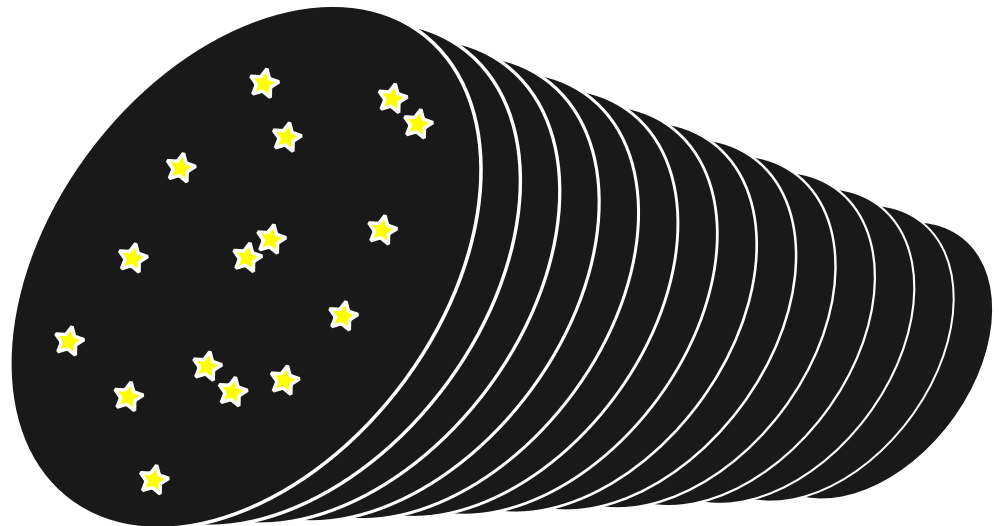


Creation and The Multiverse



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Summary

In the 1980s it became apparent that the laws of nature which govern the universe needed to be extremely finely adjusted to allow life to exist in the universe. This fine-tuning of the universe is clearly too precise to be accounted for by sheer chance.

The response of the atheist community to this has been to postulate the idea of a multiverse - a system containing a large number of parallel universes. The universes in this proposed system are unable to communicate with one another and have different sets of laws of nature. It is therefore impossible for anyone on earth to detect the existence of another universe in the multiverse. However, only those universes sufficiently fine-tuned to allow the existence of intelligent life could be observed.

As, in the hypothetical multiverse system, the laws of nature vary from universe to universe, these laws must be contingent. This means that they require a multiple universe generator (MUG) to bring them into existence. If this MUG does not have mind, then it also must be working according to pre-determined rules. These rules must also be fine-tuned to allow the MUG to generate universes. The multiverse hypothesis does not solve the atheist's problem with fine tuning. However, in resorting to the idea of a multiverse the atheist has admitted that fine tuning is required.

A MUG without mind would also be contingent and this in turn leads to the issue of an infinite sequence of contingent MUGs. As such a sequence must itself be contingent there is a need for a necessary entity to cause them; such an entity would be God.

The multiverse hypothesis also guarantees that there are some universes in which miracles occur. These universes would have a God, who being outside the universes would apply to all universes.

The multiverse hypothesis doesn't answer any of the problems of the creation of the universe. Effectively it is an atheist creation myth which does not detract from the idea of a creator God.

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Introduction

In the 1980s it became clear that the laws of nature that govern the structure and interactions of the physical world were very finely tuned to allow for the existence of life within the universe. The laws of nature need to be as they are to within very fine tolerances or life would be impossible. The universe appears to have been adjusted to allow for life and that adjustment requires a phenomenal degree of precision.

The fact of fine tuning led to a serious problem for atheists. It is almost impossible to believe that the universe could be as finely tuned as it is by chance; many atheists attempted to do this and failed. After a while of trying, the atheists hit on an alternative. This is the idea that instead of there being only one universe there are very large numbers of universes. These universes are all different from one another; in particular they have different laws of nature, chosen at random. In most of these universes the laws of nature are such that life is impossible, but in a miniscule proportion the laws of nature are appropriate for life. We live in one of these habitable universes. The ensemble of universes was named the “Multiverse”.

The idea of the multiverse appeared to save atheism from the serious difficulties caused by the problem of fine tuning. It did so at the expense of having to believe in an infinity of undetectable universes, but atheists found this preferable to the alternative - having to believe in God. However, there are problems with the idea of a multiverse which lead to a need for a creator which is no less than with a fine-tuned universe.

