Evolved-God Creationism

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A View of How God Evolved in the Wider Universe

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FOREWORD

After the collapse of the Soviet Union, the most important ideological difference on Earth is probably that between creationism and evolutionism. This book reconciles and extends them.

Neither science nor religion has provided adequate answers to the fundamental questions on the origin of our universe. This book provides logical answers consistent with what we know.[1] Scientists tell us that our universe originated about 14 billion years ago from a Big Bang.[2] But what made the Big Bang happen? Science has no answer. If God created the Big Bang, who created God? Who created the Creator who created God? Why does the universe exist? In this book, we attempt to provide logical answers for these seemingly unanswerable questions. From five compelling axioms, it is proven that God evolved in the wider universe and created our sub-universe (likely in the Big Bang) or one identical to it. [Here, "God" is just defined as the creator of our universe; it may not be the same as the "God" used in some religions.] The basic scientific paper providing this proof has been published in the *Journal of Cosmology*. [The *Journal of Cosmology* is edited by Dr Rudolf Schild, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA and other scientists from universities across the US, UK, and Australia, including Sir Roger Penrose, who shared the Wolf prize in 1988 with Stephen Hawking.]

Simple materialism, which is defined to include the belief that things exist by themselves and are uncreated, is inconsistent with the scientific consensus on the short history of the Big Bang as being of no more than 14 billion years ago. This is much less than 10 to the power of 18 seconds. The building blocks of proteins polypeptide chains of amino acids have degrees of freedom in folding in the order of 10 to the power of 143. Incorrect folding leads to malfunctioning. Even if a thousand trillion different ways of folding were tried in every second since the Big Bang,

[1] At least this is true if we confine "what we know" to knowledge with some degree of scientific consensus.

[2] First due to Georges Lamaitre in 1927, the Big Bang Theory won the acclaim of Einstein as "the most beautiful and satisfactory explanation of creation which I have ever listened to" (Greene 2011, p.12). Some believe that the Big Bang might be a Big Bounce from a previous universe (e.g. Rovelli 2017, Ch.8).

there would not be enough time to try more than 0.0000……1% of the 10^{143} possible ways (Levinthal's paradox). It is true that evolution does not proceed in this meticulous way. Nevertheless, it is still outrageous to believe that, in a natural, uncreated universe, random matter may evolve in less than 10^{18} seconds to allow the emergence of mind or subjective consciousness with creativity. Simple materialism also cannot explain such peculiarities of our universe like Einstein's relativity and quantum oddities, not to mention the narrow ranges of many constants of nature beyond which a stable universe, and hence life, is not possible. Why do lengths contract by the exact same degrees with speed to make light seem to be the same speed to different observers, one rocketing up, one rocketing down, and one rocketing sideways?

Though Darwin had doubts about a beneficent and omnipotent God, he also could not "anyhow be contented to view this wonderful universe, and especially the nature of man, and to conclude that everything **is the result of brute force**".[3] As you read this book, you will find logical answers to many of these fundamental and yet unanswered questions, as well as an explanation of Darwin's puzzle. The final chapter, "Some Daily Life and Moral Philosophical Implications of Our Results" may also be of particular relevance to many readers.

[3] From Darwin's letter to Asa Gray, May 22 1860, as quoted in Ramachandran (2012, p.293).

1. THE FAILURE OF BOTH SCIENCE AND RELIGION IN EXPLAINING THE ORIGIN OF OUR UNIVERSE

Though virtually all scientists are in consensus that our universe originated about 14 billion years ago in the Big Bang, they cannot explain the Big Bang itself. Scientists "are in agreement that the universe began as an infinitely dense, dimensionless point of pure energy. The laws of physics break down in this circumstance, referred to as a 'singularity'.[4] As it stands thus far, scientists have been unable to interpret the earliest events in the explosion, occupying the first 10^{-43} seconds (one tenth of a millionth of a millionth of a millionth of a millionth of a millionth of a millionth of a millionth of a second!)" (Collins 2007, p.65). On the early history of the Big Bang, see Weinberg (1977), Cyburt et al. (2016), and Penrose (2016).

After 10 to the power of negative 43 of a second, scientists believe that:

- "From 10^{-43} to 10^{-34} seconds, the temperature fell from 10^{32} to 10^{27} degrees Kelvin. The Universe was pure energy. Three of the four great forces of the Universe were still unified: the strong nuclear force, the weak nuclear force and the electromagnetic force".

- From 10^{-34} to 10^{-10} seconds, the temperature fell from 10^{27} to 10^{15} degrees Kelvin. This epoch saw the separation of the strong nuclear force from the weak nuclear force and the electromagnetic force, which were still unified.

- "From 10^{-10} to one second, the temperature fell from 10^{15} to 10^{10} degrees Kelvin. The weak nuclear force and the electromagnetic force separated. The annihilation of matter and anti-matter ended, leaving just one billionth of the original matter, which is all the matter that exists today" (Auping 2018).

In other words, within less than a second after the Big Bang, the temperature fell by a thousand billion billion times! In addition, huge

[4] Some argue against singularities and infinities; see, e.g. Rovelli 2017, p.202.

changes in the nature of physics took place within this tiny fraction of a second. This is a remarkable fraction of a second indeed! What else other than creation could have caused these dramatic changes within such an extremely brief instance?

