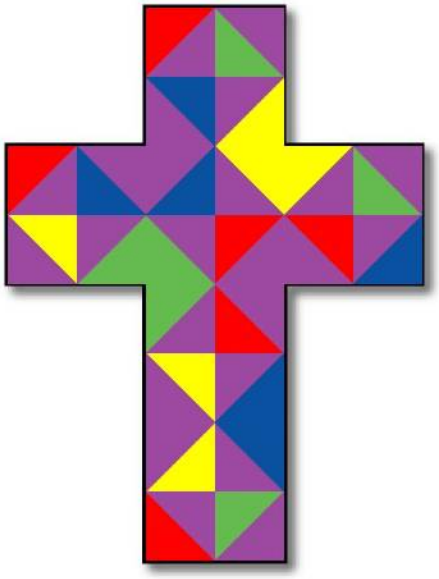
Sacred Truth

Why God and Science Are Good for One Another

By Mark White



1. What is This Book?

I am a devout atheist. To be clear: I do not believe in any deities and I adhere to no formal religion, but I do believe that God and science are good for one another. These two beliefs are not in conflict and I am not being hypocritical in making this claim. I feel the curious need to air dirty laundry so quickly and forthrightly because I know that some angry readers will protest that I am not a true atheist; and those who might grant that I am an atheist will then perhaps claim that I don't really understand God. In other words, I am surely damned if I am, and damned if I'm not deemed to be an atheist. Therefore, I fully expect to receive widespread rejection of my ideas quite early in the reading of these pages. There surely is something to be found here that will deeply offend the core sensibilities of virtually everybody. Consequently, I intend to go ahead and offend everybody in this short introductory chapter, lest anybody reach the end of the book and feel that they have been misled about my intentions. If you feel offended, please know that it is only because of my heartfelt need to leave nobody out.

God has been rudely excluded from science of late; nonetheless, I strongly believe that in the future science will help God and God will help science. But this can only happen if God is somehow let back in. Minds are surely closed coming into this inflammatory argument, and my stark admission of heretical beliefs is perhaps unlikely to open them. To add insult to injury, the two groups of angry detractors on both sides of the atheism issue will in all likelihood also eagerly join a third group to argue that I don't understand science. Some will claim all three flaws against me, no doubt, and they will do so with the utmost confidence, to be sure. Perhaps my many detractors are, in fact, all correct in the end. Yet I still do not feel compelled to offer any real testimony to the contrary. After all, I am not an expert on any of this and so I am merely spouting my personal beliefs. I do intend, however, to make my beliefs clear. This is still a country of extraordinary freedom, and thankfully I am allowed to speak my mind about these important topics. Furthermore, I have some reason to hope that all readers can set aside their pat objections just long enough to hear me out. Perhaps then we can merely agree to disagree.

This book is an argument about the natural fit and unavoidable alliance between God and science. It strongly reflects the eccentric personality and ideas of its author; therefore, I will spend a brief moment to describe myself and some of the unique influences that contribute to the perspective from which I speak. I was born in 1963 in Indianapolis, Indiana, which makes me a proud American. I am a product of my environment as well as a product of a long line of humans, most recently Americans, and many were "God-fearing" Christians, I'm sure. Obviously, I inherited my nationality, and I inherited Christianity, both entirely by random accident. I eagerly accept my nationality, yet I have drifted quite far away from religion, and I began to do so fairly early in life. Today I am completely without formal Christianity or any of its competitors. To wit, if ever asked to identify my religion, I identify it as 'none,' but this is not entirely true; I am an atheist. I am fully aware of the fact that I have been indoctrinated into many Christian principles without my full knowledge or explicit consent. In other words, I truly am an atheist, but I acknowledge that I sure smell like a Christian. How could I not?

I come from a long line of Americans who do not speak English but who do speak fluent Hoosier. My paternal grandmother claims that I descend from Paragon White, the first baby born on the Mayflower, but I don't believe her, and I hardly care if it's true. She is dead now, so there is no real point in arguing with her about it anyway. She also claimed that someone in our family invented the Eskimo Pie, which I also don't believe, but that story is more plausible too me because I too am an inventor as well. Implying to Grandma that it was perhaps impolite to use the term Eskimo would cause her to laugh. She liked to laugh. Indeed, she also frequently reveled in her extreme political incorrectness – before it was a recognized psychiatric disorder - even going so far as to call brazil nuts by their pejorative term, nigger toes. She would crassly do this loudly and in public despite utter disdain and stern admonitions from my mother. But I think this is precisely why she did it: she hated the pernicious thought control of political correctness and she also secretly loved to drive my mother nuts. She was damn good at it too. Grandma would bristle at the implication that she was racist, and retort that she was only using an amusing if not precisely descriptive term for these peculiar nuts, one that was widely accepted by everybody when she was growing up. She then proudly pointed to the fact that all of her family had fought bravely in the civil war on the side of the Union – as if that fact could shield her from anything – yet it was one claim she could actually prove with aged pictures and letters.

Grandma Naomi was highly intelligent and quite curious about many things, but she was clearly a product of a wholly different era. Her idea of exactly what criteria officially constitute one as being a racist was not consistent with what we know today. She attended the University of Chicago in the late 1920s, a time when it was rare for a woman to do so. Less rare then as now was the idea that a soft-headed young person should hook up with the Communist party. And so she did, briefly, because apparently the idea of total equality is so seductive to those new to the world of big ideas that they are obliged to embrace it however briefly. Long and well-earned experience taught Grandma, however, that reality and perfect ideals are rarely well-matched. Ideals can sometimes turn out to be monstrous realities.

Grandma was a life-long educator of children, going so far as to obtain a masters degree while in her 60s so that she could continue her career in teaching elementary school. Her husband, my grandfather, went to Indiana University at the age of 45, completed an undergraduate degree, and then obtained a degree in optometry, a trade he practiced in rural Indiana until his 70s when he died.

My paternal grandparents both were products of the great depression, and so both were stern believers in the value of education. To them there were two kinds of people: smart people and stupid people. Smart people generally got ahead, but only if they were extremely lucky. My grandparents also were quite religious, although I don't actually recall them ever mentioning the Bible. They were Christians, I'm sure, but I have no idea what denomination. They never talked about it in my presence, and I never once attended church with them. Their names, Naomi Ruth and John Philip, apparently all came from the Bible, but they never discussed the Bible with me. Their oldest son, my father, was also named John Philip, but he is always called Phil or JP. He was an excellent son and an even better father. He was apparently raised in the church, claimed to at one time be an usher in the church, although he said that he did not like it. Given a

choice, he preferred to usher at the local movie theater, because they actually paid him twenty-five cents an hour and he also got to see the movies for free.

I surely inherit my pleasant skepticism of Grandma's stories, as well as my laissez-faire religious tendencies, from my father. He is a natural born skeptic. He too is skeptical of Grandma's "descent from Paragon" story, but he and I both seem to agree that we are descended from apes over 50,000 years ago and we perhaps even descended from amoeboid creatures over 3,000,000,000 years ago. I don't know if Grandma knew of, or how she might have felt about this kind of belief because we never discussed it with her. Why bother?

Grandma was private about her religious convictions but proudly wore her politics on her sleeve. She was intensely conservative despite her close affiliation with intelligentsia and academia, and her natural predilection to communist ideas. In the parlance of our day, she was a Bible-thumping, red state, neocon, I'm sure. Note that Indiana is a red state in more ways than one, but Grandma was genuinely blood red. She bought heavily from the Franklin Mint, and she even proudly displayed Barbie-like Ron and Nancy dolls in formal attire, perched them in a glass case in her living room – and she did so during the time Reagan was president, not just after. Lest you be mistaken, she was not a slave to the Republican Party. She would defiantly withhold her vote from them if they did not toe her bright lines. She was, in fact, not shy about letting people know that she had cast her vote for Ross Perot… twice.

In case the reader is unfamiliar with some of these somewhat obscure political references, I will give a brief overview of the American political spectrum from left to right, in the same order that most people read, and the same direction that most people mature as they learn more about the structure and processes in the real universe. The American political left is represented by the Democratic party. They favor centralized governmental solutions to societal problems and liberal policies regarding individual behavior. The most extreme form of leftist ideology is called Communism, where a centralized state sets all economic and social policy. States that vote Democratic in the majority are colored blue. Here are some terms of endearment the right has granted to the left today: commie, pinko, liberal, racist, Nazi, moonbat, and one of my new favorites, troother, which is slang for the idiotic and insane followers of the 9-11 "truth" movement. Of course, the general descriptor "Godless" can easily be added in front of any of these because virtually all atheists tend to fall out on the political left.

The American political right is represented by the Republican party. They favor decentralized government and moralistic policies regarding individual behavior. They are called conservative because they prefer to conserve social and political traditions; therefore, the most extreme form of rightwing ideology is represented by the founding fathers of the United States. As an American, you can't conserve much more than that, politically speaking. States that vote Republican in the majority are colored red. Here are some of the terms of endearment the left has granted the right today: wingnut, knuckle-dragger, neocon, NASCAR fan, racist, Nazi, white supremacist, confederate, hilljack, Godbag. Of course, the general descriptor "Bible-thumping" can easily be added in front of any of these because virtually all devout Christians are conservative, which stands to reason since the nation was founded explicitly as a Christian nation.

Grandma could perhaps fairly be described as a neocon Godbag, although I am unsure of her affinity for NASCAR. I do know that she would really bristle at any

suggestion that she was a confederate hilljack. She was, in fact, a Yankee hilljack. My father, on the other hand, is a Godless liberal, but not a commie, pinko, troother. He is, after all a man of science, a physician, and so he must somehow awkwardly blend his liberal scientific social ideology with an obligatory conservative economic ideology. My mother - to make things worse - was a tad insane, which of course made her highly creative. She was God-fearing but not Bible-thumping. She would probably have loved to go to church from time to time, I'm fairly sure, but she could be a bit lazy and besides, nobody would go with her. My sister probably did on occasion, but I was not a party to it. I have no idea what Mom's political ideology might have been. I hate to guess, but I imagine it lined up pretty well with Dad's. I do know that I never heard my mom utter a single phrase from the Bible. I'm sure that Mom and Grandma never discussed it. If there was any force of nature that might drive Mom's political feelings it would be Grandma, and she surely would have driven her hard to the left.

I am obviously - like everyone - a product of both my parents and my environment. I had a pretty typical American childhood. Mom smoked like a chimney, so sadly she has died, but she also smoked while I was in the womb; consequently, I was an abrupted preemie who spent the first days of life in a glass case like a Ron or Nancy doll. I am sure that this has caused "issues" but I have no idea what exactly they are. Only time and science will tell. I do know that since I mirrored all my writing as a child I was diagnosed early as being deeply dyslexic (perhaps it was caused by the glass case) although, isn't everyone dyslexic these days? It's hard to believe now that I can even write a sentence. All in all I am an equal mix of Dad's skepticism and Mom's creativity, but I fall out well to the right of Grandma on the political spectrum. In fact, I am off the spectrum because I fall out to the right of the founding fathers. I think they failed to go far enough in setting up a system of limited government.

Of course, I have not always been a knuckle-dragging, neocon, wingnut; I come by it honestly. I suppose I am merely that rare breed of atheist Godbag that could somehow be described as a Dennis Miller Republican, but I imagine that there really is no category that would have me for their own. I am happy being called any and every name in the book. Sticks and stones… so they say. Besides, labels are in the mind of the beholder, and like the Hoosier weather, if you don't like them, wait a minute and they will surely change. I know that I have never been a Bible-thumping, white supremacist, NASCAR fan, or a confederate hilljack, that's for sure. I am a simple Hoosier hilljack who enjoys golf.

I was born in Indianapolis, but I was raised in Bloomington, which is a tiny blue dot in a sea of red. The odd blue glow emanating from our sleepy little burb of stone cutters and corn farmers can easily be understood. Bloomington is home to Indiana University, and we all know that only through the enlightenment of education do the hopelessly ignorant people of these mundane fly-over states tend to join the throbbing excitement that is a proudly blue nation on our extreme coasts. Consequently, our hyper-active and attention deficit little city is proudly governed by open liberal moonbats who can easily vote to impeach the president in the same session that they vote to double the price of a garbage sticker, no irony required. It is perhaps hard to understand how this system of governance could possibly work, but it seems to be humming along nicely. It's not everything, but it's home. Plus, growing up in this environment has exposed me to the benefits of highly liberal social policies and also afforded me a chance to get an

excellent education. I started by getting a degree in geology, and then I obtained a medical doctorate. I am somewhat well-versed in the earth sciences as well as the field of biology, but I know very little about the Bible. I used my formal education and natural creativity to invent a device that combines life and earth sciences. What little I do know about the Bible leads me to believe that this device will be welcome.

I hope this semi-intimate portrait of the author provides enough background to give any reader a good idea of my basic perspective. However, in order to understand my primary argument that God and science are good for one another, the reader should have a working knowledge of science, particularly biology, as well as have a basic feel for religion and politics. I will now describe my idiosyncratic views on each of these things, and then tie them all together in the end to convince the reader that I am, in fact, totally correct when I say that we need much more God in science and more science in God. I am politically conservative, to be sure, but this is true not despite my views of science; it is true because of them. Thank you for your time and patience, and please enjoy.

2. What is God?

It is a logical fact that every single human that has ever walked the earth has, at some unique point in time, just spontaneously appeared. After all, it is true that people are not here one moment, yet the next moment they are here. All humans, oddly enough, are somehow a product of spontaneous generation. Since you are reading this, I know that you are a human, so this fact must apply to you. You just popped up, or more explicitly you just spontaneously appeared on earth at some instant in time. You are, in fact, a creation of the processes that lead to spontaneous generation, whatever they may be. Of course, the terms 'creation' and 'spontaneous generation' have lost their logical meaning and therefore their scientific meaning today, but the concepts remain valid on some level at least. And this mysterious process that leads to your arrival in the universe can rightly be expected to cause at least some small amount of wonderment on your part. If this is not miraculous, what is? Why are you here? More puzzling is the question of who we might ever find to entrust toward the thorny task of correctly answering a tricky and important question of this nature. After all, it is true of whomever we might ask that they too just popped up as well, and so it goes on down the line for everyone who might have asked or been asked this question before us. Yes, we truly are all in the same boat here. And it is strangely hard to believe, but nonetheless it is logically true. It is no trivial matter either because people generally behave in a manner consistent with their perceived reason for existence. There is perhaps no greater motivator of human behavior. That's just the way people are, I'm sure you will agree.

Now consider that before it was you who now exists, it was a sperm and ovum that existed. You then miraculously and quite technically began your existence - at least on some level - when this sperm collided with this ovum. Your specific DNA was at one moment a remote probability and then in an instant became a unique reality. What does this mean? Who knows? Perhaps the quite intriguing question of life after death - a popular topic – could be replaced by the equally valid question of life before life. Strangely, this kind of symmetrical wonderment gets far less attention. But is life after death fundamentally different from life before life? Sure, we might choose to argue about what it means to exist in these terms, but I don't think that we can argue that you literally did exist in any tangible way before the fateful collision of your sperm with your egg, although some might try. Nobody denies, however, that after this collision of gametes, a peculiar new cell called a zygote existed, and that peculiar cell later became the *you* that we now all know and love. From the time of that defining event, however, the intriguing single cell *pre-you* soon began to divide, and it eventually multiplied to become something somewhere in the neighborhood of 75,000,000,000,000 cells. Indeed, you are an impressive number of complex and diverse cells. You are not a cell, you are a set of cells that is itself composed of many recursive sets.

To me it is most strange when people say, without any hint of irony, that life begins at conception AND they say they simply cannot fathom how a human can evolve from a single-cell ancestor. Exactly when life does and does not begin will be endlessly debated, to be sure, but in fact all of us have rapidly evolved from one cell to a complex colony of many cells. Nobody tries to deny it, but what does it mean? Regardless, our single cell zygote obviously evolves in a remarkably short period of time into our multi-

cell self. The instructions for making this awesome colony of cells were mysteriously contained in that very first one, even though we will never find them there. If that is not miraculous, what is? Nobody fully understands it and perhaps nobody ever will. Yet this magical collection of cells will exist for such a frightfully short period of time. Let no modern clown try to fool you; it truly is all so incredibly mind-boggling, and it always will be.

Sadly, at some point you will die, and all of your cells will cease to function. They will disintegrate to one degree or another. Happily, between the points in time you come into existence and the time you die there is an entirely unknown process that allowed you to become cognitively aware of your existence. If that is not miraculous, what is? It is natural that you will become keenly interested in understanding how and why you exist; however, it is not reasonable to assume that the processes that led to your existence can be completely understood within the natural limits of the cognition that results from those processes.

It is also a relatively uncontroversial fact that life has somehow just spontaneously appeared one or more times on the surface of earth. We are products of spontaneous generation in more ways than one. Who has ever argued otherwise? Exactly when and how this happened is still a mystery, to be quite sure. Note that if not yet also considered a fact at least it is widely believed that the earth spontaneously came into existence around 4.5 billion years ago. Indeed, a mind-bogglingly large number of years, but perhaps we can stipulate this as fact – at least stipulate that it is much greater than 6,000 years old - and then we can also agree that earth did not contain any of the fundamental structures of life at the time it originally appeared, whenever that was. However, at some point in time between now and the appearance of earth in this universe, life spontaneously came into existence here on earth. If that is not miraculous, what is? We do not know exactly how, when or why this happened, but since life's spontaneous appearance, life has undeniably flourished. Life has covered the surface of earth with many complex and diverse forms – one way or another. The pattern of life we now see covering the earth, in my humble opinion, is a pattern that clearly reflects a long process of evolution. Just as your one cell has become all of your cells, the first life has become all of life. However, I do indeed wholly reject the notion of a single cell common ancestor as it is a logical absurdity. Life is not a thing but a process. Life and earth are synonymous, so life started on earth with the start of earth. Although, could we go back to the origin of earth, which we cannot, we would never find the origin of life, just as we cannot find the "instructions" that make you within your first cell. Past, present and future life will never be contained in a single cell. It is just one of many silly misinterpretations running rampant in the ad-hoc world of modern biology. The broad strokes are fairly certain in the minds of many, but the details remain obscure in the minds of all.

Regardless of one's opinion about this general concept of organic evolution, one must surely realize that every individual's existence is also somehow owed to the processes leading to the existence of life on earth, whatever they might be. It logically follows that an irresistible curiosity about your own existence should then also lead to curiosity about the general processes of life on earth, whatever you believe them to be.

The formal science of understanding life on earth, and its many enchanting processes, is now firmly located in the field of biology. Man is a valid subject of biology

simply because biology is the study of life. Nobody, to my knowledge, tries to argue otherwise. It is my central premise here that God has an entirely legitimate and unquestionably useful place in all of science, but God would be acutely beneficial in the study of biology. There is obviously a large pile of miracles yet to be fully examined here, seemingly more each day, one atop another, and if anyone can actually explain them - any or all of them - they are probably not actually from this planet, or they are deluded, or merely disingenuous in the extreme. So I contend that we all can now become better biologists if God is available to us in this endeavor.