Fine Tuning

The issue that forced atheists to the idea of a multiverse was that of fine tuning. The laws of the universe are exactly what is required to allow the existence of life. Even small changes in these laws would cause the universe to be entirely different and to be entirely inhospitable to life.

Law of Electromagnetic Attraction.

For example, consider electromagnetism. This is the force which governs the behaviour of electrons in atoms and binds molecules together. It is also responsible for light and other electromagnetic radiation.

The strength of the electric force grows weaker the further away one is from a charged particle in proportion to the square of the distance from that charged particle. This fact is known as the “inverse square law”. This law is the reason that electrons can form stable orbits in atoms. If the electromagnetic interaction was an inverse cubed law then there could be no chemistry and hence no life.

Similarly, if the strength of the electromagnetic interaction changed by only a very small amount, stars would not burn or would explode, atomic nuclei would not exist and chemistry would not happen.

Scientific Notation

Large numbers are often stated in scientific notation. This involves expressing them in two parts which are multiplied together. The second part is the power of ten and the first part gives the fine numerical value. Thus:-

$$200 = 2 \times 10^3 \quad 3,600,000 = 3.6 \times 10^6 \quad 5,000 = 5 \times 10^3$$

The method can also be used to express numbers smaller than one:-

$$0.1 = 10^{-1} \quad 0.00000023 = 2.3 \times 10^{-7} \quad 0.005 = 5 \times 10^{-3}$$

This kind of notation is especially useful where the number is very large or very small.

The Inverse Square Law

The force acting on an object with charge e_1 at distance r from another object with charge e_2 is given by the equation:-

$$f = \frac{e_1 \cdot e_2}{4\pi \cdot \epsilon_0 \cdot r^2}$$

This law determines the strength of the force (controlled by the constant ϵ_0 and the distance apart of the objects. The distance is on the bottom of the fraction (which makes it inverse) and has the power 2, which makes the law an inverse square law. Only a law with this form or an inverse linear form can provide stable orbits. The value of ϵ_0 is also vital.

Another important feature exists in the size of the charge on an electron or a proton. The electron has a charge which is exactly the same as the charge on a proton, but has the opposite sign. Thus the total charge of an atom is zero as the positive charge of the proton is exactly cancelled out by the negative charge of the electron. This is important because in a universe where the charges did not cancel any body of matter would be electrically charged. Gravity would be opposed by a repulsive electromagnetic force which might blow planets stars apart and would certainly make it more difficult for them to burn hydrogen into helium.

One can go on and on; the point is that even the most tiny changes in a large variety of the features of the electromagnetic interaction would make the universe uninhabitable.

The Strength of the Big Bang

The universe came into existence as the result of a past creation event which is colloquially known as the “Big Bang”. The amount of kinetic energy injected into the universe at this creation event has a crucial effect on the lifetime of the universe. The ratio of the potential energy of the universe when the matter in it is separated from other matter by an infinite distance to the kinetic energy of the universe at the creation event is given the symbol Ω .

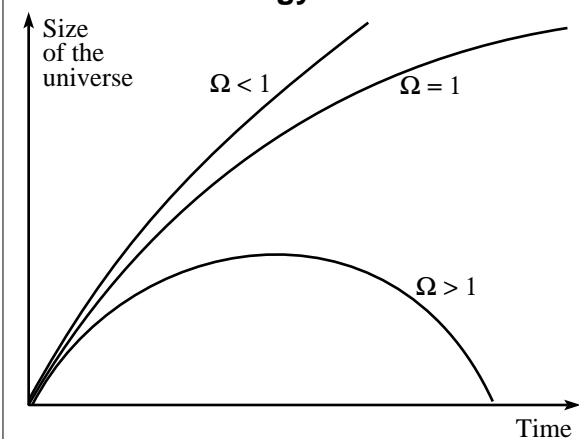
If $\Omega > 1$ then the universe will cease to expand and will contract to its destruction. For quite small increases of the value of Ω above 1 the lifetime of the universe is measured in hours rather than years; it would be impossible for humanity to develop a civilisation in this time.

The Four Interactions

The behaviour of the universe is governed by four different interactions. Two of these are long range forces, gravity and electromagnetism. The other two are very short range forces which operate only at the scale of elementary particles and which govern the stability of atomic nuclei; these are known as the strong interaction and the weak interaction.