The famous physicist Stephen Hawking recently (14 March 2018) passed away at the age of 76. Together with Newton and Einstein, he was regarded by some as one of the three great physical scientists. Scientists were so defensive about the inability of science to explain the Big Bang that they (including Hawking) regard the question: "What was before the Big Bang?" as meaningless. They say that this question is as meaningless as asking: "What is north of the North Pole?" I criticize (Ng 2011b) this view as "Earth-only-ism". On the Earth itself, nothing is north of the North Pole. However, going beyond Earth, the question: "What is north of the North Pole?" is not only meaningful, it has a valid answer: Air, space, and the Northern Stars (Polaris). Thus, I do not accept the narrow "scientific" view of ignoring the period before the Big Bang.

The inadequacy of science here is described by an American astronomer and planetary physicist as: "At this moment it seems as though science will never be able to raise the curtain on the mystery of creation. For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries" (Jastrow 1992, p.107). However, the theologians have not done any better than the scientists, as shown below.

The religious answer that the universe was created by God has its own problem. How did God come about? The answer that God exists by itself is subject to the following criticism. If I show you a clock, you may ask which company manufactured it. If I answer that I just picked it up from the ground, you will say: "Before it was lying on the ground, some company must have first manufactured it". If I tell you that it was not manufactured but that it was there to begin with, you will not accept the answer as valid. If I tell you that the clock was made by an automatic clock-making machine, you will ask: "Who or which company made the clock-making machine?" If I say: "That machine exists by itself", you will regard this as an even more unacceptable answer. If even the clock cannot exist by itself, the clock-making machine also, with stronger force, cannot exist by itself. Instead of accepting that the machine exists by itself, it is better to accept that the clock exists by itself. Similarly, instead of

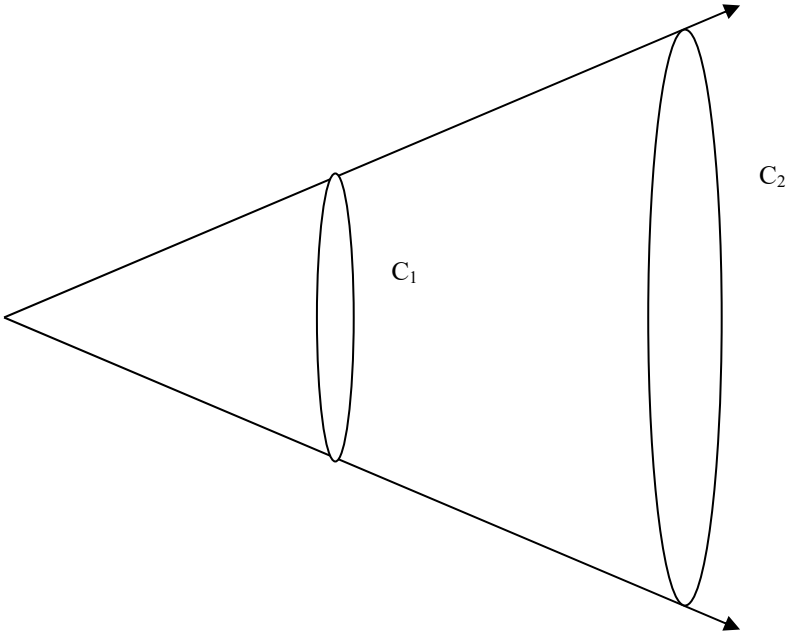
accepting that God exists by itself, it is better to accept that the universe exists by itself.

On the other hand, if I show you a rock and told you that I had just picked it up from the ground, you will accept that as a valid answer. A rock may lie on the ground by itself (or evolved somehow) without being purposefully created by some person or company. Is our universe more like a rock which may exist by itself or a clock which must be created? If the properties of our universe were like those posited in Newtonian physics, then it may be regarded as similar to a rock that may exist by itself.[5] The Newtonian equation for the force of mutual attraction being proportional to the multiplication of the two masses divided by the square of the distance between them is also straightforward, intuitive, or "natural". The larger the masses, the larger the attraction; doubling the distance reduces the attraction by four times. This is so because a doubling of the radius of a ball increases its circumference by four times. A doubling of the distance also increases the area of potential attraction by four times, or in other words, spreads the attracting force to an area four times as large, hence making the force of attraction only a quarter as large. This point in our three-dimensional space is illustrated somewhat imperfectly in the following two-dimensional diagram, where a doubling in distance increases the area by four times from C1 to C2.

Newtonian physics also requires 5+2=7. However, Newtonian physics cannot explain the observed fact of the constancy of velocity of light to observers of all frames of reference. Take an instance where you are travelling upwards (at a constant speed) on a rocket, your friend is travelling on a rocket westward, and a third object is travelling northeast. Then, the velocities of that object relative to you and to your friend are different. However, if that third object is light, the two velocities are the same. Light appears to be travelling at the same speed to observers in all frames of reference. This was a very puzzling fact that no one could explain until Einstein advanced the special theory of relativity in 1905.

[5] By a Newtonian universe, I mean a universe that is governed by Newtonian mechanics (defined to be classical mechanics before Einstein's theory of relativity; classical mechanics is sometimes taken to include and sometimes taken to exclude relativity).

