake or riverside silt. The advantage, for palaeontologists, of fossils being preserved in bitumen is that they are usually more complete, far less squashed and sometimes even have attached vestiges of soft tissue (like fur). Their preservation in time is almost as good as that of tiny insects trapped in tree resin that has become amber. The small lakes off Wilshire Boulevard are not unique, but there are not many similar sites on Earth. They are the most well known and possibly the best excavated. There are three other ‘fossiliferous asphalt’ locations in California. Others are in Texas, Peru, Venezuela, Iran, Poland and Russia, with the largest bituminous lake in the world at La Brea on the island of Trinidad.

Of course, the Los Angeles’ tar pits only give us a very recent snapshot of the story of life in one particular part of the world. With their earliest entrapments being only 38 thousand years old, they tell us nothing of what happened before then. What they do help to illustrate, and the reason I am writing about them here, is one of biology’s most intriguing conundrums – convergent evolution.

The most numerous mammal remains that have been found in the pits are those of the Dire Wolf. Well over three and a half thousand individual skeletons, or parts of skeletons, of this extinct carnivore have so far been excavated and preserved. Like the slightly smaller Grey Wolf (or Timber Wolf), the Dire Wolf hunted their prey in packs. They must have found themselves in the same predicament as their dinner, as first their feet became fastened and then the rest of them became trapped in the asphalt. They were the apex hunters during the pits' most productive period, which must be the reason they outnumber all other mammal finds there.

The Dire Wolf became extinct in North America about ten thousand years ago. Although extremely similar in design to the Grey Wolf (which has many sub species), the Dires were about ten per-cent larger and – I'm sure – that much fiercer. It is thought that they may have died out because they were more heavily built and therefore slower than the Greys, and that they hunted larger and more ponderous animals like Mammoths and Mastodons. As their prey became scarcer – helped I'm sure by the arrival of man in this part of the world – and then extinct, so did they. They were unable to evolve rapidly enough to gain the ability to catch fleeter species. They apparently also had smaller brains than the Grey Wolf. Was this one of the reasons so many of them ended up in the tar?

The Grey Wolf, at one time probably the Northern Hemisphere's most successful and widespread mammal, evolved in Asia. There would have been a population of these animals in North America for more than a hundred thousand years prior to the 'Last Glacial Maximum'. However, it is now thought that they did not become widespread there until the most recent travel gap, which made it possible to cross the Bering land bridge. This was the period between the last Ice Age waning, allowing crossings from Asia to present day Alaska, but before sea levels had risen to divide the continents as they are today. The initial human migrants entered America at the same time, about 12 thousand years ago, although some researchers suggest a small population of people arrived from Beringia – the lost land between Siberia and Alaska – very much earlier.

What fascinates me about this is that the Dire Wolf had evolved in America quite separately about one million, eight hundred thousand years ago. Although almost identical, save for a small difference in size, Dires and Greys can hardly be said to be related. Going way back, possibly ten million years, they will have had the same progenitor, but they had evolved in two different and (at the time) unconnected continents. Meanwhile and even more fascinating, on the other side of the Pacific Ocean in the Southern Hemisphere, there was another wolf who's skull and skeleton also matches that of the Grey Wolf. This was the Thylacine (sadly also now extinct, although there have been unconfirmed sightings over the last 60 years). About eleven thousand years ago, when both the Dires and the Greys were roaming around America, this predator was hunting Kangaroos in Australia.

In the flesh, however, the down-under wolf was rather different from the ones in the New World.

It was a marsupial, with a rear opening pouch rather than a front facing one as on a kangaroo. This means that the common ancestor of all three very similar animals must have lived on Earth well over 125 million years ago. That was before the divide between the placental sub-order of mammals and the marsupial one had occurred.

A book that has been described as the most significant work on evolution, since Darwin first introduced us to the subject one hundred and fifty years ago, was published in 2003. It is titled *Life's Solution* and the author Simon Conway Morris is Professor of Evolutionary Palaeobiology at the University of Cambridge. In it, Professor Morris points out that life is littered with tens of thousands – if not millions – of examples of evolution coming up with the same or very similar ‘design’ solutions. This is not only in complete animals, plants and other life forms, but in their constituent parts, from cells to organs. He explains that in addition to natural selection continually modifying all manifestations of life, unconnected forms repeatedly seem to mirror those adaptations. This gives us questions like why has the camera-like eye of a vertebrate human evolved at least half a dozen times completely separately and ended up – for example – as the organ of vision for an invertebrate octopus, whose most recent common ancestor with ourselves was probably some type of blind worm?

It might initially appear from this that there could be a universal blueprint for evolution. This possibility has let some scientists (and others), who accept the rationality of natural selection but still hanker for religion, to conclude that there must be a supernatural explanation. In other words, some supreme organiser – if not a personal religious deity perhaps some vague universal omnipresence that Einstein might refer to as Spinoza’s god – has laid down some ground rules.

As a determinist, I would suggest that the explanation is much simpler. Evolution by natural selection does have constraints or parameters, but these are between what works and what does not work. Solutions that don’t work are discarded or become extinct before or after they emerge. What works survives – as long as it can compete in the environment in which it finds itself. There are, for instance, a limited number of ways in which eyes can work. It may not be so surprising that the same solution occurs in unconnected situations.

If we return to the Californian ‘treacle pots’ and the Page Museum, we can look at the remains of a number of other parallel evolution mammals. These are American editions of modern animals that we might find when on safari in Africa, but are not related to them. They include American Cheetahs, American Cave Lions (25% larger than today’s variety) and Camelops (American camels). Over two thousand Smilodons (or Sabre-toothed Tigers) were found in the pits, but these are not related to Indian Tigers. There are also the skeletons of American Mastodons, Imperial Mammoths (16 feet high at the shoulder), Scimitar Cats (the size of lions) and Short Faced Bears (the largest land carnivore of the last 800,000 years which were nearly twelve feet tall when they stood upright). All of these animals became extinct at the same time as the Dire Wolves, or a little earlier. The remains of only one human has been found in the tar pits. This

was a young woman who lived about eight thousand years ago. Was she the victim of a sacrificial murder, did she commit suicide or perhaps she accidentally became trapped while trying to rescue her pet wolf cub? We shall never know.

Some wolves (the Greys rather than the Dires) must have been adopted by human hunter-gatherers possibly hundreds of thousands of years ago. It is thought that they did not have their natural selection speeded up by selective breeding until the arrival of Cro-Magnon man, perhaps 35 thousand years before now. One of them – again by chance – is sitting at my feet as I write this. She has a soft woolly coat and looks more like a small sheep than a wolf. This is Blossom, the little dog I mentioned in chapter one. To bring the debate back to ourselves, as I will endeavour to explain in another chapter, there was almost certainly more than one species of bipedal ape. Our ancestors, like the wolves, were just one parallel species that survived while other similar ones became extinct.



5

Four Legs to Two

We do not know when the first wooden furniture was made. This was likely to have been between seven and ten thousand years ago, when our ancestors, living in the Middle East, Anatolia, the Indus river valley of what is now Pakistan and the Yangtze, Yi-Luo and Yellow river regions of central China, began to congregate together in the earliest settlements that led to the original embryo civilisations. All wooden artifacts from that period have long since rotted away. One thing seems certain, however: from the time when our forebears progressed to sitting on objects a little more sophisticated than rocks and fallen timber, the first stools and chairs would have had four legs. This would also be true for the tables and beds that followed them, a design that has remained right up until today. The earliest examples still in existence are those that have been found in tombs, especially of Egyptians, and these date from a number of millennia later.

The reason for this is more than obvious. The most sensible way to support a horizontal object, especially if it is square or oblong, is to have a prop under each of its four corners. Nature would appear to have taken this course over 365 million years earlier, when our Tetropod antecedents emerged from the sea. This arrangement, for vertebrates only, evolved within the parameters of what would work and what would not, giving them four limbs (originally four legs) for support and locomotion on land. Although natural selection has not, in most instances, improved on this original chair or table design, what would work for the larger terrestrial animals is not the explanation for its arrival in the first place. Evolution does not work that way. It cannot come up with a design to suit a situation, it can only modify what has gone before. The reason my little pet dog has four legs is because her very distant ancestor, swimming in the sea, was a bony lung fish with four fins. The fish already had the skeletal design for that number of limbs when some of its descendants moved, by chance, to a solid ground habitation.

Again, for reasons of chance inheritance, none of the invertebrate land animals are quadrupeds. Instead they have a wide selection of limb numbers, both for support and movement. All 'adult'

insects – by far the largest class of all creatures including ants, bees, beetles, butterflies, cockroaches, fleas and flies – have three pairs of legs. Spiders and their ilk have four pairs whereas woodlice, one of the land-living varieties of the mainly aquatic crustaceans, have fourteen limbs. Centipedes have a pair for each body segment, which may be 15 or more (always an odd number). Their distant relatives, the Millipedes, have a double pair of legs for each segment – so a millipede with twenty-seven segments would have one hundred and eight legs.

It is interesting to note here (as mentioned in my book *As It Is*) that the oldest land animal fossil discovered to date (2009) is that of a tiny, 1 cm long millipede that lived on Earth 428 million years ago. This was found near Aberdeen in Scotland in 2004 by Mike Newman, who is an amateur palaeontologist and has a day job driving a bus. The species has been named *Pnumodesmus newmani*, entering Mike's name into the literature of science.