Each of these forces has a characteristic strength which; these strengths vary widely between the interactions. The strongest force is the strong nuclear interaction, but this only operates on scales less than the size of an atomic nucleus. The electromagnetic interaction is next; however, because this requires charged particles and most bodies in the universe are not charged it has little effect on scales larger than a few metres. The weakest interaction is gravity, but because there are no negative masses gravity accumulates over large volumes of the universe and on a cosmic scale gravity dominates the behaviour of the universe.

The Kinetic Energy of the Universe



The time for which the universe exists depends on the parameter Ω . For values of $\Omega < 1$ the universe expands violently and structures needed for life cannot form. If $\Omega > 1$ the universe comes to an end after a time too short to allow history to happen. Only when $\Omega \approx 1$ can life exist in the universe.

If $\Omega < 1$ then the universe expands rapidly and continues to expand for ever. If the value of Ω is only a tiny amount less than one then the universe would expand so rapidly that galaxies and stars would be ripped apart by the expansion before they could form.

Only a value of Ω very close to one will allow the universe to exist for an appreciable period. Martin Rees (Astronomer Royal) estimates that the value of Ω can only vary from the optimal value of one by less than one part in 10^{15} before the universe is either collapses in less than a few thousand years or expansion overcomes gravity and stars cannot form.

Remember that $10^{15} = 1,000,000,000,000,000$

Fine Tuning

The fact of fine tuning involves three features of the laws of physics which are necessary to allow the existence of life. These are the form of the laws of physics, the values of the constants which govern the strengths of the various forces in the universe and the initial conditions of the universe when it came into existence. Small changes in these would make the universe completely unsuitable for life.

The form of the laws of nature includes such things as the fact that the force of gravity decreases in a manner which is inversely proportional to the square of the distance. If some other power was involved it would be impossible for planets to form stable orbits. The strength of the attraction is determined by a constant, the gravitational constant; a small change in this constant would ensure that stars did not burn properly. The kinetic energy of the big bang needs to be just right so that the gravitational attraction of the matter in it didn't immediately overcome the expansion of the universe or alternatively blow the universe apart before galaxies and stars could form.

The point that the laws of nature need to be extremely fine tuned to allow life to exist is so well established that atheists have needed to invent the idea of a multiverse in an attempt to account for it.

General Picture of Fine Tuning

The issues of fine tuning can be repeated over and over again. Each of the laws of nature has a form which is the only one that can possibly allow life, has one or more constants which determine its strength and which could not be different from its actual value by more than a small amount without destroying the possibility of life in the universe.

This provided a major problem for atheists. The degree of fine tuning required to maintain life in the universe was obviously extreme, and the universe in which we live is fine-tuned for life to an extraordinary degree. By 1990 it had become absolutely obvious to all that one could not believe that the laws of nature for the universe had their known forms by chance; it was clear that some other mechanism had to be invoked. The fact that atheists felt that they had to invoke a multiverse shows that the fine-tuning observations are accurate and that the probability of a universe being able to sustain life is vanishingly small if there is no intelligent being to design that universe.

The Multiverse

In the Multiverse idea, our universe is not alone but is a member of a large set of universes. The idea was used in a theoretical way to think about probability calculations, and was applied to the interpretation of quantum theory in the late 1950s, but essentially was not taken very seriously. The idea gained momentum in the 1990s and began to be accepted by atheists as their only possible escape from what was by now an overwhelmingly obvious fact of fine tuning.

According to the multiverse idea, some mechanism has generated a vast number of universes. The natural laws in these universes are chosen at random, so that most universes are different from one another in terms of these laws. The overwhelming majority of these universes will be unable to support life, but a very tiny proportion would be just right, and an even smaller proportion of these would develop life within them. Only those universes which can support an observer can be observed, so the universes which are not fine-tuned for life can be ignored. As a result, we are bound to observe a universe where the natural laws are fine-tuned.

The Anthropic Principle

The idea that the existence of observers dictates the physical laws of the universe was proposed in the 1980s, by and Tipler. It was originally thought of as an alternative philosophical outlook to the Copernican Principle, which is the idea that the earth is not in a privileged position in the universe. The Anthropic Principle states that an observer must look at the universe from a place which is suitable for life, and that the region of the universe that we inhabit must, therefore be special.

As an example, the requirement that the observer must be alive indicates that he must be on or near a solid planet, which must be a suitable distance from a star to provide a habitable temperature. The

The Anthropic Principle

The strong Anthropic Principle supposes that vast numbers of universes exist, all different from one another. Of these only a miniscule proportion will have natural laws which can support observers, and only a miniscule proportion of the universes which could support observers will actually have them.

