



The Apologetic Argument

David Snoke

Department of Physics and Astronomy
University of Pittsburgh
Pittsburgh, PA 15260

From *PSCF* 50 (June 1998):108.

Where do we start when arguing for the existence of God? Is there a proper order of topics in the discussion? This paper draws together many of the varied threads of evidential apologetics into a single argument as a debate between an atheist and a Christian. I argue that our belief in God starts with the direct perception of his being, and that further evidences come into play primarily as responses to atheist attacks on the validity of that sense of God's existence. This argument ends up in several issues of quantum mechanics and cosmology presently at the forefront of scientific research.

The question of the existence of God is the primary question of human existence. All other deep questions revolve around this one. Questions of ethics and government come down to, Is there a God who has given eternal moral laws, or not? The question of the meaning of life comes down to, Is there a God who cares about what I do and say? The question of freedom comes down to, Is the thing that fundamentally controls everything in the universe friendly to me, or unaware of me?

In this question, the believer, who argues for the existence of God, expresses an apologetic. No Christian, who wants to follow God's command, Always be ready to give an answer to everyone who asks you to give the reason for the hope that you have (1 Peter 3:15), is free to ignore the topic of apologetics. Of course, Christians often disagree about *how* we should give that reason.

I have previously outlined the basis of an *evidential* apologetic.¹ In essence, I simply argued that the critiques which reject evidential reasoning because it does not provide absolute, axiomatic certainty do not hold up because the idea of absolute certainty is nonsense. Any use of language automatically requires some vagueness. Yet, we can become very certain of things via empirical reasoning.

Much evidential apologetic, however, seems unsatisfactory because the discussion focuses too narrowly on certain issues. One can get the false impression that those issues are *the* issues of apologetics, and that resolving them will prove the existence of God. For example, much apologetic discussion has revolved around the evidence for design in the universe. While this evidence does hold a crucial place in the apologetic discourse, nevertheless, apologetics does not start and does not end with the argument for design!

In this essay, I wish to make a case for the proper *order* of discussion topics in the apologetic argument. Science enters naturally into this discussion, but science is only part of the discussion. I see the philosophical discussion of the past two centuries as very much taking the form of a debate. At times, one side has scored points, and then the other side has responded. Although this to and fro has not occurred strictly in sequence, I will cast the discussion here as a debate.

The Starting Point: *Perception*

What is the starting point of the debate? To put it another way, what is our common ground? To have a debate, we must agree on *something*. We simply cannot have a debate if both sides agree on *nothing*! On this question I find near-universal agreement in the Bible, the historical writings and creeds of the Reformers (e.g., the Westminster Confession), and common sense and experience. We believe in God because we *perceive* God directly.

The Bible says: "The heavens declare the glory of God, the skies proclaim the work of His hands...There is no speech or language where their voice is not heard (Psalm 19:1, 3)."

"For since the creation of the world God's invisible qualities his eternal power and divine nature have been clearly seen, being understood from what has been made, so that men are without excuse (Romans 1:20)."

"His sheep follow him because they know his voice (John 10:4)."

The Westminster Confession says:

"We may be moved and induced by the testimony of the Church to an high and reverend esteem of the holy Scripture, yet notwithstanding, our full persuasion and assurance of the infallible truth, and the divine authority thereof, is from the inward work of the Holy Spirit, bearing witness by and with the word in our hearts (1.5)."

Our sense of justice also demands that this be true. If knowledge of God is not universal, then how could God condemn people for rebelling against someone they never knew? Yet, in the Bible, God claims to be the judge of all humanity (e.g., Romans 1:19). Suppose, for instance, that knowledge of God depended on a *deduction* based on abstract philosophical reasoning. Then only intelligent people could believe in God. Dumb people would all stand condemned! Alternatively, suppose that belief in God depended on a *choice*. Then if someone did not happen to make that choice, they could claim, legitimately, that they had no knowledge of God!²

This argument for perception based on justice is crucial because the debate about God is primarily about whether there is a God who is the universal *Judge*. One can imagine all kinds of other gods who hide themselves and whom most people cannot perceive, but one cannot demand universal ethical absolutes from such gods. If I cannot perceive the lawgiver, he cannot hold me accountable to his law. Paul implicitly recognizes this in his opening treatise in Romans 1. No one feels threatened by remote, clockmaker gods. People rebel when we tell them our God demands that they obey him!

A perception in this context is any knowledge which is written directly into our consciousness (by God, but we may not think so) without our fabrication. Perception therefore includes not only our five external senses but also our internal feelings, such as guilt, fear, and love.³ It does *not* include propositional statements of language, or theories and ideas from our imagination. (As discussed earlier, all languages are theories, i.e., simplifications which have their source in our imagination.⁴ Francis Schaeffer's analogy holds here: we are like travelers lost in the Swiss Alps.⁵ We hear a voice in the dark saying, I can help you if you do as I tell you.? We do not know where the voice comes from, in any absolute sense. We must merely decide how to act in response to it. To do so, we must formulate a theory about the source of the voice. We may change that theory, but we cannot change the fact that we have heard a voice.

Christian presuppositionalists, such as Cornelius Van Til and John Frame, seem to make the same point, although they get things a bit muddled.⁶ They insist, correctly, that God must be the starting point and that we do not deduce our way to God from abstract principles, but rather, we know God already. If we deny that knowledge, it is because we hate God and his laws. Thus, we tune him out, in which case we are not approaching the argument neutrally. The presuppositionalists muddle things, however, by referring to this prior knowledge of God as a presupposition, i.e., a proposition formulated in a language. They then wish to justify sense experience as a logical deduction from this proposition.⁷ As I have previously discussed, however, a language relies on prior sense-experience.⁸ Words in a language come from repeated association of sense experiences. With no sense experience to attach to the words, a proposition like God exists becomes empty sounds in the air. Therefore, we must trust our sense experience before we can trust any proposition of language. Justifying our sense experience based on logical deduction from a presupposition is not necessary. As Jonathan Edwards said, we trust our perceptions because we must. We have no other source of knowledge.

What exactly do we mean, when we say that we perceive God? Do we mean that from birth we understand the intricacies of the theology of a triune, omnipresent, omnipotent, self-existent, infinite, holy God? Not quite! I think that for most people the perception of God is found in our ascribing meaning to words like beauty, justice, guilt, and design.⁹ When we use such words, we mean that these things exist in the real world, independent of ourselves. We feel that a thing possesses beauty, not merely that it provokes beauty-thoughts in us.