These land invertebrates, all with more than four legs, are (and were) almost invariably small creatures with little body weight. In addition, quite a number of them have wings. Land vertebrates, on the other hand – from amphibians to mammals are usually much larger and heavier, so in most cases the four-limb rule does appear to be more appropriate.

Today, well over a third of a billion years after the first terrestrial vertebrates established themselves, many of them still walk on four legs. Others, however, have let natural selection change them considerably. There are some who have entirely lost their limbs. These include reptiles like snakes and legless lizards, such as the Slow-worm, also snake-like amphibians called Caecilians. These creatures have evolved methods of locomotion which embrace lateral undulation, side-winding and concertina propulsion – terms which more or less explain themselves. The fossil record informs us that there were once snakes with hind legs and there are still a few species, for example Pythons, that have small claws or 'spurs' at their rear end, which are obviously the remnants of these limbs. Although the morphogenesis of snakes from reptiles with legs is not completely understood, it is likely that it did include a 'return to the water' period. Many varieties are strong swimmers and some (sea snakes) live entirely back in that element, whilst others are semi-aquatic.

Other vertebrates, including a number of mammals, also returned to the sea and still remain there. Whales and dolphins, about fifty million years ago, when natural selection changed their four legs back into fins again with their rear-end ones diminishing or vanishing completely. They are said to have common ancestry with the Hippopotamus. With an origin going back sixty million years, Manatees have been swimming a little longer. They are shown on the same branch of the tree of life as Elephants, who love water, are very good swimmers and who almost certainly enjoyed an aquatic interlude before returning to the land again. Pinipeds, the group name for seals and sea-lions, are only semi-aquatic. However, as they spend much of their time in the sea their limbs have evolved into flippers. The water reclaimed them as recently as 23

million years ago and they are distantly related to bears.

Some other large groups of back-boned animals, after emerging from the sea to the land, took on the third environment – the air. Birds, which in our age are the largest group of tetrapod descendants, started to evolve from reptile dinosaurs about one hundred and sixty million years ago. They still have four limbs but only use the rear ones for walking. Their front ones are feathered wings.

Because of the sparsity of fossil records, we are not sure when bats first took to the air. These mammals, whose wings are made of a thin membrane rather than feathers, comprise well over a thousand species throughout the world. Their order is divided into two sub-groups, big and small. The ‘micro-bats’, who all use echolocation, include varieties like the Pipistrellus. A small colony of these tiny bats live in the eaves of my ancient house in Wales. Occasionally one or more will squeeze through tiny gaps in the ceiling timbers to give my living room a nocturnal inspection. Although this may startle any visitors who may be staying, I am used to them doing an extensive tour before they leave by the front door that I will have opened for them. Some species of the much larger ‘mega’ sub-group, who don’t have the echo facility and are usually called flying-foxes or fruit-bats, can have wing spans of up to five feet. The two groups may or may not be related. If they don’t have the same ancestors, this would mean that the membrane wing has evolved twice. This however, as the thousands of examples of parallel evolution has shown us, is quite possible. Some scientists have suggested a ‘Flying Primate theory’, proposing that flying-foxes are related to our own early primate antecedents.

Almost all terrestrial quadrupeds have more developed and, therefore, stronger hind-limbs than fore-limbs. This applies both to those that stay permanently on the ground and those that climb trees. In former quadrupeds, that have returned to the sea or taken to the sky, the opposite seems to be the norm. The common sense reason for this must be that moving around on terra firma (and climbing trees) is a ‘pushing’ operation, whereas swimming in water and flying in the air are more to do with ‘pulling’. There will be exceptions to both generalities, as there invariably are. With land mammals this may include Anteaters, who need powerful front limbs for obtaining their food, and I am sure there are others.

Some mammals have further evolved so that their front limbs are no longer used for getting about, making them available for other tasks. We, as Homo sapiens, are the best known example. Among many others are the Jerboas and Spring Hares of Africa, the Kangaroo Rats of North America and the Hopping Mice, Wallabies, Wallaroos, Kangaroos and Potoroos of Australia. Although very similar in shape, these animals come in very different sizes. The last four, which are marsupial, are not related to the first four, which are placental rodents, yet they all have highly developed hind legs and get around by jumping or hopping. As most of them live in arid or desert areas, habitat, as it always is, will be the key reason for the particular direction in which natural selection has taken them.

Among the larger animals, which are not mammals but have become bi-pedal are many flightless birds. The largest group here are the penguins, of which there are about twenty extant species and many more that are extinct (including some who were six feet tall). They are the semi-aquatic bird equivalent of mammal seals, but have been in the water very much longer. It is thought that their antecedents, whose wings first started to evolve into flippers, lived only a few million years after the extinction of the dinosaurs – from whom, like all other birds, they had descended.

Quite a number of mammals, that are not strictly two-legged, often stand up on their hind limbs. There are others that walk on them occasionally. The Primates are the mammalian order most associated with the upright posture, which is hardly surprising after spending many millions of years in the vertical position climbing trees. However Humans are the only species in that order where the word ‘occasionally’ does not apply. Why is this? The reason we have ended up in the way we have is just one more product of chance, an accidental result of natural selection brought about by the change of circumstance in which our ancestors found themselves.

In my previous book, I reprised the ‘temporary return to water’ theory for one family of apes. The hypothesis that, I feel certain, gives us the only sensible explanation of why we are so different from all other creatures living on Earth. All animals on our planet at present are there because their ancestors adapted and changed. For every species alive today there are possibly ninety-nine others now extinct. Some are preserved in the fossil record, but many we know nothing about. Those that are not with us were unable to evolve fast enough to be able to survive the changes in the environments in which they lived. Our ancestors were one of the lucky ones and, by accident, a few chance by-products among our natural selection adaptations resulted in human-kind.



6

A Seawater Interlude

I devoted a short chapter to the Aquatic Ape Hypothesis in my previous book on determinism. I explained the suggestion that the most likely scenario for the advent of the human race commenced with a family of apes (perhaps a small ‘troop’), which were alive in Africa at some time between seven and five million years ago. I wrote that due to a sudden change in their environment they, by pure chance, but like every other form of life through the route of natural selection, managed to adapt and survive. Some of their descendants, perhaps a million years – or less or more – later, emerged as our proto-human ancestors. I included in my brief summary the proposal that the catalytic change in their habitat was a rise in sea levels. This caused salt water flooding in the coastal valley in which they happened to be living.

I should point out here that this hypothesis has nothing directly to do with our lack of free will – the subject of this book. I also accept that it is possible that the reason for our arrival on this planet may lie elsewhere, notwithstanding all the other sequences of events I have heard or read about that seem far less likely. What seems absolutely certain, however, is that natural selection is a process of chance. Having said that, the history of life does appear to show us that it only proceeds in one direction. The individual tiny steps may be accidental but, because of the parameter of only something that works surviving, life forms must continually ‘improve’. As I have pointed out elsewhere, some scientists and philosophers think that wherever reproductive life establishes itself (surely in very many places in the Universe?), life can only either become extinct or evolve and produce – perhaps at its zenith – some intelligent form. This conclusion seems to make sense to me.

The Aquatic Ape story is therefore only mentioned again here as it confirms the random nature of evolution. For me it is not only the most plausible answer to how and why we are here on Earth, human emergence must also be the most exciting mystery tale that has ever been around. Having personally dismissed the fable – very many years ago – that some supreme being had ‘created’ us, there had to be some logical reason for our appearance and what followed.

When writing previously about the Aquatic Ape idea, I acknowledged the fact that the main and most knowledgeable researcher on this subject has been Elaine Morgan, an elderly lady who lives in South Wales. Although Elaine is not herself a trained scientist, many well known evolution experts and others have collaborated with her and she is now, without doubt, the accepted authority in this field (we might remember here that Charles Darwin and Alfred Russel Wallace were both self-educated scientists). When I published my earlier reflections, I listed the five books she had written about the hypothesis. Since then she has produced a further volume. I was pleased to attend the book launch of *The Naked Darwinist* at Cardiff University in spring 2008, where I renewed my acquaintance with Elaine. In this, possibly her final book on the subject, she ties up the loose ends of the theory and answers her critics.

It seems silly to re-hash the mountains of information here. Elaine Morgan's books are all listed at the back of this slight effort – and I can only point you in their direction. They are all easy to read and understand – and stimulating. However, as an appetiser, you might consider the following question and statements:

1 DNA evidence tells us that we are closely related to Bonobos and Chimpanzees, with backward projections suggesting we shared a common ancestor less than six million years ago (some projections much less). The DNA gap between chimps and gorillas is much wider than between them and us (wider still with orang-utans), yet they look much more alike these distant relatives of theirs than they do to humans. Why is this?

2 Chimpanzees mostly move on all fours (using the knuckles of their fore-limbs). When we have stopped crawling, usually before we are 18 months old, we walk on two legs. Chimpanzees, gorillas and orang-utans occasionally walk on their hind legs – especially when they are wading through water.

3 Chimpanzees have body hair, we have very little except on the top of our heads (especially females).

4 Chimpanzees have no subcutaneous body fat, we have a lot of it as do other aquatic and semi aquatic mammals.

5 Chimpanzees don't dive, swim or swim under water; we are very good at this.

6 Chimpanzees look as though they are tree climbers, which they are (except for a sub-species where the males have grown to the same size as adult gorillas). Forgetting small boys, most of us are not very good at climbing trees, whereas we look at home in and on the water. With our hooded noses and general body shape we are aqua-dynamic. Chimps are not

7 Hardly any 'primitive' chimpanzee fossils have been found. Could this be that, as they were forest dwellers, when they died their remains would have almost always been eaten by scavengers. A growing number of early human and proto-human fossils continue to be

discovered (with ages prior to the time when we started to bury our dead). This must be because these people (or mammals) had died on lake, river or sea shores, where their bones had a chance of preservation in the silt.