This explanation is so weird that it involves 5+2=6.99…. and 0.99c + 0.99c = 0.999…c, NOT 1.98c, where c is the speed of light.[6]



If a very long train is travelling at a (constant) speed of 50 km/hour on a straight railway, and a car on top of the train is travelling in the same direction at 20 km/hour, the speed of the car, intuitively, and according to Newtonian physics, to an observer who is standing still on the platform appears to be 50+20=70km/hour. However, according to Einstein's theory, it is just 69.99… km/hour. Similarly, length is shortened and time is delayed when an object is travelling fast. Such changes could explain the constancy (or invariance) of the velocity of light to observers in all frames of reference. However, no one could explain why and how we have such

[6] We learn in school that the speed of light is 300,000,000 meters per second. I was much troubled by this exact round value ever since high school. I was thus much relieved to learn that it is really an approximation of 299,792,458; see https://phys.org/news/2017-10-scientists-key-fundamental-constants.html

peculiar occurrences of shortening and delaying, giving us the constancy of the velocity of light.

There is an old story about a person who went into the forest to get wood, and stumbled upon two older people playing chess under a tree. He watched the match for about half an hour before returning home to find that his children had passed away hundreds of years ago. Such fairy tales become possible under Einstein's general theory of relativity if the location is under some gravitational influence that changes the speed of time. This also suggests that some form of time travel into the future is a possibility. By going into a state of slower time, you age much slower and hence may "travel" into the future this way. However, travelling backward in time should still be impossible. No matter how fast time passes, you can only age faster and die earlier; you cannot go back into the past.

Here, the theory of relativity is not being challenged. Its predictions have been proven to be true many times and it is accepted by virtually all scientists. However, as our universe behaves so strangely in accordance with Einstein's theory, it is difficult to believe that it is and was just like this without a creator. In fact, apart from the peculiarities of relativity, there are many other things that we take as given, but further reflection may make us wonder. For example, things expand when getting hotter and contract when getting colder.[7] If this rule is observed throughout, fish will be frozen to death in winter. As the waters in lakes, rivers, and seas get colder as winter comes, they contract and become denser and sink to the bottom, with the warmer parts of the water coming up to the surface to get colder again. If this process is not broken, most lakes, rivers and even shallow seas will all become frozen throughout their full depth, killing all the fish within. This will be so because the coldest parts go to the bottom, becoming frozen first. With the atmospheric temperature becoming cold enough, water at all levels of depth will then be frozen. However, in our world, water becomes less dense below 3.98C, reversing the general rule. This makes the surface water become frozen first, turning it into a layer of material which is a bad conductor of heat, protecting the water at deeper levels from being frozen and saving the fish from dying. Isn't this wonderful? So why does water reverse the general rule of becoming

[7] This can be seen thus. A lower temperature means that the molecules are moving more slowly. Thus, they are less able to overcome the attractive intermolecular forces drawing them closer to each other.

denser when getting colder just a few degrees above its freezing point? Is it about saving the fish? Shouldn't we think about this?[8]

If behaviour or operation in accordance with Einstein's theory is not strange enough, try that in accordance with quantum physics (also verified and accepted) which also describes our universe, especially at sub-atomic level. In fact, quantum physics is so strange that it is impossible even to understand. It is well-known that Richard Feynman, a Nobel Prize laureate in physics said that, if you think you understand quantum physics, you don't understand quantum physics! About ten years ago, I was at Monash University chatting with Dr Dyuti Banerjee, a colleague. I told him that while doing my PhD from 1967 to 1969, I spent two weeks not doing any economics but reading up on Einstein's theory and understanding it. About two decades later and having become a full professor in economics, I also spent two weeks reading up on quantum physics. Though understanding virtually everything that I had read, I still could not understand quantum physics. Dyuti then lent me a book by Feynman. After reading it, I found what Feynman said about the impossibility of understanding quantum physics as mentioned above. While returning the book to Dyuti, I showed him this passage and told him, "I told you last week that I failed to understand quantum physics; from this passage of Feynman, perhaps I did understand a bit!"

There are many very strange features of quantum physics. For example, there is the wave-particle duality of photons. A photon behaves like both a particle and a wave. This in itself is strange but not terribly so. The much stranger aspect is that whether a photon is recorded as a particle or as a wave depends on whether it is observed (by human experimenters) to pass through one of the two slits (in the famous experiments of Thomas Young). If observed, it is registered as a particle consistent with the observation; if not observed, it is registered as a wave (with interference typical of waves). This is strange but may still be interpreted as the effect of observation on the behaviour of photons. What is strange to the level of incomprehension is revealed in the delayed-choice experiment of John Wheeler (1978; see also Jacques et al. 2007)[9]. Even if the choice to

[8] Water slightly reverses the process of becoming denser below 3.98C. At freezing, it jumps by 9%, becoming less dense, ensuring that ice floats on the surface. This is due to the bonding of the hydrogen atoms within the structure of the water molecules, creating more space in between the atoms within the molecules.

