

If God Were a Space Alien

A Different Kind of Atheism

By

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Introduction

I am saying this right up front. I am an atheist. Does this mean I am certain there is no god? For me it doesn't. I don't think that anyone can be absolutely certain of this. Not even Richard Dawkins. I will certainly say that the probability of the existence of any god, that meets any reasonable definition of the term, seems pretty low. And the probability that there is a god that is anything like the major world religions propose is even smaller.

Let's try to put these probabilities in perspective, relative to other things we "know" about the world. Most of what we think we know from science is uncertain too. Over time science very often progresses by showing that things we thought were true before were not quite right. But some things seem more certain than others. How certain are we that the sun will rise tomorrow morning? I don't know the exact number, but I would say that this is pretty nearly certain. More certain than that there is no god? I would say yes. Now consider, for example, Einstein's general theory of relativity. You don't have to know much about this theory to know how highly regarded it is by scientists. It has been shown by many experiments to be correct. And yet it is almost certainly wrong at extremely small length scales. We don't have a better theory to replace it yet, so for now, we can think of it as "right". But I would rate the probability that there is no god as higher than the probability that Einstein was exactly right. So this should give you some idea that I am pretty certain, but not absolutely certain, that there is no god.

Commonly, people who are uncertain about the existence of god call themselves agnostic. In part this is because it is more socially acceptable. In a mostly religious world, it is risky to tell people that they are outright wrong. But, at least in the western world, it is acceptable to have doubts. To be agnostic is to say that you are not going to challenge anyone else's beliefs. But perhaps the time has come for more people to start challenging religious beliefs. Sam Harris is responsible, at least in part, for convincing me of this. It is not my purpose here to explain why it is so important to challenge religion. Mr. Harris has done that far more eloquently than I could hope to do. But it very much is my purpose to in fact challenge religion, and to do it in a way that I think may be a little different than others have tried. So this is part of the reason that I call myself an atheist without hesitation. But it is not yet the most important reason.

If we leave aside the social issue, and we admit that it would be foolish to assert with certainty that there is no god, then what is the difference between an atheist and an agnostic? Is it just a matter of degree? If so, where do you draw the line? I would like to suggest that an atheist is someone who has a different attitude about the possibility of god. If you come to me with evidence that there is a god, how should I respond? Should I (a) start going to church every Sunday, (b) learn meditation so that I can contact god myself, or (c) study the evidence, and if it seems compelling, then try to figure out what sort of god this is? If you said (c) then you are my kind of atheist.

If you said (a) then I am curious to know why you think I should leap to the conclusion that the evidence will favor a Christian god. Furthermore, why do you want me to worship something that I still know nothing about? I have never understood the psychology behind the worship of anything with power, whether it be a king or a god. It

seems to me instead that anything that demands worship is probably not deserving of worship. Furthermore, it seems to me that the Judeo-Christian god is an especially grim creature who has done little or nothing worthy of praise, and plenty that is not. Christopher Hitchens explains in detail the evident unpleasantness of most of the world's major religions. Let me hasten to point out that my purpose here is not to criticize religions in this way, although it may seem that way at times. Criticism tends to close the mind and raise the natural level of resistance to change. Instead my plan is to use elements of existing religions as evidence for the existence of god, and then to see what that leads us to think about what such a god is like.

Now if you have seen discussions like this before, you will know where I am going with this. You will say: "you are trying to study god using science and logic". Many eminent philosophers, mostly theologians, but even some reputable scientists, argue that this is impossible because god is, in effect, not part of the "natural" world. Even the eminent Stephen Jay Gould has tried to make science and religion compatible by saying that they are "different ways of knowing". Many people find these arguments compelling because they do indeed feel a kind of certainty about god that is not based on any actual evidence. Curiously, this kind of certainty is itself a form of evidence, and can be studied as such. Some recent research has begun to address the mechanisms which support this sort of certainty as well as its evolutionary and psychological underpinnings.

In any case, I have never been able to make any sense of these arguments about god and religion occupying a different domain of discourse. It is one of my main goals in writing this to explain why this is so, and, if possible, to convince you that there is only one meaningful domain of discourse. I'll summarize the argument here, but there is an entire chapter devoted to this topic later, and, in a way, the entire book is really devoted to this topic.