8 When pearl divers swim deep below the surface, their heart rate slows down. This happens in all other aquatic and semi-aquatic mammals, but not in other terrestrial animals that can swim (i.e. dogs).

9 When we cry or perspire we exude salt from our body. Other sea-going mammals and birds also do this. Chimpanzees do not sweat or cry.

10 Some people suggest that our ancestors were a group of apes, who simply decided to leave the forest and move to the open plains of Africa – perhaps in search of food. They advocate that we stood up on two legs, to look over the tall grass, and then learned to walk that way (the Savannah Theory). This seems extremely unlikely as (a) food would have been much more difficult to find; (b) they would almost certainly have become extinct by predation, from which they would have had no defence and no escape, and (c) recent research shows that, when all this was supposed to have happened, Africa was almost completely afforested. There was then little or no savannah

11 Some others say that if our forebears had been small apes swimming in water, they would have all been eaten by crocodiles (still today a big danger for African village children who live near rivers). The Aquatic Ape idea suggests we evolved in a lake or lakes flooded from the sea (possibly the Red Sea). There never have been any saltwater crocodiles in Africa and there are none there today.

Swimming in water and becoming bi-pedal, as we were probably wading in the shallows much of the time, did not of course make us human. However, it did free our hands so that they could be used for other things. The biggest evolutionary by-product that swimming and diving gave us was a much more important factor in our divergence from the other apes. It was this, coupled with early changes in our cultural evolution, that in the end resulted in the enormous divide between them and us.

Terrestrial mammals are unable to hold their breath at will, whereas all aquatic mammals have to be able to deliberately control inhaling and exhaling. When natural selection produced ape offspring that were able to do this, coupled with changes in the position of the cartilaginous larynx in their throats to assist breathing when swimming, they found this had a side-effect. They were able to utter a far greater range of calls and sounds. Over many generations these developed into words to represent objects and situations; later the words would evolve into language.

So possibly after changes in climatic conditions, when the salt lake habitat had dried up or diminished and our distant relatives had become dry-landers again, these swimming apes had

acquired basic speech. It was language that then promoted the growth of larger and more complex brains. The larger brains, in turn, made us the first creature to be fully conscious. A completely new mammalian animal had arrived, and by any stretch of the imagination, the most successful the solar system had ever seen. The original philosophers had landed – ourselves. Chimpanzees, like their ancestors our distant cousins, are not able to control their breathing. They have some oral communication but it cannot be described as speech or language. They can hold and use simple tools with their hands but these are needed for knuckle walking most of the time. Chimpanzees' brains are very much smaller than ours.

As I mentioned in the last chapter, primates that walk on two legs are not unique now, nor have they been in the past. Today there is an endangered species of monkey, living in the swamps of Borneo, that walks for long periods on its hind legs in a not too dissimilar way than ourselves. From its habitat, it seems obvious that this trait has evolved from wading in water. This Old World simian has other things in common with us. The males are much larger than the females, it is a first class swimmer, it has a pot belly and a large nose – hence its name the Proboscis (or Long-nosed) Monkey. In local Indonesian parlance it is known as 'Orang Belanda' meaning 'the Dutchman'. I do hope this animal can be properly protected. I am not sure if an in-depth study has yet been made of them. This might surely produce some fascinating conclusions as there may be parallels with our own early evolution.

Bi-pedal characteristics have also been found in a number of primate fossil finds, some going back nearly 20 million years. These have been discovered in parts of Africa and present day Italy and Spain. They all belong to the Miocene Epoch which ended rather more than five million years ago, a period during which it has been estimated that there were over one hundred different ape species. Almost all of these will have died out and the extinctions likely included two-legged varieties. However, if the aquatic scenario is correct, one species may have been a stage in our pre-history. At present we are not quite sure which, if any, of these early apes were our own direct ancestors.

It is probably just as well that the early upright posture fossils were not found in Charles Darwin's day. He had enough problems with the clergy, with the concept of 'Man descending from the Apes'. Bishop Samuel Wilberforce, his most outspoken critic, would have suffered from apoplexy if it had been suggested to him that 'Apes might be descended from Man'.



7

Belief and Disbelief

Very many people will have watched the episodes in two BBC documentary series, presented by David Attenborough, which show the life-cycle story of Emperor Penguins. There was also a French film *La Marche de l'empereur* (March of the Penguins) that was widely shown in cinemas a few years ago.

Apsley Cherry-Gerrard was a member of Captain Scott's fateful expedition to the South Pole in 1912. Although not one of the small historic team that reached the pole and perished on their way back, he was part of the support group that accompanied them to the Beardmore Glacier on their outward trek, and was responsible for laying down the food and fuel depots for their return traverse (Scott and his two remaining companions died in a blizzard when only eleven miles from one of these).

Ten years later 'Cherry' (as he was known) published his classic travel book *The Worst Journey in the World* acclaimed by many, at the time, as the finest real-life adventure ever recorded. Cherry wrote that "Take it all in all, I do not believe anybody on Earth has a worse time than an Emperor Penguin". Everyone who has watched the BBC documentaries or the French film will, I'm certain, have come to the same conclusion. This large flightless bird (males can reach four feet in height) not only lives in the coldest environment on Earth but, unlike most birds that mate and nest in the spring, breeds during the Antarctic winter. At one stage in their life cycle, the males stand huddling together in permanent blizzard conditions while incubating their partner's eggs in pouches over their feet. This lasts for over two months, before the chicks hatch and the females return from feeding in the ocean. By the time the males are able to walk to the sea and fish for themselves, they will not have eaten for nearly four months and will have lost over a half of their body weight.

When I was a boy, I remember being taught that God had created every creature for a purpose – and that the reason was associated with the life of humans. Dismissing the fact that, until the last

decade or two, few of the world's population knew much about Emperor Penguins – I would be interested to ask what is the object of their existence from a religious perspective? Possibly the answer might be that the Emperors' lives demonstrate stoicism and the resolve to endure, whatever the circumstances. It is certain that these large penguins do survive. Some are thought to live as long as fifty years and they have undoubtedly been on Earth far longer than we have. Yet it must be ridiculous to suggest that they are here for our enlightenment – or indeed for any reason. At some stage in the past, Antarctica was part of a larger continent and a much more hospitable place. The progenitors of Emperor Penguins might well have become extinct when their habitat began to change. However, simply by a quirk of fate, these animals have, through long periods of natural selection, evolved survival modifications. They have developed densely packed feathers and other insulation adaptations to combat the cold. I don't know if we have discovered why they walk so far inland to breed and have their young in mid-winter, when only about one in five of the chicks usually survive. It may be this has something to do with the availability of fish during the 'at sea' part of their annual cycle? What does seem certain to me is that their existence at all is a wonderful example of chance. This being so, surely our own lives can only be the same?

Although, as a species, incomprehensibly more complex, and, as individuals, varied beyond description – the lives lived by human kind are equally as bizarre (I can find no better word) as those of the Emperors. Both have arrived at nothing more than where they are, after a long process of evolution.

As I accept determinism, I must – by the definition of the word – also be an atheist. Yet I don't usually think of myself as one because disbelievers, in the main, are not determinists. As a person who is convinced that the concept of free will is nothing other than an illusion, I do not distinguish between believers in religions, agnostics, atheists or determinists. Like me, they just happen to be as they are. I fully understand that some individuals can change from one conviction or belief to another. Yet, I guess, the majority of folk on Earth remain with the concept of the meaning of life, or lack of meaning, that they were brought up with when small children. It is therefore unlikely that this book will alter anyone's outlook unless the seeds and shoots of doubt and enquiry are already there.

Over the last forty years, many people have been enlightened and enjoyed David Attenborough's factual television programmes about the natural world. A more recent documentary series, on the surface about an unconnected matter but in reality an extension of the same subject, has also been thoroughly appreciated by at least one section of the public – myself very much included. This series, titled *Around the World in 80 Faiths*, had the additional advantage of being recounted by another charismatic presenter – Church of England vicar, Peter Owen-Jones. Whereas Sir David's have shown us the wonderful story of the evolution of species, the Reverend's has displayed one of the most colourful facets of the cultural evolution of the most successful family in nature.

The eighty faiths were featured by Mr Owen-Jones in eight one-hour episodes. This was, for me, the single yet understandable flaw in the series. The schedule only allowed five minutes (or a

little more or a little less) for each religion. As soon as the viewer had become hooked by some fascinating glimpse of human behaviour, it was time to move on to the next god-fearing culture. Like all the best non-fiction front men, Peter Owen-Jones displayed a nice balance between enthusiasm and scepticism for each subject, and showed some empathy with the practitioners of each snapshot of belief that he presented – so much so that it may seem surprising that he was able to retain his own faith, during the filming process, in the Anglican/Episcopalian branch of the Christianity to which he belongs. In addition to introducing me to some religions that I had not come across before, I was struck by the knowledge that many of the observances overlap, have taken or borrowed dogma from each other and have also – like everything else – evolved over time. All religions, in essence, have the same roots. They also have twin arteries, pumping life blood through them, without which they would have few adherents and would shrivel and die.