Only those universes which can support observers can be observed. These universes are a self-selecting sample which only includes universes which are fine-tuned. Any given observer will always perceive an ordered and fine-tuned world.

However, the anthropic principle goes no further than selecting universes with observers. Any fine-tuning which is more than is required to allow observers to exist is evidence of super-fine-tuning; it implies a creator who has chosen to tune the universe.

The universe we live in is super-fine-tuned. It is too comprehensible and we are too good at understanding it. An observer doesn't need to have telescopes, particle accelerators or abstract mathematics - it is only necessary to observe the universe, not to understand it. Hesiod and Homer were perfectly good intelligent observers without any of these.

The anthropic principle also fails to explain why any laws should be enacted as physical universes.

observer cannot be at the centre of a star, because life would be impossible there; nor could it be in empty space far from a star (even satellites and spaceships must start off on planets).

The Anthropic Principle was then developed to include the possibility of multiple universes. Only a universe which is capable of supporting life can have an observer. We can deduce from this that the universe in which we live will be capable of supporting life. If there is a multiverse, then the anthropic principle could explain why the universe in which we live has finely tuned laws. There would be an absolutely vast number of uninhabitable universes for each universe which is suitable for life, but only those universes which can support life need to be considered as all the other universes will have no observers.

The idea that humans have a privileged position in the current universe is called the "Weak Anthropic Principle" and is generally uncontroversial. The idea that the universe in which we live is chosen from a multiverse of many universes is called the "Strong Anthropic Principle".

Tegmark's Classification

The theory of a multiverse was explained by Max Tegmark in 2003 in an article in Scientific American. He identified a number of different multiverse theories, which he arranged into a hierarchy of four levels. The four levels are:-

Level 1: Beyond our Cosmological Horizon

This level presumes an infinite universe; the only part of this that we know is inside a volume known as the "Hubble volume". This is the volume of space from within which light could have reached us. Any part of the universe outside the Hubble volume is out of communication with us and there can be no causal interaction with it. There are therefore many parts of such a mega-universe which have no link at all with one another.

From the point of view of the atheist this kind of multiverse is that it is in the same space as the current universe. Not only this, but as time goes on the Hubble volume expands and areas outside the universe come into it. This means that the laws of nature have to be the same in the areas outside the Hubble volume as they are inside

Tegmark's Levels of Multiverse

In 2003 Tegmark published a survey of the multiverse idea in Scientific American. This article has set the framework for thinking about multiverses ever since.

Tegmark proposed four different types of multiverse theory, based on the mechanism involved and the kind of ensemble of universes that arose from them. Tegmark's levels of multiverse are:-

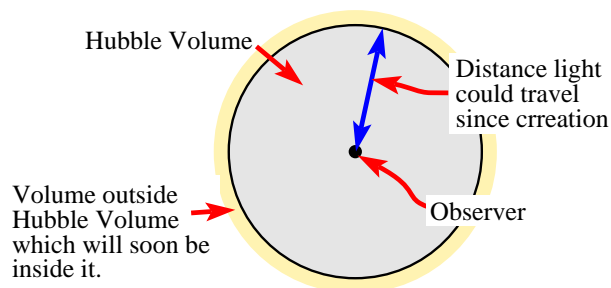
- 1 Universes separated by space - Hubble Volumes.
 - 2 Universes with different physical constants.
 - 3 Universes generated by Quantum Events
 - 4 All mathematically consistent universes.
- Of these only Level 2 is able to work with the anthropic principle. 1 and 3 generate the same physical laws in all universes and Level 4 is logically inconsistent.

it, which produces two more issues for atheists. The first of these is the obvious one; if the laws of nature are the same in all the different parallel universes the existence of parallel universes doesn't explain why the laws of nature should be as they are. There is no room for the operation of the Strong Anthropic Principle.

The other problem is that the parts of the universe outside the Hubble volume are completely out of contact with the parts of the universe inside it. In the early moments of the universe when the Hubble radius was only a few light-seconds the most of the universe within the current Hubble Volume would have been well outside it, but in spite of this the laws of nature are the same throughout the whole of the known universe. This means that some outside influence is required to ensure that the same laws of nature are in force throughout a volume where there can be no physical laws that ensure the same thing.