This, then, is the common ground and the source of the debate with the nonbeliever. We agree that such perceptions exist. The believer says that such things are *intrinsic* to the universe, basic to the fabric of the universe, and independent of us, while the unbeliever says that they are illusions, things projected forth from ourselves, and are unknown to the universe apart from us. In other words, the believer says that the universe reflects a *personal* touch, while the unbeliever says it is *impersonal*. To the believer, all these things which we uniquely appreciate as persons do not have us as their *source*, but rather as their *receptacle*. In C. S. Lewis' terms, the believer says that the Absolute of the universe is *higher* than we (having greater personality), while the unbeliever says in effect that it is *less* than we (having less personality).¹⁰

Almost all believers I know talk of coming to faith because they knew in their hearts that God was there. Few believers are familiar with axiomatic deductions or with axiomatic presuppositions! Their confidence is the confidence of perception. In the same way, a woman is confident that the chair on which she is sitting exists. She needs no axiomatic arguments, nor would they do any good; she simply feels the chair. The person with faith in God has the same kind of rest.

Why should we go any further, then? Can we not be satisfied with perception and forget about apologetic arguments? No, we must go further because the issue is pressed on us by others. Let us go back to the chair on which the woman is sitting, which she thinks really exists. A man comes into the room and begins to make very persuasive arguments that the chair is not, in fact, real. Then one of two things must be true. Either (1) she is seriously deluded and in danger of falling on the floor, or (2) the man denying the existence of the chair is a poor fool who deserves pity. Both possibilities deserve some attention. If one is confident that (1) is not true, one must still feel some compassion for the poor deluded fool in the case of (2).

As John Frame has noted, one would not adopt the presuppositions (beliefs) of the fool in trying to help him.¹¹ Frame might want to appeal to axiomatic Christian presuppositions, but a more normal approach would be to appeal to the common ground between us: sense perception.¹² An appeal to axiomatic logic (e.g., presuppositions) would not help. What might help would be a jaunt around the room, including an attempt to walk through the supposedly imaginary chair. The man might deny perceiving the chair, but he could not walk through it. His reactions would force reality on him. Even if this did not change his delusion, at least the perception of his reaction would provide a healthy safe check for the woman that (1) is not true.

On the other hand, if we did *not* perceive God, then an apologetic argument would be of little use. Suppose a person tried to persuade someone of the existence of an imperceptible, invisible chair, one which people can walk through and which they cannot sit on. What difference would it make? The argument might be self consistent, but without any perception of the chair it would mean little. In other words, it would violate Occam's razor.¹³

Since this essay will repeatedly use Occam's razor, let me restate this principle here. Occam's razor is one of the most powerful tools of inductive reasoning. In modern formulation, this principle says that given two theories about something, if one requires a substantially greater number of imperceptible entities, it is less likely to be true. Note that *all* theories require *some* imaginary, or imperceptible, entities. To simplify the vast and complex world of our perception, we must imagine some imperceptible connection between the things we perceive. Thus, we may postulate a causal relationship, or composition from the same kind of elementary particles, or some other unifying relationship. This process of hypothesizing imperceptible entities is essential for the scientific method. But our experience leads us to expect that when someone multiplies imperceptible entities *endlessly*, that person likely has a particular goal in mind that no amount of experience will overturn-theory will be ever altered to conform the facts to the preconceived goal.

We would misuse Occam's razor, however, if we said that we should prefer all simple theories to complex ones. Certain forms of astrology may be simpler than modern general relativity, and the theory of five elements-air, water, fire, earth, and ether-seems far simpler than the modern periodic table! These oversimplified theories actually violate Occam's razor, however, because they require us to ignore vast amounts of observational data. Whenever a new experiment violates the simple rules of the theory, the simple theory requires us to make an exception. Such an exception is, in effect, a hypothesis of some new, unknown entity that allows this particular data to violate the simple rules. The modern theories of astronomy and the periodic table historically grew out of old theories of astrology and alchemy for this very reason. Too many observations failed to find explanation in those simple schemes, so that the list of exceptions became an endless list of inexplicable entities.

The debate between the believer and the unbeliever essentially becomes a debate about who makes a greater violation of Occam's razor. The unbeliever argues that the idea of God is an unnecessary hypothesis of an imperceptible entity, whereas the believer argues that the unbeliever must explain away too much experience.

Christian theology may sometimes seem complex and full of imperceptible entities. As I have argued previously, however, theology acts as a theory to explain spiritual data in the same way that physical theories explain physical data¹⁴ We do not expect to directly perceive things like infinity and tri-unity any more than we expect to directly perceive relativistic field equations and hyper-dimensional symmetries. Yet, just as physical theories attempt to explain real experiments, so theology is tied to real experience. This experience of God does not consist of esoteric subtleties, but of the things that scream out at all of us beauty, guilt, justice, design, etc., and the power of the Bible itself.¹⁵ The Christian argues that the theology of God is the *simplest* way to understand all these things. C. S. Lewis said:

Theology is in a sense experimental knowledge. It is the simple religions that are the made-up ones...If Christianity was something we were making up, of course we could make it easier. But it is not. We cannot compete, in simplicity, with people who are inventing religions. How could we? We are dealing with Fact. Of course anyone can be simple if he has no facts to bother about.¹⁶

The Counter Argument: *Self-Deception*

The unbeliever must have an explanation for these religious perceptions. Even if the unbeliever denies perceiving such things himself, no one can deny that some people perceive such things. The existence of blind people, or people who keep their eyes shut tight, does not remove the need to discuss the existence of light. People with sight can describe their perceptions, communicating them to the blind person via the available senses, e.g., by talking. Unless a person has no external senses at all, and therefore no communication, that person must deal with the evidence of sense perceptions by others.

The most successful explanation by the atheist for religious perceptions came in the last century from scholars like Freud, Marx, and Feuerbach, but atheists in previous centuries used this argument as well. These men, and many after them, pointed out that our perceptions are inextricably tied to human *needs*, both physical and social. For humanity to survive, people must procreate, and in order to procreate, they must have a desire to do so. For humans, this desire often takes the form of seeing beauty. If we all looked disgusting to each other, the human race would cease to procreate and would die off. In the same way, for society to survive, it must have limits on individual behavior. If people felt no guilt, honor, or shame, then society could not enforce its rules and would cease to exist. Furthermore, it is possible for people to manipulate these feelings for personal ends. Rich people can use religion as an opiate of the masses. Men can use love to manipulate women; parents can use shame to manipulate their children.

This argument gains strength when a comparison with animals is also considered. Animals, too, have needs and senses that match those needs. People appear more complicated, but not utterly different.

