

PETER KLEIN

BEYOND GOD

WHY RELIGIONS
ARE FALSE, OUTDATED
AND DANGEROUS

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PREFACE

When we turn on our televisions, we are unfortunately no longer surprised to hear about a mass-stabbing incident, a van being driven into crowds or bombs being used to kill innocent people. We are all tired of the “terrorist” attacks that are still occurring all too frequently around the world. You hear the same rhetoric from political and community leaders, yet nothing changes: the world is no safer, nor does it appear that an end to the violence is in sight, based on the current ways of dealing with the situation.

Many people are afraid of openly stating their views on such issues for fear of being negatively labelled. Yet the only way out of this mess is to have frank and open discussions about the validity of certain widespread religious teachings. Only a small minority of people instigate terrorist attacks, and these atrocities continue partly because not enough people speak out strongly against the sources of these people’s beliefs. The unfortunate reality is that religious violence will continue as long as people are fearful of causing offence.

Even if you have not been affected directly by religious-inspired terrorism, it has almost certainly impacted on your life. The procedures for travelling, especially on aeroplanes, have become more onerous; attending large public events involves bag checks and screening; and many schools and businesses require extra security that was not needed only 20 years ago. The early 21st century has seen a gradual recession of our daily freedoms because of fear of various religiously inspired groups.

This is, however, not new. Although Islamic fundamentalism is the current main offender, before that Christianity espoused intolerance of others, and widespread bigotry and hatred was preached openly from pulpits. These preachings led to inquisitions, pogroms, the Crusades, entrenched anti-Semitism, forced conversions, and the killing and torturing of heretics, witches and homosexuals and other minorities. Before that, if we are to believe the stories in the Bible, genocide in the name of a god was also a part of the history of Judaism. Almost all religions have perpetrated violence in the name of their beliefs or gods.

The aim of this book is to share evidence and information about the history of humankind and life on Earth and the origins of some of the most important religious beliefs. At their core, most religions, particularly the three main monotheistic religions (Christianity, Islam and Judaism) have common ideas about the age of the universe, the first appearance of life on Earth and, even more importantly, how humans came to be (“made in god’s image”) and our relationship with other creatures. Until we accept the truth about this most important foundational information, we will never escape the many problems that are caused by religious teachings.

We will continue to be affected by these issues as long as we allow religious leaders to hold a level of educative power way beyond what they should have. We need to be teaching our children not only what to think, but more importantly *how* to think. We need to teach them how to accept or reject information and assess evidence for phenomena or beliefs. The scientific method is the only way of “knowing” these things; other views and “understandings” are purely *beliefs*. Until we do this, we will always be slaves to others and their teachings.

We must remember that only a few hundred years ago most people thought we lived on a flat planet, with the Sun circling us. It was only

after this long-held view was questioned and the scientific method was developed that we realized that this belief was in fact false. Questioning produced evidence that enabled us to see the truth. This book is all about questioning existing beliefs, in particular those associated with religions.

Since the blossoming of science, we have found out much about the universe, about life and about the laws that govern natural processes. Thanks to specialized branches of scientific research, such as chemistry, physics, biology and medicine, we have been able to improve both the quality of our lives and our life expectancies. Prior to the scientific revolution, there was little change in these facets of human existence and we bumbled along with only small, though sometimes significant, advances.

In the face of scientific evidence, religious leaders are now beginning to admit that religion is not about answering the “how?”; instead they claim that religion is the only way to answer the “why?”. However, one does not need to believe in a specific god or religion to come up with answers to “why?”; nor do answers based on “faith” carry any validity. Adding a god to the answer merely stops one from thinking further, and pre-supposes that the speaker knows that god’s mind.

The only way to get people to accept each other as all being basically the same is to eliminate those artificial distinctions that are taught from an early age. Often these barriers are too strong to be easily overcome unless one goes through an entire process of reviewing what one has learned since childhood. If children were never taught anything about the stories behind each religion, how many, as adults, would accept them as the truth? How many people would then choose to believe religious teachings? The stories of each religion are taught to children as facts. If you would not be happy for the stories of a different religion to be taught as facts to your child, why should it be right that the stories of your religion are indoctrinated into them. After all, children are just children worldwide. It is not until parents, or a whole community, teach these myths as facts that problems start.