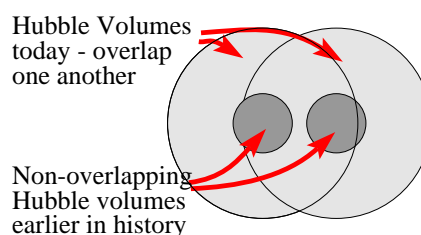
It is by no means certain that a level 1 multiverse exists, but if it does it requires something like God to ensure that it works.

Hubble Volumes and the Hubble Limit



A Hubble Volume is the volume of space surrounding an observer from which light emitted at the creation event could have arrived at the observer. Nothing outside this volume could have an influence on the observer and the observer could have no effect on anything outside the Hubble Volume. As time progresses the Hubble volume increases in radius and hence in volume.

Two non-intersecting Hubble volumes contain entities which can have no effect on one another. However, later on the two volumes could intersect with one another. This will have happened continuously since the creation event. We can see that the laws of nature are uniform across the universe. Therefore the laws in different Hubble Volumes have been the same as one another, even though those volumes could not influence one another when the laws of nature in them were determined.



Level 2: Universes with different physical constants.

In this level of multiverse the infinite space contains a vast inflation field which is continually expanding. At random moments and places a special event occurs in the inflation field which causes a universe to drop out of the inflation field. Because the inflation field is expanding faster than the speed of light, if two universes are formed out of contact with one another they will remain out of contact with one another permanently. The event which causes a universes to drop out of the inflation field has a random component which causes it to generate laws with different physical constants.

However, the mechanism proposed by Tegmark is not the only possible mechanism. Tegmark merely mentions the most commonly proposed mechanism of this kind. The point about this kind of multiverse is that it requires a mechanism which generates universes. This mechanism itself requires explanation, and the explanation is not simple.

This level of multiverse cannot be dismissed in a simple manner. It requires further examination and analysis; it is therefore considered below.

Level 3: Multiple Universes generated by Quantum Events

This idea of a multiverse depends on a particular interpretation of random events caused by quantum mechanics.

For example, there might be a probability of 50% that an electron in a high energy orbit in an atom will emit a photon and drop to a lower energy level. This would be modelled by saying that the time line splits into two parallel universes; in one of these the electron emits the photon and in the other it does not. This is the famous “Trousers of time” idea.

In this interpretation of quantum mechanics any quantum mechanical event splits the universe into several alternative parallel universes. The probability of the event is the number of universes in which the event has occurred divided by the total number of universes. An event with a probability of 50% will create two parallel universes; in one of these the event will have happened while in the other it will not. An event with a probability of 1% generates 100 parallel universes, in only one of which the event will have occurred. An event with a probability of $\pi/10$ will generate an uncountable infinity of universes as π is an irrational number.

The Trousers of Time

This is an interpretation of random quantum events which was invented in the 1950s. According to this interpretation the time line of the universe splits into several different sections. The probability of the event is the number of time lines in the section where the event occurs divided by the total number of time lines. In the example above, outcome 1 has a probability of 60% while outcome 2 has a probability of 40%. However, all the universes have exactly the same laws of nature. They are indistinguishable excepting the outcome of the one random event represented. There are other technical reasons why this interpretation cannot be real, but even if it was it could not account for fine-tuning.

There are insuperable problems for the atheist in this form of multiverse. For example, the idea of a universe which splits instantly into many parallel time-lines whenever a random event occurs cannot be described in a manner consistent with the basic principles of relativity, principles which have been experimentally verified to a high precision; for example relativity has issues of simultaneity which have to be ignored for this level of parallel universe to exist. However, the main problem with the theory is that when a random event occurs the daughter universes that come into existence all have exactly the same laws of nature; there is no possibility of a system like this generating universes which are parallel, but have slightly different laws of nature. The anthropic principle cannot operate in this system.

Level 4: All mathematically consistent universes

Tegmark’s final level of parallel universes is an attempt to answer the question of why some universes exist while others do not. For a theist the answer is simple; the universe that God decides to make is the one which is in existence. For an atheist the question is unanswerable.

Gödel’s Theorem and Consistency
 In 1931 Kurt Gödel published the first of his two incompleteness theorems. This theorem showed that any sufficiently complex mathematical system must contain statements which cannot be proved or disproved within the mathematical system. The second theorem stated that it is impossible to show that a system is mathematically consistent from within that system.
 Thus it is not possible for a universe to be shown to be mathematically consistent. Tegmark’s fourth level of multiverse is a logical impossibility.