Unfortunately, this quaint suggestion strangely does not seem even remotely possible today. Why is that? God has apparently been systematically excluded from the teachings of modern science. Nothing is more politically incorrect than to mix God and biology. So, if man wants God in his science he can no longer legally get it from any state sanctioned teaching of modern science. It is now patently unconstitutional to even expect otherwise. As a people we perhaps do not know our science as well as we should, but we surely do all know our constitutional rights, and one of them clearly is to receive our science, state-certified, and completely God-free. Furthermore, please note that God has been made especially and officially unwelcome in biology, which is oddly true despite the fact that God has played an undeniably important role in the history of all sciences, not to mention the important role God has played in building the state that now certifies and educates us about these sciences. One might rightly say that God is a co-founder of this great state of ours as well as a charter member of the society of scientists. Nonetheless, God is now a failed emissary - persona non grata. No bogeyman so fierce has ever been so conjured in the mind of man than the name of God in modern science. It is the name that cannot be spoken, heaven forbid.

To be crystal clear: I am not agnostic about my atheism, although others surely now are. Many have tried in vain to argue to me that I am not an atheist, desperately so, and they even go so far as to claim that atheism is logically impossible. In other words, they argue that nobody can be an atheist. This argument intrigues but fails in my mind because one cannot seek to merely destroy the semantic distinction between believers and atheists; otherwise, there can be no true believers. One might then simply try to label me a deist, but I reject this label as well. Being an atheist - to me at least - does not mean that one must obstinately insist that God does not exist. Before one can logically eliminate God from the universe, one must first locate him there, but where is God? In the world of pure logic we can think in terms of sets. We can think of the universe as the set of all sets – the universal set of all things to be considered - and the complement to this is called the empty set, a set containing nothing. There now are basically three logical options: God is the universal set, the empty set or a subset of the universal set. In other words, God is everything, nothing or something. Which is it? As a practicing atheist, I don't care. I choose the universal set, but that's just personal preference. Note that there is no way to define God so that he fits in the empty set and the argument can continue. In other words, if God is the empty set – no matter how it is defined - there is no way to argue anything else because the logic itself breaks down. So, today the required absence of debate is all that passes for debate. A small group of politically motivated leaders has decided that no debate exists and therefore all debate is officially off limits. We may be foolish enough to trifle with God, but nobody is foolish enough to trifle with the awesome power of the state.

As an atheist I happily acknowledge the existence of God. After all, it truly is logically impossible to believe that God does not exist, because if nothing else it exists within this sentence. Whatever else one might or might not believe, it is a fact that God is a noun. It is arguably the most important noun ever. Some might insist that it is a personal pronoun, but it is a noun nonetheless. So, it can be effectively used to name a person, place or thing, including things that are merely complex systems of other things, such as are found everywhere in the universe. No, it is not merely a routine noun. I feel it is nothing short of asinine to suggest that we cannot somehow all agree that it is the most important noun ever created, so how can we argue that we could somehow get along well at all without it? After all, a belief in the extreme power and importance of the word God is not the same as a belief in the word of God. If not a real understanding, at least a definition of the word 'God' is then an essential part of human communication. I doubt that any human has ever gotten along very well without it, and studies show that we are not doing so now. On this I'm sure we all must agree.

Unfortunately, for some it apparently is not enough to merely purge the word of God from modern science. There is now an aggressive and well-advanced campaign to eliminate the word 'God' entirely from science textbooks. It is a huge and unnecessary mistake. It is a bad joke. It is to the detriment of science. In fact, this ill-conceived and entirely misguided campaign helps no one and hurts everyone. It is somewhat like banning the word 'gravity' merely because our concept of gravity seems to have turned out to be a little bit different than we initially might have thought. Gravity it seems should somehow be perfect, in the minds of some, yet our understanding of it probably never will be, so we need at least a little flexibility when we use this particular word. Gravity is a word that must contain some amount of natural flexibility in the minds of men. Of course God is the most naturally flexible word ever (who could ever disagree?) but people are naturally not as flexible as words. Sadly, some truly unenlightened people now clearly believe that banning words is an adequate substitute for dealing with messy reality. God is and always will be an integral part of a messy reality, if not a part of a perfect ideology. To believe otherwise is to deny the entire history of man.

Some believe - as I do - that we "modern" humans first evolved our way into existence sometime around 50,000 years ago. That sounds fairly reasonable to me. As the current story goes, we started as a small group of about 5,000, and now we exceed 6,000,000,000 worldwide. It is an unprecedented overnight success story in the history of the earth, to be sure. We are a social species, so we form groups at all levels that are organized around relationships, and these groups are called societies. Societies can be formed based on any kind of relationship, but the most common kind is based on a belief in or understanding of God. Formal religion arises from the beliefs and practices of these societies. It is reasonable to assume that virtually every human society over the past 50,000 years has included some form of religion, even if this oddly means that they religiously practice a non-belief in God. Ergo, God, whatever else it might be, is empirically known to be an indispensable component of human society. It is ridiculous then to assume that religion is not also somehow an essential part of human society. God exists in all societies. It is therefore impossible to deny the real existence of God. God, or some perception of God – whatever it is – at the very least is an essential part of human society, and that makes it real. God is not merely a hollow abstraction but a real component of what it is to be human. It is disingenuous to suggest otherwise.

Denying the existence of God is like denying the existence of money. We know that some people worship money, but what do they worship? Money is a concept of man, not a tangible thing. Currency, coinage, bills, credit, assets, plastic, bank accounts, gold, these are real things that involve the concept of money, yet money exists independent of all of them. Religion, icons, ceremonies, books, songs, cathedrals, missions are real things that involve the concept of God, none of which are God, but none of which exist in the same way without it. Denying the existence of God in this form is utterly absurd, and worse than that, it is a complete waste of time. Whether God created man, or man created God, or both, God now obviously exists. After all, when someone says that God does not exist, what they really mean is that someone else's concept of God does not exist. It is a matter of record that God has existed at least as long as humans have, and it is logically impossible to prove that it doesn't. We can observe the actual existence of God but we can never reason away God. If that is not science, what is? Those who argue that we merely wish God into existence completely ignore the more obvious fact that it cannot now be wished out of existence, nor should it.

There are many complex details to every society's concept of God. There are many societies. It is unlikely then to expect every society to share the exact same details with respect to their concepts of God - and they clearly do not. It is equally unlikely, however, to assume that many details will not be shared across societies. It is also unreasonable to think that every individual within any society will share the same details in their personal understanding of God. In other words, God is not a simple and universal thing but a complex and highly individualized thing. What's more, God is neither entirely a perception nor a tangible reality. It is a perception that becomes a reality. In other words, when one perceives a God, one perceives their God in every facet of the reality around them, whatever that God, that perception or that reality might be. Cogito, ergo sum. Call it what you will, but God is an essential reality filter that all of us must have in the obligatory creation of our own individual reality.

Since we cannot logically all share a common meaning for God, and since I am using the word so freely, I simply must give you at least some formal definition of my use of the word 'God.' After all, the controversy that inevitably surrounds any God has more to do with disagreements over definitions than ultimate truth or objective reality. Note that there are many different kinds of Gods. Mine happens to be relatively simple and well-defined God. Most are not. Most people adopt a complex dogmatic God, one that is given to them by tradition and authority. Some people adopt a personally beneficial God, but mine is a purely logical and efficient God. My God helps me be more logical and efficient when I think about various things and then attempt to interact with other humans. My aim when I use this important and ubiquitous word is to communicate a clear meaning with another individual or group of individuals. I do this first by anticipating what that meaning will be within the recipients, in all probability, and then use it within the bounds of that meaning. After all, it is inefficient to use words that you know are likely to be misinterpreted. So we must first note that most people adopt a view of God that is personally beneficial. I will describe the most famous example of this kind of view first, because it is similar in many ways to my own, at least a good basis for analogy, and it is also a good anticipation of the interpretation that many people will have when they hear me use the word 'God.'

For many, the term "Pascal's Wager" succinctly summarizes their thought process when it comes time to decide whether they truly believe in the existence of God. Some, it seems, are born with pure faith while others prefer to apply a layer of logic to their faith. Blaise Pascal lived in France from 1623 to 1662. He was a child prodigy in math, particularly geometry, and he is still recognized today for many significant and diverse accomplishments. He spent much of his short life searching for simple universal truths that could be used to explain more complex and inherently less comprehendible things. Needless to say, he eventually found God. In so doing, he made lasting contributions to physics, geometry, probability, philosophy and theology, many of which still bear his name. Pascal's Wager is one such contribution that combined his interest in probability theory and theology. In a nutshell, Pascal stated that God either exists or it does not. It is a much better bet – from the standpoint of probabilities and payoffs - to assume that God exists than it is to assume that it does not. In other words, it is in one's self interest, for various reasons, to believe that God exists. This same logic appears within the dogma of many formal religions simply because it is natural to expect individuals in virtually any circumstance to be drawn to this kind of argument. It is a God that maximizes one's own self-interest. The argument that we should bet on the existence of some kind of personally beneficial God is most easily communicated now by using the name Pascal's Wager.

I ascribe to something similar to Pascal's Wager, but my position is yet more pragmatic, if that is possible. My argument is that it is in *everybody's* self interest to stipulate the existence of God. Let's call this argument White's Stipulation. In other words, since it actually is logically impossible to establish merely through reason alone the existence or non-existence of God, it is better for everybody to stipulate the existence of God. This is true for nothing less pragmatic than the fact that we need at least some shared meaning for the word 'God' to advance further debate - that is inevitable - and to nurture further communication and understanding, which is now vitally important. By the way, I truly believe it is logically impossible to establish the existence or non-existence of God, and I think this belief is well grounded in the formal study of logic. I am not a professional logician, so I'm sure toes are now irritated from being so rudely stepped upon. It is a quite touchy business, I'm sure.

To really understand the guts of my mostly intuitive argument, one must first understand the guts of an argument of pure logic made by a German logician named Kurt Gödel. To grossly paraphrase one of Gödel's famous incompleteness theorems: we strongly believe that in any system of formal logic there will be at least one statement that is true but cannot be rigorously proven true. Gödel set about proving this by first identifying each possible statement with a number, called the Gödel Number. He cleverly presaged the digital computer in this way. But if we can number every statement, we can also replace any number with a name. After all, what is a number but a name for something? For me, it is most copasetic to replace the Gödel number of the statement that is true but cannot be proven with the name "God exists." The logical opposite of this statement will be false, so we can name it "Not God exists." It is then logically true that one of the two following statements is true and the other is false: God exists. Not God exists. It is also logically true that we will not be able to prove which is which, no matter how much reason we bring to bear. That is simply the nature of Gödel's theorem. Borrowing from that basic understanding of reason, White's

Stipulation states that we all agree to choose - as convention - to use the former and not the latter. It is logically a waste of time to do otherwise. It's settled: God exists is true and Not God exists is false. We can now argue vigorously all we want about how to define God further. Certainly, there is still plenty to argue about, so why not get started?

Those who find this kind of blatant semantics to be distasteful and unproductive have missed the point entirely. The point is that we are inevitably going to argue about things such as this, but some things defy any logical resolution. Arguing for Not God is a waste of time and breath. It is merely asinine. Consider that all things require a name, and God is the most logical and efficient word possible to name a thing that everyone must talk about. Never can so much be communicated with so little effort. The alternative is to use the word Not God, which is perhaps the most expensive name in the history of human communication. Even when one successfully argues their way into this position, there is hardly anywhere else to go from here. Perhaps all roads lead in, but no roads lead out. Furthermore, people are usually able to instinctively understand that when one uses the word God, there are bound to be significant differences regarding the meaning of that word. Most reasonable people are not so rigid as to insist on perfect alignment of meaning, but some entirely unreasonable people unfortunately are. Nonetheless, when it comes to efficiency of communication, God is the best bargain possible and Not God is the most expensive and least useful word in the history of human interaction.

God, to me, represents that which I cannot logically understand, or God is the name I give to that which I believe to be true but know that I can never prove. Call it faith or call it expedience, but that is what God is to me. It is not a testament to my ability to understand things, it is an acknowledgment of the fact that there are many important things that need to be understood, but that I hold little hope of ever understanding in a rational way. My God is quite large, indeed. Frequently, there are things we like to pretend to know but cannot explain or support. These are the things we are best to merely attribute to God. It is pure hubris and an enormous tactical mistake to do otherwise. Fortunately, it is still left to each and every person to interpret the scope and meaning of such things for their own edification. It is no small or meaningless task, to be sure, and that is perhaps why so many spend a considerable part of their lives in just such a pursuit.

3. What is Science?

Science is many things. At bottom it is a uniquely human way to know the universe. To avoid too fine a point, we might simply define science as the acquisition and possession of knowledge. After all, the name is derived from the Latin word for knowledge, or scientia. Through science we can come to know the universe via the processes of inventing, testing, sorting, refining and learning ideas about how it can be known. Unfortunately, much of what passes as science today in the mind of John Q. Public is really nothing more than overblown science fiction, or a misunderstanding of true science. After all, the largest disputes in science today are still philosophical; they always have been and perhaps they always will be, so it is sadly true that there are more histrionics involved in modern science than one might expect. To wit, technology and science are handmaidens, and so they have become conflated in the minds of many. To be sure, technology is but one fabulous byproduct of science, but technology is not itself science. So, naturally, many of the "big ideas" surrounded with expensive gee-whiz technology that pass as high-powered science today are more fiction and less science than one might care to imagine. In the end it is simply not as simple to neatly define science and therefore label various things as belonging to "science" as it once might have been. Perhaps more than anything else, then, science should merely be understood as a large acquired body of accepted knowledge. The validity, utility, application, methods of acquisition and acceptance - as well as the basic teleology of that knowledge - are all separate matters entirely.

One major misconception about science that is ubiquitous today involves the silly notion that all scientific knowledge is strictly empirical, that it deals only with *a posteriori* truths and not *a priori* truths. But the idea that scientific knowledge is derived only from "the scientific method" is a rather large, onerous yet common misconception. In other words, it is expressly not true that science admits only that knowledge which can be "proven" by experience. In the spirit of this mistaken belief, it is commonly said that science deals in empirical fact and not a priori belief. In a word, it is said that there need be no faith in science. Preposterous! Science is based on faith and loaded to the gills with it today. You can't sling a dead cat in science without hitting an article of faith in science today. Indeed, there are many respected branches of science that simply could not even exist in an environment of pure empiricism. After all, empiricism is an extremely limited way to know the universe. It would be a sad, brutal and unhappy world if we relied solely upon it. So, it is a plain fact that faith is a necessary and accepted element of science, and faith has never been more rampant in science than it is today.

Mathematics, while considered a field apart from practical "science" per se, is actually a form of a priori science. It is said that math is the language of science, but I disagree. Math is the language of logic, and science is the logical study of the universe. However, mathematics is itself now a massive body of reason and knowledge that is first built upon axioms, or truths that cannot be proven. Disbelief or a loss of faith in one such mathematical axiom – Euclid's fifth axiom – after thousands of years became an intriguing possibility, and then rejection of that axiom actually became required in the service of some branches of mathematics. This kind of non-Euclidian geometry then provided the mathematical foundation for Einstein's general relativity. Furthermore,

other branches of science, such as social sciences, political science, medicine and economics are simply too messy and complex to ever be studied by a rigorous application of the formal scientific method. They are fields that can utilize math but cannot be communicated by it. Of the natural "hard" sciences, such as physics, chemistry and biology, there are none that exist in a pure state of empiricism, as is the overly romantic notion of science. More importantly, even that which we accept as "empirical fact" still requires an enormous amount of faith in many different ways. After all, people are prone to make mistakes, but it is simply too impractical to proceed in science without a tremendous faith in the good work of our scientific ancestors and bona fide scientific heroes. Sometimes our heroes fail us.

Knowledge is a messy business in general, to be sure. Modern science has actually done nothing to change this over the past four centuries. If anything, it is worse today than it has ever been. Of that which we believe to know for certain, which parts are fact and which parts are fiction? This question is more difficult to answer today than ever before simply because there is more knowledge and less opportunity to apply reasoned skepticism to any of it, let alone all of it. Plus, one man's knowledge is still another man's manipulative form of overt deception. That will never change. One man's fact is another man's faith. Unfortunately, our collective faith in science has become so strong that abuses are inevitable. It would be surprising only if this were not the case. After all, Mary Shelley told a great fictitious parable for the monstrous unknown future, not a true tale of history.

Knowledge is a necessity of life, on this we can all agree. The antelope must know not to wander alone in an open field, or it will suffer a sure and bloody death by the lion. The bee must know how to make a hexagon in wax that would bring a tear to Euclid's eye, lest the hive will starve. The bacteria must know to point in the direction of glucose, or it will miss the party. The toddler must know to look both ways before crossing, or it will suffer the indignity of a swift pat on the behind. The gunner must know the exact trajectory of his shell, or his enemy might tragically prevail in a deadly exchange of mutual disagreement. Knowledge of all kinds is a necessity of life, no doubt, but the body of knowledge represented by science today is also an extreme luxury of sorts. Humans have enjoyed the good fortune of tens of thousands of years of glorious success as a tight-knit species, allowing the luxury of science and human knowledge to become what it is today. We have the luxury of knowing piles of interesting and important things, but many things must already be in place before we can know, for instance, that an electron orbits a proton and neutron. In fact, many things must be in place before we can know that the earth orbits the sun.

Science inevitably makes mistakes. Some things simply cannot be known, and there is no guarantee that things will ever be known in the "right" way. In other words, science represents a grand history of knowledge, and also a less-grand history of demonstrably false knowledge. Science, like all things human, can never be perfect. Indeed, some might claim that science is nothing but an unbroken string of mistakes. One might go so far to claim that this is in fact precisely the essence of science itself - a process of knowledge "improvement," a process of adopting ever less-bad ideas, guided by a large body of intelligent humans vigilantly deciding true and false all along the way. After all, science falls always on the side of true knowledge and never on the side of false

knowledge, does it not? Alas, knowledge is a tricky business and mistakes are inevitable. Granted, there are two kinds of mistakes in science: big ones and little ones.

A good example of a big mistake in science comes from the time when smart folks everywhere believed that the earth was a stationary object at the center of the universe. The accepted body of knowledge, to be properly understood at the time, required that all things, including the sun, be seen to rotate around a stationary earth at the very heart of the universe. I'm not making this up. You can look it up. However, if you stop to think about it for just a moment, it is hardly a stupid or crazy idea. It's just science. After all, it is virtually *a priori* knowledge that the earth is indeed stationary. Does it look like it's moving to you? It is actually counterintuitive to believe that the earth is in motion. The "truth" in this case is something that must be learned against our instincts. So, it takes frightfully little experience, or *a posteriori* knowledge, to convince a smart person to believe that the earth is in fact a stationary body. It takes much more context and experience to become convinced that it is not. We tend to believe the simplest possible story, but the simplest story is sometimes incorrect. What's more, there is virtually no downside to holding this wee bit of false knowledge about a geocentric universe. After all, we are only human, and humans are frightfully prone to be fooled, but who cares if they are fooled unless there is some tangible downside? Plus, for all intents and purposes, the earth really is the stationary center of the universe for those of us living in a reality-based community upon it. Only if one contemplates the vast heavens - and the meanings therein - does it seem to matter at all.