It is amazing how many people, if granted just one wish, would ask for “world peace”. If it is such a common desire, why has it not happened? Is it because we can’t visualize what is required for it to occur? Or because we cannot imagine what such a world would look like? Is

it that we just don't recognize the major impediments, or is it because those impediments are a part of our long-standing, indoctrinated belief systems and therefore too difficult for us to cast aside?

Progressing towards this goal requires us to use our imagination *and* have the will to question and to make the choices that would enable the relevant important changes to occur. This will necessitate a slow, generation-by-generation shift in thinking, such as has occurred with many other societal issues – for example, with the acceptance of equal rights for women, that all citizens should be able to own land within their own country, that all citizens should be able to vote, and, currently, that any two people should be able to marry.

So much tragedy is created by people acting on what they believe to be true rather than on what they can demonstrate to be true. We should respect all people's rights, but not necessarily their beliefs, as the actions created by beliefs often infringe on other people's rights. Those who adhere to any religion are supporting systems that uphold faith as a virtue – that is, claims without evidence. While this situation is still accepted, anyone can justify any act. This is exactly what allows jihadists, for example, to behave as they do.

Although this book focuses mainly on religious belief systems, it is important to acknowledge that there are many other causes of the world's problems and a few of these will be touched on later, particularly in Chapter 3. Many writers have written excellent books on those other issues, including the conflict and oppression caused by nationalism or by political or financial greed.

Many of these problems, however, do not result from belief systems that are so obviously open to questioning or preach and cause such worldwide division. Without a doubt, tribalism will always be a part of humanity, but when it is based on mythology, falsehoods and bigotry and when it preaches an "us versus them" mentality to the point of causing violence, then not only should these beliefs be questioned, but surely we are morally obligated to do so.

* * *

So, this book mostly looks at the history and validity of religious belief systems and their current relevance to humankind. Why? Because religions are often based on just a few main texts and the default position

for their adherents is that any evidence contrary to the teachings in these texts is not as valid as “god’s word”. They insist that these old books are the best guide to how people should behave. One can see throughout history what tragedies this mindset has led to, with perpetrators being able to use the “Nuremberg Defence” – that they were only following religious rules and orders. Those who commit immoral, bigoted or violent crimes in the name of religion often believe wholeheartedly that they are doing right, that they are just following the commands laid out in their scriptures and that their behaviour is divinely ordained, even if others can see that they are wrong. Religious followers repeatedly state that faith and religious beliefs are central to being a good and moral person. What we commonly see, however, is faith being used as both a rationale and vindication for excluding or treating poorly or differently anyone who does not live according to that particular faith’s edicts.

Religions appeal to the narcissistic side of us because they make us feel that we are somehow more special than every other living thing on the planet, that we can interact personally with the creator of the universe and that we may continue to live on after our deaths in a “better place”. In contrast, secular thought has at its core the understanding that we have so much more to know and the belief that humanity need not suffer endlessly because of narrow religious views. Instead of looking at the sky and seeing a god, secularists look at the sky and try to understand the almost incomprehensible scale of things and how and why things occur – without the shackles of old belief systems. Secular thinking creates the opportunity to see all other people as just “other people”. Religions do not want this; they are happy to have divided and divisive societies.

Religious adherents often do not accept scientific evidence for phenomena because it contradicts the view of history set out in their religious texts. Studies have shown, for example, that a disproportionate percentage of the more religious, who reject the evidence for evolution and the timescales of the universe, also reject the evidence for human-induced climate change.¹ Repeated polling in America shows that between 40 and 45 per cent of the population believe the biblical narratives to be factual and not just metaphorical, and that life on Earth is less than 10,000 years old. Although the figures are lower

in most European countries, there is still a substantial percentage of the population there who believe this and make life decisions as if it were true.