The idea is simple. If we can observe it, it is part of the natural world. If we can't observe it, it may still exist, but it is irrelevant. If god came to earth and started performing miracles, then everyone would agree that this is evidence that we could study in a scientific way. There would be some who assert that we should not or must not do this, but even they would agree that we *could*. But what about religious experiences that are only in the mind? You may argue that the mind, or some part of the mind, is not in the natural world. But if you have a religious experience, then you can talk about it. You may find it difficult to articulate exactly how it felt, but I can ask you questions about it, and there is no part of it that would not be accessible in this way. Thus your mind is also part of the natural world, and is accessible to study using science and logic. This doesn't mean that you *have* to study it that way. Only that you *can*. So I'll leave you with that thought for now, and hope it will encourage you to read on.

Perhaps you are starting to wonder what this book has to do with space aliens. That is the main title, after all. You'll soon find out. The first chapter is mainly about space aliens. Furthermore, space aliens keep coming up in later chapters as well. There have been many suggestions over recent years to the effect that space aliens of the distant past may have been responsible for (a) bringing life to earth, (b) bring humans to earth, (c) staying here and becoming humans, (d) staying just long enough to plant the idea of god in the minds of primitive humans. And so on. I will not be making any suggestions of this sort.

Instead, the reason I like to talk about space aliens is to get you to think about what god does, assuming you believe in god. I claim that many people have thought more about what space aliens do than about what god does. Presumably everyone agrees that if space aliens came to earth, or if they are already here, then they do something that is, in principle, observable. Certainly in popular depictions they are always observable, even if all they do is take over the minds of other people. So the fundamental question I want to ask is this: if a space alien came to earth, how would you know it wasn't god? Your first reaction might be "that's ridiculous (or blasphemous) – god is not a space alien". But you would still have to explain – to me – how you would tell the difference, and in the process we would learn something about what god is like. Then as we go on through later chapters, and we explore the different things that people may think god does, we will constantly raise the question: could a space alien be doing this? In the final analysis you may accuse me of simply renaming "god" to be "space alien". So be it. I got you to think about what god does in the process. Mission accomplished. I am not really trying to convince you that god actually *is* a space alien.

So who am I to be writing about space aliens and god? What are my credentials? Am I famous for anything, so that I think you should pay attention to me? Am I trained in philosophy, or theology, or perhaps psychology? Perhaps I am a science fiction writer. I am none of these things. Perhaps you think I am some kind of nut that you would see at a science fiction convention or at an alien abduction meeting. I am not that either. At least I am not that kind of nut, anyway. Instead, I am just the guy next door or the guy across the bar. I am hopeful that you may be drawn in by my way of thinking, and not be distracted by whether I am famous for something else. I do hope you find that my way of thinking about god is helpful and complementary to some of the other god books that have been published recently. Perhaps the actual philosophers and theologians will find it naïve relative to other works in their fields. Then they might correct me and we will all have more to think about.

Chapter 2: Alien Contact

Before we start, let me try to explain why I am starting out by discussing space aliens. I am not about to suggest that god is really a little green man from another planet. I want to get people to think about what their god is like. Many of today's religions include the idea that god was manifestly present on earth at one or more times in the past. In Christianity, the central tenet of the faith is that god himself was here in the form of a man named Jesus. At the time, not many people could tell that he was god. But now, millions of people claim to know for certain that if you don't believe Jesus was god, you will spend eternity in hell. Some people believe that god will return. Many of them even believe that the return is immanent. But even if you don't think god is coming to earth any time soon, you probably still believe that he *could* come, but just chooses not to. It is also possible that real space aliens will visit us some day. Of course some religions claim that god only made intelligent life once and it is us. If you believe that, then anything that comes to earth must be god, since there are, by definition, no space aliens. For the rest of you, if something unusual showed up on earth, you would have the job of deciding whether it was space aliens or god. How you would decide says a lot about what you think god is like, and that is the point of my writing this chapter. For me the job is easy. It is almost certainly space aliens, no matter what. For the religious among you, I am hopeful that going through this thought process might nudge you in the direction of thinking the same thing.