Once it was finally and firmly established that the earth did in fact rotate around the sun – thank God - it was another quandary entirely to understand exactly what might now account for the earth's motion. Obviously, God had a hand in it, but how was God doing this clever trick with the heavens? It was left for Isaac Newton to solve the riddle, and in the process he invented several important concepts, methods and physical tools that are still useful today. Because of this miraculous burst of productivity, Isaac is generally considered the greatest scientist of all time, and rightfully so. Everybody knows that one of the critical concepts Newton contributed to science was the concept of gravity. What few know is that the great Sir Isaac's description of gravity is ever so slightly inaccurate. Heck, nobody even guessed at Isaac's fatal flaw for a couple hundred years, but it's just that kind of ever-so-slight imperfection that leaves the door open for future geniuses. As it happens, Isaac left the door ajar for Albert Einstein to waltz in and correct his tiny error. Al arrived on the scene and gave us nothing short of a new and improved concept of gravity. He did so from within the grand structure of general relativity and non-Euclidian geometry.

Notably, Galileo Galilei presaged the validity and importance of the concept of relative motion. Ironically, he died on the same day Newton was born (there must be a God). The universe is full of perfect symmetry, and human history is no exception. After all, Galileo is considered by some to be the father of modern science. Einstein corrected Newton when he expanded and formalized the concept of relativity first suggested by Galileo, and he did so in a way that is now indispensable in modern physics. Today's lesson: It takes a long time for truth, even simple truth, to take root in the body of science. In the words of my friend, Jeff Parker, it takes a long time to become an overnight success.

The idea that the sun rotates around the earth is an example of a big mistake in science. The idea that gravity does not also require some concept of general relativity for complete accuracy was a little mistake. After all, in most scientific applications Newton's fabulous description of gravity is more than adequate, but it is nonetheless inaccurate in a very real sense. Technically speaking, Newton made a tiny mistake in need of correction. It was quite fortunate, then, that Einstein happened to come along and correct it for us all, but it was bound to happen. Science does not invent truth, it merely discovers it, or so the familiar story goes. Truth is notoriously hard to discover, so we should be ever mindful to maintain a workable "Plan-B" in lieu of it. We always like to bring our A-game to the science playground, but our A-game doesn't always show up, now does it?

The example of the big mistake – the one where the earth was seen as stationary in the center of the universe – is confidently blamed today on religion and not science. Sadly, this is a familiar part of the all-too-common revisionist history holding that science always wears the white hat and religion must always wear the black hat. After all, science is the defender of truth and pure knowledge, and religion merely obfuscates at best, and manipulatively deceives at worst. Religion distorts and science corrects. It bravely saves us from our spiritual weaknesses and self-destructive superstitions. Science protects us from the innate human brutality that epitomizes all religious ignorance. Unfortunately, this "modern" view is completely fictitious and ignores the fact that this particular big geocentric mistake in science was made at a time when science, religion and politics were merely the three equal points of the same triangle. Most people fail to realize that they were related in this way then, and in fact they still are related in exactly this way today. Nothing has changed. There truly is nothing new under the sun, whether it rotates around us or us around it. Religion, science and politics are three equal points of the exact same human triangle; always have been and always will be. That's just humans.

Just as mass is energy and time is money, knowledge is power. It matters little if knowledge is divine or common, revealed or acquired; knowledge is power. It is merely one of the many curious yet reliable universal conversions. Politics is the practice and application of human governance, or simply the practical application of human power by whatever means available. People are governed by knowledge. They govern themselves from personal knowledge, and collectively we are governed by shared or common knowledge, so it is completely irrational to believe that science and politics do not always share the same bed. They are not merely odd bedfellows, they are obligatory bedfellows. Likewise, religion is inseparable from politics. Therefore, it is entirely rational to search for *both* of the other two whenever one of the big three shows up today publicly in a position of prominence and controversy. In other words, there is always an element of science and an element of politics in religion. There is always an element of religion and an element of science in politics. There is always an element of religion and an element of politics in science. They are merely three mutually-dependent human activities. That's just the way humans are – always will be.

Obviously, God has an important role to play in religion. Perhaps less obvious is the role that God must play in politics, but it is the opposite of rational to claim that God plays no role here. What's more, it is hard to see why God should not actually play a role in politics. Given that God has such prominent roles in religion and politics, and given

that science can never be completely divorced from them, how is it possible that God has no role whatsoever to play in science? It defies all known forms of logic. Science must pick a definition for its God and then logically and consistently use it within that context. Science, however, is not a unified voice – yet - so how shall it be done? The answer is pure politics. Science can not logically eliminate God, so it must somehow deal with God. Modern scientists prefer to ignore God, to be sure, but this is not the same as dealing with it in any rational manner. It is not hurting God so much as it is hurting science.

In my mind, it is not possible that God and science are separate entities, and attempting to deny God a role in science is a major disservice to science. For instance, from where do we derive our axioms of math? To what do we attribute the force of gravity? To what do we ultimately attribute the existence of life on earth? From where do we as a people derive our powers to govern? It is not that we so much need pat answers to these meaty questions; it is that we must avoid blindly accepting wrong ones in the total absence of rational answers. Science is not shy about supplying answers where none actually exist, yet some things are known to actually have no answers. The aforementioned questions – simple questions really – are just a tiny portion of those that have no rational answers. They simply cannot now be understood in purely rational terms. It is a big mistake, then, to believe or even suggest otherwise, yet the obviously correct answer 'God' is now prohibited from being given. The correct answer is only logically correct, but sadly it is now politically incorrect. When politics conflicts with logic then it is the politics that we should suspect as faulty. We can always abandon politics but logic is something we should try to at least pretend to maintain. Therefore, in this case, man must distance himself from the intoxicating influence of modern science and the apparent "certainty" it offers, and regain a measure of humility in the face of the awesome unknown.

Yes, it is true that we know more today than we've ever known in the past, but it is also true that one of the most important things we now know is the awesome true magnitude of the yet unknown. What's more, the most important scientific questions of today have strangely been around and unanswered for more than a few millennia, so it is not that we are fundamentally different from our poor, ignorant, knuckle-dragging intellectual ancestors. We do not now have all of the really big answers already in the bag. Folks, we are not merely now working on detailed answers to questions; we are still working on the questions. It's just that we now recognize so many more big questions today than ever before. Furthermore, it is not that the seeming conflict between God and science today presents a rational problem of science or religion, it is purely a problem of politics. Don't let anyone convince you otherwise.

It is true that scientists are frequently atheists. I am an atheist, yet I assure you that all atheists do not speak with one voice, and the ones who pretend to do so, I further assure you, do not speak for me when it comes to God and science. The hyper-legalistically militant fundamentalist atheists are clearly giving the majority of peaceful moderate atheists, like me, a bad name. I personally disagree with and I am offended by most of what is being said and done in the name of atheism, all of it under the pretext of science, none of it devoid of partisan politics. After all, science and atheism are not one and the same, but it is not really a shock that a high percentage of atheists fancy themselves to be scientists, or at the very least they call themselves skeptics in that they

like to practice formal skepticism. But science itself merely appears to be one of those special areas in which skeptics are allowed to lack skepticism. Once something is fully vetted and labeled as "science" we can seemingly relax and cease to be skeptical about it. The moral authority of atheists to invoke science appears to be just one of those things. It must be nice to have such magical powers, and it must be doubly nice to bring the full force of the American legal system along with you on this fool's errand.

Skeptics have assigned themselves to be arbiters of scientific fact, but until such time as fact is determined we must label things as pseudoscience, superstition, mysticism, spirituality or overt fraud. Naturally, it falls to the skeptics among us to sort things into neat categories for those less endowed, perhaps disabled by a misguided sense of spirituality, or for that matter any sort of reverence for the unknown. But scientists are inconveniently not always devoid of spirituality, even if they are generally somewhat short on obvious and overt formal religion. One needs look no farther than the great scientists of all time for evidence of the enormous impact that spirituality had on them. They all seem to have had a profound faith in a higher power that guides their scientific intuition and thinking.

Isaac Newton was devoutly religious, some might say insanely religious. It seems to have not adversely impacted his scientific abilities, but perhaps he was just lucky. He spent most of his time advancing his science in the pursuit of a relationship with God. Stranger still, he spent most of his private time in pursuit of alchemy, or specifically searching for a practical way to make gold from lead. Of course he needed to keep this politically incorrect hobby of his day entirely private from his patron, the king, if not from his God, because the king would not want it to fall into the hands of any man devoid of the divine right to possess this particular kind of knowledge… lest it be abused, of course. Furthermore, when Newton found himself at loggerheads with the scientific head-scratcher of how gravity could be a force that somehow acts at a distance, he invoked the body of Christ as his formal solution. In other words, Newton was actually searching for the body of Christ and came to believe that he had found it in the substance through which gravity must act. What could be more rational? After all, if gravity is not miraculous, what is?

Of course Einstein had similar issues. He was Jewish, which caused no shortage of problems for him and his ideas about the universe. Being Jewish in turn-of-the century Germany had an adverse impact on both his political and scientific situation. The Nazis, it seems, hated the Jews in much the same way they hated the Christians. It is hard to think of the Nazis as religious bigots because they seem to have hated everybody. The Nazis were not without spiritual beliefs; however, it's just that their new brand of Aryan spirituality conflicted with the more-established spiritual beliefs of the day, like Judaism and Christianity. Ultimately, Einstein found that his core beliefs hopelessly conflicted with the beliefs of the Nazis, and so he fled to America. Germany's great loss was our great gain. God bless America. It was not that Einstein was devoutly Jewish, or that he practiced his religion in an overtly formal way, it was just that he was Jewish. This fact alone appears to have been the silly impetus for one hundred German scientists to publish a refutation of Einstein's key contributions to scientific ideas. Einstein was clever enough, however, to retort that if he were indeed wrong, they surely would only have needed one!

Such vignettes point out both the role of religion in science and the hazards of ever voting on scientific truth. After all, truth is not a democracy. But Einstein's faith in a higher power clearly bled into his scientific work. He spoke frequently of "the Old One" and speculated on this Old One's influence and desires. The details of his belief are entirely irrelevant, but the fact that he needed to invoke this concept to make his scientific thinking clear should be appreciated by all. If not think clearly, Einstein at least could not communicate his thinking clearly without invoking the notion of God.

Another big myth about science is that it gradually yet inexorably progresses toward truth. In fact, science does not follow a smooth pattern in the evolution of ideas. The accumulation of "facts" in the accepted body of knowledge demonstrates the numerous trace fossils of endless zigs, zags, fits and starts. It is not a slave to gradualism but more so it exhibits a pattern of punctuated equilibrium. Big ideas, when they first appear, are rarely no-brainer winners but usually just hopeful monsters. Frequently, the best ideas are rejected more than once, and often they are rejected over long periods of time. That's just science. But an idea, once accepted - right or wrong - is frightfully hard to get rid of. The game that is played is not one where traditional ideas are jettisoned right and left, but where they are nurtured and supported. It is a conservative game of ideas, and any good scientist must have a huge measure of faith in the cherished collection of accepted ideas. Inevitably, observations will accumulate that make no sense within the context of the accepted ideas. It is not the job of a scientist to immediately reject the accepted ideas but to find clever ways to make sense of the conflicting observations. Failing that, it is the job of the scientist to explain to the non-scientist why he just "doesn't understand science."

However, it is frequently the case in the long course of human events when the sheer weight of conflicting observations becomes too great. Maintaining a particular "accepted" idea in the body of science finally becomes untenable. When that finally happens, as it always does, science experiences a revolution, not an evolution of ideas. In some instances, the entire meaning of key "facts" becomes wholly reversed, old facts are forgotten, an entirely new and bigger pile of facts begin to roll in, and thus the process begins anew. It is a continual process of constructive destruction and renewal. Note, however, that the nature of this process means that the entire scientific endeavor requires a huge amount of faith. It also requires an extended period of time to learn, one might even say it requires a lengthy indoctrination. There are languages, conventions, procedures, even rituals that must be followed. Some have called it a religion, and that is not an entirely unfair or inaccurate accusation. It is hard sometimes – sometimes impossible – to distinguish the actual practice of science from a formal religion. This is especially true when science proceeds from the application of blind faith in a person, project or idea.

Like religion, or any other human activity, science mostly requires a large amount of leadership. The force of this leadership derives primarily from the power of ideas, but it is in no way immune to the other important influences that effect all great leaders, influences such as luck, timing, connections, money, ideology, ambition and personal charisma. After all, the practice and politics of science is hardly any different from the practice and politics of religion. Politics are politics: there is no escaping it when human activity is involved.

At the dawn of modern science, virtually all scientists were amateurs. Of course the great ones had their wealthy and powerful patrons, but the vast majority pursued science as a labor of love. There simply was no money in science. After all, most great scientists are merely inventors who have spread their craft into the realm of inventing new ideas. And for many centuries the paradigm of a gentleman scientist was the norm, people like Charles Darwin and Benjamin Franklin, men of independent means who pursued the hidden truths of nature on their own dime. Even Einstein was merely an amateur physicist working as a patent clerk to pay the bills when he cracked some of the deepest riddles of the universe. But those times are long gone. Rare is the man who does not expect to earn a decent living from the practical application of his scientific skills. The money in science today is overwhelming, and it comes from all quarters. Private industry invests in science because it leads to technology that is quite profitable, but government provides a large amount of funding in various forms. The ubiquitous "military industrial complex" is a good source of science dollars, and the education system funnels billions of dollars into every corner and crevice of scientific ideas.

Cutting-edge science is no longer done in private at the kitchen table, or so it would seem. It now appears to be a public endeavor performed in multi-billion dollar shrines. After all, it is not so cheap or easy to peer into deep space or deeply into an atom. It takes money to set up complex biochemical reactions and then to capture unruly data on vast servers. We are no-longer rolling balls down inclined planes or spreading sunlight through the divine crystal, we are splitting atoms and synthesizing life. The stakes are high and so is the ante. Certainly, for this kind of public investment we can expect to get clear answers to important questions. Certainly, God and uncertainty cannot be a part of those answers.

The funny part is this, science is not fundamentally in the business of providing answers; science is in the business of asking questions. Religion is in the business of providing answers. In other words, it is always true that every correct answer given by science merely generates hundreds of new questions. What most people cannot seem to understand is that knowing something is not the same as knowing everything. In fact, one thing science always teaches us is that learning anything is merely the first step in understanding just how many things there still are that we don't know, things of which we were previously unaware. The domain of science expands with time not contracts. That's just science. The realm of the unknown constantly gets larger not smaller, so if your God coincides with mine, it is getting much bigger at an accelerating rate. God is simply made larger by science not smaller.

4. What is Life?

Presently there is no accepted definition of life, a situation that some will find perhaps a bit surprising. But there really is no simple way to decide when a thing is and when a thing is not alive. Many have tried, and all have failed in an effort to define life in a way that is widely accepted and useful for this basic purpose. It is simply another mysterious fact of life that life is an inherently difficult thing to define. But perhaps it is not too surprising after all, since we must all agree that every living thing on earth is built of common parts that alone are not themselves living things. So, life is necessarily a complex transcendent property hidden somewhere within the organization of things and not a simple property to be found within the things themselves. For instance, a single carbon atom is not a living thing by anyone's criteria, but carbon is the essential part of every known living thing today, and so the study of carbon-based molecules is known as organic chemistry.

Biology is the study of life, so one imagines there to at least be a robust guidance, if not a perfect definition of life on which biology is based. In fact, there is no such definition nor is there any strict guidance to contain the bounds of biologic sciences. Biology is a purely ad hoc branch of science, as all branches are. It is a free-for-all, and so it should be. What's more, there is still a fair amount of uncertainty about whether common and relatively simple things, such as a virus, constitute a living thing, which is – to me at least – silly. Of course a virus is a living thing. It clearly falls under the purview of biology. Nonetheless, it fits into some accepted criteria of living things but not into others. Furthermore, it shares many basic and intriguing features with inorganic crystals too, but we still expect to study a virus in biology and perhaps not in mineralogy. Fortunately, we now learn the most about the core principles of living viruses from our understanding of computer science. So, in the end we must accept that life is simply the thing that is studied by biologists and biology is the study of life. Alas, one must be comfortable with more than a few major tautologies in biology. But what on earth then cannot reasonably fall into the domain of biology in one way or another?

Biology is an inherently complex field, such that many of its important features simply must remain wholly undefined today, even while we continue to aggressively study them. It appears then that many things in nature simply must be studied even while they defy accurate definition. Life is just one of these things. Other basic topics in biology that remain undefined include species, gene, and molecular information, to name just a few. This perhaps shocks the senses, but all remain essential concepts in biology that are frequently mentioned and widely "understood" yet notably undefined. In many cases the task of adequately defining something is the ultimate goal of the study itself. So, life is much like art: we don't precisely know what it is, but we do generally know it when we see it - or we like to think we do - at least when we see it here on earth. Most professional scientists will agree that all great science is equal parts art and science.

All life on earth does at least appear to share a handful of common features, and these common features are nowhere more striking than at the molecular level. Here at the bottom level of physical life – molecular life - common sets of molecules appear to be universally shared. So this exhilarating domain of study is aptly named molecular biology, and it is a relatively new domain. Consider that modern chemistry and its

accompanying view of molecules did not arrive until well into the last century, so it is not at all surprising that molecular biology is less than 100 years old. However, ideas about biology at the molecular level took off quickly, accelerating greatly with the discovery of DNA as our universal genetic material, which was followed soon thereafter by the demonstration of DNA's preferred structure as a double helix. So, DNA is widely seen today as the central molecule, or "the secret of life," and our familiar models of molecular biology now clearly set the tone for the first principles of all biology.

What this all means is that knowing any of the widely accepted - if poorly defined - scientific views of life today will require a cursory look at the key molecules that work and play at the very core of life on earth. There simply is no way around it, and what's worse; there are so gosh darn many different kinds of molecules involved in life, to be sure. Fortunately, at the very bottom there are only two broad sets. These two are indisputably the essential molecules of life, so I will describe them in the most efficient way I can. To be sure, in one way or another they underpin all of life and the way we see it today.

The two broad sets of molecules that always participate in life on earth are called nucleotides and proteins. They are truly at the core of life's many processes. Furthermore, a complex and multi-faceted relationship exists between nucleotides and proteins. This relationship – whatever it is - is perhaps the most common feature of all life. So, I will focus my attention on these molecules and their relationship to one another as I describe the things we know to be true about life today. These essential facts are virtually without controversy today. It is pure science; you can look it up anywhere, test it yourself, and you can understand these facts of science whether you are devoutly religious or an avowed atheist. Nobody denies the existence of nucleotides and proteins; nobody denies that a clear relationship exists between the two, and nobody denies that they are central to all life on earth. Count me among those who truly believe in the tenants of the basic doctrine if not the state-sanctioned sect of bizarre ideas that run interference for it.

The name 'nucleotides' applies to a diverse set of molecules comprised of individual molecules called nucleic acids. They are called nucleic acids because they are acidic and they were first noted to be concentrated in the cell nucleus. Nucleic acids (NAs) individually are important for various cell functions, and they are yet more important when they group together to form large chains called biopolymers, also called macromolecules. There are two broad categories of NAs that are very similar to each other. The first is called DNA and the second is called RNA. DNA is deoxy-ribo nucleic acid, and it generally exists in a double helix. RNA is ribo nucleic acid, and it exists in many important structures, three of which are called mRNA, rRNA and tRNA. The 'm' stands for messenger RNA; the 'r' stands for ribosomal RNA (a ribosome is a molecular machine that makes proteins) and the 't' stands for transfer RNA. The mRNA, rRNA, and tRNA are all required to translate DNA into protein. We need both DNA and RNA or we will have no protein.