This mindset is creeping into politics, especially in the United States, where Christian fundamentalists have recently been elected to and appointed to important government positions. With their anti-scientific views, these people have the potential to cause major global damage by ignoring the research carried out by thousands of scientists from many different disciplines. The appointment of Evangelical Christians to important political posts in the US government does not bode well for the future of the world and alarm bells should be ringing across the globe. We must call out these false beliefs or else the future of all life on Earth may be in peril. When the effects of doing nothing could be catastrophic, it is no longer acceptable for us to simply let people “believe what they want”. These are the policy-makers for our planet and their beliefs will affect the entire world.²

In the meantime, humans are slowly destroying the planet, and the rate of destruction is increasing as the world population explodes. We reached 1 billion humans around 1804, then 2 billion in 1927, 3 billion in 1960 and we are now at over 7 billion in the year 2017. What humanity and life on Earth needs is a slowdown or reversal of human population growth. Without this, environmental damage will increase, especially habitat destruction. According to the World Wildlife Fund, for example, “Some 46–58 thousand square miles of forest are lost each year – equivalent to 48 football fields every minute.”³ as a result of deforestation.

Pollution of waterways and the atmosphere, and the hunting to extinction of countless species also continue, yet most religious leaders still tell their followers to “go forth and multiply”, in a kind of religious arms race. Many religious leaders refuse to educate their followers about, or allow, simple contraceptive measures; hence they are partly to blame for the accelerating problems that our descendants will soon face. Only those with a secular viewpoint have the courage to promote the much-needed benefits of population control. While the Pope talks about caring for our environment, he still preaches against the use of contraceptive measures.

* * *

It is important to forewarn readers that some comments made or concepts raised in this book may offend. Strong, confrontational words are often required to get people to reflect on long-held beliefs. The purpose of this book is not, however, to offend individuals directly, but rather to question belief systems. I want to make readers stop and think, and then ask questions they may never before have thought of asking. I certainly hadn't thought about all of these ideas in any depth until fairly recent times, and it was often the most confronting facts and discussions that created the most thought-provoking moments.

Religions are still so much a part of most societies that we often don't have the mental space to consider all reasonable alternatives. No one should feel any guilt while reading this book if they haven't previously asked some of the questions raised or read many of the religious textual quotes. Most people grow up within the intellectual constraints that their society has placed on them, especially during the formative years of childhood and adolescence. I am sure that many people have had passing questions or thoughts about the issues about to be discussed, but it is hard to think further about them if there are few large public displays of similar views. And most people would prefer not to pursue such thoughts if it means questioning or abandoning the belief systems of their family and community.

To benefit from this book, you have to be altruistic and ask yourself whether, if you gave up certain beliefs, it might improve the world for your descendants, even if it causes you some personal discomfort. Those who have children or grandchildren are perhaps more likely to appreciate the need to make sacrifices to create a better life for later generations, but we are all capable of making this leap. This book asks this of the reader, and it also asks, towards the end: what sort of changes can each individual make to help us and our children have a safer and more equality-based existence?

In this discussion, we must keep in mind that there have been three main stages in the history of humankind, which might be termed the magical, religious and scientific. One would hope that in this scientific phase, using scientific methods, we should be able to make more objective decisions about how we live our daily lives, how we view and can accept all other people, and how we interact with all of the other creatures and environments around us. It really is 11:59pm on the "Age

of Religions” clock for humankind. It is time to move on.

To better conceptualize our possible future, however, we must first have an understanding of our past – how we arrived at this point and where we as human beings stand relative to everything else. We cannot begin to investigate or reject religious teachings until we first review and accept the evidence that questions the very foundations of them all. Where do we come from? How long have we been here? Are the stories recounted by religious texts supported by evidence, or are they myths? How do we know this? And how much supporting evidence is there for a secular view of the world?

We have no problem dismissing the creation stories and myths of many indigenous peoples around the world, yet often cannot see past the creation stories and myths that form the backbones of our own and the other prevailing major religions. Given that most religions make claims about the origin of life and humankind, and about the time-frames involved, we must start by investigating these claims.

AUTHOR'S NOTE

For quotes from religious texts, I have mainly used the following sources: www.biblegateway.com for both Old and New Testament quotes, and www.quran.com for quotes from the Koran. The dictionary definitions are from www.merriam-webster.com.