The Christian does not deny any of these physical, psychological, or social needs. In the economy of God, people tend to feel good about things that are good for them, either as individuals or as a society. If God had not set things up this way, we would indeed have a short existence on this planet! Human society would not remain stable for even a few years. The Christian also does not deny the existence of manipulation. Because of sin, sometimes those perceptions become warped and we perceive things as good which are actually bad, or things as shameful which are actually honorable. Evil people can deceive us -no one denies Marx' charge that rich people have used religion as an opiate for their own ends. Calvin responded to similar teachings in his day:

It is utterly in vain for some men to say that religion was invented by the subtlety and craft of a few to hold the simple folk in thrall by this device and that those very persons who originated the worship of God for others did not in the least believe that any God existed. I confess, indeed, that in order to hold men's minds in subjection, clever men have devised very many things in religion by which to inspire the common folk with reverence and to strike them with terror. But they would never have achieved this if men's minds had not already been imbued with a firm conviction toward God, from which the inclination of religion springs as a seed.¹⁷

In other words, all of the manipulation and wish fulfilment has an explanation in the Christian worldview. In fact, the

Christian worldview even has a good explanation for the existence of atheists.¹⁸ This does not settle the issue, however. Occam's razor comes back into play. If all our perceptions of God, honor, shame, etc. are explained simply by psychological need, then why postulate God? This is a strong argument. How can I tell the difference between perceptions of properties which are inherent in something outside of me, and perceptions which are really false projections of my own internal need? Since every act of perception involves both a source and an observer, I cannot decouple my perceptions from myself, to see the real universe apart from my needs and desires.

Response: *The Complexity of the Self*

The Christian addresses this problem by noting that it ignores a larger question. Given the existence of humans the way they are, the atheist can perhaps easily find a way to attribute all of our deep, religious perceptions to internal, psychological needs. But whence come such complicated things as people, who can project such sublime feelings onto the impersonal universe? As pointed out by C. S. Lewis, if all these perceptions by persons come from properties found entirely within themselves, then does that not make humans *superior* to everything else in the universe? How could an essentially impersonal universe generate humans which see personality in it?

It is difficult to express in exact terms this superiority of humans to everything else. As far back as Augustine, scholars have ranked various creations and creatures, putting humans at the top. Is this mere self-centered pride?

Our common sense tells us that something must be unique about humans for them to have such subtle thoughts. Several modern scholars have made the argument more precise. Roger Penrose, building on Gödel's revolutionary theorem,¹⁹ has shown that human thought cannot be reduced to any computational process, and therefore he has argued that it cannot be reduced to any known physical process.²⁰ We can understand things that no computer ever will. In fact, the concept of understanding is extremely subtle and a unique attribute of humans.

Walker Percy, using modern language theory, has illustrated how humans react differently from everything else in the universe.²¹ Rather than responding to stimuli, we respond to *symbols* of the stimuli, which we ourselves have generated. This ability to create fictions in our minds gives us both the ability to create literature and the ability to lie. This ability forms the basis of language, which lumps the universe into vague categories and, therefore, makes absolute certainty of anything impossible.

Both Penrose's and Percy's arguments center around exactly those properties of humans which allow them to conceive of things like beauty, guilt, justice, design, etc. These kinds of perceptions deal not with the direct stimuli from objects, but with estimations of the overall nature of systems. This systematic, big picture perception is difficult to reduce to mathematical terms, but no one can deny its existence.

On basic philosophical grounds, then, the Christian argues that personality exists, that it exists in us, and that it is inconceivable for a fundamentally impersonal universe to spawn personality. Finding the same attributes of language, etc., to some degree in animals would not affect this argument. Instead of only one fantastically complex and subtle creature, perhaps we will find several!

Counter-Argument: *Chance Evolution*

The atheist's response is well known, going generally under the name of evolution. The argument is as follows: in an infinite, infinitely varied, but essentially impersonal universe, all kinds of improbable things will occur, including the existence of very subtle and complicated people. The picture is frequently given of millions of monkeys typing randomly at typewriters for millions of years. Given enough time, the laws of probability say that eventually one of them will generate all of the works of Shakespeare. Not only that, but in an infinite time span, they would generate all the works of Shakespeare an infinite number of times!

This argument is essentially correct in its treatment of probability. It is certainly true that many things happen that seem magical, yet which follow directly from simple laws of chance. I and three of my friends may accidentally meet in a shopping mall after not seeing each other for years. Should we conclude the meeting was the result of some unseen, purposeful cause? No. This is known as statistical clumping, or the nonpareil effect. You can see this at home. Put two different kinds of small candies (nonpareils) in a jar, and mix them up. You will not see an even mix of candies throughout the jar. Instead, you will see clumps of one kind of candy in different places, no matter how much you mix the candy.

In another example, suppose you throw a single six-sided die repeatedly. If you threw it just a few times, you would be surprised if it came up one five times in a row. If you continued throwing it for hours, however, it would become *probable* to see five ones in a row. Not only that, but if you continued for an *infinite* time, there is no limit on the number of ones that you might see in a row. You could easily see runs of 100 ones, 1000 ones if you sat around throwing dice for years!

Note that this argument assumes that *the range of possibilities spans the set of desired outcomes*. It is useless to ask the probability of getting a run of ones, if the dice are labeled two through seven! Or, in the previous example, if the millions of monkeys all sit at typewriters that do not have the letter, *i.e.*, no matter how long they type they will not reproduce Shakespeare!

Why belabor this obvious point? The reason is that, as R. C. Sproul has emphasized, randomness is not a causal force, but merely another word for ignorance of causes.²² What the atheist really says, in the above argument based on probability, is that many uncorrelated, simple causes can lead to arbitrarily complex coincidences. This is true, but it leaves out an important consideration, which is that the system must be constructed properly to allow the right kind of coincidences. A randomly constructed system will not necessarily allow the kind of coincidences we want to see.

For instance, in an example often used today, it is possible to write computer programs that generate cellular automata

which reproduce themselves, mutate, and show numerous other characteristics of evolving life, using simple equations. What often remains unstated, however, is the fact that these programs themselves are the products of intricate design. Not all simple equations generate cellular automata. Not even a significant fraction do most equations generate boring solutions. Without instruction based on previous decades of mathematical research by thousands of brilliant mathematicians, few of us could write a computer program to generate cellular automata. The computer itself must also possess a high level of design. Getting equations to generate the brilliant graphics displayed in these programs requires a complicated code of thousands of lines. Random generation of computer code would hardly ever produce cellular automata.

Since the atheist aims to show that intelligent life could arise without prior purpose or design, the evidence must therefore support *both* of the following contentions: (1) that there is no connection between the construction of the system and the existence of persons (the system is impersonal), and (2) that, nevertheless, random correlations in the system have led to the complex patterns of life. In terms of the statistical arguments above, this means that (1) the range of possibilities in the system includes the desired outcome but is not specially related to it (the dice are not loaded), and (2) adequate time has passed for the full range of possibilities to be spanned in actuality (there have been enough throws of the dice.)

The atheist therefore needs no explanation for the existence of life, and for the existence of humans with subtle feelings, if (1) life can be shown to involve only natural processes consistent with impersonal, simple laws, and (2) the universe can be shown to have existed long enough for these laws to actually make intelligent life probable by coincidence. Few people doubt the first premise these days because of the great success of modern science in showing that all kinds of biological processes obey known physical laws. As Penrose and Dembski have argued,²³ however, it is far from proven that brains follow known physical law.²⁴ A more serious challenge, addressed below, is to what degree known physical laws can be viewed as simple, impersonal, and unrelated to life. From the time of Newton, physical laws have been assumed to have utterly simple form, but as discussed below, many hidden complexities are swept into the values of the physical constants that appear in these laws.