Tegmark attempted to answer the question by the claim that all possible universes exist, as long as they are mathematically consistent. This, however, is not a useful answer. Gödel’s incompleteness theorem shows that it is not possible, even in principle, to show whether a mathematical system is consistent (unless that mathematical system is very simple: too simple to allow arithmetic, for example).

Comment on Tegmark's classification

Most of the possible types of multiverse have no bearing on the discussion of fine tuning in the universe. Only the level two multiverses can possibly allow the strong anthropic principle to be invoked; the level one multiverse actually strengthens ideas of a creator outside the universe (or even the multiverse). The rest of this article therefore discusses only multiverses classified as level 2 by Tegmark.

The Generic Multiverse

Any level two multiverse must have a mechanism which generates all the universes in it. This mechanism will be described as a Multiple Universe Generator (MUG). The MUG will cause creation events each of which will develop into a new universe.

Features of the Multiverse

The MUG will need certain inescapable qualities in order to be able to generate universes in this way:-

1. The MUG must follow a set of natural laws; all proposed candidates follow laws of quantum mechanics, general relativity and produce space-time. The only alternative is a supernatural being who replaces mechanical laws with mind.
2. The MUG must be outside time and space; it cannot be made of matter as these are generated in the universes it produces.
3. The MUG will need to be able to produce sufficient energy to generate its daughter universes, and must continue to do so indefinitely. This means that the energy density of the MUG must be infinite at all places.
4. The MUG must be able to generate systems of natural law. The laws of nature generated by the MUG must be able to vary randomly or chaotically from one universe to the next.
5. The MUG must generate rational laws which follow mathematical principles. This requires a rational MUG.
6. There are many possible theories of MUG; half a dozen are commonly proposed. This means that the MUG is not forced to be as it is - it is a contingent entity.
7. The MUG may be part of a system of MUGs, or may be a single generator. The full system will have to be infinitely old (unless it was created at a specific time by God) and thus any mechanism must make an infinite number of repetitions. Hence the existence of an MUG system without God must imply the existence of an infinite number of universes.

This set of properties leads to serious difficulties for the multiverse theory. The mechanism required to produce randomness, for example, will need to be subtle and the ability to generate universes which are governed by laws which are rational supposes a high degree of order in the multiverse. However, the most important problems are that a multiverse must be contingent and also fine-tuned if it is to meet the requirement to generate even a small number of universes like the one in which we live.

Contingency and Necessity

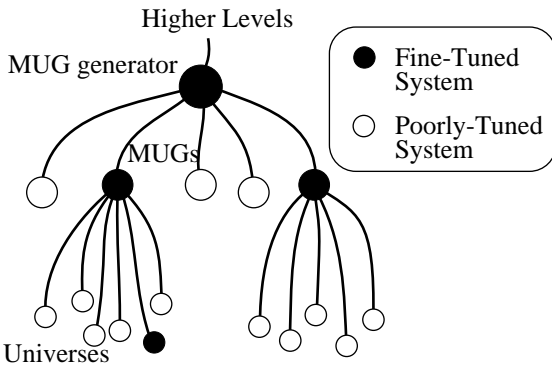
To understand the theory of multiverses it is important to understand the concepts of a contingent entity and a necessary entity.

Contingency: An entity is contingent if it could be different from what it is or could not exist. A contingent entity cannot cause itself; it must be caused by a different entity.

Necessity: An entity is necessary if must logically be as it is. If the entity could logically not exist, or be different from what it is, then it is not necessary. A necessary entity must logically exist; it does not need to be caused.

It is clear that any chain of cause and effect must start with a necessary entity.

The Cascade of Multiverses



A multiverse consists of an ensemble of universes generated by a multiple universe generator (MUG). The laws of nature differ from one universe to another; many of these will not allow life. Similarly the laws of nature in the MUGs will not necessarily allow the generation of daughter universes. One way of accounting for this is to have a MUG generator which makes multiple MUGs, all with different laws. Most of these MUGs will not be capable of producing universes, but a few may be able to do so. Of course the same argument could be applied to MUG generators, calling for a higher level and so on.

The Multiverse and Fine Tuning

Suppose that there is a multiverse; this will require a MUG to generate the universes within the ensemble of universes which is the multiverse. The Multiple Universe Generator could, of course, be a being with a mind, equivalent to the Judeo-Christian God. However, atheists would reject this idea in favour of a MUG which produces universes according to a set of laws (the production of universes could either be systematic or random). One might refer to such a MUG as a *mechanical* MUG, although no actual physical machinery may be involved.