1

OUR HOME: THE UNIVERSE AND THE PLACE WE CALL “EARTH”

Currently, we know of nothing larger or grander than the entity we refer to as “the universe”. It is a realm of possibly infinite size, about which we are gradually finding out more and more. Many nations and organizations around the world are working together to contribute to our knowledge of what the universe is made of, its scale and shape, its age, and how it has developed and might continue to change. Space probes and satellites, terrestrial telescopes and scanners, even underground research facilities, are constantly gathering and sharing images and data that might help us better understand what is out there and how it came to be.

At the South Pole in Antarctica there is a complex known as Bicep2, which detects gravitational waves of the early universe and the effects of the “Big Bang”. On the high-altitude plains of the Atacama Desert in northern Chile stands a \$1.5 billion facility encompassing an array of 66 variously sized radio-telescopes, which was jointly built by scientific teams from Asia, Europe, North America and Chile. Called

ALMA (Atacama Large Millimeter Array), it gathers observations in millimetre and sub-millimetre wavelengths that may provide insights into the birth of stars during the early universe, as well as images of more recent local star and planet formation.

Scientists have been able to estimate the age of the universe using a number of methodologies, which include:

1. determining the ages of very old stars by understanding their life cycles and how quickly or slowly they have been burning up their energy
2. measuring the rate of expansion of the universe by measuring cosmic microwave background fluctuations
3. using radiometric dating techniques
4. utilising cosmological “redshifts” of various radiations.

The current, most widely accepted estimate is approximately 13.78 billion years, with an error margin of about ± 60 million years.

People often respond to such statements by asking, “But what preceded the birth of the universe?” Ongoing investigations in physics and cosmology are leading to a number of possible answers, including the “multiverse theory”, which suggests that the universe that we exist in is just one universe in a multitude of universes. These theories are fascinating but too complex to even try to explain here.¹

“The singularity at the Big Bang doesn’t indicate a beginning to the universe, only the end to our theoretical comprehension”
– Sean M. Carroll, *Cosmologist*

Theists – people who believe in a god or gods – often say, “That’s all very well, but surely there must have been a divine creator who set it all up in the first place?” On the surface this seems a reasonable question, but in reality all it does is move the responsibility one step further down the road, because as much as we can ask where the complex laws of the universe originated from, so must we ask where the even more complex divine creator came from? Suggesting an even more complex scenario is creating an even greater question, not the opposite. And if one can explain a god without a creator, then one should be able to explain a universe without one. The universe is, in fact, a simpler entity than a god.

Many theists often also argue, “A universe can’t come from nothing.” But invoking a god does not help because what were the building blocks that a god or gods used to create the universe? If they were something definable then there was always something there; and, if not, then the universe has still come from “nothing”. The answer is exactly the same.

Similarly, it is understandable that theists are not happy about the answer to why our universe exists being, “It just does.” Yet if you ask them why their god exists, they will provide the same answer: “He just does.”

We must accept that at this stage of human intelligence and knowledge there is nothing wrong with simply saying we don’t know, rather than creating an even more complex entity than the universe. Some questions may never be answered by *Homo sapiens*, but if science can’t answer them, then without doubt religions certainly cannot either.

We must remember that until 100,000 years ago, our brains evolved to survive and avoid predation on the plains in Africa, and it is still only a relatively short time (on the evolutionary scale) since then. Understanding concepts of the extra-large (the universe, galaxies and so on) or the extra small (atoms, quantum mechanics and the like) does not come intuitively to the human brain. For tens of thousands of years, until we began to understand gravity in the late 1600s, it was beyond most people’s comprehension that we could live on anything but a “flat earth” – otherwise we would surely fall off. It is still hard to explain this to many people. Take a child or an adult from a less educated background and show them a globe with little people attached and ask how they can all possibly stay on.

There are thought to be over 200 billion galaxies in the universe – galaxies being vast collections of stars and planets – with each one containing maybe 200 billion stars and planets. This figure is based on observations made by the Hubble Space Telescope, which can reveal thousands of galaxies in a single composite picture.