The idea of powers, greater than themselves, must have occurred as soon as our ancestors' brains had become large enough for consciousness to develop. This was probably at our Homo erectus stage, before we became sapiens. The first supernatural beliefs would have been animist. Our early homo forbears will have feared, and so worshipped, animals that were larger and more powerful than themselves. Some indications (and fictional stories) suggest bears were one popular candidate, possibly because they occasionally stood up on their hind legs as people did. Stone-age folk would have been in awe of their surroundings. Large trees and rocks, mountains, rivers and the sea would have all had chimerical significance. The elements that came and left without warning, rain, wind, hail and snow, lightening and thunder would have appeared mystical and even more commanding, to these early minds, would have been what they could see in the sky yet not be able to touch. Rainbows, the stars and the moon would have been among their first deities and their most dominant god of all – the sun.

When I write that every religion comes from the same root, I should explain that this is not a single one at a specific point in time. In the same way as we have convergent or parallel modifications and solutions in biological evolution, this very same phenomenon occurs in culture. As mentioned in a previous chapter, vision and eyes evolved completely separately on a number of occasions. This has happened in the same way, time and time again, throughout human cultural history. Television was 'invented' by a Scotsman in 1926. It was also invented in Hungary and probably in Russia at the same time. Pre-history ended with the arrival of writing, which happened in at least three different locations. Although this was not at the same time, it is unlikely that there was any connection between these separate innovative breakthroughs. The discovery of the wheel almost certainly also had multiple origins. All faiths today, of which I am aware, contain two central features. I have described these as their twin arteries as they are connected. The first is the belief in some after-death existence, spiritual or physical, and the other the pre-eminence of mankind in the universe. You cannot have one without the other. Natural science should have shown us that we are, in reality, no different from any other animal – or any other form of life. Even if we are a little brighter, that should not entitle us to any priority tickets to some after-life. As far as our dominance of the universe is concerned, that looks wholly unlikely.

As a non-believer in the supernatural (some of my persuasion call themselves ‘Naturalists’) and, although they range from the utterly bizarre to the understandable, I regard all religions as irrational. This includes the one in which I was brought up myself, which might be described as ‘middle of the road’ evangelical Christian. I do this with some misgivings as I still love church music, the hymns and psalms, the canticles and carols. I still hold the opinion that the *1662 Book of Common Prayer* and the King James *Authorised version of the Bible*, published in 1611, together contain a fair proportion of the most beautiful and emotionally charged writing in the English language. As a boy and a young man I was a ‘lesson’ reader. I have many happy memories of delivering them in the most realistic (and theatrical) manner I was able to muster. The sentences are so wonderfully constructed and so much more powerful than in the more recent versions of these Christian books.

My father was a clergyman, of whom I had the highest respect when he was alive and still retain in my memory of him. One of his greatest gifts, as a parish priest, was his ability to comfort both the dying and the recently bereaved. Occasionally I still come across some elderly survivors, who remember him for his help to their family many years now after his own death. Part of this was due to a quirk in his character, no doubt distilled by chance through childhood experiences, the influence of his mother and his time as an army chaplain during the 39-45 war. This gave him a unique way of reacting to other people. To him, whether they were the family in the manor house or the tramp begging at his door, he mentally and entirely naturally made no distinction between them. Although I am no longer a believer, this remains for me the greatest memory of my Christian heritage. It is also a trait that has been inherited by my sister, who remains a staunch supporter of her faith.

As someone who recognises everyone as being as they are, determinism is unlikely to involve me in any atheistic anti-religion crusade. There is one promoted by freethinkers who subscribe funds to pay for signs on the sides of buses. These have slogans like “There is probably no god – stop worrying and enjoy your life”. However, I do accept them, and find some humour in them, in the same way as I do for the blurbs of religious enthusiasts. Some of these are organised by groups with a fundamental biblical outlook. They answer the atheists with texts such as “The fool hath said in his heart, there is no God” plastered on other buses. Both camps – in the same way as the tent I occupy – are simply as they happen to be.

Over the last decade or two there have been a spate, if not an avalanche, of books with an anti-religion theme. Two of the most well known – and I would guess the most read – are *The God Delusion* by Richard Dawkins and *God is Not Great* by Christopher Hitchens. Although they each come from slightly different perspectives – Professor Dawkins is a respected scientist and Mr Hitchens a historian and journalist – they are in some ways complementary and succeed in their aim. Both books are extremely well written and diligently researched, I’m sure the facts they marshall together are correct and therefore the conclusions they reach are valid. They

would both certainly feature on my recommended reading list for anyone with an inquiring mind. Having said that, these books miss one point entirely. The essence of what religion is and its purpose. I am sure that neither author is a determinist.

All species of animal and indeed all life has just a single aim and that is to continue. Flowering plants need to attract insects so that pollination can take place and their survival ensured. Polar Bears have evolved white coats for the same reason as have hedgehogs their prickles. Homo sapiens, with their large brains – a by-product of a number of other evolutionary progressions, language, bipedalism, diet, control of fire, etc. – found themselves with what might be regarded as a contrary side effect. All evolution advances have positive and negative features, which in the end, depending on changes in the environment, either help ensure the survival of that particular species or hasten its extinction. In our case, the downside of our large brain is that we think too much. Religion helps to offset this. Like the white fur, for bears who live in the snow, it is part of our survival mechanism. Initially a cultural adaptation, it is possible that it is now part of our physical make-up. I think some scientists have already suggested that there is a religion gene and there may be ‘religion’ connections in the brain.

If the affluent areas of the world remain affluent and become more secular, as they appear to be doing at present, perhaps the religion gene will evolve away in a section of our species (even creating a sub-species?). I suspect, however, that if we survive environmental changes and further increases in our numbers, that it will be a long time – if ever – before this is general. Religion is – and is likely to remain – an important part of our species adaptation for survival. Other animals on this planet do not need religion. However, if there are large brained creatures on other planets (as seems probable) it must be likely that they have evolved religion as well.

There are some fundamentalist atheists who proclaim that the trouble with society is religion. I think they are incorrect when they suggest that most of the world’s wars and a great deal of the individual degradation, fear and misery, suffered by a large number of our fellow humans, can be laid at faith’s door. Although religion may bind groups of people together, this is little different from other combinations – tribes, nationalities, social classes, trade unions, football team supporters, stamp collecting clubs or families. Being part of a congregation may polarise but this does not necessarily promote conflict. Wars happen by chance, a combination of an infinite number of tiny factors, although the central one is usually economic disparity. Two prosperous nations may fall out but they are unlikely to want to fight each other. It would seem to me that disparities are bound to expand with populations. Unless a worldwide human catastrophe reduces us to hunter-gatherer numbers again, I consider it unlikely that conflicts will cease.

As a determinist I do at least have peace of mind. I may not be able to change anything – but I can, like an Emperor Penguin, accept everything and just enjoy living my life.



8

Determinism in History

Kurt Vonnegut, the celebrated American writer who died in 2007, said in one of his television interviews that “*gonorrhea, giraffes and hippopotamuses are evidence of evolution being controlled by a divine power*”. One of his earliest and best known satirical novels *Slaughterhouse 5* (for which he gave himself an ‘A plus’ rating) has a deterministic theme. It is the story of Billy Pilgrim, a US World War II soldier. After being captured by the Germans, Billy is incarcerated in a POW camp housed in a disused slaughterhouse at Dresden – prior to it being heavily bombed and the fire-storm that followed. This part of the book is written from the author’s personal experiences, as he was a prisoner of war in Dresden in 1945 and witnessed the destruction of that city. Billy later becomes ‘unstuck in time’ and finds he can re-live past and future events of his life. He is abducted by extraterrestrials from the planet Tralfamadore, one of whom says “*I’ve visited thirty-one inhabited planets in the universe and have studied reports on one hundred more. Only on Earth is there any talk of free will.*” Of course this is anti-war fiction with a sci-fi slant, but the point it makes is a sound one.

We do not know if there are any other intelligent life forms out there in the universe. However, we must surely conclude that it would be extremely strange if there were not. If there are Tralfamadorians somewhere – or their equivalent – and they accept they have no free will, they are likely to be at a more advanced level of their evolution than we presently are of ours. Here on Earth, determinism – as a concept – may only have been around for about 350 years. Our species, as I have already suggested, probably became partly conscious before we became human. This was certainly before we reached what we now call ourselves, *Homo sapiens*, two hundred thousand years or so ago. As soon as full consciousness did arrive, we entered the age of superstition as we searched for the answers to what life was about. That age may now be coming to an end. At least some of us are now aware that what we thought was so, is not actually as it is.

Although (if anyone asks) I now call myself a ‘Determinist’, this is only something that has happened in the last couple of years. This is because, until I was part way through writing my

previous slightly innocent book on this subject, I hadn't come across the term. For most of my life, since reaching these conclusions, I have just thought of myself as logical or a realist. I had never, to the best of my knowledge, come across anyone else with similar convictions to my own. Although I had always suspected that there must be many others, it was not until after the publication of *As It Is* that I discovered for certain that I was not alone. Among the many that determined it, one of the reasons for self-publishing my reflections was that I was feeling a little lonely!

On discovering that my certainty about Hard Determinism had been professed by others for some hundreds of years, I was more than delighted to find that I was in good company. An interesting selection of the universally accepted 'greatest' minds had reached similar conclusions time and time again. These range from the most respected philosophers going, like Baruch Spinoza (17th century), David Hume (18th century), Ralph Waldo Emerson (19th century) and Bertrand Russell (20th century) to very many top scientists including Francis Crick, the discoverer of DNA and the man most people in the world regard as the finest brain ever – Albert Einstein. Some of these may have included caveats with some of their reasoning, but they were determinists.