The name 'protein' applies to a diverse set of molecules comprised of individual molecules called amino acids. They are called amino acids because they are acidic and they contain an amino group, which can be written as ($-NH_2$), but they also each have a carboxyl group, which can be written (COOH). Amino acids (AAs) individually are important for various cell functions, and they are yet more important when they group

together to form large chains called biopolymers, also called macromolecules. There are roughly one hundred different kinds of AA, but usually only twenty different AAs are used to build proteins. Many of these can be altered after they are added to a protein. AAs are linked together primarily by a bond called a peptide bond (PB). The PB is a common relationship between the amino group of one AA and the carboxyl group of another AA. A peptide bond can be written as (CO-NH), and since a biopolymer made of many AAs must have many PBs it is also called a polypeptide. A protein is merely a polypeptide with a specific shape.

Contrary to the popular view of DNA as "the secret of life," proteins are truly the most mysterious and important molecules in life. Proteins are not the secret of life, as no molecules can be, but neither is DNA. Together they can begin to give us a glimpse of life's seductive little secret, but alone they each keep their best secrets closely guarded. From a purely practical standpoint, however, given the choice on a multiple choice test, pick protein, knowing full well that the state will count it wrong, but it's important to stand on logic and principle and then argue about it later. Granted, this is a subjective call on my part, but DNA has merely had decades of better PR than has protein.

Consider that there is virtually no function of life in which proteins do not play some role. They participate in functions that are structural, mechanical, enzymatic, cell signaling, hormonal – everything. Proteins are even an integral part of the process that makes DNA, RNA and proteins. In other words, we absolutely need protein to make both DNA and RNA. We need protein to make protein. It is mind-bending, I know, but life as we know it cannot exist without proteins, of this we should by now be entirely certain. Yet we strangely do not even know how many different proteins there might be on earth today, and estimates vary wildly. There seem to be roughly 100,000 different proteins in a human. Species can share proteins, but each generally has its own variations of "equivalent" proteins. There are millions of species on earth, so the number of distinct proteins on earth is certainly quite large – in the trillions. However, the number of actual proteins is still infinitesimally small compared to the number of possible proteins. As large as the number of real proteins may be, the theoretical number of different proteins is - for all practical purposes - infinity.

Proteins are inherently complex and therefore difficult to comprehend on any level. What are they? What do they "mean?" Where do they come from? To begin understanding proteins and the simple answers to basic questions like these, one must first know that proteins at first derive their functions from their physical shapes. Yet they are considered "linear" biopolymers because they are made from single-file chains of amino acids, but these chains always fold up into intricate and precise three-dimensional shapes. The shape of any given protein is known as its conformation. Quite remarkably, for every chain of amino acids found within the normal environment of a living cell, there exists a single conformation that is more stable than any other conformation for that chain. The axiom holds that primary sequence determines tertiary structure. Surely we've all heard that one at one time or another as a compulsory part of basic common knowledge. This magical structure is called the native state of the protein. Every other of the infinite number of conformations is called a random coil. Words are funny, but statistical probabilities being what they are, the native state of every protein will always be found by the chain quickly, and found via a random walk known as protein folding. To be sure, the protein-folding random walk has its many and charming helpers or

molecular guides, sometimes called chaperones, but it is fundamentally a random, or a "thermodynamic" way that every protein will become the "correct," "native" shape and therefore be able to reliably perform the specific function for which it is "intended" so to speak. This is a critical fact that must be properly understood for any of the rest of this tidy story to make any sense at all... make sense, that is, if one wants to pretend that it makes any logical sense.

The idea of a native state was first merely a hypothesis of Christian Anfinsen, an organic chemist back in the mid 1950s, but he later tested and proved his hypothesis with a rigorous application of the scientific method. He did this to everyone's satisfaction. The idea is now known as the thermodynamic hypothesis of protein folding, and it is universally accepted today, so Anfinsen was awarded the Nobel Prize for chemistry in 1972. It was an important official recognition that Anfinsen alone had securely contributed this critical piece to a fabulous molecular puzzle. He found the main piece, and so work by all could then proceed at an accelerated pace. And so it did.

We all can agree that it is much easier to use the name 'single target' when referring to the idea behind the thermodynamic hypothesis of protein folding. In other words, whenever a protein exists in a less than perfectly stable conformation, it will ultimately have a single target in its chaotic path toward becoming stable. It is not so shocking that a protein will buckle under thermodynamic stress, but it is show-stopping and utterly fantastic to know that it will always do so in a single way. Now consider that proteins have roughly 500 AAs on average. (Some are known to exist with far fewer than 100 AAs, and, shockingly, some have as many as 27,000 AAs.) It is also notable that a single chain of 500 AAs has more possible conformations than the number of particles in the known universe, yet all proteins can be expected to reliably find the correct one in a matter of seconds. As difficult as this is to fathom, it is a scientific fact, one that is the essential starting point for understanding the rest of this complex narrative. If it were not true, we would not exist. In no small way we really do owe our lives to this fact of nature.

But where do proteins actually come from? Proteins come from DNA, or so we are religiously told. Perhaps it is better to say that proteins are made from the "molecular information" that is stored in DNA. Is that better? After all, this is the center of the molecular information universe, the command and control molecule of life, the point of rotation for all of molecular biology. We can, in fact, now finally and properly understand this intensified view of DNA precisely because every sequence of amino acids can fold in only one way. In other words, to make a protein, all we need is the ability to make a sequence of amino acids, and DNA neatly provides the means for doing just that. The essential insight that proteins fold in only one way is the foundation for understanding molecular information at the very core of life. Molecular information is simply a function of biopolymer sequences. It is stored and translated much like any other form of information which serves at our beck and call in modern digital technology. Molecular information is merely stored in sequences of nucleotides and translated into sequences of amino acids. And so the code that orchestrates this process was called the genetic code.

The basic concept at the heart of the genetic code was first proposed in the late 1950s, Anfinsen's time, a time soon after the double helix was discovered. It was quickly noted that there are four nucleotides participating in this molecular code, and these should

be grouped into sets of three. A sequence of three nucleotides then became known as a codon. The genetic code consists only of a mapping of the set of codons to the set of amino acids. This famous code is known as co-linear or one-dimensional. In other words, molecular information is merely stored in one dimension, stored in the sequence of nucleotides in DNA and then translated into one dimension in the sequence of amino acids in protein. There are 64 codons (4 X 4 X 4 = 64). However, there are only twenty amino acids, so most AAs have more than one codon assigned to them. Each codon "means" one AA during translation, but each AA usually has an average of three codons, so there is a large amount of redundancy in the genetic code. In this basic way the genetic code is undeniably simple, and we can now easily visualize it in a wide variety of ways. The most common way to visualize the genetic code is by looking at a codon table. It is a look-up table, or a spreadsheet that allows us to quickly find every codon and the amino acid to which it is assigned by nature. For all intents and purposes, a codon table is precisely what we mean when we use the name 'the genetic code." This name has become increasingly confused with DNA or a genome of late, but 'the genetic code' actually is a simple data table in the minds of the experts in this field.

Figure 1. Standard Codon Table.

	U	**C**	**A**	**G**	
U	Phe	Ser	Tyr	Cys	**U**
	Phe	Ser	Tyr	Cys	**C**
	Leu	Ser	STOP	STOP	**A**
	Leu	Ser	STOP	Trp	**G**
C	Leu	Pro	His	Arg	**U**
	Leu	Pro	His	Arg	**C**
	Leu	Pro	Gln	Arg	**A**
	Leu	Pro	Gln	Arg	**G**
A	Ile	Thr	Asn	Ser	**U**
	Ile	Thr	Asn	Ser	**C**
	Ile	Thr	Lys	Arg	**A**
	Met	Thr	Lys	Arg	**G**
G	Val	Ala	Asp	Gly	**U**
	Val	Ala	Asp	Gly	**C**
	Val	Ala	Glu	Gly	**A**
	Val	Ala	Glu	Gly	**G**

Note that the genetic code is one-dimensional because a protein can fold in only one way, and a protein can fold in only one way because the genetic code is one-dimensional. This is just one more of the many endearing tautologies that must be assimilated and that collectively make biology so fascinating. Yet had it not been for all the remarkably convincing proof for the single target hypothesis, this beautiful tautology never would have gotten started. It would have surely been strangled in the cradle, so it is a good thing that Anfinsen came along and proved it at the dawn of this important

puzzle-solving process; otherwise, there would be no logical basis for our strong beliefs today.

As a necessary consequence of being one-dimensional and highly redundant, the genetic code must also be seen as uni-directional. In other words, information "flows" in only one direction, which is an important tenant of protein translation that is also known as the Central Dogma of molecular biology. This lovable key dogma holds that information is stored in DNA, and it is transcribed into mRNA only to then be translated into protein. The information does not flow backward in this system, so it is truly unidirectional.

Perhaps most remarkable is the fact that the genetic code is universal. In other words, every living thing on earth shares this exact same spreadsheet. That fact alone might be the most mind-bending truth in all of biology. Nothing more neatly summarizes all that we've come to know about biology than this one key fact. After all, the odds of exactly this spreadsheet existing just once anywhere on earth are as close to zero - without being zero - as one can possibly imagine. But the odds of the genetic code being exactly the same everywhere on earth are so unfathomable that it demands an explanation, and only evolution can provide that explanation. It has been completely explained, rest assured, and it is now widely recognized as the single best evidence that evolution has generated the awesome scope of life on earth. After all, this code has enough "trivial" details that are consistent enough in all cells everywhere that a single cell must have, at some time in the distant past, somehow acquired these details, for whatever reason, and then passed all of these details along, entirely unchanged, to all of its descendants. The descendants of this single all-mighty cell include every living cell on earth today. The evidence and conclusion are utterly indisputable! This is the fingerprint of "common descent" that Darwin was so prescient in predicting more than a century ago. Long live Darwin.

In the parlance of poker, the genetic code is a royal flush for evolution. Of course, there are some highly-publicized exceptions, but there are always exceptions to every rule in science. Right? People who cannot accept this are merely in denial. They need to just get over it. Only a narrow-minded, knuckle-dragging Godbag would ever question the natural beauty and utter supremacy of this idea. Plus, the few differences in codes that we do know about today seem so remarkably small. They hardly matter at all. Right? So, if the genetic code were not actually universal, we would rightly expect a tremendous amount of variety within the details – and there are so many details. Right? So, in the end, the noted exceptions actually strengthen the argument that evolution accounts for the nearly universal consistency of the pattern of the genetic code! It is truly the centerpiece for all those who argue in favor of natural selection as the animating force of life on earth. Never mind that it is a simple heads I win tails you lose argument. But this is precisely why it is critical that we understand what evolution really is and how it really works. To be clear, I believe in evolution. I don't think that anything in biology can be properly understood without it. Furthermore, I think that natural selection might be the single most powerful concept in all of science. Therefore, since we are using the genetic code as the "best" evidence to "prove" evolution, it is undeniably important that we properly understand the genetic code. We clearly understand the genetic code. Right?

To continue exploring this rich and complex understanding, essential to understanding why science believes so strongly in evolution, one must first recognize that for all intents and purposes the genetic code can be considered an arbitrary arrangement of molecules. The idea is that life is not based on pure logic but on the logic of pure randomness. In other words, there are many equally good ways to arrange amino acids within a matrix of nucleotide codons. There are also an infinite number of ways to construct a codon table. There could be 12 nucleotides instead of four, for instance, or there could be two nucleotides in a codon instead of three. After all, the only function of the code is to generate sequences of amino acids, and there is nothing "logical" about any codon; therefore, there are an infinite number of ways to construct and arrange a codon table. Fortunately for us we only need one! There is absolutely nothing that logically says it must look in any way like the one we have, but once a single way that is "good enough" was found, that way was embedded in life. This concept of embedded inefficiency is not unheard of, and it is actually much like the way the inefficient layout of a common keyboard – called a 'qwerty' keyboard – has become embedded in our modern culture.

The qwerty keyboard is a relic or fossil of technologically primitive times that required it. So too is the genetic code. Think of the genetic code as a living fossil. It harkens back to a simpler time when the requirements placed upon it were far less severe, and yet it still functions admirably now despite its many obvious inefficiencies. In fact, the many puzzling inefficiencies merely add to its many charms. If one expects perfection from natural selection and biology in general, one will be sorely disappointed. Life is about taking lemons and making lemonade. Didn't you get the memo? But what is being said about the genetic code is clearly false; however, these same things could rightly be said about our view of the genetic code.

So let's take a quick time out from these comforting bedtime stories. Evolution theory now has some serious work to do. Here's the problem: Imagine three points in time on earth, A, B and C. At point A there is no life on earth and there is no genetic code. At point B there is life and the genetic code first appears in the single one-cell ancestor of every cell today. At point C today we have trillions of trillions of different kinds of cells and they all share the same genetic code. Evolution now needs to explain two different stretches between these three periods: A-B and B-C. During A-B the genetic code does not exist, but presumably life does. However, life depends on the genetic code for its existence. What's more, the genetic code itself is essentially functionless and arbitrary, so it is difficult to see how anything might evolve toward it. Worst of all, the mechanisms that execute the genetic code – DNA, mRNA, tRNA, rRNA and protein – must all be in place before the code can exist, and they all require the code itself in one form or another before they can exist. Conversely, during B-C the genetic code exists in all its full glory, and it does not change henceforth, yet the cells that contain and depend on it change wildly. Once again, the code itself has many trivial and arbitrary details, so there must be a way to explain a lack of change in an environment of overwhelming change. There must be a mechanism vital to evolution that rigidly prevents change. Puzzling, is it not?

The clear challenge to evolution theory is now this: explain the two diametrically opposite periods of evolution in the genetic code, and do so in light of its proven features of being simple, linear, redundant, universal and arbitrary. During the first period it must

evolve wildly to "randomly" find its single spreadsheet target. After all, there is a whole lot of evolutionary work to be done before any spreadsheet can exist, let alone the one we've obviously got now. During the second period it must not evolve at all! Something dramatic surely must have happened. There is a clear point in time – point B – where the forces and mechanisms of natural selection must reverse themselves entirely. It is analogous to the sudden reversals in the earth's magnetic poles, I'm sure. But in this case, life busily evolves a key feature into its fabric and then it suddenly and busily works to ensure that the feature will no-longer evolve. Keep in mind that natural selection is often described as "survival of the fittest," and the fittest are those who survive. So we can feel entirely free to employ another nifty tautology when we try to explain this evolutionary mind-bender!

Rest assured, we have perfectly rational answers for the extreme quandary presented by both of these curiously different periods of evolution. The two leading theories for period A-B are called panspermia and the RNA world. Panspermia holds that since the genetic code is so improbable on earth, it did not originate on earth. This idiotic purely creationist proposal has its share of famous supporters, but it is wholly unsatisfying. It merely begs the question it purports to answer: where did the genetic code come from? The second hypothesis, the RNA world, essentially says that we should start in the middle. In other words, since we need DNA and protein to make RNA, and we need RNA and protein to make protein, life started by first making RNA in the absence of all else. Thousands of scientists are busily and profitably charting the course for this to have occurred billions of years ago on earth. I imagine that a Sunday children's special is in the offing for PBS. They surely are creating charts, and diagrams, and timelines and grant proposals that advance the idea. They strongly believe that this is exactly what happened, I'm sure, but the theory is a loser. Trust me. It did not happen; it could not happen, and what's more it too utterly fails to explain the origin of the genetic code. Most unfortunate is the fact that it further hides the obvious truth from our lying eyes. The truth stares us in the face and mocks us at ever turn. So, given a choice, I prefer panspermia. It does less harm. At least it is slightly more comforting to hear the brilliant scientists say, "we really don't know, but we know you will accept science fiction in lieu of real science."

The second period, B-C, the period where the genetic code is strictly prevented from evolving actually does have a widely accepted, you might say an unchallenged explanation. It is called the functional imperative. In other words, for something to survive, it is imperative that it functions. A cell that survives today obviously functions, and it obviously uses the genetic code. If we made a change to the genetic code being used by that cell, then all of the proteins that depend upon it would probably cease to function, and the cell itself would also cease to function. So, it really is difficult to conceive of a change to the genetic code that would not have a net deleterious consequence to the entire cell. It is difficult to see how the genetic code could ever change once it is functioning – this is the functional imperative. It is nothing more than a restatement and inversion of natural selection tautology: Survival of the functional and function of the survivors. Unfortunately, there are at least two big logical problems with this idea. First, mutations are the engine that drive evolution, and therefore mutations are a constant in life. Second, we could presumably invoke the imperative for every code contained in the ancestors that led up to the first all-mighty cell with this magic code, and

we could also say it about the trillions of trillions of contemporary cells that existed alongside that first cell. In other words, the functional imperative does not satisfactorily explain the reversal at period B. Furthermore, we can no more imagine that a single cell today will become the sole ancestor of every living cell tomorrow than we can imagine that it happened yesterday. It is, in fact, logically harder to imagine it happening then than it would be now. It is a non sequitur.

I imagine that if you have had no exposure to biology, and specifically if you have had no exposure to molecular biology, you are confused by now. If you have studied these fields, odds are that you have been able to follow along just fine, but you are frustrated by the fact that I insist on plainly calling this exactly what it is: it is a fairy tale. I am now rudely in your face and challenging your core beliefs that you hold so dear. This is precisely my intent, yet I have said virtually nothing controversial about the current theory, nothing that cannot be found in any good 9th grade biology textbook. I simply but emphatically disagree with all of it. It is ad hoc crap. Fortunately for me, the facts and the logic are on my side. Unfortunately for you, the standard dogma is logically inconsistent with itself, and the dogma is blatantly yet consistently at odds with all known empirical facts. Sadly, the "experts" simply must accept indoctrination of these basics of non-fact and illogic as the only path to solving bigger, better, more complex problems. Those who have done so are probably more than a little upset by my flip treatment of some of these serious ideas. Grants are being brought into question, and I clearly have no reverence for the hard work of others. This is false: In fact, I have no reverence for the flawed work of others. I'll suffer fools but not gladly. Virtually everything that is presented in the 9th grade textbook is critically flawed in obvious ways. Don't believe a word of what the textbooks say. The emperor has no clothes!

Kabuki Theater is a highly stylized form of Japanese theater. It involves elaborate make-up and overly dramatic characters. The sets are minimalist, designed to focus the attention of the audience only on the desired action. They even extend the stage into the audience to draw them into the drama. Everything is designed to focus attention on a few important details and away from everything else. The narrative surrounding the genetic code is today a classic example of Kabuki Theater. If our attention strays one little bit from the sanctified script, the illusion disappears. It is theater of the absurd.