We live in *one* of those 200 billion galaxies, and call ours the “Milky Way”. It’s a spiral galaxy approximately 100,000–120,000 light years across, which means that if we could travel at the speed of light (which we can’t), it would take over 100,000 years just to traverse our own galaxy. And our solar system, with the eight planets whose names are

so well known to us, plus our star, the Sun, make up just a speck in our galaxy, located on the edge of one of the concentrations of gas and dust called the Orion Arm.



*Hubble Ultra deep field view of distant galaxies
(courtesy NASA and STScI)*

We use light years to measure space because it is just too huge to comprehend or explain in kilometres or miles. The speed of light is approximately 300,000 kilometres per second, which equates to 9.5 trillion kilometres in a year. In real terms, this means that the light generated from the Sun takes just over eight minutes to reach us here on Earth; so when we look at the Sun, we see it as it was about 8 minutes ago, not how it is now. This is fascinating, because if intelligent life forms existed on a planet 70 million light years away (which is not that far, relative to the scale of the universe) and those beings were looking at Earth through a super-powerful telescope, they would see the dinosaurs roaming the surface of our planet. The images of *our*

existence wouldn't reach them until long after we were gone. Likewise, when we look at very distant stars through a telescope, although we can see them, they may actually no longer exist, because their light has taken such a long time to reach our eyes. And the light we see from distant galaxies via today's advanced telescopes had been travelling for billions of years before it was photographed. So, when we look at things in "outer space", we are actually looking back in time.

How old is Earth?

Okay, so now we have an understanding of what is around our planet, but what about Earth itself?

For the last few thousand years, people have theorized about the age and history of our world, using a variety of approaches. Some early scholars (notably ancient Greek and Middle Eastern thinkers) suggested that as there were no written records prior to a certain time, Earth must have been created then. Religious authorities counted the lifetimes described in the Bible to come up with an age for Earth of approximately 6,000 years.

In 1896, the French chemist Henri Becquerel discovered and began to study and understand the phenomenon of radioactivity, whereby certain elements decay into others by shedding atomic particles. He realized that the ratio of atoms in the original element to the decayed element could be used to determine the age of a substance if you knew the rate of decay of the original element, commonly expressed as its half-life, or the time it takes to shed 50 per cent of its atoms. This led to the development of radiometric dating, which is the most common method of determining the ages of earthly materials.

Through this method and other corroborative techniques, the age of Earth has been determined to be 4.54 billion years old, with a margin of error of 1 per cent. As Earth was formed by an accretion method, whereby it slowly increased to its current size by gravitationally pulling in nearby rocks, dust and debris, there was no single point in time at which Earth could be said to have come into being.

A designed universe?

All of this information should already demonstrate that the notion

that humankind was shaped in the “image of god” and that we are the pinnacle of a god’s creation is purely egocentric, small-minded, and wishful thinking. The religious viewpoint appears to regard the existence of the rest of our Milky Way galaxy as insignificant, never mind the rest of the universe! And it assumes that the universe was finely tuned for our benefit, while in fact 99.9999999999 per cent of it is at best indifferent to human life and most likely inhospitable to us.

If theists reach the conclusion that the universe must have been designed by a god (by having only a simplistic look at it) what then do these believers think a universe that wasn’t designed by a god would look like? I would say: just like this one! Theists have a damn big job ahead of them explaining the purpose of the other 99.9999999999 per cent of the universe if it was created by a god whose primary focus is humankind on earth, whereas without the involvement of a god, the presence of the rest of the universe requires no further explanation.

Despite supposedly having been written or inspired by the creator of the universe, the old religious texts, such as the Torah, the New Testament and the Koran, contain no enlightening comments about the universe, no observations that would not have been visible to the naked eye. Religious thought creates this shallow idea that the universe has no meaning without the presence of humankind, whereas scientific evidence indicates the opposite: that the universe would exist just fine without us. Moreover, it’s likely that among the billions of galaxies and billions of planets within each galaxy, there exist other life forms. And given the timescales involved, it’s possible that some of these life forms are far more advanced than humans.