Had I troubled to read any books written by these people, or those of many others, I would not – I suspect – have bothered (or as I see it, been 'determined') to publish my first little effort on this subject. You may now ask, what is the reason for this one? That is not an easy question to answer. As I have attempted to point out in an earlier chapter, everything that happens to us is chance or, to put it even more simply, completely accidental. Yet all the causes, and the causes of all those causes – of that accident, must be determined. Simple logic will always arrive at that conclusion, so the answer must be that there is no specific reason. Possibly a few people who read this may do so because it is simple and, I trust, free from intellectual jargon. Many people, like myself, do find it difficult to follow the writings of greater minds than our own. So, if you can understand what I am getting at, this book may serve a purpose.

When contemplating how I should go about giving a 'presentation' about determinism to a small group of people, I will not say 'I thought of' (that is not a deterministic phrase), rather a simple analogy found itself in my brain. The more it lodges there the more apt I think it to be. It is that determinism is rather like a lead pencil. It is the same, with the same core, all the way through. Yet it does have two ends even though they are indistinguishable. You can sharpen one end or both of them, if that is the way things happen to go.

Historically determinism had two ways of being explained, one way through logic and the other from scientific knowledge. In today's enlightened age, these are more or less the same. About two and a quarter thousand years ago, Aristarchus of Samos pointed out that the Earth was not the centre of the Solar System. However it was not until cosmologists like Ulug Bek, Nicolaus Copernicus, Tycho Brahe, Galileo, Johannes Kepler and Isaac Newton appeared on the scene, from one and three quarter thousand years later, that we began to understand how man fitted into

the cosmos and the extent of his insignificance. Prior to that age, followed by a more recent one populated by scientists starting with Charles Darwin, there were few determinists and the pencil could only be sharpened at its logic end. All of human kind were largely ignorant of how the universe worked, and the deep thinking people of the day were going round in circles trying to work out the enigmas and controversies surrounding superstition and myth (a lot of them are still at it today). A few early philosophers did point out that everything had a cause, but usually their writings or the reports of their views seem to us today to be either contradictory or impossible to follow.

Dozens of ‘sayings’ have been attributed to Prince Siddhartha who lived over two and a half thousand years ago and became known as Buddha, e.g. ‘the enlightened one’. *“Deeds are done, events happen and there is no individual doer thereof”* would appear to be deterministic, however this idea does not seem to have become central to most of his followers. I am aware that many Buddhists will tell me that their understanding is a way of life and not a religion. I am not knowledgeable in this field but it would appear to me that the teaching – in one of Buddhism’s main streams – that there are sixteen different ‘Narakas’ or hells (eight hot and eight cold), provided for people who misbehave during their lives, must make it a faith in the same way as all the others. Buddha also said *“Choose the path that leads to wisdom”* and *“Living well favours a serene death and rebirth in a happy state”*, so he was certainly not a determinist. Having mentioned that, this early Indian sage did come up with one pronouncement – *“Believe nothing, no matter where you read it, or who said it, no matter if I have said it, unless it agrees with your own reason and your own common sense”*, which does strike me as being extremely wise.

A similar saying could well have been made by Socrates, who was born at about the same time that Buddha died. He is regarded as one of the founders of Western Culture and, although he taught his pupils (like Plato – who holds the title of the father figure of philosophy) how to think, he doesn’t appear to have come to any particular conclusions about life himself. However, he did enjoy witticisms, which seems to be one of the reasons the powers of his day sentenced him to die by suicide. Many politicians and religious leaders – then, now, and in-between – have suffered from the singular lack of a sense of humour.

For the two thousand years following the flowering of learning in Greece, humanity experienced its prime period of the take-over of our cultural evolution by religion. It was during this time that most of today’s faiths were either founded or entrenched, if their beginnings preceded that time. As they evolved, and as different factions took turns at being in the ascendant or the opposite, it was not a good time for free-thinkers.

There may well have been some philosophers during this period who realised they had no free will, and I suspect that someone will put me right on this, but most were sensible enough to keep their heads down. Loosing your head by having it chopped off was one of the more comfortable

ways to die, in an era when any dissent from the prevailing beliefs of whoever was in power was a capital offence. The strategies used in those times to persuade people to change their minds, are too painful for us to think about today, never mind experience. No one quite knows who burnt down the library at Alexandria, it may have been the Christians, or the Moslems, or Julius Caesar – by accident. However it was mostly Christians, in the army of a Mongol ruler, who destroyed the equally important libraries in Baghdad in 1258 (and murdered most of the inhabitants of that city). Although mathematics and medicine did flourish in the Moslem world for some hundreds of years, religion and scientific inquiry were not generally good bedfellows.

As I see it, the earliest known determinist was probably Baruch Spinoza (born 1632), who was of Spanish or Portugese Jewish descent but lived in the Netherlands. He is now regarded as the first great ‘rationalist’ and one of the most exceptional thinkers who ever lived. Philosopher Roger Scruton, in his pocket-sized book *SPINOZA – A Very Short Introduction*, points out that this fascinating man’s arguments are hidden behind an almost impenetrable style which is extremely difficult to explain. As someone who may be too lazy, or nor bright enough, to follow most philosophers’ reasoning, I must go along with that. Spinoza was certainly lucky to be born in an age when you had a chance of staying alive after publicly stepping out of line. He was also fortunate to live in a country where free-thinking was at least tolerated. This did not save him, however, from being kicked out and excommunicated from the Jewish community in which he had been brought up. He changed his first name to the Christian ‘Benedict’ and then had all his writings banned by the Catholic Church. Spinoza did believe that there might be some supernatural authority so was not quite an atheist. However, you can hardly blame him as he would have found it difficult in his day to even find someone to have a conversation with, had he not accepted some type of god. He died at the age of 44, probably from glass dust silicosis, following his profession as a lens grinder. Much of his writing, including his main work ‘Ethics’, were not published until after his death. A year later they became prohibited reading in his home country.

Spinoza wrote:

”Men believe themselves to be free, because they are conscious of their own actions and are ignorant of the causes by which they are determined”.

He also said,

“The mind is determined to wish for this or that by a cause, which has been determined by another cause, and this again by another, and so on to infinity. This realisation teaches us to hate no one, to despise no one, to mock no one, to be angry with no one, and to envy no one.”

Two hundred and fifty years later, Albert Einstein echoed those statements when he wrote,

“This awareness of the lack of Free Will keeps me from taking myself and my fellow men too seriously as acting and deciding individuals, and from losing my temper”

As I have written previously in this book, I am not an academic, I am not a historian, I am not a scientist or even a philosopher – in the generally accepted meaning of that word. Your mind will either accept the proposition that you have no free will or it will not. I have to refer you back to Buddha. The facts I write about here will either ‘agree with your reason and your own common sense’ – or otherwise.



9

Culture and Emotion

In late 2008, the twin ‘British National Museums of Art’ in our capital city – “Tate Britain” and “Tate Modern” – held contemporaneous showings of two of the most influential artists of the last century. As the two galleries are on opposite banks of the Thames, visitors were able to view both exhibitions within a reasonable period of time by travelling between them by river launch. The artists were Francis Bacon and Marc Rothko, the first British and the other American. Both, who painted in quite different styles, are regarded by quite a number of people as the most significant artists produced by their respective countries in the twentieth century. Their works certainly command very high prices. One of Rothko’s paintings was sold in New York for nearly 73 million dollars in 2007, and a ‘Triptych’ by Bacon reached over 86 million dollars in London in 2008. The buyer of the Bacon was the Russian billionaire Roman Abramovich.

I will not go into the merits or otherwise of each painter, but mention them here to point out that most people of my generation regard their works as ‘modern’. Yet both artists were born over one hundred years ago and, to younger people, they are already part of the past. The artistic side of our nature moves, changes and adapts at such a rapid pace that all of us here – living at the same point in time – exist in a culture that is not only unimaginably diverse but one that becomes more so with every succeeding generation. A great Flemish artist, like Pieter Breugel the elder (one of my favourites), who lived in Antwerp and Brussels in the 1550s, only had a limited number of schools and styles of painting that had preceded him and which may have given him inspiration. The products of today’s exponents of visual art are magnified or constrained by an uncountable number of influences. Our tastes are wider now than they have ever been and it is unlikely that this can ever contract. What is true of painting, is also true of all the other forms of art, and of everything else that may brighten and make our lives more livable. If we take music, architecture, sculpture, literature, food, fashion, faith, humour, entertainment, sport, recreation, travel, employment and even personal relationships – all of these now come in so many manifestations and combinations that it would not be possible to list them.

What has expanded in our cultural lives has exploded in the field of learning. There is no way in

which we could start to work it out, but I would suggest that the increase in knowledge since I was a child must be ten-fold. Additionally, day by day, not only does information and culture continue to evolve but the process accelerates. It goes and grows faster and faster. As the lives of individual members of our species are inconceivably more complicated than that of any other creature, it is hardly surprising that we are under the illusion that we are special and in command of our own destiny.