When scientists first began to systematically study the surface of the earth, they began to notice several strange things. Nothing perhaps was stranger to them than to find evidence of oceans residing at the tops of earth's highest mountains. It became acutely important then to somehow explain this observation, and so many ingenious explanations were vigorously promoted and pursued. However, every single one of those explanations has been lost down the memory hole today because we luckily discovered the concept of plate tectonics. Massive plates wander the surface of earth and crash into each other, driving oceans high into the air where they sit stoically for tens of millions of years, waiting patiently atop the highest mountains to give us their precious few clues. The explanations of the genetic code today are analogous to all those theories in geology prior to plate tectonics. They are missing one critical and obvious fact that profoundly impacts upon, indeed reverses the entire logic and narrative of everything else: The genetic code is not really a relationship between codons and amino acids, and so it is not even remotely one-dimensional. This is not merely a little mistake of science. This will perhaps go down as the biggest mistake of all time.

5. What is the United States of America?

Just as humans need God they need nations. Bees need hives, ants need colonies, cells need walls, bodies need skin, and humans need nations. Life is a complex collection of recursive sets, and nations represent perhaps the most important set toward the big-picture as far as any human is concerned. A nation is a basic group identity that often determines self from non-self amongst man. A nation is strongly dependant on geography but not exclusively dependant on geography. Nations fundamentally provide formal ways in which large groups of humans govern their behaviors both individually and as a whole, whether they are in immediate proximity with one another or not. Specifically, a nation is the fundamental mechanism for allocating resources amongst man, and therefore it is the most significant unit of selection that has been driving human evolution for tens of thousands of years. It is a plain fact that humans who have participated in nations have thrived, while those without nations have fared not quite so well. There have been thousands of nations, each with thousands of features, and they are constantly changing. So, like God and snowflakes, no two are ever alike, but obvious similarities between nations will always exist.

Although less than 250 years old – relatively no time at all - the United States of America, in my humble and extremely biased opinion, is the greatest nation in the history of man. That does not, of course, mean that I believe it could not be made yet better. Every nation will have inevitable imperfections. Nations are human. Admittedly, there will be disputes over what is and what is not a "great" nation, so perhaps I should instead merely state that it is the most powerful global empire in human history, and then profess my belief in its otherwise ultimate greatness. There is no single objective measure on which these statements can be made, but most reasonable metrics of global power suggest that the United States of America has become the most powerful global governing body in recorded human history. I happen to see it as an empire. Whether or not these opinions are valid should be debated vigorously, by all means, but there can be no debate about the founding principles of this nation: it was established exclusively as a Christian nation. It was to the "Glory of God" that this nation was established. It is not unusual, however, that this should be the case because in one form or other vast majorities of nations are founded upon a strong perception of God. This nation just happened to be founded on long-established principles of the Christian faith. It is a faith that history has empirically proven to be good for nations in the inevitable competition between nations.

Human governance is a tricky business. Humans are complex and unpredictable, and they do not always behave in ways that are in their own best interest, let alone in ways that represent the best interest of a whole nation. But there are a variety of influences contributing to effective governance of human behavior. Humans are complex and so is their governance. We like to think in simple terms where possible, but nothing about humans, nations or the way they behave will ever be simple. We Americans happen to now call ours "a nation of laws," but laws by themselves are never enough. That's just common sense. And the overriding law of all laws is the law of unintended consequences. In other words, every law is prone to cause more problems than it solves, so the first rule of laws is that less is more. Fortunately, there are a variety of other more powerful internal and external forces that add to laws in the grand scheme of human

governance. Apart from formal laws, humans require economic, spiritual and social pressures to influence the behaviors of individuals and groups. Furthermore, the need for personal security is perhaps the most pragmatic concern that has historically driven the behaviors of nations, a concern that must always be addressed in some way within a national context.

It is a bit ironic then that the greatest threat to anyone's personal security comes from other nations; the irony being that we now clearly need nations simply because we already have nations. After all, one's own behavior is predicated in a tangible way on the behavior of others. One can perhaps control their own behavior, but one can seldom control the behavior of others. The logistical problem then is that one's own behavior must be predicated on the expectation of unpredictable behavior on the part of others. It would be nice if there were some internal guide for the expectation of how others might behave. How can such expectations ever be reliably formed? The "golden rule" generally guides us to treat others in a manner we deem to be acceptable treatment in return. Unfortunately, we seem to differ greatly on the specifics of this plan in terms of what is and what is not acceptable. Religion has traditionally assumed the role of describing to and training humans in the accepted behavior patterns for self and others. Yet it is a plain and self-evident fact today that man is the single greatest threat to man, and this has probably been true for the past 50,000 years. Man is often safe within his own region or religion, yet man is always extremely vulnerable to the threat of others. It is not that religion is dangerous – man is dangerous.

Nature is red in tooth and claw, but nowhere more so than in man. Animals kill other animals to obtain food and defuse threats from competitors. Man kills animals for these reasons too, but man kills man primarily to defuse threats from competitors and to secure resources for a nation. This appears to have been the winning strategy for man ever since our evolutionary break with chimpanzees over two million years ago… perhaps even before it. Regardless, since then, approximately twenty-three species of chimps have evolved and persist today; yet only one species of man survives today. What once was perceived as a lineage of human ancestors now appears to be a broad bush of human contemporaries that modern man has systematically wiped from the surface of the earth along his merry way. Man is methodical and efficient in his ability to defuse threats from competitors and secure resources for a nation. That appears to be what it is to be human, as far as any other species is concerned. As a result, man has thrived. The dominance and proliferation of man on earth is a testament to this basic proficiency, and a nation is undeniably the best vehicle for consistently delivering it to the masses.

It is hardly a factual debate that man has thrived, but it is a hotly contested matter to explain how or why this has happened or what it means. Of course, my "Darwinian" view of man also vibrantly colors my view of nations. How could it not? Men and nations and God are all three inextricably linked in the evolution of man. I believe that Darwin's essential insight, natural selection as the mechanism for evolution of life, has its most instructive use in understanding nations today. Darwin noted that resources are inevitably limited, yet reproductive capacity is not, so reproductive capacity is ultimately governed by limited resources. Therefore, there is always fierce competition for the resources needed to reproduce. Competition always produces winners and losers, and Darwin simply noted that the many and particular features within each of these two

groups are bound to differ. Over time, the features of the consistent winners will dominate the group, and the competition itself will evolve, changing the collective features of the group along with it. Therefore, as a nation we can merely observe and make note of the consistent features that define winners and losers. Winners have tended to rely heavily on God and losers have not. There is clear and convincing evidence in the data of world history that God provides a selective advantage in man. Only an idiot or a fool ignorant of evolution would ever argue otherwise.

The basic concept of natural selection logically leads to the perception of life as a never-ending arms race of sorts. There is no way to avoid it. The simple numbers game of natural selection is a fundamental equation of nature, and man has never done anything to change or suspend it for himself. To be utterly clear: man is not immune to the basic principles of natural selection and he never will be. Despite our extreme cleverness, we do not play by a special set of rules. Reproductive capacity is still governed by limited resources. Man will never create unlimited reproductive capacity, and the only significant competition for resources in this arena now comes from man, so the only defining competition of man becomes one of allocation of resources amongst modern man. Therefore, nations have become the most significant unit of evolution in man.

In any competition between nations it has always been a better bet to bet on one powered by God than one without it. There are many important reasons this is true, but nobody could successfully argue that it is not true. After all, there is a maximum number for human zygotes that can be nurtured to reproductive maturity at any one time on the surface of the earth. That number will change considerably with circumstances, but a number will always exist, so there will always be some mechanism by which man must arrive at that number and a way to allocate slots among men. There is no free lunch. God will always play a role in the method of allocation and in determining the actual number. The nation has represented the infrastructure for the mechanism by which this allocation has been performed for many thousands of years, and it surely will be a part of the system well into the distant future. Therefore, understanding nations is tantamount to understanding our own existence. Understanding the role of God within nations is every bit as important.

Nations must act according to global and national interests, but individual humans must act according to a wide range of interests that always extends downward to the individual. The most effective nations are the ones that balance all interests and align positive behaviors at all levels and on all time scales. Mere laws will never achieve these ends. After all, many laws are nothing more than disingenuous wishes, or fig leafs of human governance. They are enacted either by fools or charlatans for reasons other than effective governance, and rarely do they have the intended effect, if they have any effect at all. Most lawmakers of today no-longer even maintain a pretense that they are serious about how they govern. They merely govern for the sake of governing, and try to look fabulous while doing so.

Human behavior is always governed by something more than laws; nonetheless, no discussion of nations, particularly the USA, is valid without an examination of its system of laws. Of course, the USA had a perfectly respectable system of laws before it even became the USA, and it did in fact borrow heavily at its inception from the very system that it replaced. We proudly call it an American revolution, but truth be told it

was much more a case of governmental evolution than revolution. That's just governing. That's just evolution.

The United States of America began its grand existence merely as a colony of the mighty British Empire. It was only one tiny global prize of many snatched away from all the other grand empires of its day. The land, of course, was already occupied by a loose collection of nations now known, ironically, as Native Americans, but widely referred to at the time as uncivilized savages. The term was nonspecific and widely applied to any people or culture that did not closely resemble the one in England. They were called Indians only because of a superficial resemblance to other people and to a lesser extent to other cultures. Crass, to be sure, but these truly were the accepted official terms applied to members of the many indigenous nations then occupying potential colonies and all future American soil. However, like all nations on earth today, this nation, the United States of America, had to somehow displace one or more pre-existing nations. Land is a scarce resource and all nations require it, so there is fierce competition among all humans over control of land. There always has been and there always will be.

The British colonies knew of course that they possessed an enormous advantage in this competition for land with the low-tech savages allied with competing empires of their time. They derived this advantage from their acquired body of knowledge and therefore from the highly refined technology they could bring to bear on the essential competition for land. This was in turn derived from God. It took barely a couple centuries to take from the previous inhabitants the land now comprising the USA. The critical initial minority of it was acquired as a British colony and the vast subsequent majority was acquired as the sovereign nation we know and love today. In between, the nation experienced a brief but bloody revolution in its own governance, and then a bloodier struggle for its continued union. The revolution revolved around the question of specifically who should govern this nation, and to a much lesser degree around the details of how they should be governed. Essentially, the global empire of England split in two, like an amoeba, and it became two sovereign nations. The two obviously share a common origin and so they continued to govern themselves based on virtually the same kinds of first principles of human governance. Today, as then, the two nations still govern in highly similar ways, albeit ways that in no way resemble their governance at the time of their fateful split.

The British colonial nation in America officially existed under a parliamentary form of a monarchy, a system of familial power that derived its authority to rule by divine right. It was a relatively new and improved Protestant form of Christian governance at the time. By birth or marriage a series of kings and queens ruled England for hundreds of years, deriving their power from the vested authority of the church. This authority is ostensibly based on individual consent and conscience, but it is ultimately maintained by physical force and threats to personal safety and well-being. The coercive powers of all governments are always manifest in military and police forces, which are comprised of significant numbers of people and significant amounts of collective resources, in a word: gold.

Within this particular monarchical system of governance there were many laws. A "law" within this context is merely a contract or an agreement between a government and its people. In other words, if a person acts in a certain way, the law gives forewarning and a reasonable assurance that the government will in turn act in a certain

way. However, there are and were many other kinds of laws recognized then and now. The British colonies of America were subject to the laws of the King of England, among other kinds of laws, and his power to rule his subjects was granted by God via the Church of England. The king then allocated portions of this power to governors within the colonies and empowered them with troops, technology and resources. The system worked remarkably well for a short while, but it eventually became irritatingly ineffective, so a new system quickly took its place.

The official birthday of this nation is July 4th, 1776. This is the day when the Declaration of Independence was adopted. This was a declaration to the world that we would no longer be governed by the King of England but would govern ourselves from an as yet unspecified system. The United States Constitution, the defining document of today's government, went into effect on March 4th, 1789. During the intervening years, this nation was merely a confederation of nations, or independent states or colonies joining together for common defense as described by the Articles of Confederation. Becoming a nation is a messy business, to be sure, so it is difficult to point to a time, place and document where that completely happens. In this case, by convention, we point to the Declaration of Independence. This document proclaims in flowery prose that the King of England will merely be replaced in his duties to govern by those previously governed. The document lists several good reasons for doing this. It is a long rant (pre-internet) against the king, giving notice to the world of the dysfunctional inequities suffered at the hands of British rule. But by what right did colonists claim to rule? They claimed unalienable rights endowed by their creator: "…to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them…" These words were purely legal terms to them, albeit words founded in a strong spiritual conviction. However, at that time virtually all specific legislative powers over day-to-day behavior were left to each individual state. While each state was understandably wary of the kings – all of them, England, France and Spain, to name just a few – they were also wary of each other. No state in America at that time would ever consent to be ruled by any other state, or any collective authority. So the Constitution merely defines the formation of a national authority that is deliberately kept as small as possible, enacted only for common state concerns, not collective state concerns, formed not only to protect the confederation from others but from each other. Most importantly, the Constitution protected the individuals from the very authority it sought to create.

Just as the rules that govern each and every one of your seventy-five trillion cells can be traced back in one way or another to your first cell, all rules that govern the United States of America can be traced back to the Constitution. All governing powers are derived from it. It derives its powers from the people it governs and they derive their powers from God, according to the documents left by those who devised this particular system. So the first "self-evident" axiom of our current governance is that God endows us with rights and powers to govern. We then build a complex network of rules upon this axiom, which means that a complicated explanation and justification for any law can be given today, but all of them will trace their ultimate empowerment back to God at the bottom of this particular system of laws. God is the giver of governing rights in this and the previous system, but the king was simply replaced by the nebulous concept of "we the people." It remained to be seen who they might be.

It is far more complex to govern a colony of cells than it is to govern a colony of people, yet the similarities can be striking. Just as our laws are based on first principles so are the laws of cells. Just as the rules that govern four cells, or one hundred cells or one million cells are not actually contained within the first cell – they are emergent – the laws at state and local levels are not contained within the Constitution. State and local laws are not contained within but emergent from Constitutional principles. Just as proteins are produced in massive amounts and varieties from centralized DNA, which then emerge into creative and unanticipated laws of their own, our legislatures and court systems are busily producing new laws and interpretations that emerge into laws of behavior that could never have been anticipated by the original Constitution. The document actually reads like a huge and complex board game that is to be played out over centuries. And so it is.

Of course, this amazing document defines for us a system of governance that is not a direct democracy, as many falsely yammer endlessly about today, but it is a republic or a representative democracy. It establishes three "co-equal" branches of government and then allocates powers to them so that no one branch can theoretically subvert either of the other two. It is a tricky business, to be sure. In other words, "we the people" do not merely govern ourselves per se, but we vote on those who shall govern us. Those elected then appoint people and create auxiliary modes of governance. True, these elected rulers emerge from we the people to obtain the authority and responsibility to create and enforce laws based on the powers delineated by the Constitution. But we are not a true anarchy as suggested by "we the people." Individuals do not govern, and in fact individuals are not entirely self-governed. "We the people" are and always have been governed by others. Fortunately, individuals are granted certain "rights" by this government, some of which are hinted at in the original articles of the Constitution. But most of the "individual rights" are actually set forth in the amendments of the Constitution. The amendments were anticipated, and in fact they were a part of the bargain made that ultimately allowed for the initial ratification of the Constitution. The amendments to the Constitution began to roll in with the first wave of ten, also called the Bill of Rights, ratified in 1791, and now extending to twenty-seven amendments. Sometimes an amendment extends another, and sometimes it cancels it completely. Amending the Constitution, it appears, is more art than science.

Unfortunately, the articles and amendments and their attendant rights are always subject to extreme interpretation by the courts. That's within the rules of the Constitution itself, and the framers recognized this inherent weakness. They prayed that it would never be abused. Unfortunately for us, they did not pray or plan well enough. The worst fears of our founding fathers have now come to pass. Our individual rights are perhaps unalienable but they are always contingent on interpretation. The courts are charged by the Constitution with the duty to interpret the Constitution. The courts today are now also apparently charged with the ultimate interpretation of what it means to interpret the Constitution. Simply put, the separation of powers has now been subverted by the judicial branch's willingness to loosely interpret the Constitution toward its own ends, thereby granting themselves effective control over the other two branches. It is nothing short of a bloodless coup. For all intents and purposes, we the people are now completely governed by the courts. Consequently, it is not until reality and the courts have had an opportunity to act that we can have any practical understanding of the meaning of our

"rights." To wit, perhaps our most famous and cherished individual rights are contained within the first amendment of the Constitution, which reads:

"Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances."

This is clearly an exercise in the school of less-is-more governance. It is truly significant for what is stated, but far more significant for what is not stated. The questions begged outnumber the questions answered one thousand-fold. The courts have now aggressively stepped in to fill the void, ironically a void created by the courts themselves. The original intent of this amendment can no longer be recognized within the vast number of rulings made in its name. In fact, the amendment itself has been made absurd and self-contradictory by innumerable legal actions. The first amendment no longer has meaning in and of itself. In other words, it now only means whatever the courts say it means. All disputes of first amendment meaning must await court approval because inherent meaning is now long gone.

The first amendment now goes by many names, but is usually recognized by two different names: free speech and separation of church and state. The first name is apt, but the second is not. Free speech is protected but a separation of church and state is not. How could it be? This document - the Constitution itself - presupposes a Christian nation, so how could it purport to separate government from Christianity? It is more than just well-documented, it stands to reason that the amendment was expressly enacted merely to prevent one form of Christianity from receiving government preference over all others. Like Henry Ford, who promised any color of Model-T, as long as it's black, the founders promised any religion as long as it's Christianity. So it is best to refer to the first amendment properly as the establishment clause, not as the separation of church and state clause.

At the time of writing of the first amendment, a "separation of church and state" was seen as absurd and dangerous, and in fact some states had even already firmly established their own religions. A professed belief in God was required of most holders of public office. But the beauty of the establishment clause was not that it kept God out of governance (how could you?) it was that it kept governance out of God. In other words, the founders widely recognized the Bible as the founding document of the nation, and their fancy new documents expressly presupposed the existing laws of the Bible. The new laws were not designed to replace the old laws but to merely bind them together. These leaders recognized religion as a legitimate form of local governance, and they wanted to keep it local. They did not want to get into the business of picking winners and losers at state and national levels. For goodness sake, the federal government had enough on its plate already, and so it was very wise to officially allocate the wide range of existing governing duties to individuals and their choice of religion. After all, one could never possibly legislate everything. Could they? The founders strongly believed that which was already legislated by the Bible needed not be legislated by the new and fragile nation. Surely it could not be done in a document so small as the new Constitution.

Beyond all of this theory and religion, more than criminal and civil laws, day-to-day public human behaviors are always governed in some important way by commerce. Yes, the United States of America is a nation of laws, but the most important laws now are the ones that effect commerce. The rules of nature are not suspended by the Constitution, and the golden rule is once again the most significant one here (the one that says he who has the gold makes the rules.) Our system of government is a representative democracy, but our system of commerce is based on the concept of capitalism. There is no system more democratic than capitalism. People vote with their wallets, but unfortunately one man one vote is not the rule and never will be. The Constitution empowers our government to control the monetary system, as well as control commerce, and it gives it the power of taxation. In addition to military power, these are the big three in all governance.