[9] These were originally thought experiments, but were later realized by other researchers, including Jacques, et al. (2007, p.968) who conclude that 'Our realization of Wheeler's delayed-choice gedanken experiment demonstrates that

observe or not to observe is made ***after*** the photon has passed through one slit (if it behaves like a particle) or both slits (if it behaves like a wave), the recorded result still conforms to whether it was observed or not. It appears as if there is either reversed causation (the ex-post observation caused the photon to behave as a particle or a wave in advance) or as if the photon knows in advance whether the experimenter will or will not observe it and it can behave accordingly in advance! This is stuff from fantasy land! Is it credible that natural things that exist by themselves behave so strangely?

There are more incomprehensible phenomena in quantum physics. The well-known Schrödinger's cat is both dead and alive at the same time! The quantum uncertainty is intrinsic and happens spontaneously without any cause. A pair of "entangled" particles in two different places light years apart involves instantaneous effects of the observation of one on the other (the quantum entanglement as confirmed by the Bell experiments; see, e.g. Barrett, et al. 2002)!

On top of the verified peculiar nature of how things in our universe behave in accordance with Einstein's theory of relativity and with quantum physics, there are more recent (but not yet fully verified) fanciful theories such as the string theories, M (M for membrane, mystery, magic) or brane theories, and loop theories which are equally as far-fetched, if not more so. Some of these theories require 10-dimensional space. [Incidentally, at least a four-dimensional space must be accepted. Those firmly believing that space (not counting the dimension of time) is no more than three-dimensional have not spent enough time trying to catch mosquitoes. You see a mosquito clearly between your two big palms and clap. Oops! Nothing! Where has the mosquito gone to but through a fourth dimension?!][10]

Even ignoring the properties postulated by these fancy theories, our universe is far from being something like a rock. There exists a host of peculiar sub-atomic particles, including positrons, quarks, leptons (electrons and neutrinos), bosons, etc.; 61 "elementary" particles altogether are

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the behavior of the photon in the interferometer depends on the choice of the observable that is measured, even when that choice is made at a position and a time such that it is separated from the entrance of the photon into the interferometer by a space-like interval. In Wheeler's words, as no signal traveling at a velocity less than that of light can connect these two events, "we have a strange inversion of the normal order of time. We, now, by moving the mirror in or out have an unavoidable effect on what we have a right to say about the already past history of that photon"'. The quote within quote is from Wheeler (1983).

[10] This is just a joke, not a serious argument.

known so far (Baggott 2017, p.55). "Every second, your body is penetrated by billions of neutrinos with virtually no consequences" (Davies 2007, p.103). Moreover, "the micro-world is not just a ragbag of random objects, but a harmonious realm in which the components possess deep, albeit abstract, interrelationships" (Davies 2007, p.106). There are matter, anti-matter, dark matter, dark energy, negative energy or exotic matter (Ford & Roman 2000), and perhaps even quintessence (Ostriker & Steinhardt 2001).[11] A fermion (including an electron) takes 720º (instead of 360º) to rotate to its original state. Thus, "the universe is not only queerer than we suppose, but queerer than we can suppose" (Haldane 1927).

Our universe is extremely bio-friendly

First, in our universe, there is a good supply of elements to make biomass. In particular, the element carbon has elicited the wonder of scientists who are familiar with its structure: "Some super-calculating intellect must have designed the properties of the carbon atom, otherwise the chance of my finding such an atom through the blind forces of nature would be utterly minuscule" (Hoyle 1981, p.12). For life as we know it to emerge and to persist, we also need liquid water, warmth, a stable environment, and a very long time for living things to evolve.[12] At least on our planet Earth, we have all these conditions. Of course, our planet is only one out of potentially many trillions (possibly quintillions) of planets in our universe. The anthropic principle suggests that our planet must be suitable for us, as we are here to engage in the discussion. If very few of the many trillions of planets in our universe are suitable for life, then perhaps our universe is not that bio-friendly. On the other hand, one may argue that the fact that life, especially highly intelligent life, exists in some part of the universe at all already suggests that our universe is bio-friendly. Let us look at the overall picture.

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[11] The existence of dark matter and dark energy has not been confirmed and has been challenged as being based on Newtonian physics; using Einstein's general relativity theory, perhaps no such matter and energy need to be posited, as argued by Peebles (1993), Cooperstock & Tieu (2005), Wiltshire (2007), Ishak & Sussman et al. (2008), Gibson (2013), Auping (2018, ch. 2).

[12] It is true that different forms of life may be possible. This reduces the degree of bio-friendliness of our universe somewhat. However, regardless of whatever forms of life exist, the emergence of life in itself seems rather special; hence, our point is not affected.

Constants of nature

To begin with, for more than 60 years (Dicke 1957), it has been observed that "the constants of Nature are rather bio-friendly. If they are changed by even a small amount the world becomes lifeless and barren" (Barrow 2003, p.168; See also Naubmann 2017). In the words of Linde (2017), "A careful inspection of the values of the different parameters has led to the suggestion that at least a few of those constants of nature must be fine-tuned if life is to emerge. That is, relatively small changes in their values would have resulted in a universe in which there would be a blockage in one of the stages in emergent complexity that lead from a 'big bang' to atoms, stars, planets, biospheres, and eventually intelligent life". (The wording of "fine-tuning" might have originated in Davies 1982, p.60; see Auping 2018, first page of Ch.3.) In the words of Penrose (2004, p.730): "The Creator's pin has to find a tiny box, just one part in $(10)^{123}$ of the entire phase-space volume, in order to create a universe with as special a Big Bang as that we actually [have]".