In addition to our accumulated human wisdom and the packaging of that knowledge that we call culture, the most insurmountable barrier to our acceptance of not having free will is likely to be our emotions. This is the side of our make-up that automatically responds to how we feel about what we learn, what we enjoy, what we fear and what sadness or grief we suffer. We may assume that human emotions have changed little over many generations. This is not entirely so as, although the feelings may be the same, their trigger points have evolved. As a convinced determinist, I must be logical and I know I consider most things in a cool and calculating manner. Yet, at the same time, I have always been an extremely emotional individual. Although a male who was brought up to have a stiff upper lip, my tear threshold is low. This can be activated by music, painting, photography or drama, but most easily by literature (especially poetry) which creates strings of connections in my mind. I explained to my children, many years ago, that I suffered from *Little Match Girl* syndrome – and still find myself moved by that Hans Christian Anderson story. I have long realised that emotion is an evolved human response. However, it is not possible for me to curb mine. Although it can be embarrassing at times, I generally enjoy it as part of my fascination with life.

At the start of this book, I suggested that the human belief in free will is a quite natural conceptualisation. I think it has always been with us, since the very first of us realised that they were alive. This was not the first man or woman but long before our forebears had reached that stage. Although we are unable to ask them or receive any reply, rationality tells me that the feeling of being blessed with free will is shared by all mammals, birds and some other animals. I include all creatures that, although below us on the EQ graph, possess brains large enough to think that they make decisions. I'm certain that my dog Blossom does not feel she is an automaton. Superstitions and religions have used the concept as part of their creeds from their beginnings. They have reinforced the idea but they did not invent it. The free will belief evolved with us and it is part of our inherited survival strategy.

What has solidified this belief is the outward display of our human culture. How could it be that a temple, with the carved reliefs of animals, came to be erected on a hilltop in Eastern Turkey nearly twelve thousand years ago (this is Gobekli Tepe, the oldest building yet discovered). How did it come about that the Great Pyramid of Cheops was constructed over four and a half thousand years ago in Egypt, and Stonehenge raised in southern England at about the same time, or the Great Wall of China two thousand years, the Gothic cathedrals of northern Europe nine hundred or the Potala Palace four hundred years ago – a building which still dominates Lhasa today. And what about the cutting of the Panama Canal only a century ago, the

bridging of the Golden Gate near San Francisco in my lifetime, and the more recent tunnelling under the English Channel to France or the damming of a river on the border between Brazil and Paraguay to create the Itaipu dam (one of the ‘seven wonders’ of the modern world). How can these structures and engineering feats have come about by accident? It is not easy to accept that they are just the results of our cultural advance.

Determinists say that the idea that we can personally arrange our future or the future of our children, or anyone else’s future, or transform any of our desires into reality, is nonsense. You may ask how are we able to mentally cope with this? How do we survive without at least thinking we have self-determination? I’m sure that most of us who accept that all our thoughts and actions are the result of previous causes do not dwell on this. I certainly don’t. Generally, in common with the majority of people, I think and act under the illusion that I am in control. When I write this, I just wait for the words to come into my brain, which then moves my hand holding the pen as it travels across the paper. I then read what I have written (struggling occasionally with my own handwriting) and frequently strike out part of what I have put down, modify it and start again. Other writers prefer to print their thoughts out directly with the keyboard of their word processor. As a one-fingered typist, I find it easier the old fashioned pen and paper way. Whichever way it is done is irrelevant, in the same way that, as I write this paragraph I have no idea if I will finish it. I can have a fair guess that it will be so and, if I haven’t edited this bit out, the printed version is now in front of you. However, as a determinist, I am also aware that the ceiling could fall in, I might suffer a heart attack, the telephone could ring starting a chain of events that could stop the book from ever being completed. All is in the hands of chance.

Some of us, who accept we have no free will, are able to live in the third person. The psychologist Professor Susan Blackmore, who writes, lectures and broadcasts on this subject, tells me that she no longer thinks ‘what shall I do next’. Her mind re-phrases this to ‘what will she do next’. I can’t say that this happens to me, but I can see that my process of thought might move in that direction. I’m sure that, in reality, most determinists live their lives in much the same way as everyone else. We are human and our emotions are frequently in control. Yet we are different in the certainty of our conviction. We know where we are and why we are – and we know that we know. That knowledge is as clear as a crisp winter morning. We enjoy life and we relish new experiences. We are fascinated by all of nature, especially our own species, in all its intriguing and frequently bizarre formations. Yet, at the same time, we accept that all this happened by chance.

Susan Blackmore is the author of the foreword to an excellent little book titled *The Myth of Free Will*, which is an anthology of the writings of many learned scholars about determinism. The book was edited by Cris Evatt, who lives in Hawaii; she is a writer and runs an interesting blog titled Brain News. I asked Cris how she first came to realise that the idea of having original thoughts leading to making original decisions (i.e. free will) was an illusion and how, since then, her life and the way she thought about it had changed. Cris told me that the realisation took a few years to accumulate. It was sparked by reading the writings of two Indian philosophers, and

confirmed after meeting and discussing the subject with other determinists. She says (and I use her words in an email to me):

Discovering that free will is a myth and “I’m not in charge,” has changed me in many delightful ways.

1 I’m less arrogant. It’s difficult to puff up with pride when you accept the role of your genes, conditioning and brain state in decision-making. I still experience feelings of pride, but these arise less frequently and are less intense. Often, a little inner voice says, “There’s no *you* doing anything, so get over yourself. Your sense-of-self is brain software, so relax.

2 Since there’s no free-floating, ghostly “me” in my brain or hovering around it, I’ve also stopped *blaming* myself for my (passing) thoughts and actions. I blame others less, too. So enjoying decision-making as an organic process—and not a personal achievement—has made me less of an emotional blamer, and more of a detached boundary-setter.

3 Finally, I’m more grateful for the “freedoms” I have relative to other animals. I’m free to travel 33,000 feet above the Earth, live in a climate-controlled home, and eat a wide variety of foods from all over the world. My cat is not envious, because she can’t even contemplate our differences.



10

Living Without Free Will

In the previous chapters, I have attempted to give examples that explain why it is simply not logical for any manifestation of life to have free will. Logic is only a word, but even without it, the concept that a bacteria micro-organism (for example) could decide what it wanted to do seems far more than unlikely. For a start, this would negate the principles of natural selection. I have also speculated about the later stages that our particular species may have passed through to arrive at where we are today. I have pointed out that – although humans have large brains and live in social arrangements of unbelievable complexity within an evolved culture almost as diverse as nature itself – we are, in essence, no different from any other mammal, animal or, indeed, any other form of life.

I hope I have shown that, in common with all other living things throughout our planet's history, our present circumstances and the evolving situations in which our ancestral progenitors found themselves are all the result of chance. That is, if we accept that 'chance' is just a word we use to describe a process where it is beyond the bounds of possibility to know or calculate the outcome. Although we can never be sure what the end product (or the future) will be, all the many and various factors that decide those consequences are dependant on what happened previously. In other words, all effects are the result of causes, which are the result of previous causes – in a progression back to the start of time – and that those effects will then also become causes.

All this must be common sense. If you accept it, you are a determinist and must come to the realisation that all your own thoughts and actions cannot be excluded. They must all be the results of what has gone before, both inside your brain and external to it. You may then ask yourself, if this is so, what are all the libraries full of books and the countless pages of words written about philosophy, about mysticism and divinity, about ethics and morality – and about everything else from self-improvement to meditation – about? How can it be possible to sum up reality in two short paragraphs? Your mind will decide the answer for you.

Some people with whom I have discussed this subject ask me, “if what you say is correct, why should I bother to get out of bed tomorrow morning?” The answer to that is that you will do whatever the circumstances demand. That is, you will be likely to get up because that is what has happened on most mornings of your life. Yet, there is always the possibility that you may not. A few people have taken this other course. At a certain point in their life, the ‘thought’ has arrived that they will stay in bed until they die – and they have done so. You may be one of them.

Other people say, “If you are right, I cannot be responsible for anything I do. If I commit a murder or steal your car, I cannot be held responsible for it. It’s not my fault.” If either of these actions happens, it is true that on the ultimate plane it is not your fault. There is no final right or wrong or good or evil. However, we live in a world of cause and effect so, if you do murder someone, in all probability you will be arrested, tried, convicted and be forced to spend many years in prison. That will not preclude me from visiting you or writing to you and confirming that you are correct - you were unlucky and it was not your fault. It is more than likely that you will not commit murder. Like most mammals, humans have an in-built antipathy to taking the life of their own kind in an individual way. This is partly fuelled by our own instinct for self-preservation. When humans are in pairs, groups, mobs or armies this personal reserve vanishes or is diminished. As any homicide detective will tell you, most murders are not premeditated and all of them – in the same way as everything else that happens – are by chance. This is why, if you visit one of the more dangerous places in the world – say Afghanistan, Baghdad or perhaps some city in Africa or South America (where there may be a large number of very poor, hungry, unemployed and consequently fairly angry and desperate young men), the chance of being murdered is still relatively small.

Determinism should not be confused with pre-destination. That term is most frequently used in a religious context. It suggests that the course of any individual’s life, from birth to death, is pre-arranged. Although determinism will agree that there can only ever be one final outcome, that consequence can never be known in advance. There is no ‘computer in the sky’ that can work out how the universe will end – or plot the miniscule journey of any human life. If there was one it would need to be as large as the universe! Although every instant is the result of what has happened previously, the next moment in time is completely unpredictable.