An honest man must admit that the United States of America is a modern global empire. Perhaps it is an empire of a slightly different sort from most that preceded it, but an empire nonetheless. It is an empire of wealth, one that spreads its ideology through the human freedom that accompanies economic prosperity. If this is not now an empire then what is? After all, a world without empires is like a forest without trees. However, the USA does not conquer distant lands merely so that it can remotely impose its formal system of governance on them, like the king seemed to think should happen, but it does tend to impose a general ideology and a general system of commerce that is mutually agreeable with its own. This was the stated goal with Germany after it viciously attacked its neighbors and with Japan after it viciously attacked the USA. The plan seems to have worked with good results, and so to a greater or lesser degree the USA still follows this pattern as its great influence continues to spread throughout the world. But application of this influence relies on the power of the purse in two important ways. First, it requires a tremendous amount of economic resources to build and maintain the requisite military strength that goes along with being the world's most powerful empire. Second, it needs a vibrant and attractive economic magnet from which other nations will profit through cooperation with it; otherwise, there will be much difficulty in inducing foreign lands to behave in ways that benefit the empire. The promise of the USA is a promise of human freedom. That promise can only be realized through economic prosperity because without it there can never be freedom. That's just the way the world works.

Compared to the enormous and frightening global power of the purse wielded by the United States today, the domestic power of the purse within the US government is yet more enormous and much more frightening. The internal effects of our economic governance far outweigh the external effects. The federal government in one form or another is now by far the largest single industry in this country, larger than any ten others combined. We produce more federal government than any other service or commodity in this country. Direct costs in terms of federal tax dollars are merely the tiny tip of the gigantic federal iceberg. Mandates to state and local governments must be added, plus intangible costs are now incalculable. The federal government touches every single thing we do today. What started so improbably as a tiny nation neurotically averse to centralized power has become a gigantic nation addicted to federal government. Yes, we pretend to maintain a thin façade of a love-hate relationship with that entity, but love it or hate it, federal government is now the way all things are done. We may not believe in

Christmas anymore but we sure do have a Santa Claus mentality towards human governance.

The United States has gone from a tiny offshoot of a global empire to the exciting new-fangled first principle of self-governance and back again to an acceptance of being governed by an enormous global empire. It appears that London merely went to a mobile network and happened to unwittingly locate its best new remote server in Washington, DC about four centuries ago. The take home message should be that principles of self-governance will always win, but the key question now becomes one of self. Who are we and how do we propose to govern ourselves?

6. What is Babylon?

There now seemingly is no problem big or small that does not today have a component of federal government to it. This means that all matters of legal dispute are constitutional matters. The same documents created to lightly govern the common concerns of a loose confederation of independent states in a fragile backwater of global politics are now used to govern the most powerful empire in the history of the globe. The only practical way to have this happen was to either change the wording of the documents or change the meaning of the words within the documents. The case is clearly one of the latter because apparently the former seemed in no way practicable. It then is a bit ironic that the exact same documents used to throw off subjugation by the King of England now merely serve to empower the much larger global empire of the United States of America to rule over its many subjects. It was perhaps bound to happen because the system set up by the founders was so darn good.

We have become victims of the extreme success of our ancestors, and it now appears as though the amoeba split but failed to stop being an amoeba in its daughter cells. Perhaps such a thing is entirely unavoidable, but we have become what we at first sought not to be. In other words, we the people whose ancestors started as subjects of one empire have quickly descended into the subjects of another much larger empire. Rather than we the people ruling over our federal government, it now completely rules over us. Federal laws displace, usurp and just plain trump all others, so let's face it, we have traded in the small, old, democratic republic fueled by God and capitalism for a shiny new oligarchy of breath-taking proportions, highly-socialized in economy and neurotically averse to God in all civil matters. The judiciary now regularly trumps the legislative and executive branches of our government. Not even the lawmakers know what the laws are until they are told so by the courts, and there are a lot of courts in the gauntlet that must be run by any seemingly innocuous law. Fortunately we have an army of sheriffs, also known as attorneys, who diligently seek to keep the peace. One might expect this to cause some measure of angst and confusion. And so it does.

Unfortunately, the confusion has now extended into science. After all, the process of building and maintaining a body of knowledge – science – is now an issue that must always be addressed at the federal level from all conceivable angles. This starts with the funding of R&D and purchase of essential high-tech applications, but it also includes the entire system of education, from graduate school to nursery school. Education is now the official business of the United States Government, and science lies at the heart of education. Of course the original system of education in the United States was built from top to bottom solely for the purpose of teaching the Bible, but today such teaching is paradoxically prohibited everywhere within the system. And this amazing reversal was done without even a hint of irony. The exact same US Constitution that guaranteed freedom to study the Bible now prevents it from even being kept in a school library. There are very few things that US citizens are less free to do than discuss God in a public school. This puts more than a little strain on teaching the facts about our own history as a nation, and it is crippling the nature of scientific education right along with it. Science is taking a pounding during this exchange of control over the thoughts of an entire nation.

The founders knew that a free society depended on the education of its citizens, and they felt strongly that the only essential education required by any citizen of this nation was a firsthand understanding of the Bible. Self-governance depended on one's ability to know and understand the principles of governing one's self. Those principles, as far as the founders were concerned, were aptly contained in the Bible, so reading the Bible was a prerequisite to being a good citizen of this particular nation founded entirely on Christian principles of self-governance. Removing God from education would to them be like removing sound from music. So, the recent exclusion of God from science and education is not merely a problem of science or religion but one of pure politics. It has been tried before and it has never worked very well. The banishment of God from science means many different and important things to our country and the education process of its citizens. All actions have consequences, and the act of removing God from education is no exception. A reasonable person could never disagree, but reasonable people can disagree about the type and extent of the consequences. It is my premise that science has suffered paradoxically adverse consequences from the removal of God. I will give specific examples in following sections.

The practice of medicine, by way of analogy, involves a distinction between signs, symptoms and diseases. For instance, fever is a sign of disease, it is a symptom of disease, and fever can even cause pathology like seizure or heat stroke, although we rarely think of fever as a disease process itself. Similarly, the absence of God in today's system of education is an example of all three: it is a sign, symptom and truly a disease process within a dysfunctional system of education. In the triangle between religion, science and politics the judiciary has erected a fictitious constitutional wall between religion and politics to the detriment of science. If that is to be the case, I would also now wish to see a similar wall erected in the triangle between science and politics, creating a de facto third wall that re-establishes the true separation of powers that the founders had originally demanded within the constitution. The wall between church and state has been erected to the detriment of all, but these new walls would restore the original system for the good of all. Science is simply being misused and abused by politicians and the courts. It's just that simple, and it needs to stop.

God can occupy a positive place in science and science has traditionally found a place in religion. There is no reason - bar one - that this cannot happen again. The one reason that it is not happening now is that both science and religion have become highly politicized, and they are firmly entrenched in opposing camps. Education is now controlled by the American left and religion is now controlled by the American right. What started as a good idea – the Establishment clause – has led to absurdity and continuous acrimony. Recall that at the time of the clause, education was mainly the responsibility of religion. It now seems it would have been prudent to add at least one more clause – the government shall establish no system of education – to the first amendment and then perhaps we would not have this mess today. Unfortunately, the Supreme Court has consistently adopted an absurdist view of the first amendment and this view has been aggressively used in a campaign to drive God completely out of science. This campaign is bent on using the full force of the United States government to do so. This is not healthy for God, country or science.

Babylon is an ancient city now located within the nation of Iraq. It is an actual place with a long, rich, and quite diverse history. It is described in the Bible, so naturally

there are numerous interpretations of Babylon and what it should represent to us today. An ancient society within Babylon has been cited as the precedent for our own form of negligence law, and nothing could be more apt. This serves today as the basis of our system of civil and tort laws. Also of note, the Tower of Babel is probably a real structure from the past, and it has taken on a large amount of symbolic significance, so there are many reasons we might now be curious about Babylon, its history, laws, symbols and structures. The word 'babel' means confusion. Theoretically, the iconic Tower of Babel was erected from the foundation of a common language to enable man to reach up to God, but the language became highly fragmented and God became angry. Confusion reigned and destruction ensued from within. This sounds to me like a reasonable analogy to our legal system today.

The primary problem with society in the United States today is undeniably parallel to the general history or at least the parable of Babylon. What started here as a nation of laws has simply become a nation of lawyers. The legal language created in the Constitution has become so terribly confused that we can no longer communicate any concept of governance between ourselves on any level whatsoever. Consequently, we are in constant need of translators – lawyers – merely to communicate with each other. Note simply that we now have manifold more lawyers per capita than any nation in the history of the world. The happy result is that we now confidently all know our rights, but unhappily we can only know them after a lawyer tells us what they actually are. I doubt that most lawyers or lawmakers have actually read the Constitution. Black is white, up is down, anything can be argued within today's Byzantine legal system based on pure legal babel. Nothing is absolute and so everything is made merely relative. Right and wrong are quaint and archaic notions that no longer can govern individual or collective behavior.

A clever lawyer can now find a constitutional right for anything. It is amazing that a document so small can contain so many rights. And a really clever lawyer – or a large team of them – can even help you get away with grizzly murder. It's easy if you know how. The lawyer has simply become the lawgiver. If someone has a grievance or a perceived slight, they merely need pick up the phone and dial the number on the back of the phone book. This smiling person will bring the full weight of the law down upon the accused, guilty or not, and punishment will be surely meted out in the form of depositions, discovery, public shame, trial and huge legal bills. It's all quite scientific, I assure you. The system is compulsory, and it is all-controlling. It is self-financing too because the accused gets to pay for it all. It is winner-take-all and the lawyer always wins. It is a perfect system of the lawyers, by the lawyers, for the lawyers. If you think this ancient and tired anti-lawyer rant is mere hyperbole, simply read the Declaration of Independence and substitute the judiciary for the King of England. Then also recognize that the Constitution started as a shield to protect individual rights, but now is nothing but the sword used to systematically remove them via the absurd misapplication of our legal system to the simple idea of self-governance.

To get an idea of the arc of influence that the legal system has had with respect to science and religion, one need look no farther than the legal rulings involving education and religion that were issued in the past century. We can begin with a series of "monkey trials" that started in 1925, and continued to crop up occasionally in various states. The first one has been called the Scopes Monkey Trial because the defendant was named John Scopes and the issue was cartooned as a debate about who is and who is not a monkey or

at least a monkey's uncle. The most recent one is known as Kitzmiller V. Dover because the lead plaintiff was named Tammy Kitzmiller, and she was one of eleven parents who sued the Dover area school district in the state of Pennsylvania. All of these monkey trials ostensibly involve the issue of teaching evolution, but none of them actually are concerned with evolution per se. They are purely matters of the power of the state to control the education system.

Before I delve into the two cases, I will again make my beliefs crystal clear. I am a big fan of the theory of evolution via the mechanism of natural selection. It is, in my mind, perhaps the most useful scientific insight in the past two centuries. It is the fundamental organizing principle of all biology, and I believe it can be used – if properly applied - to conceptually bridge the gap between organic and inorganic matter. I have no problem imagining and accepting the idea that humans have evolved relatively recently from an ancestral species of apes. I think it would be a very good idea to have every school kid afforded the opportunity to learn this fabulous scientific theory. They should be allowed to ask questions about it - all questions - and they should be allowed to come to their own conclusions about its validity. They should be encouraged to do this and also to think about how the idea of natural selection fits within other important ideas they may have about exactly what it means to be a human. I am an atheist so I have no conflict between my beliefs about God and evolution. I have been raised in an almost God-free environment, and my exposure to formal religion has been quite minimal. However, in discussions with those of faith I have found much common ground, and I don't think that an understanding of evolution should ever preclude a religious faith of the deepest kind. I could, of course, be completely wrong.

To return to the monkey trials: in 1925 the Tennessee state legislature passed the Butler Act, a law that prevented the teaching of evolution in Tennessee's public schools. The exact wording, however, was purely biblical:

"... that it shall be unlawful for any teacher in any of the Universities, Normals and all other public schools of the State which are supported in whole or in part by the public school funds of the State, to teach any theory that denies the story of the Divine Creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals."

This appears by today's standards to be not merely in conflict with the establishment clause but in defiance of it. One might suggest that evolution could be taught if it were deemed to not be in conflict with the Bible; regardless, the Butler Act immediately became a cause celeb for the intelligentsia of the day. A test case was quickly manufactured in Dayton, Tennessee, and the media spotlight of the world was focused sharply upon it.

Despite the fact that evolution was already contained within the school's official textbook, and despite the fact that John Scopes was not a science teacher and probably never taught evolution to any class, Scopes was found guilty of violating the act and fined $100. The trial was intended to be a circus by everyone involved, and it never really dealt with the issue of guilt or innocence, but it was a referendum on the absurdity of the Butler Act. Naturally, the verdict was appealed to the state supreme court, and again logic of it was upheld; however, it was sent back down because technically the judge

could not impose a fine greater than $50 without input from the jury. Here, in part, is what the court had to say:

"He was an employee of the state of Tennessee or of a municipal agency of the state. He was under contract with the state to work in an institution of the state. He had no right or privilege to serve the state except upon such terms as the state prescribed. His liberty, his privilege, his immunity to teach and proclaim the theory of evolution, elsewhere than in the service of the state, was in no wise touched by this law."

"Belief or unbelief in the theory of evolution is no more a characteristic of any religious establishment or mode of worship than is belief or unbelief in the wisdom of the prohibition laws. It would appear that members of the same churches quite generally disagree as to these things."

"The courts cannot sit in judgment on such acts of the Legislature or its agents and determine whether or not the omission or addition of a particular course of study tends "to cherish science.""

Essentially, the justices of the Supreme Court in the state of Tennessee were saying that this, to them, did not even approach the concept of establishing a religion. Furthermore, when one requests of the state of Tennessee to educate one's children, one can expect them to be educated by a state employee, and one can expect that employee to abide by the laws of the state. It is the clear job of the legislators to make the laws in the state, not the judiciary. The laws may be good or bad, but the desired quality of laws is merely a good reason to be careful when electing the representatives who make those laws. Unfortunately, when one seeks a state education, the material to be taught falls under the control of the state. The judiciary has no ability and no inclination to parse through that material. The case law on the establishment clause was unanimously in favor of the State of Tennessee for this case. This is explicitly a Christian nation that explicitly expected its citizens to learn the Bible. And so for good measure the Tennessee Supreme Court added the following:

"The court is informed that the plaintiff in error is no longer in the service of the state. We see nothing to be gained by prolonging the life of this bizarre case. On the contrary, we think that the peace and dignity of the state, which all criminal prosecutions are brought to redress, will be the better conserved by the entry of a nolle prosequi herein. Such a course is suggested to the Attorney General."

Note, this reflected the state of the art, cutting-edge state legal proceedings in the United States of America circa 1925. These judges seem to have possessed an understanding of their jobs that is entirely absent today. Now, fast-forward eighty years to the U.S. District Court for the Middle District of Pennsylvania where eleven parents sued for injunctive relief and equitable remedies against the Dover Area School District. The legal dispute was over a statement the school board had voted to be read by biology teachers before they taught 9th graders the theory of evolution:

"Students will be made aware of the gaps/problems in Darwin's theory and of other theories of evolution including, but not limited to, intelligent design. Note: Origins of life is not taught."

Of course the entire scientific community immediately went into convulsive seizures of indignant apoplexy, and so the board later released a press statement explaining their action:

"The Pennsylvania Academic Standards require students to learn about Darwin's theory of evolution and eventually to take a standardized test of which evolution is a part.

Because Darwin's Theory is a theory, it is still being tested as new evidence is discovered. The Theory is not a fact. Gaps in the Theory exist for which there is no evidence. A theory is defined as a well-tested explanation that unifies a broad range of observations.

Intelligent design is an explanation of the origin of life that differs from Darwin's view. The reference book, *Of Pandas and People* is available for students to see if they would like to explore this view in an effort to gain an understanding of what intelligent design actually involves.

As is true with any theory, students are encouraged to keep an open mind. The school leaves the discussion of the origins of life to individual students and their families. As a standards-driven district, class instruction focuses upon preparing students to achieve proficiency on standards-based assessments."

Not only did the voters remove every single board member who voted for this resolution; but also the case was forced to proceed to trial. The court found in favor of the plaintiffs. The judge issued a 139-page finding of fact that ostensibly but quite authoritatively explained to the world the difference between science and religion, and dissected the personal motivations and private affiliations of the defendants. The grossly offending rule enacted by this school board was found to be unconstitutional, of course. In the end, the defendants were fined $1,000,000 and narrowly avoided criminal prosecution. Again, the judge chided the participants for wasting the time and resources of the state.

Please take just a minute to reflect on these two trials. Which one is more frightening? The first one was a prosecution of a misdemeanor that was never considered anything more than a publicity stunt by all involved. The courts were completely agnostic to the quality or motivations of the law and the lawmakers. They found it absurd to rule on a matter of science. The court didn't give two hoots about motivations or outcomes but only procedure. Imagine that. Yes, the entire world was given a mocking glimpse of the flaws and imperfections of our quaint hilljack system of governance, but the system worked as it was intended. Tennessee legislators were made laughing stocks within the enlightened world abroad, but thankfully they maintained their constitutional right to legislate the people of their state. The courts, in this case, wisely chose not to steal it from them. The general lesson learned by all, however, was that the state could indeed control the content of the education system via legislation, so be very careful when selecting legislators. Don't pick morons.

The Scopes monkey trial garnered the rapt attention of the entire world and focused it upon some of the biggest political celebrities of the day. Despite the rambling nature of the tangential subject matter of the trial, the whole thing lasted exactly one week. Ultimately, the punishment was $100, but even that penalty seems to have fallen through the cracks, and all of the principles had moved on anyway. It was a legal circus and the circus simply left town.

Now, contrast the Scopes trial with the Kitzmiller trial that took almost two months, and it resulted in civil penalties in excess of $1,000,000. Essentially, the ruling was the same - that the state has the power to control the content of a child's education - but now instead of having legislators at the most local level make those kinds of decisions – elected school boards - we must ask politically appointed federal judges to do this hard work for us. And what hard work it must have been – 139 pages to describe science to all those of inferior acumen. It seems a tall order to be a judge today if one must know science so well and at the same time micromanage every facet of the daily lives of every citizen on every issue. Where does one find the time? I suppose it is a good thing there are so many lawyers and scientists around to help carry the load. And keep in mind that the primary logic of this particular judicial ruling turns entirely on the fact that a document – the United States Constitution – a document that derives its power to govern ultimately from "our Creator" now somehow prohibits the mere suggestion to school children to keep open in their minds the possibility that this creator might actually exist. This too was a legal circus, but unlike the Scopes trial this was no publicity stunt. This was clearly intended as a cautionary tale: do not mess with the power of the federal judiciary to dictate all content in education at every conceivable level. If you do, you will not so swiftly but nonetheless severely and surely be punished. As a civilized people we have neither time nor patience for independence when it comes to the education of our children. Intellectual tolerance will not be tolerated.