There are a number of different aspects involved, including the following:

- The space in our universe is three-dimensional. It has been shown that only if space has exactly three dimensions can we have stable planetary systems and stable atoms (Ehrenfest 1917).

- If the initial power of the Big Bang had been different either way by as little as one part in 10^{60}, it would either have collapsed or expanded too far for the formation of galaxies, and life as we know it would not exist. (As summarized by Sarkar 2007, p.134, based on Collins 1999 and Leslie 1989; Sarkar is not in favour of the design argument. Leslie in turn bases arguments on calculations by S.W. Hawking and others; see Leslie 1989, Section 2.4.)

- If the strength of gravity [this refers to the constant of proportionality g, not the inverse square principle] had been different by one part in 10^{40}, then life-sustaining stars like our Sun would not exist (Sarkar 2007, p.134).

- If the mass of the neutron were not about 1.00138 times that of the proton, they would decay and life as we know it would not be possible (Sarkar 2007, p.134).

- If the electromagnetic force were slightly stronger or weaker, life as we know it would not be possible (Sarkar 2007, p.134).

- "ε, whose value is 0.007, defines how firmly atomic nuclei bind together …If ε were 0.006 or 0.008, we could not exist" (Rees 2000, p.2). Expressed differently, "If the strong force [which keeps the protons and neutrons in atomic nuclei together] is slightly stronger or slightly weaker (by maybe as little as 1%), then the binding energy of the nuclei would change… devoid of life" (Davies 2007, p.157; based on Oberhummber, et al. 2000).

- The same case exists for the weak force, where if it were slightly stronger or weaker, life as we know it would not exist.

- "The cosmic number Ω measures the amount of material in our universe… If this ratio were too high… the universe would have collapsed long ago; …too low, no galaxies or stars would have formed. The initial expansion speed seems to have been finely tuned" (Rees, p.2-3).

- Antigravity is very small. "Otherwise… [this would have] stopped galaxies and stars from forming" (Rees, p.3).

- "If Q [another constant of nature] were even smaller, the universe would be inert and structureless…much larger…a violent place" (Rees, p.3; see also Livio & Rees 2018, Sec. 2.3).

- The "existence of the visible universe hinges on the minute degree of symmetry-breaking between matter and anti-matter" (Davies 2007, p.121).

Thus, Davies (2007, p.3) concludes, "the universe *does* look as if it has been designed by an intelligent creator expressly for the purpose of spawning sentient beings". Ross (2001, first page of Ch. 14) puts the option of something other than purposeful fine-tuning more colourfully as "a Boeing 747 aircraft being completely assembled as a result of a tornado striking a junkyard". (See also Leslie 1989, Chapters 2-3, Swinburne 1991/2004, 2005, Strobel 2004, Monton 2006, Walker and Ćirković 2006, Davies 2007, Naumann 2017, Livio & Rees 2018, Auping 2018, and Metcalf 2018. For a mathematical foundation for the probabilistic intuition of fine-tuning, see Koperski 2005. But see also opposite arguments such as Colyvan et al. 2005.) Alternatively, some writers have estimated the

extreme improbability as a vanishingly small number, e.g. one part in 10 to the power of 229 (Smolin 1997, p.325) or one part in 10 to the power of 267 (Auping 2018, Math. Box 3.8).

There are scientists who do not buy the intelligent design story. In particular, Stenger (2003, 2007a, 2007b, 2011, 2014) argues that forms of life other than our carbon-based one could be possible and that "Our universe is … not fine-tuned for humanity; *humanity* is fine-tuned for our universe" (2007a, last line of text). This argument certainly has some force. However, the "big point is instead the one made by Rozental [1980] when he shows that small changes in fundamental constants – force strengths, particle masses, Planck's constants, etc. – would have meant the total absence of 'nuclei, atoms, stars and galaxies': not merely slight changes in the cosmic picture but rather 'the destruction of its foundation'" (Leslie 1989, p. 52). It is difficult to imagine how any form of life could exist. A rock will simply not tick like a clock! Even Stenger (2003, last few pages of Ch.6) himself admits that "life *as we know it* would not exist if any one of several of the constants of physics were just slightly different". (See also Barnes 2012 for a refutation of Stenger's arguments.) Moreover, apart from its bio-friendly nature, our universe is simply too weird (such as $1+1<2$ and quantum oddities as discussed above) to be like a rock that could exist by itself. Thus, we have our:

Conclusion/Conjecture: If a clock cannot exist by itself, it is with greater force that our peculiar and bio-friendly universe cannot exist by itself and must have a creator. We call this creator God. So, God exists, or at least existed when our universe was created.

Justification: As discussed above, while a Newtonian universe may credibly be taken to exist by itself without a creator, our universe is very weird with its Einstein's relativity properties and quantum peculiarities. Many of its constants of nature are within narrow ranges just suitable for the formation of stars and planets and the evolution of life. It seems impossible that our universe can exist by itself without a creator.

In addition, Chapter 6 below provides proof of creation based on five compelling axioms. We also have logical answers to seemingly unanswerable questions, such as the origin of God.