2

HOW DID WE GET HERE?

At the outset, we must make it clear that as yet we do not have any definitive evidence as to how the first animate life began on Earth. Four and a half billion years ago, our planet was far different from the world we currently see. There were no water-filled oceans, forests or living things. It was a rocky planet obviously devoid of any life, with atmospheres that would be toxic to current life forms.

It did, however, encompass a suitable, nutrient-rich mix of elements from which the first complex chemicals and, likely, amino acids were able to form. Today, scientists are continually experimenting and assessing data to work out how animate life then developed, in a collaborative process similar to the attempts to understand the scale of the universe.

There is much interest and research into the field known as “abiogenesis” the process by which non-living substances such as simple organic compounds become more complex until they can be considered life forms. Viruses, which we have only become aware of in recent

times, are one such interesting form of life. They carry genetic material, reproduce and evolve through natural selection; however, they lack key characteristics (such as cell structure) of more sophisticated life forms. Because they possess some but not all such qualities, viruses have been described as “organisms at the edge of life” or “replicators”.

Given the myriad of physical properties that exist in the universe, it was highly likely that such complex chemical interactions would eventually happen somewhere. When science is eventually successful in providing strong evidence that life can form this way, it will finally prove that a god was not required to create life. From that moment on, all of humankind will have to finally accept Nietzsche’s famous comment that “God is dead”.

For the first few billions of years on Earth, life was extremely simple. Gradually, multicellular life forms came into being, which then begat more and more complex forms of life. This process, evolution, happens on a time-scale that in most cases is imperceptible, spontaneous alterations, or mutations, leading to tiny changes from generation to generation. Evolution does not involve one creature giving birth to a completely different creature; nor are there simplistic “hybrids”, where an animal is half one species and half another. The change is so gradual that if you look at only one or two or even a few preceding generations, the differences will not be apparent; however, if you can examine hundreds of generations over thousands of years, you will sometimes start to see distinct physical changes. For example, all of the varieties of dogs that we have as pets, from the large Saint Bernard to the tiny Chihuahua, are derived from a common wolf ancestor that lived just 10,000 years or so ago. Much of this selection process was accelerated by human intervention, but it is still evidence of the changes that can occur on a relatively short evolutionary timescale.

Even if no fossils were ever found (and only an incredibly tiny number of all living things do fossilize), boundless evidence and traces of the evolutionary process could still be identified. They are evident in DNA and the differences between species, in the geographical distribution of plants and animals, and in the embryological development and comparative anatomy of all living things.

For example, present-day humans retain many physical and behavioural attributes that evolved for a particular purpose but are no longer

required. These include the appendix, coccyx (tail bone at the base of our spine), wisdom teeth, nipples on males, hair on various parts of the body, the paranasal sinuses, and a variety of redundant muscles, such as those that can move our ears forwards, which originally allowed us to better detect approaching threats. On this erratum list, one of the top contenders for evidence of a change in the evolutionary pathway is the recurrent laryngeal nerve. In many animals, this nerve, the tenth of the twelve cranial nerves, emerges directly from the brain to supply the throat and laryngeal region. The interesting thing about this nerve is that in our ancestors, the tetrapods, from a few hundred million years ago, the nerve travelled along a short path from the brain to the gills, passing around blood vessels from the heart. In modern mammals it was “trapped” below these blood vessels and, as mammalian bodies elongated and the heart moved further from the brain, so too did this nerve have to elongate. As a result, it does a U-turn after descending down into the chest towards the heart and returns back upwards quite a distance to get back to its area of innervation.

This anatomical pathway is especially odd when one then looks at its path in the giraffe. It only needs to travel a distance of 2 feet, yet it commences at the base of the brain, runs down the giraffe’s long neck to its heart and then ascends back up the neck to the mouth region, a total of up to 30 feet! If this is “intelligent design” then the designer is certainly not very intelligent. Education is the only way to enlighten people who still deny evolution.

There are also many physiological and behavioural remnants of our ancestry, including “goose bumps”. This mechanism of making hairs stand on end evolved to aid heat retention and to make the individual look larger. Today, it is of little use to humans but remains helpful for our mammalian cousins who are far more hirsute than us.