The school is to be USGA certified God-free come hell or high water. Of course the Babel here is quite clear. Something somewhere along the way has gone awry. What in hell is going on with these two cases? The answer is that between the first and last monkey trial, the monkeys took over and the first amendment was deemed to be unconstitutional with itself. This had nothing to do with state executives or legislators – other than they became all-too-wobbly and acquiesced to the bloodless coup - it was the result of pure judicial fiat. The bizarre concept was specifically and precisely tested in the 1970 case where the Netcong School Board passed the following motion:

"On each school day before class instruction begins, a period of not more than five minutes shall be available to those teachers and students who may wish to participate voluntarily in the free exercise of religion as guaranteed by the United States Constitution. This freedom of religion shall not be expressed in any way which will interfere with another's rights. Participation may be total or partial, regular or occasional, or not at all. Non-participation shall not be considered evidence of non-religion, nor shall participation be considered evidence of recognizing an establishment of religion. The purpose of this motion is not to favor one religion over another nor to favor religion over non-religion but rather to promote love of neighbor, brotherhood, respect for the dignity of the individual, moral consciousness and civic responsibility, to contribute to the

general welfare of the community and to preserve the values that constitute our American heritage."

I laughed out loud when I first read it. Surely it was a joke, but more surely the motion was found unconstitutional by the New Jersey Supreme Court and upheld by the United States Supreme Court. Hard to believe, No? The first amendment of the constitution is itself now unconstitutional. Who'd a thunk it? The court decided that school children are, in fact, wards of the state and therefore must be protected from the potential injury that might result from exposure to religion of any sort while under their care. But wait, it gets much better! It is not merely unconstitutional to mention God in school – in any form whatsoever - it is unconstitutional to even think about God while in school. The following kindergarten poem was ruled unconstitutional as well:

"We thank you for the flowers so sweet; We thank you for the food we eat; We thank you for the birds that sing; We thank you for everything."

There was at least one voice of sanity in dissent when one justice pointed out the following:

"Despite the elimination of the word "God" from the children's recital of thanks… that word is still in the minds of the children. Thus we are asked as a court to prohibit, not only what these children are saying, but also what plaintiffs think the children are thinking…"

When it becomes a constitutional thought crime to think about God in school, can there be any real limit to the new power of the Constitution to reign over its people? How might this bizarre logic begin to affect other thoughts? How might this absurd system of governance begin to affect the behavior of those charged with actually educating our children? Not only is God now clearly persona non grata, it is a punishable offense to expose children to anything that is in any absurdly remote way connected to Christianity. For instance, teachers are routinely disciplined for things such as sending emails amongst themselves that have Christmas lights for borders. The tail does not wag the dog because the dog no longer exists if this now is what passes as freedom of religion in this great country. After all, no school district can afford the cost of guaranteed legal challenges of the most asinine variety (the more asinine the better) so it's pragmatically much easier to suppress individual expression of all kinds. And why wouldn't we? There's a new sheriff in town and it's called the judiciary. All shall bow down before thee! It is no longer good enough to merely elect representatives with whom you agree – at any level, and in any location - you must now be sure to align your ideas about science and religion with the ideas of the select few who grace the federal judiciary. Judges are given great authority and with it comes great responsibility. They have failed in their responsibility to protect the Constitution and with it our system of governance. Liberty for all has suffered for it. It was forewarned by our founders, but we failed to heed their most prescient warnings.

The founders provided the proper lens through which we must view Scopes. Unfortunately, the hyperventilating mass media now provides the lens through which we

must view Kitzmiller. On the "scientific" merits Kitzmiller decision reminds me of the oft-repeated adage of academia that the fight was so fierce because the stakes were so low. But on the legal merits the stakes continue to be quite high. I find Scopes odd, but not bizarre or irrational. Kitzmiller, on the other hand, is absurd and terribly frightening. It is an obvious affront to the hard work of the brave men who wrote the Constitution, and to all who have ever risked all to defend it. This is the exact form of tyranny the founders feared most: tyranny from within. It is now a tyranny of thought from within.

I must admit that I am not a fan of the concept of Intelligent Design, but it does not offend me, or threaten me, or intellectually disable me in any way. I can actually enjoy and benefit from the spirited debate offered by its proponents, and its proponents are ironically quite open-minded about it. They like to discuss it and hear my ideas to the contrary. It is not my cup of tea, but it is not entirely devoid of merit at some level. It raises some interesting questions about the very nature of intelligence and how we might possibly study or understand it when that intelligence is necessarily different from our own. It certainly forces me to ponder the weaknesses and strengths of my own belief system, and thereby makes it stronger. Open discussion and debate is the only way to strengthen ideas whether they be accepted or not. I probably would not automatically teach ID to a class of 9th grade biology students, but I wouldn't hesitate to engage in a discussion about it with them either. It certainly is nothing to be protected against. There is nothing offensive, dangerous or remotely unconstitutional about the resolution passed or the statement made by the Dover School Board. Of course that failed to protect them from the extreme ravages of the pernicious court. After all, there no-longer is any protection from the courts. They have broken the bounds of the Constitution and are no longer accountable to anything or controllable by anything. Self-control has evaporated from the courts and so it must from the subjects of the court.

Perhaps all men are created equal, but all thoughts are not. Our government, any government, is in the business of picking winners and losers. This is what every government must do in order to govern. But it is a dangerous business when the government gets involved in picking winners and losers of thought, whether it be science, politics or religion. It is still more dangerous when a government begins censoring the thoughts of its own founders. Our government has now gotten into exactly that business, and it has done so under the pretense of applying those very thoughts. I suppose it is true that the bigger the lie and the more often it is repeated the more likely people will be to believe it. Unfortunately, we now have utter confusion of thought. Welcome, my friends, to Babylon.

7. What is Evolution?

Anyone who says they don't "believe in evolution" is one or more of the following: lying, delusional, irrational, or wholly ignorant about evolution. I have met a few of each, but most fit quite nicely into the last category. After all, when one says that they do not believe in evolution what they really mean is that they do not believe in somebody else's view of evolution. It is logically impossible to not believe in evolution. Alas, far more people today "believe" in the literal word of the book of Genesis than "believe" that evolution accounts for the patterns of life we see everywhere on earth today. Of course, it can also be said that more people believe that the President of the United States is a chimpanzee who is responsible for the fall of the World Trade Center than believe he is actually a descendant from ancestral apes. So, the logic or quality of a particular idea is never any match for the emotional investment in it. We can never really poll our way into truth no matter how passionate we may be about a particular topic, now can we? Even if we were to find 100 German geniuses to vote against Einstein's ideas, would we "believe" them?

I am passionate about natural selection, more so than evolution, simply because I find it extremely useful in understanding so many different kinds of things - things like life, art, politics, music, golf and computers, things I happen to love. Quite simply, my views of natural selection color all else. It is not God to me, but it is the clearest window into the mind of God that I can imagine. It brings me to the precipice of that which I believe to be true but can never hope to prove, articulate, or even fully understand. It can take me so far, but no farther. Perhaps my idiosyncratic views will also find use with other folks, some of whom I might normally expect to have no use for them whatsoever… and perhaps not.

At the most basic level, life is information; evolution is the organization of information through time, and so evolution is life. What then is information? There honestly is no good answer today as it pertains to life, and that is a big part of the current epistemic problems rampant in biology. My best short answer is that information is both a system of choices and the choices actually made therein. The system and the choices are a function of time and the product of natural selection. The system and the information must co-evolve, and so life is a system that expands information exponentially. I think of life as an information catalyst at every level in the universe. The universe is itself a "self-organizing" system that creates fractal patterns of information through deep and prolonged recursion. This recursive mechanism is known simply as natural selection. Consequently, the most concentrated forms of information in the universe are found within the patterns we call life.

Regardless, if one hopes to understand life through biology then one must understand evolution as it inevitably follows from natural selection. Biology is currently organized around Darwin's view of evolution, but unfortunately Darwin was not privy to molecular genetics and information theory; he merely was prescient of these things. It is equally unfortunate that modern biology has an exceptionally poor grasp of information theory, because as a result the entire field is an epistemic mess today. Indeed, Darwin had an awful lot to teach our modern biologists, but they too have not considered his

words carefully enough. There still is so much to learn from those words, but they are selectively ignored.

Consider a school of fish that swim in the sea. Imagine that this school is typical of all such things, and so within it are some fish that are faster than most and others that are slower than most. No school of fish exists as equals; they always exist on a curve. Now imagine that a school of swift, bigger fish one day swims into these waters. The big fish, as big fish are want to do, will begin to eat the tasty little fish. This does not necessarily mean that the school of smaller fish will become fewer in number because fish, like all things living, produce more offspring than can logically survive. The size of the school might, in fact, remain the same, or even increase, but the nature of the school will change. The presence of the fearsome new predators will force the old school to become faster as a group. This is evolution by natural selection. These bigger, faster predators selectively eat slower fish and therefore leave faster fish to produce more fish. This is what is known as a selective pressure. Remember that every school of fish will always have some that are faster and some that are slower, so in this case the entire curve of fish speed will move in the direction of faster fish. It is not that any individual fish gets faster; it is that the group as a whole gets faster in successive generations. Biological evolution is a function of time and reproduction, not of individual gain. Now consider that the fish have many features – not just swimming speed - and all of these features in some way or another must contribute to whether they will live or die, both individually and as a group. If you have followed along and see the logic in this then in a nutshell you have grasped the theory of evolution via natural selection. It is common sense 101. Who could ever argue that this does not always and constantly occur? The argument today is merely about degree and teleology.

Darwin's basic insight, natural selection, was fairly intuitive, but he further realized that given the vastness of time on earth there was no end to the detailed precision this selective force could produce in any complex network of interacting structures and interacting forces. All is prone to evolve through the simple forces of natural selection. It is a difficult concept to comprehend when contemplating a single thing, like a hummingbird, a thing that is the product of billions of years of highly complex selective pressure, so when one considers the evolution of life on earth one must first consider life as the only true single thing that is consistently evolving. No one thing - besides life - evolved in isolation, so we must seek to find the many consistent patterns within life, and they will invariably mimic the patterns as a whole. Life is a fractal process so it creates fractal patterns.

Science is in love with evolution by natural selection simply because it works so well toward explaining so much within science, but also because science itself is the product of natural selection. However, since science, religion and politics are merely three points of the same triangle, we must see this wholly within the context of the other two. More ideas are derived from the existing body of scientific knowledge each day than can survive within that body, so only the most powerful ideas survive. This does not mean that only good ideas survive because in fact many powerful ideas are decidedly bad ideas, but it does mean that the body of ideas moves toward better and better ideas that naturally surround the most powerful ones. For instance, Euclid's fifth postulate was perhaps a bad idea, but it has led to so many other ideas it undeniably is a powerful idea. Another example is the idea that the earth is stationary at the center of the universe,

considered by some as perhaps the worst idea in the history of science, yet it still finds practical uses in some applications today. Holding the theory of a geocentric universe as true definitely led to many creative exercises in understanding heavenly epicycles. There is no shame in being wrong, but there is shame and great epistemic harm in denying that you are wrong.

I personally believe that the theory of a geocentric universe is not the worst idea in the history of science. My candidate for that title is a relatively recent theory, the one I touched on earlier, and it is one that has yet to be rejected in any practical sense. It still has free reign over all other of the many and important ideas that touch it today and it lies at the very heart of modern biology. There can be no doubt that many explanatory epicycles continue to accumulate within science and fascinate us with the intricately absurd, as they always do. My candidate for the worst idea in the history of science is the theory of a one-dimensional genetic code. It has sunk the entire narrative of modern biology and it is taking Darwin down with it. It is completely underwater with logical absurdity. Fortunately for us, the truth always floats to the top.

Some powerful people within religion are convinced that Darwin, because of his theory of evolution by natural selection, is no less than the Devil himself. After all, his views seemingly contradict the word of the Bible. These people are either disingenuous or completely without rational capacity. After all, there is no such thing as a single Bible with a single word. The Bible is a large and diverse collection of many different kinds of writings that have been translated many times and in various ways over thousands of years. The day that somebody finds the actual Bible is the day that I move to Neptune. Charles Darwin, evolution and natural selection can no more be found within the Bible than can the privacy clause be found within the Constitution. Just as courts have freed themselves to read the Constitution any old way they like, religious leaders are free to do the same with the Bible. The stories in the Bible have much historical value, to be sure, but they teach us more through parable and allegory than through scientific data. It takes little effort to find an appropriate allegory or parable for evolution and natural selection within the Holy Scriptures if one is so inclined.

On the other hand, the problem that state-sanctioned science educators have had in educating people about evolution merely centers on the fact that they have done such a fabulously poor job of doing it. It truly is a simple concept at bottom, but how could one ever hope to communicate these ultimately complex and important ideas without the use of the word God? The word of God is relatively unimportant toward understanding evolution but the word God is extremely important. Talking about evolution without God is like ballet without music; it should not be done. However, these misguided educators insist that God is nowhere to be found in biology, when in fact God's fingerprints are all over it. If you are missing the fingerprints of God within biology then you are a lousy biologist. You don't have to be an atheist like me to be able to see that you can't sling a dead cat without hitting God somewhere in biology. Let's at least be honest and call things the way we see them whether we like them or not. After all, it's for the good of the kids, now isn't it? I am not a smart man but I do know that God and evolution goes together like peas and carrots. Anyone who argues otherwise is one or more of the following: lying, delusional, irrational or wholly ignorant about God.

In my most humble opinion, it is impossible to understand natural selection, evolution and therefore biology without a firm grip on the basics of information theory.

The parallels between life and computers are stunning, to be sure, but one does not need to be Bill Gates to appreciate those parallels. At bottom, information is nothing more than counting. Everything can be numbered and counted – digitized – and we can thereby precisely quantify things. After all, this concept was the very basis of Gödel's Incompleteness Theorem, and it could be used as the basis of biology as well. But when we count, we first need to identify things to be counted. There are two sides to every coin, so we can easily count them, and we can know the probability that the coin will land on one side or the other. When a coin lands, information is created. We can also count the number of times that a coin is flipped and thereby accumulate information in known amounts and at measurable rates. In doing this counting of tosses we must be ever mindful of the system that makes the tosses. The system and the tosses must always be taken together. The trick in biology then becomes one of deciding what counts as what. This is perhaps where Darwin had his most ingenious insight.

Darwin is paradoxically known for drawing lines between species and then explaining those lines. In fact, Darwin never explained these lines; instead he noted that they could never be drawn in the first place. He was astonishingly brilliant. There was no workable definition for 'species' in Darwin's day and there still is none today. There never will be one because species is a fungible construct that exists only in the mind of man. Likewise, there is no workable definition for race, and here is why. Imagine that we scoured the earth and found a human that everybody on earth agreed belonged to the white race, and then found another that everybody on earth agreed belonged to the black race. Now imagine that these two humans have a baby. What race is the baby? Now, answer the same question for every baby that all races might conceive over thousands of years and trillions of combinations. Either every human is a member of the same race or every human is an exclusive member of his own race. If you are a firm believer in the concept of race you must be either a lumper or a splitter, but at the end of the day you must draw bright lines that do not exist in reality. Race is a fungible construct that exists only in the mind of man. In contemplating the origin of species Darwin recognized that a species is not an individual but a set of individuals, and there are no firm criteria on which any set can reliably be described.

Once one starts thinking in terms of sets, instead of in terms of individuals, the concept of evolution becomes much easier to understand. The concept is valid on any scale of time, space and number that we might chose to examine. A zygote, for instance, evolves sequentially in remarkably short time scales into various sets of cells that become an adult human, but beyond that an individual human does not evolve. An individual contributes to the evolution of the human set merely by contributing a large set of unique gametes to an entirely novel potential set of zygotes. Humans never reproduce. Humans merely produce. Life rarely ever reproduces; life always merely produces, and in the case of human zygotes it produces a staggeringly large number of unique potential zygotes, all guaranteed to be unique by basic principles of biology and all drawing at some level from the same pool of ancestry. The hallmark of life at every scale is that it expands information. That is what life is.

Once one assimilates the concept of information, sets, and the ways in which natural selection operates on the two, one cannot help but descend into the realm of pure mathematics. It is instructive to note then that the history of mathematics seems to parallel the history of life on earth quite well. Sets are informative of both, especially

when one studies life on the molecular level and on the level of the most basic forms of math. It is all about the sets folks. Mathematics is a language of logic, but there must be an inherent logic to the universe on which it can be based. Set theory is merely a tool that we use to generate the recursive logic that is necessary in mathematics. Life is based purely on logic too, but what kind? In order for humans to perhaps find the answer to this important question, they might apply the tools of set theory to life so that a language of life will become available to humans for communicating ideas about life - just like we did with mathematics.

So now let's all imagine, if we can, the state of mathematics at the dawn of mankind. No concepts and symbols existed at that time, and yet they do now, so they all somehow had to be invented along the way. This was not a perfect and linear process, and by no means is the job now complete - perhaps it never will be - but we do have a wealth of recorded experience to examine. The first thing one must note when examining the origins of mathematics is the pressing need for a basis, or a foundation for numbers. To this end, a number line was invented. Upon this line has been heaped many and intriguing concepts, all of which wind their way back to the number line in one way or another. Once the line was created, various sets of numbers were created to fill it. We have whole numbers and rational numbers and real numbers and negative numbers and logarithms and now we even have imaginary numbers. And don't forget zero. That was a biggie. The numbers themselves are quite interesting, but the methods for using them, the conventions, the symbols, the algorithms, are what bring them to life. Math is not animated by numbers; rather it is animated by relationships between sets of numbers. These are what we call functions or codes.

So now let's all imagine, if we can, the state of molecules at the dawn of life on earth. No life existed so no fancy molecules existed either, and yet they do now, so they all somehow had to be invented along the way. This was not a perfect and linear process, and by no means is the job complete - perhaps it never will be - but we do have a wealth of recorded molecular data to examine. The first thing one must note when examining the origins of life is the pressing need for a basis, or a foundation for molecular life. DNA is commonly cited, but this is nonsense because it begs the question of the origin of DNA. It is far too complex and refined to be our starting point. We clearly need something more primitive so that we can understand the foundations of molecular life.

One day, while sitting at my kitchen table, I stumbled upon a viable solution for the thorny problem of finding the primitive basis of logic for molecular life. It is called a dodecahedron. Plato said that the dodecahedron embroiders the heavens, and when it comes to life on earth, Plato was precisely right. There are exactly five perfect solids, and the dodecahedron is the most informative of the five. In fact, the other four are merely derived from the dodecahedron. What a number line is to math the dodecahedron is to life. This perfect solid provides the number line upon which all math with molecules is performed. The molecules themselves represent distinct sets, but life is not animated by sets of molecules; rather it is animated by relationships between sets of molecules. This is what we call molecular codes. As math is based on number lines, life is based on the dodecahedron as the principle measure of spatial information. Molecular information is always spatial information. At the heart of all molecular codes of life lies the genetic code. Sadly, the awesome natural beauty of this all-important code of life has

been totally butchered by the ugly dogma that now defines it. Yes, folks, they got it completely wrong and so the official story is now completely backwards.

The genetic code is dogmatically defined as the linear relationship between a set of codons and a set of amino acids. Despite the obvious fact that these are the wrong sets and the wrong relationships between them, the flawed simplicity of this definition then became the impetus for aggressively defining all other modes of translation in the world of molecular information today. Remarkably, the dogma requires that molecular information be defined and perceived as linear sequences of molecules, when in fact all forms of molecular information are always spatial and non-linear. Yes, sequences are nifty short hands for, or compressed formats for actual molecular information, to be sure, but they should never ever be confused for actual molecular information as the strange and harmful dogma insists today. Consequently, we have no workable definition for molecular information today, and that which passes for enlightened discussion is no more than pernicious babel that cannot even be used to justify its own existence let alone be used to clarify any first principles in this field. There are big mistakes and there are little mistakes in the history of science, and this is perhaps the biggest mistake in the history of science. So, how did it ever happen?