In regard to the second premise, the age of the universe of billions and billions of years, indicated by numerous astronomical measurements, has long been assumed adequate for life to evolve, not only on the earth, but on countless other planets as well.

In the first half of this century, therefore, the atheist's argument of evolution based on probability nearly destroyed Christian philosophy. Almost all Christian theologians accepted the above premises, which imply that belief in God fails in inductive argument because it violates Occam's razor. In response, three Christian schools arose, all of which jettisoned inductive argument and with it, argument based on evidence.

The neo-orthodox school, represented by Karl Barth, conceded that evolution made belief in God dispensable, but argued for belief in God based on a personal value choice. The presuppositionalist school, led by Cornelius van Til, maintained orthodoxy as an axiomatic assumption not open to argument, holding out for a complete reinterpretation of science; the fundamentalists held to the Bible axiomatically and rejected science altogether. While these schools differed radically in many ways, they all accepted the idea that the atheist could *consistently* reject God in a scientific worldview, that nothing rationally compels a person to believe in God. In contrast, previous Christian thinkers had held that the atheist must turn a blind eye toward certain things, i.e., that the *atheist* violates Occam's razor. Only a few scholars like C. S. Lewis and E. J. Carnell maintained an evidential approach, mostly concentrating on the larger philosophical issues and ignoring the details of evolution.²⁶

Response: *Probability in a Finite Universe*

The best Christian response amounts to saying, essentially, Okay, let's roll up our sleeves and calculate the probabilities.²⁷ Using the non-Christian model of evolution, do the numbers work out to make life probable? It is important here to recognize that this approach does not imply acceptance of the non-Christian model, either in its age of the universe or in its definition of natural law. On the contrary, the purpose for working within the non-Christian evolutionary model is to determine whether it is consistent with experimental and observational evidence and is self consistent. As with any theory, one of the strongest means of refutation is to show that a self contradiction arises while working entirely within the framework of the theory.

Many Christians have shied away from the Big Bang theory because they have assumed that the billions of years involved would provide ample time for chance evolution to produce life. By and large, Christian philosophers have missed the tremendous import of the paradigm shift involved in the Big Bang theory, which requires acceptance of a *finite universe*. As Hugh Ross and others have pointed out, atheists historically have opposed the idea of a finite universe; the Big Bang theory, which implies a universe bounded both in age and extent, received acceptance in this century only after the weight of evidence overwhelmed years of philosophical opposition.²⁸ In an infinite universe, the second criterion for the probability argument, above, is manifestly satisfied. If the universe is finite, then the probability for life can, in principle, be very small.

Although the details of astrophysics provided the impetus for this paradigm shift in atheist philosophy, strong proofs of the finiteness of the universe are available for all to see. These typically were expressed as paradoxes before the formulation of the Big Bang theory, since they find their resolution only in the finite-universe model of the Big Bang.

The first is Olber's paradox, or, Why is the night sky dark? Simple geometrical considerations, and the assumption of the conservation of energy, show that if the universe were infinitely large and infinitely old, then the night sky would glow with the intensity of the surface of the sun.²⁸ Although the intensity of stars very far away falls as the square of the distance, the *number* of stars *increases* as the square of the distance. Thus, on average, stars at all distances contribute the same amount of light to the sky.²⁹ Therefore, in an infinite universe, the infinite number of stars remotely far away would contribute an infinite amount of light to the sky. Although various scholars attempted solutions through the years³⁰ the

only satisfactory solution came with the Big Bang theory, which says that there are not an infinite number of stars, and furthermore, that the light from very remote stars has not had time to get here, since the universe has finite age.

A second indication of the finiteness of the universe is the paradox of the Arrow of Time, or "why does time only run forward and not backward?"³¹ Aquinas touched on this paradox with his argument from Change. The assumption of the conservation of energy implies that the laws of motion must run equally well backwards as forwards. Why then do we experience time running only one direction? The answer comes from the Second Law of Thermodynamics, which states that entropy always increases. The Second Law, in turn, follows directly from the fact that the universe is not in equilibrium, but is expanding. In a static, random universe, a highly ordered state (which could occur due to statistical clumping) will evolve *toward* a disordered state, but it will also necessarily evolve *from* a disordered state, if the laws of motion are time reversible. In other words, nothing should ever change, on average. To have a *continuous* increase of entropy, the universe must have had an overall entropy minimum at some time in the past, i.e., a beginning.

Both these arguments rely on the assumption of the conservation of energy. This could be doubted, but this would amount to doubting the entire structure of all modern science. Occam's razor comes in to play once again!

Given ample evidence of the finiteness of the universe, one can attempt to calculate the probability of life based on known processes. This probability of life involves several different arenas. First, one can ask how intelligent life could evolve from primordial bacteria or other simple life forms (biological evolution). Second, one can ask how celled life forms could arise from DNA and other complex chemicals (abiogenesis). Third, one can ask how DNA and other complex chemicals necessary for life could arise from simple chemicals (chemical evolution). Fourth, one can ask how the simple chemicals came to exist, i.e., how stars and planets formed (stellar evolution). Fifth, one can ask how the universe came to have the energy and matter characteristics necessary for stars and planets (cosmology).

It is beyond the scope of this essay to review all of the work on these topics. Instead, it is sufficient to say that (1) there is growing perception among non-Christian scientists of a crisis in the probability arguments, and (2) these calculations ought to be taken seriously by Christian apologists.

Although the view that life appeared spontaneously in primordial pools of slime still appears in many textbooks, recent data on the early-earth environment gives a picture of a much more hostile climate than still pools. The experiments of Stanley Miller are largely discredited as unrealistic.³² Chemical evolution is presently questioned to such a degree by both Christian and non-Christian biologists,³³ that panspermia, the idea that previously-evolved spores fell to earth from outer space, now merits serious attention.³⁴ In the area of stellar evolution, despite the stories in textbooks of clouds collapsing into stars via gravitational attraction, there is still no satisfactory picture of star formation. Although the inward force of gravitational attraction increases as $1/r^2$, conservation of angular momentum implies that the outward centrifugal force increases as $1/r^3$, so that stars can never form unless some exotic mechanism carries away angular momentum.³⁵ In the area of cosmology, recent discoveries of large-scale structures in the universe, so large that light would take one-tenth of the age of the universe to cross them, have severely constrained models of galactic formation.³⁶