“We are certainly wonderfully developed, but we are not wonderfully made.” – Richard Dawkins, Evolutionary Biologist

Design flaws

There is amazing complexity in the natural world, but there is no sign of perfect or intelligent design. There are fish that live at the bottom

of the ocean with eyes that are non-functional, since there is no light there. There are birds with token wings that cannot use them to fly. In fact, there are countless features retained by living creatures that are purely remnants of their evolutionary development.

As much as we like to be told that we are “the pinnacle” of creation, we in fact carry many redundant parts in our bodies and a great deal of redundant genetic information, proteins and other chemicals. Much of our DNA contains non-coding base pairs (material in our chromosomes that appears to be completely redundant) and there are well over a thousand genetically-related diseases. If a god created us, why did he create so much waste and so many built-in faults and time-bombs?

We are just a point on a branch that is extending and will continue to grow and change. We are neither an end-point nor a supreme creation. Yes, we are the most powerful and influential creatures currently on the planet, but we are in fact very limited in our abilities. We cannot inhabit the 70 per cent of the planet covered by the oceans, seas, rivers and lakes. On land we can barely exist in the desert or cold regions and we cannot survive at very high altitudes. In fact, we humans can only live comfortably on a very small proportion of our planet’s surface.

We do not possess enormous body strength like elephants, or arm strength like gorillas, or jaw strength like crocodiles – we have to cook most of the foods in our diets to soften them for our relatively weak jaw muscles. Our vision is limited to what we call the “visible spectrum”, a relatively narrow range of all that can be observed. Bees and many other insects, as well as a number of other animals, can observe the world in the ultraviolet range, beyond the “visible spectrum”. Plant species that depend on insect pollination often display colours and patterns that we humans are only able to see with special lighting but that are vivid to certain insects. Many birds can see things in the ultraviolet range and some have markings on their plumage that are only visible in such light. The distance range of our vision is quite limited too. We do not have “eyes like a hawk” and most people by middle age require assistance to see up close or at a distance.

Our sense of smell seems almost feeble when compared to many creatures, such as dogs, which are able to detect what we would call tiny traces of scents. A number of animals utilize senses that we cannot even begin to comprehend. For example, sharks, rays and

platypuses have electroreception; bats have echolocation; snakes have infrared detection; and bees and pigeons can sense and utilize Earth's magnetic fields to navigate.

We are also not the only creatures to have an understanding of "self". There have been many experiments that show some sense of self among a number of different species. In the mirror self-recognition test, an animal is habituated to a mirror for a period of time (so that it begins to understand that its reflection is not threatening); then the animal is anaesthetized so that a single or multiple dots can be painted or stuck on its body without it knowing. The animal is then allowed to wake and look in the mirror. A number of animals began to touch the spots or even try to remove them.

This was summarized very well by Professor Marc Bekoff, Professor Emeritus of Ecology and Evolutionary Biology at the University of Colorado, Boulder:

So, while animals might not ponder life and death the way humans do, they still may have some sense of self ... Not only are some animals self-aware, but also that there are degrees of self-awareness. Combined with studies by my colleagues, it's wholly plausible to suggest that many animals have a sense of "mine-ness" or "body-ness". So, for example, when an experimental treatment, an object, or another individual affects an individual, he or she experiences that "something is happening to this body". Many primates relax when being groomed and individuals of many species actively seek pleasure and avoid pain. There's no need to associate "this body" with "my body" or with "me" (or "I"). Many animals also know the placement in space of parts of their body as they run, jump, perform acrobatics, or move as a coordinated hunting unit or flock without running into one another. They know their body isn't someone else's body ...

Some people, don't want to acknowledge the possibility of self-awareness in animals because if they do, the borders between humans and other animals become blurred and their narrow, hierarchical, anthropocentric view of the world would

be toppled. But Darwin's ideas about continuity, along with empirical data and common sense, caution against the unyielding claim that humans and perhaps a few other animals such as other great apes and cetaceans are the only species in which some sense of self has evolved.¹