The various proposed mechanical MUGs have some or all of the laws of quantum mechanics, gravity, string theory and inflation fields; they all have space, time, and cause and effect and some law which causes universes to be started from the MUG. Each potential set of laws will give rise to a different MUG; there are many possible MUGs.

Not every set laws is capable of generating universes which could support life; some possible MUGs may be completely dysfunctional and not produce any daughter universes at all. The MUGs that can produce daughter universes that could support life will have a very small subset of the MUG laws and constant values that are possible. Effectively the MUG itself requires fine tuning, or there needs to be a vast set of MUGs so that a tiny proportion of them will be able to produce life-friendly universes.

The multiverse hypothesis is thus no answer to the problem of fine-tuning. Instead of solving the problem for the atheist, the idea of a multiverse simply puts the problem one level further back, but in the meantime it requires the existence of an infinite number of universes created in parallel to the existing one. This is really multiplying hypothetical entities without reason.

The Multiverse and Contingency

The set of laws that will be followed by a MUG will is not guaranteed by logic. More than one set of laws is possible. The MUG could be different from what it is in exactly the same way as the universe could have different laws. Essentially, any MUG would have to be contingent. This means that it needs to have been caused by something.

The Zero Energy Universe

One idea which is repeated frequently in atheist literature on the origin of the universe is the idea that the universe in which we live, and by extension all other universes, has zero energy and thus could be created at any point without effort. This is achieved by defining zero potential energy as the potential energy when the universe has expanded to the point where all masses are infinitely separated. This makes the potential energy at any finite time negative. If the universe has just sufficient kinetic energy to reach this degree of expansion (which implies that the geometry of the universe is "flat") then the potential energy and the kinetic energy of the universe will exactly balance at all times to produce a zero-energy universe.

The problem here is that potential energy is not an absolute quantity. The amount of energy required to accelerate a universe involves an additional term, the potential energy at the start. When this is added into the cosmological equation the universe has positive energy. The idea of a zero-energy universe is an elementary error.

If the current universe has zero energy, then a universe which is destined to collapse again will have a negative energy. If there is a mechanism which brings zero energy universes into existence it should generate infinitely more negative energy universes!

Reasoning about the origin of the MUG then follows the same logic as reasoning about the universe. The universe needs a cause and one cannot appeal to an infinite regression of similar contingent entities to provide this. At the start of the sequence there must be a necessary (non-contingent) entity. This determines the nature of what it causes. Essentially this entity is the same as the God of the Judeo-Christian religion, the God revealed in the Bible.

A multiverse is no place to hide away from God.

Miracles and the Multiverse

One of the obvious problems that the multiverse theory generates for an atheist is the problem of miracles. If there is an infinite number of parallel universes in which anything can, and will, happen, then some of the those parallel universes will include miracles.

After all, while miracles are very unlikely, they are no more unlikely than, say, life coming into existence in a universe or the fine tuning of physical laws to allow life to exist. It is more likely that a dead body, which contains all the structures required for life, will return from the dead than that life would appear at random from a soup of chemicals or that a whole universe might spring into life.

In all the universes in the multiverse some will have miracles, and some will even have a supreme being who causes miracles to take place. To deny this is to deny the multiverse hypothesis; one cannot have a multiverse without all its consequences. If the multiverse hypothesis is correct then one must expect miracles.

Laws and Creation

Stephen Hawking has attempted to account for the universe by M-theory, a version of string theory which includes an attempt to describe the values of fundamental constants.

M-theory itself is a dubious construction and a large number of physicists have registered fundamental objections to it, not the least being that it makes no predictions that can be tested. However, even if it is correct and can generate laws of nature, this is not the same as generating a universe.

Lennox uses this analogy:- the laws of Newtonian mechanics describe the motion of balls on a pool table, but they will never start a cue-ball rolling; to do so requires a human with a cue. C. S. Lewis explained that the laws of accounting would tell him exactly how much money was in his bank account, but that the amount would not increase by even a farthing as a result of bookkeeping.

Lennox J (2011) "God and Stephen Hawking", page 41
Lewis C S (1974) "Miracles" pages 90,91

Antony Flew's Comment

Antony Flew was a philosopher and a leading atheist who finally discovered that the arguments for the existence of God were too strong to ignore. He commented on the fact that the supposed existence of a multiverse left serious issues in terms of the contingency of multiple universe generators.