In our first series of thought experiments, we consider various sorts of visits to earth by aliens. Many depictions of alien visits are, of course, familiar from film, literature, and so on. Curiously, these descriptions rarely imagine the aliens claiming or appearing to have the status of gods. It has occasionally been suggested that distant past visits might account for ancient mythology, but people somehow imagine that modern alien visits would surely be recognizable as aliens. They may have advanced technology, but we imagine that it will be understood as just that – advanced technology. Arthur C. Clark famously said that “any sufficiently advanced technology is indistinguishable from magic.” With this thought in mind let us consider some of the common alien images and perhaps some less common ones as well. Into each scenario we will inject the question: “could the alien(s) be god(s)?”

Reptiles and Gods

Consider one of the common alien visits we see in movies: ugly reptilian creatures arrive in spaceships. It is a massive invasion, and their expressed intent is to kill or enslave humans. They shoot at us with recognizable weapons of mass destruction. Naturally we mobilize our armed forces and the world comes together to fight the aliens. Somehow, against all odds, we find a way to win.

Now just change the plot slightly. They still mean to enslave us, but what they say is “We are gods and you must worship us.” They provide specifications for the churches and rituals we are to use. How would we respond? Although there might be a few believers, it seems very likely that the response would be something like this: you are not gods – you are space aliens, and we are going to fight you to the death.

Why is this response so likely? I think that the main reason is that everything in this scenario is recognizably part of the natural world as we might understand it. There is nothing supernatural, spiritual, or mystical about these aliens. They are visible real-world creatures who come in spaceships and shoot at us with fancy weapons. We can easily imagine that if we were to build spaceships and travel to another planet the situation would look much the same. Furthermore, the aliens are ugly (they obviously did not create us in their image), and they don't seem to like us much. These factors also contribute to their lack of godliness.

This entire picture is quite similar to one which has actually happened. If "creatures" in metal suits arrive in boats from across the ocean, some people might see them as gods. But for others, and eventually also for the believers, it will be war. Once the killing starts, and it is seen that the aliens are mortal, this clinches the case that they are not gods.

What are the lessons to be learned from this thought experiment. We apparently have some expectations, or requirements, that gods must fulfill. They must be supernatural, immortal, and good. There are many more properties we would like our gods to have, but if they fail these basic ones, they are in trouble. One of the most interesting of these is the supernatural. We will have much more to say about this later.

So are there other alien visits that would be more convincing as gods? Clearly the answer is yes. Let us immediately jump to the other end of the spectrum.

The Rapture

Suppose that one day many devout religious christians mysteriously disappear. They vanish right before people's eyes. At about the same time disasters occur all over the world – earthquakes, hurricanes, volcanoes, tornados, plane crashes, fires and so on. The earth becomes a living hell for everyone who is left.

All of this and more are predicted, according to some interpretations, by the chapter revelations in the bible. Remarkably, many people seem to believe these things are really about to happen, and soon. If it did happen, then this would constitute strong evidence that perhaps christianity is right after all, and the bible really is the literal word of god.

Now ask yourself what you would think if this were all perpetrated by space aliens. Or, if you prefer, one space alien, or perhaps one main alien along with a number of subordinate aliens (angels). Certainly it is not hard to imagine that space aliens could have the technology to make people disappear, or to cause natural disasters. They did these sorts of things all the time on Star Trek. This is not to suggest that Star Trek is scientifically valid but only that it is easy to imagine.

Chances are that many people would respond to this suggestion with something like "don't be silly, this isn't space aliens, this is god." Just the opposite of the science fiction reptilian space aliens. How can we account for this? I can suggest several possibilities:

- There are no visible aliens or space ships.
- It is just as predicted in the bible. Any minor disagreements would easily be dismissed.

- The idea of space aliens is comical. God is respectable. The majority of people believe in some god, while belief in space aliens is generally considered to be kooky. Since there is no visible evidence of aliens surely it is “simpler”, and much more acceptable, to believe that this is god.

If you are following along in your notes, the assertion that something is due to god is pretty much equivalent to saying that it is due to space aliens. Somehow it sounds different, but we will argue the equivalence in general later on. This is just the second example, so maybe you are not convinced yet. Carry on.

Another thing you may be asking yourself about this example is “why would space aliens do something like this?” What could be their motivation? So you have to answer by asking the equivalent question: why would god do this? According to the bible, it is judgment time. It is not our purpose here to examine the theological justification for the idea of divine judgment. But it definitely is our purpose to wonder why it sounds wrong for space aliens to sit in judgment on humanity whereas there seems to be no problem with the proposition that god would do it.