2. SOME FUNDAMENTAL QUESTIONS

Some questions are more fundamental than others. For example, we may ask how a bowl of noodles is made. One may answer in terms of the ingredients and the method of cooking. We may ask further questions such as where to get the ingredients, etc. Eventually, one may ask: "How did all the matter, energy and the whole universe come about?" This is clearly more fundamental a question than how to make a bowl of noodles. In my view, the very fundamental questions include the following five.

First, where or how did humans come about? This question has been largely answered by the Darwinian theory of evolution. Man evolved from lower animals through inheritance, variation, and natural selection. (See Chapter 3 for more details.)

Second, how did life come about? How could non-living things evolve into living things? This question has been largely answered by the discovery of the double helix structure of DNA by Crick and Watson (1953; see a description by Watson 1968). When complex organic molecules evolve into the double helix structure as discovered, they may reproduce themselves. This is by definition life. On the question of whether the 14 billion years since the Big Bang has been enough time for random variation to reach the height of consciousness and creativity, see Chapter 3.

Third, how was it possible for material things, even when capable of reproducing themselves, to evolve to result in subjective consciousness or a mind? This is correctly regarded by philosophers as the hard problem or the world-knot that no one on Earth has been able to answer satisfactorily, even if partially or through a general outline. This fundamental question is one that is likely furthest from resolution, if that is ever possible. Though I have touched on this question before (Ng 1992), I do not pretend to have the slightest hint of an answer. I pledge inability here. Many philosophers are far more ambitious than this. For example, the famous philosopher Daniel Dennett calls his 1991 book *Consciousness Explained*. Though I read the whole book with virtually full comprehension, I pledge total ignorance on how the hard problem or the world knot can be answered; consciousness has not been explained by Dennett or any other person.

Fourth, what is the ultimate objective in life? What is of value intrinsically? I view this as the easiest fundamental question to answer. I knew of its obvious (to me) answer at about six years of age, when discussing such questions with my elder brothers. Many things are of instrumental value to some more fundamental objectives. Ultimately, the only thing of intrinsic value is happiness. I have defended this moral-philosophical hedonistic position elsewhere (Ng 1990; Ng, 2019, Appendix B; forthcoming). Hedonism here differs from the common understanding of "just seeking pleasures for oneself to the disregard of other things/persons". It just means that the intrinsically valuable thing is happiness which need not be confined to one's own happiness. At that young age of six, I also had the clear idea that, for the whole of society, maximizing the sum total of the happiness of all is clearly good and right. Recalling my early and clear acceptance of this utilitarian position, I recently (after being at least half-convinced of the possibility of reincarnation) became suspicious that I might be the reincarnation of Jeremy Bentham; if not, how was I so sure of this at the age of six? Ha ha! Though this is an important and interesting question, it is not the focus of this book.

Fifth, how did our universe come about? As discussed in the previous chapter, neither science nor religion has provided a satisfactory answer to this question. This book answers this question adequately, logically, and in consistence with all that we know. Briefly, our peculiar universe (called our small universe, or the sub-universe, though enormously large in comparison to the Earth) that allows consciousness and creativity to evolve within less than 10 to the power of 18 seconds, is more peculiar than a clock and must have been created for fast evolution. The creator, called our God, evolved in the higher universe (called the wider universe) that has an infinite history. Appendices A and B answer questions on the origin of this wider universe and its properties. Though this wider universe was not created and hence has a much, much slower speed of evolution, its much longer (than our small universe) history more than offsets that to allow evolution to a level (that of our God) much higher than us and hence, it was able to create the Big Bang.

3. THE REPLACEMENT OF THE OLDER ARGUMENT FROM DESIGN BY DARWINISM

Our argument is similar to the old argument from design. However, older authors of the design argument such as Aquinas and Paley did not have the benefits of the Darwinian theory of evolution and the abundance of scientific evidence supporting it. Thus, this argument has to be updated.

The argument from design can be traced back to at least Plato; see Ruse 2003 and Shanks 2004 for reviews of the design argument. This older design argument is based on the apparently designed characteristics of animals, including humans. We now know that other animals and humans most certainly evolved on Earth over billions of years.

Compelling evidence for evolution comes from at least nine different reinforcing sources. First, there is the record of fossils showing step-by-step evolution from ancient times to more recent eras consistent with gradual evolution (though not ruling out that the evolutionary equilibrium may be punctuated with faster changes on certain occasions). Though many missing links have been alleged, these are to be expected as the fossil record is incomplete. Moreover, with further discoveries, more and more of these gaps have been closed, e.g. the discovery by Shubin, et al. (2006) of the species *Tiktaalik* which is between fish and land-living animals. Even a living species of something between fish and land-living animals has been found (Pietsch, et al. 2009). (For the closings of other "missing links", see, e.g. Martin 2004, Westmoreland 2018. On the philosophy of the absence of evidence vs. evidence of absence, see Sober 2009).

Second, "morphological similarity performs even better than the fossil record in providing support for evolution" (Sarkar 2007, p. 7). This includes the similarity of the wings of birds and bats, flippers of porpoises with the front legs (or arms) of mammals.

Third, biogeography also provides impressive evidence for evolution right from the time of Darwin and Wallace. For example, in the well-known case of Darwin's finches in the Galápagos Islands, quantitative studies have shown how changes in the shapes of the beak in different islands are

consistent with the natural selection of the fittest for the different conditions of the separate islands (Grant & Grant 1989, Weiner 1994, 2017).