Some neuro-scientists have suggested that as the deterministic way of looking at life becomes more general (I am not sure if this will happen), society’s ideas about crime and punishment will change. In the long run this may be so, certainly in western cultures, but I think the first changes are more likely to be driven by practical considerations rather than our perception of guilt. In the foreseeable future, ways will almost certainly need to be found to reverse the rising prison populations in America and parts of Europe (like the UK). I guess it’s conceivable that new scientific solutions will be developed to eradicate problems like drug dependency. This may lead to the ‘modification’ of some individuals, who do not conform to that which society requires, by some medical intervention.

In addition to our cultural heritage being a major hurdle in the acceptance of the logic of determinism, a belief in the supernatural puts this concept further out of reach. Although there may have been a decline in Britain of traditional religion, like Christianity, recent polls suggest that at least two thirds of the population accept one or more of a vast range of paranormal propositions as being factual (the percentages in North America are similar). These range from abduction by aliens, astrotherapy, angels, automatic writing, alchemy, animal magnetism, ancient astronauts, alphabiotics and astrology – and that is just a selection of the ‘a’s. If you want – for instance – to learn how to perform telekinesis (moving inanimate objects with your mind), the internet has many web-sites that announce they can teach you how to do it (it may cost a few dollars!).

In September 2009 I attended a short ‘sceptics’ Paranormal Conference, which took place in a beautiful setting on the west coast of the English Lake District. It was a most enjoyable weekend. The talks and the discussions that followed covered subjects like Apparitions, Out-of-Body and Near-Death Experiences, Spiritualism, Belief in the Paranormal and Conspiracies, and UFPs (the same as Os – but now phenomena rather than objects). The lecturers were all psychologists who were investigating their particular areas of brain-science or parapsychology except for, in the case of the ‘unidentified fliers’, an ex-Ministry of Defence official. All the various lines of research, in some cases lasting many years, have led to the same conclusion. There is no scientific evidence whatsoever that any ‘paranormal happening’ ever took place outside the brain of whoever experienced it (or thought they had). The keynote speaker was Christopher French, who is a Professor at Goldsmiths College, London, researching the psychology of paranormal beliefs. In his presentation on *‘The Psychology of Anomalous Experiences’* he informed the company that the human brain, with its vast number of connections, frequently takes short cuts when processing information. This leads to misinterpretation of situations so that it often reaches the wrong conclusions or, to put it more crudely, the brain lies. The professor also confirmed, to me, that he accepted he had no free will and would regard himself a determinist.

Being a sceptic does not mean that all phenomena can be explained by current scientific knowledge. This is manifestly not the case. Maverick biologist, Rupert Sheldrake, has postulated that other animals have a sixth, telepathic sense (perhaps now lost in humans) and that each species has an ever-expanding collective memory, which he describes as ‘morphic resonance’. He suggests, for instance, that this might explain why shoals of fish and very large flocks of birds (Knots, Starlings, Flamingos, etc.) can wheel round in tight formation without ever bumping into each other. He has written many books on the subject, including one with the lovely title *Dogs that know when their owners are coming home*. I found this an engrossing read and, although I accept that the general scientific community regard many of Dr Sheldrake’s hypotheses as pseudo-science, it does highlight how little we know about how some animals communicate with each other. As research continues, new generations are likely to understand more. What is certain is that, if my little dog is able to use telepathy or not, she – like me – leads a life entirely determined by previous causes. Neither of us has free will.

The Human Brain is, of course, the most complex arrangement of cells known. It has been estimated to contain up to a hundred billion neurons with possibly a thousand trillion synaptic connections passing signals between them. Yet, like every other organ, it has evolved from much simpler ones. Among its predecessors, in sequence, were the brains of early tree-climbing primates, nocturnal rodent-like mammals, lizard-looking reptiles, four-limbed amphibians and before that fish. Their ancestors – in turn – were probably primitive craniates, which were worm look-a-like chordates with skulls. Earlier chordates did not possess a head in which a brain could be housed!

Human brains vary considerably and the study of them – by other human brains – has still a long way to go. One area, which I find fascinating, is reading about the capabilities of those small number of people with ‘Savantism’. This is not a recognised medical term or diagnosis, but is one of the titles given to the condition found in a few individuals who have far more extraordinary brains (or possibly more ‘connections’) than the rest of us. About half of these people come within the Autistic Spectrum and many of the others have some disabling condition. This has led some scientists to suggest that these brains have modified themselves by some compensatory mechanism. In the same way that a blind person often has far better hearing and a more acute sense of touch than a person with sight. Someone with Asperger’s syndrome, who finds it difficult to communicate with other people, may possess a far superior memory than is normal or have other abilities not possessed by the rest of us.

In 2007, a young savant, Daniel Tammet, brought out a book about the first 27 years of his life (he was only 30 this year). *Born on a Blue Day* gives us a compelling insight into what it is like to have his gifts. I can highly recommend it. He has just followed this up with *Embracing the Wide Sky*, his title being taken from a line in a poem by Emily Dickinson, ‘The brain is wider than the sky’, and his subject the incredible capabilities of all human minds. Again, this is a book that needs to be read by anyone who marvels at the human condition. Daniel Tammet can learn any foreign language in seven days and in 2004 recited the ‘irrational’ constant Pi to 22,514 decimal places without fault. It took him over five hours! He informs us that his and other savants’ memories are not ‘photographic’, as popularly supposed, but work in the same way as the recall of the rest of us. The difference is, that they are able to use a much larger network of interconnections. He goes on to explain how memory accumulates via three separate systems, episodic, semantic and procedural. It has been suggested that, among many others, Mozart and Albert Einstein were probably savant and today, Professor Steven Hawking, the theoretical physicist, who certainly suffers from severe disabilities, is possibly one.

My own acceptance of deterministic ideas arrived fairly gradually when I was a young man. I have written elsewhere, that a by-product of attempting to come to a logical understanding of my relationship with my wife may have been a major influence. I will not go into that in this book, except to explain that we came from quite different backgrounds and did not speak the same language. Over the years we invented one of our own, which became extinct on my wife’s death – except in my memory. This has made me feel a strange affinity with those people in history

who were the last of their race. However, I have recently realised that another persuasion may have come from my religious upbringing.

As mentioned previously, there was a period in my youth when I read the ‘lessons’ every Sunday in an Anglican church. My favourites were those taken from the book of Ecclesiastes, because of its beautiful and dramatic language (the Jewish religion hold that this part of the Old Testament was written by Solomon, as that’s what is states in the first verse of chapter one. However, some Christian historians think it appeared five or six hundred years later and that the author was another philosopher). Looking at it again today, fifty years after I used to read it, I see that there is quite a lot in it about God, much of it is contradictory and certain sections are full of masculine chauvinism. However the words (in the King James’ version) have lost none of the power I remember and some passages contain deterministic strains. ‘*All is vanity*’ was certainly lodged in my brain, as perhaps was also verse 11 of chapter 9. ‘*I returned, and saw under the sun, that the race is not to the swift, nor the battle to the strong, neither yet bread to the wise, nor yet riches to men of understanding, nor yet favour to men of skill; but time and chance happeneth to them all*’. I would be interested to hear if other determinists have also caught a spark from this.

If you have read this far, it is possible that you may have come to the conclusion that having a deterministic outlook is rather negative. If so, this book has been a failure as the opposite is the case. Although, most of the time, my brain is inhabited by similar thoughts and goes through the same processes as the minds of people who do not share my convictions, I find I am able to eradicate any feelings of anxiety, anger, envy, fear or guilt. That must be very positive. Having the knowledge that I have no free will and realising that everything I think or do is the result of something from my past, coupled with the present circumstances I find myself in quite by chance, allows me to be happy and at peace with myself. So I am able to bring this book to no better a conclusion than to paraphrase the words of Spinoza and Einstein. As a determinist, I don’t hate anybody, I try not to look down on anyone or make fun of them, I avoid being annoyed by any person or becoming jealous of them – nor do I take myself, anyone else or indeed anything too seriously.

Thank you for reading what I have written.

Postscript

This book was previously published as *FREE WILL – Life without it*. However a number of people, who were kind enough to tell me that they had enjoyed reading what I had to say, informed me that they thought my title a poor one. Biologist and author, Dr Rupert Sheldrake, wrote that this was ‘off putting and does not make one want to read it’. As he also said that he found the book a ‘wonderfully fresh and sincere account’ and ‘written in a very engaging way’, I accepted his criticism about the label and decided (or rather – was determined) to give the book a rebirth under a new heading. In addition to this, some readers asked questions that could do with answers. A re-publication has allowed me to do this and update some of my statistics and explanations. Initially, I thought this might be achieved by adding a few extra paragraphs to existing chapters. Later, I realised that it would be simpler to write an additional chapter or postscript. This is what you are reading now.

First of all, I have modified my ideas on the subject of chance. Psychologist professor, Susan Blackmore, has pointed out to me that Determinism and our lack of free will are not entirely bound together. This I must accept. In the end, it all comes down to language and, like most words, determinism has grey areas where explanations are not clear cut. My mind has therefore come to an additional realisation that seems plausible. Perhaps a phenomenon - that we might call ‘original chance’ – actually exists. If so, this must surely occur in both the sub-atomic world and in our more familiar atomic one. Although Determinism insists that all occurrences must be the product of previous ones, there are bound to be instances when there is a complete balance between two, three, four or any number of equally possible determined outcomes. As there can only be one outcome, what occurs must be ‘purely’ stochastic as, given the same set of circumstances again, a different outcome might emerge. There will always be one question that Determinism cannot answer. If everything is the result of what has gone before, what started the process in the very beginning? Was there once a void with no time, no space and no matter or is ‘everything’ part of a never-ending or ever-starting cycle? Our language has no word for beyond infinity, so I will not attempt to answer that question or even speculate whether or not there has always been ‘something’.