The probability problem does not end with the above, however. As discussed in the previous section, an argument based on odds must analyze two things: the probability of the desired outcome given the rules of the system, and the probability of the system having rules which allow the desired outcome. In regard to the latter, numerous well-known physicists have drawn attention to the problem of large number coincidences in the laws of nature.³⁷ These arise when various constants of nature, e.g., the mass of the electron and the speed of light, are combined into unitless ratios to make pure numbers. The numbers so formed typically are large, of the order of 10^{60} to 10^{100} . Furthermore, if these numbers differed by some tiny fraction from their actual values, then life would be impossible. Christian authors Hugh Ross and John Templeton and Robert Hermann have drawn attention to these coincidences;³⁸ New Age authors like Louise Young have also discussed them at length.³⁹

In the scientific method, things that are fantastically improbable are considered impossible. This follows from Occam's razor. If you walk into a room with 100 six-sided dice, all showing one, you know that someone has placed them that way. Why? Effectively, to suppose that they had fallen that way randomly would amount to supposing 6^{100} unseen entities, i.e., roughly 6^{100} unobserved previous throws of the dice. Note that this argument supposes some connection of the pattern of the dice to you, personally. Any throw of the dice is just as improbable as any other, but most of the possibilities would have no meaning to you - they would be equivalent states.⁴⁰ Only certain states, e.g., all ones, connect directly to your experience. Occam's razor insists that if you find an extreme improbability related to yourself, then it is in fact related to you.⁴¹

The point of calculating the long odds involved in evolutionary theory is therefore not to argue that there are gaps in the physical laws, as though the physical universe really has flaws that God must fill *ad hoc*, so to speak. In the scientific method, finding inconsistencies in a theory leads one to look for a new theory. Pointing out the long odds involved in evolutionary cosmology theory does not imply a belief that the real, physical universe has gaps, or unregulated parts. Rather, it says that a description of the physical universe which relies entirely on *simple, impersonal* laws fails Occam's razor, because the real universe has the indelible imprint of a Person.

Counter-Argument: *Many Worlds*

It may surprise some Christians to learn that modern philosophy of science has largely begun to accept the fantastic improbabilities discussed above and the implication that the laws of nature are, in fact, related to us. The atheist's arguments today have changed direction, in response.

The new atheist's argument allows that the laws of nature and the structure of the universe are related to us based on the

anthropic principle.⁴² This argument goes as follows: suppose I ask, Of all the billions of places on earth, why was I born in Teaneck, New Jersey? This place is specially related to me—my birthplace—and yet on the face of it, very improbable. We all understand, however, that I had to be born *somewhere*. My individual experience picks out a certain set of parameters that are special only because I am looking at them, a so-called observer effect. In the same way, the atheist's cosmological argument supposes an infinity of different possible universes. The one universe in which we live has physical laws and structure related to us, only because if it did not, we could not exist to observe it.

This argument is sound, but relies critically on the evidence for multiple experiences. I am not surprised that I was born in a certain place because I see many people born in many places, covering the globe. In a sense, it is the evolutionary probability argument all over again, except that instead of many random occurrences within a system, one assumes the existence of many, random systems. Given an *infinity* of possible universes of infinite diversity, all manners of coincidences become possible. One has simply embedded our finite universe in an infinite, eternal macro-universe. The atheist has recovered the eternal, impersonal universe that the Big Bang theory seemed to destroy.

The problem for this kind of theory, of course, is that, unlike the example of being born in Teaneck, in which I can easily see many examples of other people being born, we have no examples of even one other universe. The atheist apparently violates Occam's razor to an infinite degree by supposing an infinite number of imperceptible entities, each of which is an entire universe!

Non-Christian scientists have attempted to find evidence for other universes in at least two different ways. The first hypothesis has relied on a nonstandard interpretation of quantum-mechanics, called the many-worlds hypothesis. To resolve certain paradoxes in quantum mechanics, Everitt and Wheeler proposed a view in which at every quantum event (trillions of which occur in a single second, at a single point in space) the entire universe splits into a number of alternate universes covering every possible outcome of the quantum events.⁴³ While this view has received a lot of popularity in the science fiction literature, very few physicists take it seriously. In short, it creates more paradoxes than it solves.⁴⁴ How can the entire macroscopic universe light years away split at each microscopic event here on earth? Does this not violate conservation of energy to an infinite degree? Why does it only split going forward in time, and not backward? What gives the arrow of time?

A more serious proposal revolves around the inflationary model of cosmology. This theory, first proposed by Alan Guth, starts with the standard Big Bang theory and inserts, at a very early stage, an epoch of extremely fast expansion of the universe, or inflation.⁴⁵ This epoch then conveniently disguises itself so that the universe looks like it evolved from a simple Big Bang. Only a few trace evidences would remain from the Inflationary era.

The Inflationary model allows two critical changes from the standard Big Bang theory. First, it allows many of the large number coincidences to be combined into one large number coincidence. Second, it allows our universe to be a recently-spawned part of a larger, eternal macro-universe, so that the remaining coincidences can be viewed as a probable event in an infinite series of random sub-universes.⁴⁶

Most Christian philosophers have missed the import of the Inflationary Theory for cosmology. If proved, it would go a long way toward establishing a cosmic Darwinism that yielded persons in an impersonal universe, just as hoped for in the original Darwinism. This aspect explains a lot of the excitement among non-Christian physicists about the Inflationary model in recent years.

The Inflationary model gives very specific predictions for certain observations. Its primary parameter is the total mass density of the universe, usually written **W**. The Inflationary model implies that $W=1$, i.e., that the total density is exactly equal to the amount needed to make the universe eternal in the future. The density must be neither too little, in which case the universe would evaporate (i.e., expand to zero mass density in the far future), nor too much, in which case the universe would collapse in on itself due to gravitational attraction.

Astronomical observations, however, indicate that the actual mass density is closer to $W = 0.2$. Since observations of the visible universe (light-emitting stars) indicate a mass density too low for the Inflationary theory, many physicists have proposed a search for Dark Matter, which would make up the remaining 80-90% of the mass needed for the theory.⁴⁷ The constraints of nuclear theory imply that this Dark Matter cannot be mere chunks of rock or other normal matter. Instead, it must be an entirely new kind of particle which passes through us nearly imperceptibly.⁴⁸ Despite the entirely hypothetical nature of Dark Matter, many atheists are so convinced of its existence, based on the above philosophical considerations, that one frequently reads in the popular literature that 90% of the universe is made of an entirely different kind of matter from us.

The Inflationary theory seems to have received a death blow from recent observations, specifically the Cosmic Background radiation (COBE) study and the observations of large-scale structures, in the universe, clusters of galaxies so large that to cross one, light would take a tenth of the age of the universe.⁴⁹ These observations, put together, strongly indicate a value of $W = 0.2$, and do not allow Dark Matter to be hidden. Proponents of the Inflationary theory have not given up yet, however, and continue to attempt new variations of the theory that agree with the observations.⁵⁰

Concluding Remarks

We have ended with several issues at the forefront of scientific research today. This is proper, because much of science today dwells on ultimate questions. Yet we must not put the cart before the horse and dive into scientific issues without addressing the fundamental basis of perception that drives all belief in God. We talk about science in *response* to arguments by atheists which attempt to explain away our perceptions of God. I have heard numerous apologetic debates end with the Christian showing strong evidence of something or other, and the atheist finally responding, But if God exists, why is he so silent?