Fourth, molecular studies in the past five decades or so have produced strong evidence to support evolution. For example, the more related any two species according to the theory of evolution, the more similar the molecules constituting them. For another example, the DNA coding of functional protein molecules are much more constrained and have evolved much more slowly than non-functional molecules, as they should be (to ensure the continuation of the functions). (See, e.g. Klein & Takahata 2002 on the molecular evidence for the evolution of Homo sapiens.)

Fifth, numerous studies show that the same gene accounts for a similar function across vastly different species. For example, the same gene for the protein BMP4 is responsible for making both the beak of the Galápagos large ground finch (*G. magnirostris*) deep and wide (for feeding on large seeds) and the jaws of some species of the cichlid fish in the African Great Rift Valley thick and powerful (Ridley 2009, p.64). Similarly, the same gene FOXP2 plays a similar function in both human speech and in the singing of birds such that a mutation to that gene causes similar inaccuracy in both (Scharff & Haesler 2005; Cf. Chabout et al. 2016).

Sixth, different species have many common genes, consistent with their having common ancestors. However, this consistency does not quite prove evolution, or negate creationism here. Even if the different species were all created by God, they may still have some common elements. For example, the bicycles, cars, trains and airplanes that we create all have wheels. As they perform certain similar functions, it is not surprising that they may have some common elements like wheels. Nevertheless, there are many genes that have lost their functions, or which even lost the top half of their structure ("decapitated") through mutation, and still get passed on from one generation to another. These genes are known as "ancient repetitive elements". For example, chimpanzee, mice and man all have such ancient repetitive elements that are similar and which occur at the same link. If chimpanzee, mice and man do not have a common ancestor, it is very difficult to explain such common ancient repetitive elements. Thus, even Francis Collins, who led the Human Genome Project, and is in favour of creation, has to admit that, "Unless one is willing to take the position that God has placed these decapitated AREs [ancient repetitive elements] in these precise positions to confuse and mislead us, the conclusion of a

common ancestor for humans and mice is virtually inescapable" (Collins 2007, p.136-7).

Also, "The human gene known as caspase-12, for instance, has sustained several knockout blows, though it is found in the identical relative location in the chimp. The chimp caspase-12 gene works just fine, as does the similar gene in nearly all mammals, including mice. If humans arose as a consequence of a supernatural act of special creation, why would God have gone to the trouble of inserting such a non-functional gene in this precise location?" (Collins 2007, pp.138-9).

Seventh, scientists appear to be close to the creation of man-made or synthetic life. Previously, scientists could only obtain components that form life, but not self-reproducing lives themselves. However, on 20 May 2010, scientists at the J. Craig Venter Institute in the US, headed by J. Craig Venter and Daniel G. Gibson published a paper in *Science Express* entitled "Creation of a bacterial cell controlled by a chemically synthesized genome" (Gibson et al. 2010). Arguably, this may be regarded as the emergence of synthetic life. These scientists transplanted digitized genome sequence information into the cell of a bacterium (*M. capricolum*) to form a new cell. The new cell is completely controlled by the synthetic chromosome. The only DNA in the new cells is the designed synthetic DNA sequence and it is capable of continuous self-replication. It is not completely man-made, as a living cell is used. However, the DNA of this living cell is replaced by synthetic DNA.

If we put the head (or even just the brain) of a person into the body of a robot with adequate brain-body connection, this robot-looking entity is actually a biologically human person, as what is controlling his thinking, feelings and body is the biological brain. Thus, what determines whether a living thing is synthetic/man-made or not depends not on the body, but on what controls the body. For a person, this is the brain; for a bacterium, this is its DNA. Thus, Venter claimed it to be the first synthetic cell. The cell comes from a synthetic chromosome. The chromosome is formed by four bottles of chemicals, with the information provided by a computer. Life could be man-made, lending strong support to the theory of evolution. (On the progress and problems of synthetic life, see a review by Kämpf & Weber 2010, a special issue on "Artificial Life" in the *Journal of Cosmology*, 2010, and Gibson et al. 2017.)

Eighth, it may be argued that humans have consciousness (or mind), wisdom, morality and religious beliefs and could not possibly have evolved from

lifeless matter. In an earlier chapter, I conceded that science cannot explain consciousness or mind, now or in the foreseeable future. It is possible that the mind is special and cannot evolve from matter. However, we can hardly be certain, one way or the other. Consider, before the discovery of the double helix by Crick and Watson, people (myself included) would think, how could lifeless matter evolve into living things? Thus, we had better be agnostic here.

Given the existence of consciousness, the emergence of morality and religious beliefs may be explained by Darwinian evolution. Humans are social animals. The emergence (about six million years ago) of morality in humans or their predecessors helped cooperation and increased fitness.[13]

Ninth, there are many specific details (such as the well-known clumsy thump of the panda and the caecum of humans) that could be explained by evolution but are difficult to explain consistently with intelligent design, especially by an all-powerful God.

However, over the one or two decades since 1991, there has been a resurgence of the design argument. These proponents of intelligent design (ID) focus on "irreducible complexities" in living things such as the flagellum and eyes (see e.g. Behe 1996, Dembski 1998, Pennock 2001). Though the complexities involved here are very remarkable, they are not completely out of reach by natural evolution.