While you are pondering this, I’ll close this section with a couple of suggestions about why space aliens might do this:

- Space aliens really are god (or god plus angels, if you prefer). Two thousand years ago, and earlier, they sent humanoid life-forms to earth. Some wrote the bible. One was Jesus, and so on. They wrote down in the bible that there was going to be a judgment day. Then they left, and we haven’t seen them since. But now they are back and it is judgment day. If this sounds blasphemous then I can only say that I am happy you are still reading.
- The space aliens have a twisted sense of humor. They use primitive civilizations like ours for entertainment. They have been monitoring us, and have read our literature and seen our television programs. They thought it would be pretty funny to make the biblical predictions come true and watch to see how we react. Later they will vaporize us all.

The Sweet Spot

Now that we have seen two extremes of response, “alien not god”, and “god not alien” our next goal is to see if we can find a sweet spot where we are not sure whether to think that a visitor is god or alien. Let’s try some simple examples first.

Suppose a flying saucer lands on the mall in Washington, DC. A ramp opens up and out comes one of those stock movie aliens – gray skin, skinny, bipedal, large head, blank, lidless almond-shaped eyes, blinking strangely. It has a vaguely beneficent and intelligent appearance. It says, in modern American English: “I am Jesus Christ, son of the god who created you.”

Why is this picture so absurd? Well, to start with, we made him out to look like a known space alien. Any reasonable person would assume this was some sort of Hollywood stunt. So we’ll fix this right away. Make it a modern Caucasian male, and dress him in a western business suit. Most likely the initial reaction would be pretty similar. Aside from the words themselves, everything about this picture shrieks publicity stunt. The geeks in

the crowd would be wondering how they did the flying saucer part, but a few others would be thinking about writing angry letters regarding the blasphemy, just as soon as they knew who the perpetrators were.

A few of the observers might be more willing, on further thought, to consider the proposition. After all, if Jesus were to visit us today, wouldn't he adapt his appearance and language to match modern times? Chances are their biggest problem would be the flying saucer. Surely Jesus wouldn't come in one of those. But before we lose the space ship, let's explore a little further in the appearance and speech domain just for completeness.

What if we give him long brown hair and dress him in a long white gown and sandals. We give him a halo. Instead of modern English, he speaks King James English. Surely at this point quite a few people would have bells going off in their heads. They could ignore the flying saucer because this exactly matches the image of Christ that is burned into their memory from church walls, Sunday school, bibles and other religious books. So this is obviously god, not a space alien.

So how ridiculous is this? We have to assume that, for whatever reason, Jesus wishes to appear as his historical self rather than a modern human. But we know that the historical Jesus, if there was one, was probably not white, did not have brown hair, and spoke Aramaic. In spite of this language problem, there are many people who, to this day, think that King James English is the true language of Christianity. We are left to suppose that, on the occasion of this new visit, the most important thing to Jesus is that people believe that he is indeed Jesus. To achieve this, he simply takes on the appearance that people have in their minds. So if it looks like a duck and quacks like a duck, it's a duck, and not a space alien. It's a cartoon duck though. A real duck would be something else again.

God or Kook

Now let's discuss the elimination of the flying saucer. Of course this means any kind of space ship. A space ship is a sure tip-off that this is aliens. So we have to have some way of getting him here without one. Of course there are lots of ways, but we'll start with the idea that he just shows up one day and we don't know how he got here. If he looks like a normal human, then we have an additional choice besides god or space alien: kook.

So one day you see some guy in the park. You have never seen him before. He is surrounded by a small group of people and, out of curiosity, you join the group and listen for a while. It turns out that he claims to be Jesus. He looks like an otherwise normal guy – not deranged or anything. And he does have a sort of charisma. This happens in real life, of course. And remarkably, a few people are sometimes convinced, and a cult forms.

But you are not convinced. You know there is a slim chance that it is true, but you are certainly not going to give up your life and follow someone who is almost certainly just crazy. This is just a kook. There is no reason to think that it is a space alien, and the probability is very low that it is god.