If a person feels no guilt, no sense of absolute justice, if a person has no sense of the dignity of humankind, no appreciation of the beauty and design in nature, and if that person remains unmoved by the words of Holy Scripture, then what good is astronomy? As Francis Schaeffer said, He is there, and He is not silent.⁵¹ To shut him out, a person must stop up his eyes and ears. Yet to those with eyes and ears to hear, the Christian can present credible evidence that the things we perceive do indeed come from God and not from our own self deception.

In the last section I outlined a scientific theory that aims to overthrow the Christian concept of a beginning of the universe. What if it succeeds? In the first half of this century, science seemed to provide a perfectly airtight, Godless view of the world, and Christians mostly retreated into liberalism, presuppositionalism, or antiscience fundamentalism, all of which had the effect of cutting off Christians from meaningful discussion of science. In the latter half of this century, Christianity has seen an intellectual rebirth, even while the number of nominal church attendees in Europe and North America has decreased. Non-Christian scientists and authors have questioned the paradigm of evolution. The disaster of the new morality both in the U.S. and in the communist nations has led many to look for moral absolutes. Numerous Christians now claim impressive academic credentials and hold their own in debate with atheists. In a way, it is easy to be an evidentialist. But what if the Inflationary theory suddenly jumps into the public eye with strong evidences of multiple universes Should evidentialists all say, You're right, the Bible is wrong

Every person should do two things when faced with challenging evidence. First, one should have a healthy doubt about new claims which take into account the presuppositions of the person bringing the message. If a sales agent with an interest in selling me a product shows me an impressive array of statistics, I should still hold out some doubt. Similarly, if people with an interest in becoming a new elite or with an interest in discarding old fashioned claims of morality tell me science has proven..., I should take it with a grain of salt.

Second, one should hold on to internal evidence, i.e., gut feelings. This is valid evidence! For instance, suppose someone tells me my wife has committed adultery, and presents an impressive list of corroborating facts and witnesses. Still, I may say, I know her, and I know she would not do that! No Christian should feel ashamed to say, I know God, and I know his Word!

Still, one has to leave open the possibility that one has been deceived. As Francis Schaeffer said, The Christian must have the integrity to live open to the question as to the possibility of his being 'taken in' by his Christian commitment.⁵² One must ask, What level of evidence ought to convince a Mormon to forsake his faith? Am I honest enough to admit error based on the same type of evidence This is an uncomfortable idea for many Christians. Yet a person who has looked doubt in the eye, who has examined all the facts and found them to hold up, has a certainty that surpasses all forms of protected belief. A man who knows his wife would not commit adultery has no fear of the facts. The man who loudly rejects any examination of the facts is usually the one that fears that they may, in fact, point to a truth he does not want to know!

One thing Christians ought not to do is to take hold of a few scientists of dubious credentials who claimed to have disproved all Inflationary theory, trumpet their findings as the final word, and mock all scientists who disagree as members of an international conspiracy to hide evidence. In fact, much creation science in this century has taken exactly this form. Evidentialism has taken a beating when numerous apologists had to retract dramatic evidence after loudly proclaiming it the definitive proof of Christianity. In doing so, they ignored good rules of lawcourt reasoning. A person who says what you want to hear is not necessarily a trustworthy witness! Sometimes we must simply admit certain things appear contradictory and leave it at that. This is not irrational if we have other strong evidences for believing something.

In this essay I have only discussed the atheist's position. Christian apologetics must deal not only with the atheist, but also with the pagan. The above discussion of large number coincidences has led not only to support of the Christian position, but also of many other religious but non-Christian views, especially New Age views that make man into God, such as the works of Tipler and Young. In dealing with such views we must dive into the specific evidences we have for God-to-man communication. Apologetics is never-ending, because it must always respond to new challenges to what seems to us obvious: our experience of God.

©1998

Notes

[Author's note: an * indicates references recommended as useful reviews of science for nonexperts.]

¹D. Snoke, "Toward the Unity of Theology and Science," *Perspectives on Science and Christian Faith* 43 (September 1991): 166-73 and D. Snoke, "The Problem of the Absolute in Evidentialist Epistemology," *Perspectives on Science and Christian Faith* 47 (March 1995): 2-22.

²As I have argued previously (see "The Problem of the Absolute"), a survey of Scripture passages indicates that belief in God is essentially *passive*, based on being convinced, not an active choice. Choice in the Bible is always associated with obedience to what we already know.

³ This distinction between internal and external senses goes all the way back to Roger Bacon (*Opus Majus* VI, i) but has unfortunately often been lost in subsequent discussion. Restriction to the five external senses artificially excludes a whole realm of our experience. As professional counselors often say, feelings are facts, though in Western culture we would often like to deny their reality or validity. See, e.g., *A. R. Damasio, *Descartes' Error* (New York: G. P. Putnam, 1994).

⁴*B. Gregory, *Inventing Reality: Physics as Language* (New York: John Wiley and Sons, 1988).

⁵D. Snoke, "The Problem of the Absolute" and F. Schaeffer, *The God Who is There*, in *The Complete Works of Francis A. Schaeffer* (Wheaton: Crossway, 1985).

⁶C. Van Til, *The Defense of the Faith* (Philadelphia: Presbyterian and Reformed, 1955) and John M. Frame, *The Doctrine of the Knowledge of God* (Phillipsburg: Presbyterian and Reformed, 1987).

⁷Alvin Plantinga, another modern presuppositionalist from the Calvinist school of Cornelius Van Til, takes the same approach to justifying the senses, e.g., in *Faith and Rationality* (Notre Dame, IN: University of Notre Dame Press, 1983), he affirms belief in God from direct perception, as I do: Upon reading the Bible, one may be impressed with a deep sense that God is speaking to him. Upon having done what I know is cheap, or wrong, or wicked, I may feel guilty in God's sight and form the belief, God disapproves of what I have done. Upon confession and repentance I may feel forgiven, forming the belief God forgives me for what I have done. A person in grave danger may turn to God asking for His protection and help; of course he or she then has the belief that God is indeed able to hear and help if He sees fit. When life is sweet and satisfying, a spontaneous sense of gratitude may well up within the soul; someone in this condition may thank and praise the Lord for His goodness, and will of course have the accompanying belief that indeed the Lord is to be thanked and praised.