I would like to consider the philosophic idea known as ‘Compatibilism’. I mailed a copy of my book to the British philosopher Roger Scruton, and was delighted he had found time to read it and write me a letter. Mr Scruton describes himself as ‘some kind of compatibilist’ and wrote that, for him, my book was ‘a clear, gentle and forthright expression of a tempting mistake’. I would like to attempt to explain why I feel certain I am not mistaken. Compatibilism appears to be a popular philosophy, both in Europe and America. If I understand it correctly, it allows its adherents to believe they can hold the buns in their hands after they have devoured them. A compatibilist (in this context) would be someone who realises – as do most people – that much of their individual lives must be shaped by the circumstances of their birth, education and previous experiences. And also, that they are at the mercy of the external circumstances in which they find themselves. However they feel that, nevertheless, they are able to exert free will and

make their own choices – which result in original thoughts and actions. I would like to ask them one question. Are you able to decide to extend your own life by even a moment? I am sure that most people would agree that the time of our own death is not negotiable. Whether we die young or old, suddenly – by accident, or after a long and protracted illness, we have no control over the time (or reason) for our demise in exactly the same way as we have no say in our beginning. If, therefore, we have no input whatsoever in these most dramatic moments of our lives – the start and end of them – how can it be of any consequence, or possible, to alter any of the tiny little moments in between. If, however, compatibilism means living a life on a plane where we all just think we have free will – as that is the only way our species can operate from day to day – yet, on a deeper plane, we are able at the same time to realise that this is just an illusion, I will go along with that. As a hard determinist myself, I am still programmed to ‘believe’ I make decisions – which I do all the time, even though I ‘know’ (when I think about it) that this cannot be so.

Although the rest of this book was only written two years ago, some of the figures I gave in my ‘Numbers’ chapter – relating to cosmology (stars, galaxies etc.) – are already obsolete. There is not a lot of point in giving all the revised calculations and estimates as, by the time this is printed or being read by you it will be miles – or light years – out of date again. Cosmology numbers expand almost every day! I will just mention that currently (2011) scientists now suggest that our own galaxy, the Milky Way, is far bigger than previously thought. It may be much larger, rather than smaller, than Andromeda – our ‘twin’ galaxy. Cosmologists now believe it contains over a billion stars (one scientist guesstimates three billion). It strikes me that if the extent of our own galaxy is still so unknown, the number of Galaxies and stars in the universe must be completely incalculable.

Those of us who are interested in the possibility of life on other planets, will be intrigued by the information now emanating from the team of experts studying the data so-far obtained from the Kepler spacecraft. This unmanned ‘space observatory’ was launched from Florida by NASA at the time I started to write this book. Kepler was designed to discover Earth-like planets outside our solar system, in a fixed patch of the sky, over a period of between three and four years. The initial results of the accumulated discoveries, up to September 2009, were released last month (Feb 2011). 1,235 probable ‘extrasolar’ planets had been found, in that period, circling just less than one thousand stars. Of these 54 were thought to be in habitable or ‘goldilocks’ zones, where the existence of life might be possible. From this, the space scientists deduce that about 6% of all stars have Earth-like planets. This would give us, perhaps, a hundred million in our galaxy alone, suggesting that life outside the Earth is commonplace and that some of the wildest ideas of science-fiction are not improbable. As the reality of convergent evolution on our own planet would appear to indicate, where there is biology, intelligent life will eventually emerge; these findings must surely evaporate the religious contention of man's predominance.

I would like to add a little here to my thoughts on ‘belief’. I felt privileged, late last summer, to spend a little time at what must be the oldest constructed temple of organised religion in the world. After mentioning Gobekli Tepe in this book, I knew I should certainly go and see it for myself. Gobekli Tepe, which translates as ‘pot-bellied hill’, is not the location of a single temple but a complex of them. They are situated a dozen or so kilometres north-east of the city of

Sanliurfa (colloquially *Uffa*) which is in the south east of Turkey, between the Ataturk lake on the Euphrates and the Syrian border. Although recognised as of archaeological interest, in an American survey of nearly fifty years ago, the importance of the site was not recognised until excavations were started there by German Professor Klaus Schmidt in 1994. Professor Schmidt recalls that on his first day he realised that he would be there for the rest of his life. Other than closing down the site for a brief period each winter he is still there, seventeen years later, directing his team on behalf of the German Archaeological Institute and says that at least another fifty years are needed (he is 58 this year) to complete what he has started.

For my back pocket Gobekli Tepe, nearly three times older than Stonehenge, must be the most exciting and important archaeological site in the world. Sir Arthur Evans, digging in Crete at the start of the last century, and Howard Carter's opening up of Tutankhamen's tomb in 1922 may have been more colourful and attracted more publicity, but Klaus Schmidt's endeavours tell us far more about our ancestors and the evolution of religion. I am surprised that this dig is so little known in the world outside Germany and Turkey but this may not last for long. I'm sure the professor does not want the site awash with tourists but, last year, I noticed that a motorway was nearing completion only a few kilometres away. This book is not about archaeology, so I will not go into long descriptions of GT. There is plenty to read and photographs to look at on the internet, which you will be able to find for yourselves. Although cave paintings in France and Spain (and on rocks in Australia) are older than Gobekli Tepe and very likely had some religious significance, GT is without doubt the earliest series of buildings (so far discovered) that must have been constructed by a large group of people. Klaus Schmidt thinks that it must have taken at least five hundred men, working together, to quarry the large monoliths, move them and then erect them. In my mind, this indicates one particular man with his group of followers exploiting other men, or – to put it more directly – slavery. However, it is possible that the builders were rewarded, or promised rewards, rather than coerced. We must remember that all this happened in the stone age, before the husbandry of animals – or the growing of crops – or the storage of large amounts of food – and before we had previously understood that 'tribes' existed. There is evidence that one of the reasons these temples are so well preserved is that they were completely and purposely buried, between a thousand and fifteen hundred years after they were constructed. Was this because later people (still in the stone age) had a new religion and were terrified of the gods that were thought to lurk there?

I would like to change my 'popular conception' conclusions in the last paragraph of chapter four. I was wrong. I can now see that my previous understanding, that human hunter-gatherers adopted some young wolves from which all present day dogs were subsequently bred, was something I had not properly considered. After reading Stephen Budiansky's book *The Truth About Dogs*, I accept that it was much more likely to have happened the other way round. A few wolves made the first move and ingratiated themselves with humans. Blossom's ancestors adopted mine. I have added Mr Budiansky's book to my Bibliography and recommend it to all those fascinated by the strange bonds between the Canine and Homo sapiens species.

Some people have asked me what I think will have happened to the human race by the end of the present century. I have no idea at all and know it would be foolish to make any predictions. When I consider all the changes that have occurred during my life span, most of which could not

have been predicted by my own grandparents, to try and foresee the world in which my grandchild will grow older would be pointless. I'm certain that the biggest change during my lifetime has been the explosion of the global human population. Statisticians tell us that our numbers have increased three and a half fold in the last eighty years - two billion in 1930 to seven billion next year (2012). They say that, encouragingly, the annual rate of increase has been declining for the past forty years and conclude that when we reach some figure, say 10 billion, the world population will 'stabilize'. As we currently have more than twice as many people being born than dying, I am not so optimistic. Actuaries working for the British government have recently informed us that one million people, alive in the UK today, will reach the age of 110 (10 million will reach a century). This must mean that some of the one million are likely to reach their one hundred and twentieth birthdays. The future is not only unpredictable, it is unalterable. Everyday, politicians and other public figures tell us they have decided 'this' or they are going to alter 'that' – but they are only really reflecting human society's cultural evolution. No politician, potentate, preacher or philosopher (or banker) has ever wilfully changed history by one iota since our species began. They are only part of the process, they do not activate it.

Frequently we hear people say 'if only', followed by an explanation of what they had done or, perhaps, what they had not done. They recall a 'mistake' that had altered their life for that year, that decade or, sometimes, for the remainder of their days. They had thrown in their lot with an incompatible partner, or had not married the one they nearly chose when that 'choice' was available. Possibly they had expanded a small business, at what turned out to be the wrong time or in the incorrect location. What should have resulted in almost certain success followed by a comfortable retirement, had been replaced by liquidation, bankruptcy and everything that brings with it. Or, perhaps – the most difficult scenario to live with, some very minor 'decision' or change of plans had led to the untimely death of a close family member or friend. If, however, we are able to understand what I am trying to say in this book, we will realise that logic must inform us that there are no 'if only's'. We are not able to initiate 'choices' or make 'mistakes'. If we were able to do so the whole concept of physical laws could not exist. If we can see this (perhaps this small book may help) and know we were never able to change what has happened in our lives, we should be able to eliminate self blame and guilt. This will alleviate regret. Few of us are likely to reach complete contentment but, if it is within our ability to understand the logical truth, it is possible to live with ourselves.

I must end by reiterating what I wrote in chapter 10. This little book cannot change the way you think about your life, unless your mind has led you to the point I am trying to make. If you are lucky enough to realise that you have no Free Will, you will be able to enjoy life more fully. You should find yourself (when you reflect) free of disappointment, regret, ill-temper, guilt or worry. At the end of my preface I write that we may require a simple answer to the question '*What am I doing here?*'. We are here for the ride – I hope we are able to enjoy it.

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