He noted that the multiverse didn't answer problems of contingency, but also that the multiverse generator needed fine-tuning. He also noted that the multiverse argument guaranteed a universe where miracles can occur and which had a creator.

His comment on the contingency problem for the multiverse hypothesis is as follows:-

"If the existence of one universe requires an explanation, multiple universes require a much bigger explanation: the problem is increased by the factor of whatever the total number of universes is. It seems a little like the case of the schoolboy whose teacher didn't believe that his dog ate his homework, so he replaces the first version with the story that a pack of dogs - too numerous to count - ate his homework"

[Flew A & Varghese R A (2007) "There is a God: how the world's most notorious atheist changed his mind." Harper One, ISBN 978-0-0613-3530-3 page 137

The evidence is that we live in a universe in which miracles have taken place. The resurrection of Jesus Christ is exactly such a miracle, and the evidence in favour of it is overwhelming. Thus it would be illogical for an atheist to declare a belief in a multiverse but to reject belief in the resurrection of the dead.

If there is a supreme being to one universe, then that supreme being is outside time and space. This means that such a being is equally outside all universes, and hence that there is a God who might intervene in any number of them.

Detecting a Multiverse

In the multiverse argument atheists appeal to the Anthropic Principle to explain why the observed universe is clearly fine-tuned for the existence of life. The anthropic principle states that, out of all the possible universes in the multiverse, only those universes which can support an observer will be observed. However, the anthropic principle does not distinguish between different observable universes. Thus a universe which allows the existence of observers in excess of what is required by the principle, or one which is fine-tuned to allow the existence of observers by a wide margin is not explained by the anthropic principle and is evidence of a creator.

The universe in which we live shows exactly such evidence. The laws of the universe are more precisely life-friendly than is required by the anthropic principle and we are better at observing the universe than the principle requires.

The laws of the universe could be more chaotic than they are and still support life. The dipole moment of the electron can be measured from spectra, and it has been confirmed that they are constant to more than one part in 10^{10} . Life would not notice if they were constant to only one part in 10^3 ! Similarly, there is overkill in the abilities of human beings as observers. The anthropic principle only requires that we observe that the universe exists; we do not

The Atheist Creation Myth

There is no evidence to support the existence of a multiverse and no reason to suppose that one exists, but many atheists rely on the idea to underpin their faith in the non-existence of God.

To avoid believing in God the atheist is required instead to believe in the existence of an entity completely outside the universe which is greater and infinitely more powerful than the universe and which created everything in this universe and an infinity of other universes. In spite of this the entity is completely undetectable, even in principle.

The problem for the atheist is that there are serious logical problems in believing in a multiverse while believing in a creator with a mind avoids these problems. There is evidence for the existence of God; there cannot be evidence, even in principle, for the existence of a multiverse.

The Oscillating Universe

According to this theory the universe will expand for a while and then collapse to a big crunch. This will cause another big bang and the universe will restart. The process could continue for ever.

This theory was devised by R. Tolman and published in 1934 as a way of generating an infinite universe in spite of the fact (still under debate at that point) of a creation event. The intention was to provide an infinite regression of universes as a possible explanation of the current universe.

It was shown to be inadequate before the end of the decade which it was devised by the man who had invented it. A mathematical analysis of the system showed that the cycles would grow longer and longer in every cycle and that the laws of nature would mostly persist from one cycle to the next. The idea thus fails to explain the fine tuning of the universe.

The idea also fails to provide a cause for the universe, as even an infinite sequence of contingent entities is itself contingent.

The theory of the oscillating universe was shown to be a complete failure before 1940. The fact that it is still repeated by atheists in defence of their ideas shows the failure of atheist theory. If the best that can be produced to defend atheism is a theory which was exploded in the 1930s then atheism is indefensible!

need to understand it. The fact that we can understand the orbital mechanics of planets or the motion of light near a black hole is far more than is required by the anthropic principle.

Conclusion

The idea of a purely multiverse requires one to accept the existence of an entity for which there is no evidence, and which raises insuperable logical contradictions. However, it doesn't rule out the existence of God.

The idea of a multiverse was invented to try to answer the issue of fine tuning; however, it doesn't do this. Instead the multiverse produces the problem of a fine tuned multiverse generator. The multiverse idea provides no answer to the argument from contingency, but in fact makes the contingency argument even more pressing.

Rather than providing an alternative to the existence of God the multiverse confirms that God exists.