For Plantinga, however, such perceptions are not *sufficient* for belief, and he would supplement them with properly basic beliefs, i.e., axiomatic presuppositions, which allow organization of these perceptions into meaningful frameworks. Arguing from experience alone would constitute what he calls the error of foundationalism, the view that beliefs are rational only if based on such sense experience, or on self-evident or otherwise undoubtable propositions (if such exist).

Plantinga, like all presuppositionalists, says that evidentialists are not self-consistent since they must assume the foundation principle. As I have discussed at length (see "The Problem of the Absolute"), this objection does not stand up since evidentialists do not have to make their foundation principle an axiomatic assumption. It simply makes sense as a proper inductive theory based on sense experience. Although our ability to generate theories inductively may involve an irrational leap of the imagination, belief in such conclusions is not irrational because they can be tested by further experience. Plantinga sounds almost as if he would agree with me in advocating an inductive approach to formulating properly basic beliefs: We must assemble examples of beliefs and conditions such that the former are obviously basic in the latter, and examples of beliefs and conditions such that the former are obviously *not* properly basic in the latter. We must then form hypotheses as to the necessary and sufficient conditions of proper basicity and test these hypotheses by reference to those examples.

In allowing numerous *propositions* to stand alongside experience as obviously properly basic, however, Plantinga opens the door to all kinds of wishful thinking. We need only apply the test of self-consistency to our set of basic beliefs. We do not need to actually test them against experience. It is hard to imagine why *any* religion could not follow the same program. As I have argued earlier (see note 1), such an approach protects Christianity from attack, but leaves it without an argument why Mormons or, for that matter, believers in the Great Pumpkin should not make their claims into properly basic beliefs. K. Parsons, in *God and the Burden of Proof* (Buffalo, NY: Prometheus, 1989) has argued the same: Plantinga's views mean the end of rational debate, the end of a common ground for discussion, and open season for all the kinds of nonsensical beliefs seen in bookstores today.

⁸One objection to the idea that all language relies on sense experience is that of Polanyi, that values must come from somewhere else. As I have discussed previously (see "The Problem of the Absolute"), all real values come from experience. Of course, one must include internal sense experience, which many would like to ignore (see note 3).

⁹Can we perceive God via the five external senses? Although the Bible makes clear that we cannot perceive the "fullness" (or "face") of God via the five external senses. No one has seen God (John 1:18), God does not rule out communicating via the external senses. "External" sense experience with God forms the basis for "special revelation"; the prophets heard his voice or saw the pillar of fire; Jesus, who has "made God known" (John 1:18, Col. 1:15, Heb 1:3), was perceived via the same senses (1 John 1:1-4), even after his resurrection (John 20:27). As discussed previously (see "The Problem of the Absolute"), we obtain this special revelation today via testimonies and messengers which come to us via the five senses, e.g., reading. Reformed theologians have always argued, however, that without a confirming internal testimony, these messages of special revelation remain meaningless to us. Without prior reason to believe in God, belief in miracles would violate Occam's razor, i.e., Hume's objection.

¹⁰C. S. Lewis, *Mere Christianity* (New York: Macmillan, 1943).

¹¹J. M. Frame, *Apologetics to the Glory of God: An Introduction* (Phillipsburg: Presbyterian and Reformed, 1994).

¹²Some presuppositionalists seem guilty of a logical fallacy. Since the Christian presupposition (the existence of God) implies the reliability of the senses, they would then say that any use of the senses implies reliance on the truth that God exists. But that does not follow. If A implies B, it does *not* follow that the truth of B implies the truth of A!

¹³The failure to address Occam's razor is the reason the presuppositionalist Christian argument remains so unsatisfying. Presuppositionalists may be correct that starting with their presuppositions they can remain perfectly logically consistent, but a person who hypothesizes a room full of invisible, imperceptible chairs could do the same. Self-consistency alone never suffices to convince anyone of anything.

¹⁴D. Snoke, "Toward the Unity of Theology and Science" and Snoke "The Problem of the Absolute in Evidentialist Epistemology."

¹⁵As C. S. Lewis has argued (see note 10), we do not have to agree on exactly what is just or what ought to cause guilt, to agree that justice and guilt are real things. We also do not need to agree on the interpretation of the Bible to agree that it is God's Word.

¹⁶C. S. Lewis, *Mere Christianity*.

- ¹⁷J. Calvin, *Institutes of the Christian Religion* J.T. Macneil, ed., F.L. Battles, trans., (Philadelphia: Westminster Press, 1960).
- ¹⁸R.C. Sproul, *The Psychology of Atheism (If There is a God, Why are There Atheists?)* (Wheaton: Tyndale, 1988).
- ¹⁹Gödel, *Monatshefte f. Math. u. Physik* 38 (1931): 173 in *From Frege to Gödel*, J. van Heijenoort, ed. (Cambridge, MA: Harvard Press, 1967).
- ²⁰*R. Penrose, *Shadows of the Mind: On Consciousness, Computation, and the New Physics of the Mind* (Oxford: Oxford University Press, 1994).
- ²¹*W. Percy, *Lost in the Cosmos: The Last Self-Help Book* (New York: Farrar, Straus and Giroux, 1983).
- ²²R. C. Sproul, *Not a Chance: The Myth of Chance in Modern Science and Cosmology* (Grand Rapids, MI: Baker, 1994).
- ²³*R. Penrose, *Shadows of the Mind* and W. A. Dembski, "Converting Matter into Mind: Alchemy and the Philosopher's Stone in Cognitive Science," *Perspectives on Science and Christian Faith* 42 (December 1990): 202-26.
- ²⁴Penrose has argued that brains could get their unusual properties from quantum mechanical wave function coherence, as seen in things like Bose-Einstein condensation and lasers. He makes no claims about how this could work, but invokes hypothetical, completely unknown aspects of these phenomena. As an expert in wave function coherence (see, for example, *Bose-Einstein Condensation*, A. Griffin, D., W. Snoke, and S. Stringari, eds. [Cambridge: Cambridge University Press, 1995]), I can attest that these ideas are merely wild speculation, and serious students of wave coherence would all agree.
- ²⁵It is only a slight overstatement to say that evolution was *the* fatal blow. Other evidences that weakened evidential apologetics included higher criticism and archeological attacks on the Bible. Yet, these had limited impact before evolution became widely accepted in Western culture.
- ²⁶C. S. Lewis, *Mere Christianity* and E. J. Carnell, *Introduction to Christian Apologetics* (Grand Rapids, MI: Eerdmans, 1955).
- ²⁷It may seem nearly impossible to calculate odds like this, without having complete knowledge of every law of nature in the universe. On the contrary, scientists do this kind of calculation all the time. *Bayesian* probability theory, favored by most practicing scientists, allows the calculation of conditional probabilities based on partial knowledge. In a sense, Bayesian probability is just the codification of inductive logic. John Earman has written a useful introduction to Bayesian probability, in which he also shows that the Bayesian probability methods being developed during the lifetime of David Hume have subsequently rendered Hume's arguments against miracles invalid, in "Hume's Abject Failure: The Argument Against Miracles," (Dept. of History and Philosophy of Science, University of Pittsburgh, 1997).
- ²⁸*H. Ross, *The Fingerprint of God*, 2d ed., (Orange, CA: Promise, 1991).
- ²⁹*P. C. W. Davies, *The Physics of Time Asymmetry* (Berkeley: University of California Press, 1974); see also S. L. Jaki, *The Paradox of Olbers' Paradox; A Case History of Scientific Thought* (New York: Herder and Herder, 1969); and *E. Harrison, in *Bang: the Evolving Cosmos* (Nobel Conference XXVII), Richard Fuller, ed., (Lanham, MD: University Press of America, 1994).
- ³⁰The idea that immediately comes to mind, intervening clouds, is one proposed solution that does *not* work-given enough time, these clouds would absorb so much heat that they, too, would glow like the surface of a star.
- ³¹*C. W. Davies, *Space and Time in the Modern Universe* (Cambridge: Cambridge University Press, 1977); *Davis, *The Physics of Time Asymmetry* (Berkeley: University of California Press, 1974); and M. C. Mackey, *Time's Arrow: Origins of Thermodynamic Behavior* (New York: Springer-Verlag, 1993).
- ³²*J. Horgan, *Scientific American* (February 1991), 100.
- ³³See, e.g., *R. Shapiro, *Origins: A Skeptic's Guide to the Creation of Life on Earth* (New Jersey: Summit Books, 1986) and *M.J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996).
- ³⁴*J. Horgan, *Scientific American* (February 1991): 100.
- ³⁵See, e.g., W. M. Tscharnuter, in *The Birth and Infancy of Stars*, R. Lucas, A. Omont, and R. Stora, ed., (North Holland, Amsterdam, 1985); and T. Ch. Mouschovias, in *Protostars and Planets*, T. Gehrels, ed. (Tucson: University of Arizona Press, 1978).
- ³⁶Physics Today 43 (June 1990): 20; *Nature* 348 (January 3, 1991): 14.
- ³⁷*J. D. Barrow and F. Tipler, *The Anthropic Cosmological Principle* (Oxford: Oxford University Press, 1987); *P. C. W. Davies, *The Accidental Universe* (Cambridge: Cambridge University Press, 1982); *A. J. Leggett, *The Problems of Physics* (Oxford: Oxford University Press, 1987); and P. A. M. Dirac, in *The Physicist's Concept of Nature*, J. Mehra, ed., (Dordrecht-Holland: D. Reidel, 1973).