One mechanism that increases the probability of the natural evolution of "irreducible complexities" is gene duplication. This is quite common, e.g. in humans about 38-50% of genes have duplicates, while some plants have much higher proportions (Zhang 2003). For example, a certain gene A provides some essential function X. For gene A to mutate into gene B that has higher fitness usually requires many steps of mutation. However, when

[13] On the biological basis of the emotional and moral sentiments, see Konner 2002, Hauser 2006. On the fairness feeling and behaviour of monkeys see Brosnan & de Waal 2003. In humans, Richard Ebstein and other scientists in Israel discovered the significant relationships of altruistic behaviour with the Dopamine D4 Receptor gene (Bachner-Melman, et al. 2005). The fairness feeling and behaviour also disappear with the electrical interference of the dorsolateral prefrontal cortex (Knoch et al. 2006). Religious or similar beliefs may enhance social relationships, and are beneficial for survival. On the existence of the so-called God gene (DRD4) and the generation of the mystical religious feeling of oneness with the universe, see Persinger (1987), Hamer (2005), Comings (2008), Tiger & McGuire (2010). See also, Johnstone et al. (2016), Ferguson et al. (2018).

A mutates into A', the original function X is usually lost or diminished, seriously reducing the fitness of the organism, and making it not possible to evolve into gene B. However, with gene duplication, gene A may duplicate into A1 and A2. Then, A1 may continue to provide function X, while A2 may mutate into A2' and eventually into gene B that provides function X or even better, another function Y that is better than function X. After that, A1 may vanish through another mutation. Thus, through gene duplication, the evolution of A to B may happen without concurrently causing the death of the organism or species.

Gene duplication should originally happen by mutation. However, since it may increase fitness through the mechanism described in the previous paragraph, genes that tend to duplicate, or genes that enable other genes to duplicate, may be naturally selected after their emergence through mutation.

As apparently irreducible complexities like our eyes may evolve through the above and other mechanisms, the intelligent design argument around the turn of the century has also been effectively refuted by evolutionist arguments. Even creationist scientists have to admit that "it now seems likely that many examples of irreducible complexity are not irreducible after all and the scientific argument for ID is thus in the process of crumbling" (Collins 2007, p.188).

Insufficient time for evolution?

There is a rather strong argument against evolution. This is based on the fact that our Earth is only about 4.5 billion years old and life on Earth has a history of only about 3.5 to 4 billion years.[14] Evolution is by genetic inheritance, random mutation (and other variations like genetic drifts), and natural selection. This takes eons even for moderate improvements. This is especially so since mutations occur infrequently and the effects, being random, are usually deleterious. Also, with sexual reproduction, a mutant on one side would be swamped or blended away by non-mutants of the other gender, while similar mutations for both genders are extremely improbable. Thus, it takes a very long time for a random mutation to

[14] Jenkin's (1867) original argument is based on an old estimate (Kelvin's) of the Sun and Earth's age of only hundreds of millions of years (see Burchfield 1990). Even with the modern estimate of billions of years, the length of time may still be regarded as relatively short for evolution. See however, Haldane (1924), Nilsson & Pelger (1994), McQuat & Windsor (1995), and Sarkar (2007) on the power of natural selection to produce rapid changes.

happen to be fitness enhancing and selected through the natural process of the mutants having more offspring. It is therefore believed that for such an un-designed random process to progress from a single-celled amoeba into Homo sapiens would have required much more time than just several billion years on Earth.

Two partial answers to the above alleged insufficiency of time for evolution are outlined here; the first argument was advanced by the present author (see Ng 1996 for more details).

Before the evolution of many different species, the environment on Earth was relatively simple. Living things could then survive with relatively simpler and inflexible behavioural/adaptational patterns/routines that could be hard-wired through genes. With the evolution of more species, especially more complex species, the environment became more complex. The number of potentially alternative circumstances became astronomical. This made it difficult to programme the optimal behavioural/adaptational patterns/routines in advance by hard-wiring. This factor favoured species that could make more of its choices flexibly, guided by consciousness (defined as more rational species). The conscious species could decide on the spot after sizing up the situation before making such decisions as fight or flight. This created a selection pressure towards more complexity and rationality. This virtuous cycle partly explains the speed of evolution towards highly complex and rational species, culminating in Homo sapiens.

A second explanation relies on the vastness of our universe. The speed of light is about 300,000 km per second. Our moon seems very far from us and it takes a long journey for us to reach it. However, in terms of the speed of light, it is just over one second away. Our Sun is more than 8 minutes away. The Milky Way is 100,000 light years across. (One light year = 9.5 trillion km.) Our neighbour Andromeda Galaxy is 2.5 million light years away. The farthest galaxies observable in the Hubble space telescope are 10 billion light years away.

The Milky Way has at least 100,000,000,000 stars. (Recent estimates suggest 400 billion stars or more.) There are at least as many galaxies in our universe as there are stars in the Milky Way. Thus, just in our observed universe, there are billions of trillions of stars. Even if only a tiny fraction (say one out of a billion) of those galaxies have planets suitable for life, there could be trillions of planets with life. Some of these may evolve slowly and some fast, as determined randomly. We are probably one of the fast ones.