The current dogma was a product of science in the 1950s and 1960s. Although it was only half a century ago, it is hard for us to imagine for all the gee whiz technology we have today. The electronic digital computer had just been invented, and although it was not particularly useful in cracking the genetic code, it was an obvious basis for an essential metaphor. Please note, however, that our understanding of computers has changed greatly, but our use of computers as genetic metaphor is fossilized in the romantic notion that the first pioneers in the field of genetics knew exactly what they were doing. They did not. What they did clearly know was that their task was next to impossible, so they decided to make it as simple as possible. This was a huge mistake. Complexity is the essence of genetic information, so over-simplifying it is only guaranteed to confuse ideas; not clarify them. It is exactly analogous to stipulating a stationary earth at the center of the universe. It has caused a reversal of all perceptions, including cause and effect.

The first principle of today's dogma is that the genetic code is one-dimensional. The second principle is that information flows from DNA to protein, and therefore DNA is the center of the molecular information universe. Both of these principles are demonstrably false. The genetic code is not one-dimensional and protein – not DNA - is the center of the molecular information universe. Until one realizes this, all else is pure babel. Molecular information today remains wholly undefined. The genetic code today remains wholly undefined. The evolution of the genetic code is exactly backwards, so using the current dogma of the genetic code as the paradigm for evolution – as is widely done – is nothing but a comedy of errors leading to a sad theater of the absurd. It is not a code that can exist without either protein or nucleotides, it is one predicated on the relationship between the two. It is not a code that started and stayed one-dimensional; it is a code that started and stayed multi-dimensional, having as its endpoint the mere appearance of being one-dimensional. It is not a code where sequence determines structure but where structure leads to sequence.

Much like our current interpretation of the Constitution, our current interpretation of molecular information and the genetic code is one where up is down and black is

white. In fact, cells are governed in much the same way ants are governed and much the same way as the original intent of the founding fathers to govern the United States of America. None of these systems are simple top down systems of central control. They are each complex systems designed from bottom up. The concept is not "one size fits all" but "each one fits many sizes." One can never know the whole in advance, so the smart plan is to design pieces at the piece level. In the case of ants the queen does not govern but is governed by ants. In the case of molecules DNA does not govern but is governed by proteins. But if you can't trust the scientists on this simple relationship, who can you trust? Likewise, in the case of the brand new US Constitution in 1789 the federal government does not govern but is governed by its pieces.

The theory of a one-dimensional genetic code is a failed theory in every way imaginable, yet science tenaciously clings to it. Why? The epicycles cloud the vision and dazzle the mind, but in the end it is nothing more than an amusing explanation of mountains in the absence of plate techtonics. Science is human and makes mistakes. Science has made a big mistake here. Likewise, the theory of an active judiciary has failed. It is a bad way to govern and it is demonstrably not working in any way imaginable. The epicycles are too many to count, but we all know the effects of them quite well. Perhaps the biggest and most pernicious epicycle imaginable is the one where the judicial branch of the federal government told the legislative branch of all local governments that they had decided that the founding fathers did not want the word God mentioned or contemplated in public schools. This is perhaps the biggest lie ever perpetrated by any judiciary anywhere at any time, and so it continues to be a devastating blow to the confidence in our system of government. If you cannot trust the judges, who can you trust? Judges are human and make mistakes, but they made a big mistake here.

8. What is Utopia?

The genius of our founding fathers was that they knew the nature of uncertainty and they had a workable plan for dealing with it. The weakness of modern science is that it does not. Our founding fathers were scientists of the highest caliber. They studied systems of government and accepted only evidence of that which works and that which does not in the face of extreme uncertainty. They had firm principles of governance and their first principle of self-governance was to govern one's self. They deeply believed in and were wholly committed to bringing power to the people regardless of the uncertainty that it may bring. Ironically, they were certain about the nature and transformative power of uncertainty merely because actions have consequences and those consequences will always determine the future, whatever it may be. They had power over their own actions, and realized that by empowering others with the same they could achieve collective consequences to the benefit of all. There is, however, a huge difference between the benefit of all and the benefit of every single one. In later parsing the complexity of their intent the founding fathers were found to be "dedicated to the proposition that all men are created equal." What exactly did this mean to them? What should it mean to us?

Conversely, in today's world everybody must be sure of what they know. We demand results in terms of absolutes; therefore, we must have experts for everything, experts that can give us definitive answers for anything and everything. We have become a hyper-legalistic society simply because we are governed by our legal system. But the plain truth is that most of what we depend upon for our knowledge and behavior is utterly unknowable. What word shall we give it?

Our founding fathers designed a system of government from within an environment of obvious and extreme uncertainty, and with every expectation of an increase in uncertainty going forward. That is the very core of the government they designed and all of the features of that government must be appreciated through that lens. When one tries to remove the uncertainty and replace it with absolute certainty, one has destroyed the features of that government, the features that give it its incredible strength. One simply has removed the very heart of that government. In the tricky business of governing, systems of government must explicitly deal with how they will handle uncertainty. We govern for the future because the past is past and the future is wholly uncertain, but certain to reach us eventually.

Conversely, centralized governments must be entirely sure of what they are doing because that is surely the only thing they will be doing. They may or may not change, but whenever whatever it is they are doing stops working – it always does - they merely do more of it, and they utterly destroy the original intent of the work in the first place. Yes, decentralized governments can never be sure of what they are doing, and that is precisely the beauty of it: we will find out what works and what does not. Test them all and see which one works best. It's science! Surely not all will share the same "right" system to begin, but others are likely to adopt that which has proven to work because if they don't, they will lose vital numbers of adherents. It takes time, but it always works. It works not because it is easy but because it is hard. The business of governing people is complex not simple and it is never easy. Be very suspicious of any offer of an easy solution. Like the weather, nobody can know how things will turn out, but we will

indeed find out. However, when one stakes his future on certainty, one has bought a false bill of goods and should pray it is returnable.

Science is a large and diverse endeavor. At its heart is a simple and undeniable pursuit: to seek the mind of God. Einstein did just that; he sought to drill the largest possible hole in the thickest part of the board. It is fine that others want to drill tiny holes in thin sections, but at the end of the day all scientists seek the handful of universal truths that can form the basis of all others. These truths will themselves be wholly unexplainable, and they will need a name. God is the name I use, and I am a devout atheist, but everyone is free to choose his own word. One thing is certain, however, humans will fail to communicate with each other if for some absurd reason they attempt to remove the word God from their vocabularies. God is a special word that cannot be removed. Even an attempt at removal necessitates its existence, so why bother?

Failure to educate children about evolution is not a sign of weakness of the idea or the children; it is a weakness of the education. How could any child care about something when they are told that caring means the exclusion of that which they care the most about? They are given a false choice between God and evolution and naturally they will pick God. It is not a crutch but a logical reality. Evolution may or may not be useful, but God always finds a use. The obvious solution then is not to remove elements of caring but to add to them.

Unfortunately, we as a nation embarked on a fool's errand, and we have been fruitlessly running it now for half a century. So for heaven's sake, let's get with the program and at least try something that has a chance to succeed. At least let us not damage the teachings of American history and destroy the principle logic of our judicial system in the process. Attempting to remove God from the American educational experience through a misguided and tyrannical judiciary has done far more damage to children than we might ever possibly imagine had it merely been left in. It was a stupid idea, and it failed. Let's merely put it back and begin to reverse some of the damage. It is the wrong tree so stop barking. The right tree, pal, is right behind you.

The Scopes monkey trial is an historical curiosity of our legal system but the Kitzmiller monkey trial is a travesty of that system. How could any official admonition to keep an open mind regarding biology – for whatever nefarious reason - be considered unconstitutional? The strain on the Constitution is now unbearable. We are now involved in an active witch hunt, and I strongly agree with the persecuted school board, not despite evolution but because of it. I am highly conservative in my political views not despite evolution but because of it. The more you understand about evolution the less inclined you will be to trust a powerful centralized government, and the less supportive you will be of the nefarious usurpation of our Constitution by our judiciary. Plus, to add a note of pure scientific practicality to the argument, the very same biology textbook that bothered the banished Dover School board so very much bothers me even more, and I'm an atheist. Within it lies a blatant lie: the genetic code is demonstrably NOT one-dimensional. Sequence does not determine structure within the world of protein, so why are we teaching this false doctrine? More insane, why are we using this blatant lie to "prove" evolution and the scientifically sanctified removal of God from it?

I feel that my children suffer far more epistemic harm from this false "science" than they ever would from any suggestion that they should contemplate an ultimate creator. Contemplating a creator will probably at least do the kids some good, but

contemplating this "scientific" drivel will surely do them harm. The state is clearly harming the minds of my children by spewing false pseudoscientific doctrine. Unfortunately, the science tyrants dominating left-wing American politics and the courts are now supremely insistent that their view is the only correct view, while empirically it is not. My children are simply being damaged by the tyrannical religious faith in false science. What's a poor atheist boy to do? Perhaps I should sue. I would truly love to defend my scientific position about the genetic code on the stand against every single scientific "expert" today. I would win! Let's roll.

Just as we cannot "legislate morality" we cannot legislate science. Forced to choose I think the former would be more tolerable than the latter. More importantly, we should legislate nothing from the bench but from the legislature. Legislating the removal of God from science by the judiciary is the ultimate and most absurd mistake of human governance under the American system of human governance. Where are all the brilliant skeptics that should have been highly skeptical of doing this? Removing God from science is stupid but removing God from society has never worked in the violent annals of man. It is extremely dangerous. Yet removing God from science has no possible benefit and huge proven detriments. This is not a matter of science trumping politics; it was purely a matter of politics trumping science. The left has merely used the government to separate the right from science. A false choice was created between God and science and it has since been tyrannically enforced. It is absurd. This aggression will not stand.

The ultimate shame is that the spirit of science is being destroyed with the removal of God and absolute uncertainty from it. To wit, Grandma Naomi took a geology class at the University of Chicago, and her textbook is now on my shelf. It is copyright 1877, 1882, 1891, 1896, and contains more wisdom than most textbooks today. If one wants to know how mountains form, one is treated to a good deal of "good" information along with a large number of epicycles. And then there is this:

"The theory of Babbage accounts with great probability for the rise of ground in the vicinity of volcanos, and Herschel's theory accounts, perhaps, for the subsidence of deltas and other places where great accumulation of sediment occurs; and this latter theory has the additional advantage of accounting for metamorphism, and perhaps, also, for volcanic phenomena. But it is evident that some other and more general theory is necessary to account for those great inequalities of the earth's crust which form land and sea-bottom."

In other words, they were trying to explain quite a lot with their theories and so they wanted to keep an open mind about all possible explanations. They were not really certain about what they knew and didn't know, but they obviously did not know about plate tectonics. Consequently, what they did know didn't entirely make sense to them. They did know – most importantly - that there was something they didn't know, and they weren't afraid to admit it within the context of what they were already teaching. In the end, God only knows how it all works, but we can keep trying to figure it out, to be sure. Always keep an open mind about things you read in textbooks, and don't be afraid to ask the teachers if there are perhaps any other books with a different perspective that you might read.

Utopia is translated from Greek into a double meaning. It means both a good place and no place. It is a fictional place that represents a perfect society. Make of it what you will, but the perfect is always the enemy of the good, so we do truly now live in utopia. In our voracious pursuit of perfection we have destroyed much of what is good about what it is to be American. And science has been the unwitting foil for this, or perhaps the witting foil in an unholy deal with the devil. Regardless of motive, science has forfeited its soul in the process. The pursuit of universal truth – the mind of God – has always been the soul of science. Without God there can be no soul in science or otherwise.

It is all well and good to rant endlessly about this sad state of affairs, but what are we to do? I honestly don't know, but I do know that we need to aggressively oppose any system that necessitates a "single school of thought." Science, politics and religion should be in agreement on one thing: all forms of thought control are repugnant. Excluding God from science is a form of thought control that surely needs to stop. It needs to stop right away. I think we can safely start with biology. To do my small part here, I will pretend to have been hired to teach a class of 9th grade biology students in the all-too enlightened school district of Dover, Pennsylvania. After I lawyer-up completely, here is how I would begin to teach it:

Good morning, class. Your parents - against all odds - have hired me to teach you biology. I do not know everything about biology, but I do know a little, and I do know that there is far too much for us to learn, so we must pick a good place to start. Please know that we could - each and every one of us – all spend our entire lives studying biology. And if we do, we can be sure that we will never learn even a tiny fraction of all there is to learn. In other words, the only thing we can know with certainty is that we will never know all there is to know. Biology is life and life is inherently unknowable. So, I am going to start here with God. First, I do not know what God is, but I do know that we must necessarily start with God when we study biology. I happen to practice an eccentric and paradoxical religious belief about God that has a tiny group of followers. It is known generally as atheism, but it comes in many forms. You can apply your own belief system as you see fit here. I am somewhat of a natural born contrarian, but you can have no fear of contradiction with me on this one important issue.

We are not going to discuss anything here regarding God except as it pertains to the science of biology. How you use God to guide your life is not important in this class or to me personally, so do not be shy about expressing doubts and concerns wherever you might find them. This is a safe place. I also know that each and every one of you knows what God is, and you can now sense that we all know God in a different way. So, if anything I say about God offends you, I definitely want you to tell me about it, and we will discuss it, or you can discuss it with your parents, or you can merely ignore me, because I am not always right. Rest assured there will be no beheadings over our beliefs in biology. However, your parents have hired me to teach you biology and I simply cannot teach it to you unless I first explain my meaning of the word God. So, when I say God you can take that to mean that I am talking about something that is completely unknown, or something I believe to be true and important but that I cannot or chose not to explain at this time. Any questions?

I am first going to explain a brand of biology that you will not learn in any textbook, and that is because I believe things to be true about biology that I cannot find in any textbook. In fact, the only things I can find in any textbook are directly contradicted by those things that I am about to tell you and that I firmly believe to be true. I have a deep and abiding faith, one might say, but I know that it will take many years for the textbooks to catch up with my belief system. Unfortunately, you little squirrels are legally wards of the state, and so you will in fact be expected to prove that you know exactly what is in those textbooks, even if you don't really believe it. So we will cover the material in your book quickly and efficiently just after we learn the truth. It never hurts to hear more than one side, anyway, and it will be much easier to remember the false trivia in these books once we know and understand the truth. The truth always makes more sense, and it is always easier to remember things that actually make sense. We can then remember and regurgitate the state-sanctioned trivia in these textbooks more easily by simply applying an opposite logic to the truth.

We believe the earth to be roughly 4.5 billion years old, although estimates vary. We believe that the earth is made of molecules, and life is made of molecules, but that the earth had no life on it when the earth was created within the universe. God breathed life into the molecules of earth sometime between when it was created and today. Since that miraculous time, life has flourished. The diversity in form and numbers of life on this planet today is incomprehensible to our minds, so to understand it in some way we must begin to look deeply into the mind of God. We must seek the plan that best explains the existence and patterns of all life on earth. Please do not expect to fully understand that plan from the things I teach you here, but you can get a general pattern here for a journey that should consume your entire lifetime and thousands of others. It is a big job to know the mind of God as it is reflected in the patterns of biology, but we can begin staring directly at it by looking first at the genetic code. Nothing more perfectly reflects the mind of God, in my learned opinion, than does the genetic code.

Life is composed of molecules and those molecules represent a form of molecular information. The very idea of molecular information implies molecular codes and specific languages to execute those codes. This implies that life is in many ways like a computer. This is useful, except life is more like every computer on earth than a single computer, and even then it is a thousand-fold more complex. If you are somehow able to understand every computer on the planet and the complex relationships between all of them, then you are merely at the starting point of trying to understand life. However, at the core of any code or language, or system that executes them, we can always find first principles that will help us understand the system as a whole. These first principles are given by God and in service of God in making the system work, and in the service of making any system work whatsoever. The systems inevitably improve with time, but without first principles there can be no coherent system at all, and life is no exception. It is simply too complex for our minds to ever fully comprehend, but we can investigate it and discover the many fascinating truths therein. God has left many fabulous clues. I must warn you, however, the deeper you look, the larger the role that God must play in your understanding of life. You will work a lifetime only to discover that there is too much to discover. That is just the way science is. That's just life.

When we talk of molecular information, codes and languages we talk of many different things. However, the genetic code is the granddaddy of all molecular codes and

so we can learn something about all of them by learning everything about this one. Unfortunately, we do not know everything about this one code, and most of what we do know has been empirically proven wrong. Your state tests will expect you to give wrong answers, so do not be fooled. We once preached that this code was simple, linear, one-dimensional, uni-directional, inefficient, arbitrary and universal, but we now know that the opposite is true of all these things. The genetic code is impossibly complex, non-linear, multi-dimensional, multi-directional, highly efficient and the farthest thing from arbitrary as anything that can be found on the planet. In terms of perfection, nothing on earth could be found to be more perfect. It is the heart that pumps life's blood, the engine that drives all of life's processes.

It is amazing to think that we might completely know a universal code of life in so short a time and with so little effort. And so we cannot. We can pretend to know, but we cannot actually know. More amazing is the proven reality that the genetic code itself in not universal and so each species must somehow maintain its own dialect, but there is in fact a stunning degree of commonality to them all. It is mind-boggling, but we can learn from this. This consistency of form can be traced back to the first principles of the genetic code itself, and we can know at least the first principles, which are: All molecular information is structural information, and the most perfect and informative structure in the universe is a dodecahedron. Therefore, in order to understand the genetic code we must first understand the dodecahedron.

A dodecahedron is called a perfect solid because it is a solid object that contains faces, points and edges, and every face, point and edge is identical to every other. This is called symmetry and God has breathed symmetry into every aspect of life. This is the tool of choice whenever God does anything in the universe, so we can have blind faith that God has chosen it to build a system of life on earth based first on principles of symmetry. Please note that in the real world of molecules, faces, points and edges are all that exist and so they simply must represent the basis of all molecular information.

Every molecular code must have a basis and the fundamental basis of the genetic code is a dodecahedron. It is the form that informs all others. The genetic code itself consists of many complex sets of molecules and many complex relationships between those sets, but we can dissect out just two of those sets and map them on the surface of a dodecahedron. The two sets are called nucleotides and amino acids. We can place a specific nucleotide from the genetic code on each face of the dodecahedron and then simply derive its relationship to every amino acid within the points of the dodecahedron. This, of course, is not the actual code itself no more than a map of the earth is the actual earth. The code resides at levels higher and lower to this, and it operates in scales of time and space that will never be captured by any simple map. It is unimaginably complex not simple. This single globe of information is simply a cartoon depiction of the genetic code, but it does indeed nicely map out the basic structure underlying the raw logic of this fabulous code. Of course, the many fabulous details remain hidden. Perhaps someone in this class will add an important piece to this exciting unsolved puzzle!

Remember: only God knows the actual genetic code, and don't let anybody tell you different. Even if your over-educated parents tell you that they know the genetic code, you have my permission to vociferously disagree with them. If you cannot, for some strange reason, convince them of their utter ignorance, please send them to me and I will give them a lesson for free.

Now… all you snot-nosed little monkeys, open your books to page one and let's get started.