³⁸*H. Ross, *The Fingerprint of God* and J. L. Templeton and R. L. Hermann, *The God Who Would be Known* (San Francisco: Harper and Row, 1989).

³⁹*L. Young, *The Unfinished Universe* (New York: Simon and Schuster, 1986).

⁴⁰This concept of equivalent states formed the basis of the theory of statistical mechanics in the last century. All possible configurations of the atoms in the gas in a room are equally likely, but only a few have special properties discernible to macroscopic people, who see things with coarse grained perception. For example, to all intents and purposes it is impossible, according to statistical mechanics, for all the atoms in a room to line up at one wall, causing you to suffocate, although this configuration is just as likely as any other, according to Newton's laws. The reason is that out of all the possible states of the atoms, only a tiny fraction yield this special result, while the vast majority are essentially equivalent regarding your breathing ability.

⁴¹This is quite different from *cabalism*, which finds *a posteriori* meaning in random sequences by applying a large number of trials, e.g., birth dates, Hebrew values of letters, etc., until some match is found. The odds are no longer low in most cases, because of the large number of possible meanings that have been attempted.

⁴²*J. D. Barrow and F. Tipler, *The Anthropic Cosmological Principle*.

⁴³H. Everitt, *Reviews of Modern Physics* 29 (1957): 454; J. A. Wheeler, *Reviews of Modern Physics* 29 (1957): 463.

⁴⁴See, e.g., J. G. Cramer, *Reviews of Modern Physics* 58 (1986): 684; and *P. C. W. Davies, *The Accidental Universe*, 122-30.

⁴⁵A. H. Guth, *Physical Review D* 23 (1981): 347.

⁴⁶*A. Linde, *Physics Today* 40 (September 1987): 61.

⁴⁷There exists some confusion about the evidence for *Dark Matter*. The total of observable, i.e., light-emitting, matter in galaxies gives $W = 0.1$. Estimations based on the rotations of the galaxies indicate a higher number, however, due to nonlight-emitting mass. When this extra (normal, but not light-emitting) mass is accounted for, one gets $W = 0.2$. *Dark matter* must be something entirely new in addition to this.

⁴⁸One may write $W = W_b + W_e$, where W_b is the total of all *normal* (baryonic) matter and W_e is the total of all *exotic* matter, e.g., *weakly interacting massive particles* (WIMPs), or heavy neutrinos (there is presently no evidence that neutrinos have mass). Nuclear theory combined with astronomical observations gives a constraint of $W_b = 0.1 \pm 0.05$. See E. Rolfs and W. S. Rodney, *Cauldrons in the Cosmos* (Chicago: University of Chicago Press, 1988), 86-9. R. A. Malaney and W. A. Fowler, in *American Scientist* 76 (1988): 472, presented a model based on Inflation which would allow $W_b = 1$, using what they call the "luxury of a large parameter space," i.e., tweaking of the many unknown parameters in the new Inflation theory, not unlike the tweaking of epicycle theory. Since their model has remained unconvincing to most scientists, Inflation theorists continue to hold out hope for observation of exotic Dark Matter. Cosmological theory requires that these particles have neither too much nor too little mass within tight constraints, or they will not help the Inflation scenario.

⁴⁹Nature 356 (30 April 1992): 741; *Nature* 356 (9 April 1992): 489; *Physics Today* 45 (June 1992): 17; and *M. Geller, in *Bang: the Evolving Cosmos* (Nobel Conference XXVII), R. Fuller, ed. (Lanham, MD: University Press of America, 1994).

⁵⁰Although the data now seems stacked against it, Inflation theory has become a cottage industry with thousands of adherents, mainly out of philosophical commitments. New versions which allow $W > 0.2$ have been proposed. A useful modern critique of Inflation theory has been written by J. Earman and J. Mosterin, in *A Deflationary Analysis of Inflationary Cosmology*, (Dept. of History and Philosophy of Science, University of Pittsburgh, 1997).

⁵¹F. Schaeffer, *He is There and He is not Silent*, in *The Complete Works of Francis A. Schaeffer* (Wheaton, IL: Crossway, 1985).

⁵²As quoted by R. Reymond, in *The Justification of Knowledge* (Philadelphia: Presbyterian and Reformed, 1976).

[Back](#)