What if he dresses like Jesus and speaks King James English? Still not convinced? Of course not – that would be easy. After a bit of thought you decide that it was possibly more convincing the first way. But what if he does miracles? It would obviously depend on the sort of miracles. Simple magic tricks won't do at all. Healing sick people is

troublesome too, because there are plenty of faith healers around already. Although quite a few people believe that at least some of them are truly directing the power of god, probably most people believe that they are frauds.

We need big miracles. If he points a ray gun at a building and the building falls down, then it is certainly a space alien. Jesus wouldn't need or use a ray gun. What if he just points his finger and the building falls down. Now maybe it could be god, but we're not so sure. Destroying buildings somehow doesn't seem godlike, even if they are "bad" buildings. It seems more like something space aliens would do. This despite the idea that god would create a hell on earth for the sinners that he doesn't take to heaven during the rapture.

What if he raises his arms to the sky and suddenly dark clouds gather, lightning flashes, and hail begins to fall. Now we're talking god. There is no reason to think that space aliens couldn't do this, or that god couldn't, or wouldn't destroy buildings. Surely god, if he were all-powerful, could do anything space aliens could do, or for that matter, anything we could imagine. It seems that to be godlike the miracles would need to be the sorts of things that people thought godlike 2000 years ago, like controlling the weather. If it is too high tech, people will think it is space aliens.

The Arrival

When we did away with the space ship, we just had the god or aliens show up in the park. We didn't say how he got here. Perhaps he was born here, just like a human but with very superhuman powers, and he just chose today to go public. Perhaps he comes from a long line of secretly alien or godly beings going back thousands of years. Or perhaps aliens or gods implanted a baby alien/god in a normal human woman. Both gods (counting satan here as a kind of god) and space aliens do this sort of thing all the time in movies. So this method of arrival seems acceptably godlike, but is also quite popular among space aliens. We are told, of course, that the first Jesus came this way, so there is a good chance that if he comes again, he might use the same method.

But suppose that he has to get here, fully grown, from whatever planet or heaven he comes from, and that there are witnesses. It can't be in a spaceship, of course, so what other methods are there? If we see a shimmering yellow glow in the shape of a human, and then the glow fades and Jesus is there, then we know this is not really Jesus, but someone from Star Trek, dressed in a Jesus outfit, which is no doubt standard issue for starships in case they encounter primitive cultures. We have been conditioned by television to think that this is obviously a space alien. What if he just appears, instantaneously? One second there is nothing, and suddenly there is a man there. I think the nod still goes to space alien because this just doesn't seem properly godlike.

The next possibility for your consideration is the puff of smoke, possibly accompanied by a flash or lightning and a thunderclap. When the smoke clears, Jesus is there. Now this could be god all right. We could believe this, even though any good magician could probably do this trick. God could do better. What we need is the arrival on a cloud, up in the sky, with sunbeams, rainbows, and angels, followed by a descent to earth.

The Human Response

Enough of this silliness. The space aliens are here. What are we to do? If you have ever seen any science fiction movies about aliens, you know what the choices are. First you determine whether they are hostile or friendly. If they are hostile, then you have a war. If they are friendly then you try to learn from them, arrange trade and technology exchange, and so on.

It is hardly my purpose here to explore the possible outcomes of a visit by space aliens. Rather, it is to wonder why the response should be any different if the visit was from god. If slimy reptiles came in spaceships and demanded worship and obedience, it is hard to believe that we would just say “ok, tell us what kind of churches you would like.” Perhaps if they made it clear that if we didn’t obey they would vaporize the planet, then we would do this. But we would do so grudgingly, and we would continuously look for ways to somehow defeat them. If they told us they could read our minds, and they would punish us if we did not truly love them, still we could not love them, and we would have to suffer for it. But by some elusive reasoning, love, obedience and worship, or eternal suffering, are what several of the world’s major religions tell us are required by a god we can’t even see. Perhaps once we get to know the aliens better, some of us at least will find that they are lovable after all. Like beauty and the beast.

But if the aliens are really god, is he hostile or friendly? [Note: it is tempting to substitute “she” here, but I have found this too distracting.] If this is the Judeo-Christian god or the Islamic god, then there is quite a lot of evidence in favor of hostility. We are told that he loves us, but the deeds suggest that this is really tough love. Just the idea that we are doomed to eternal suffering merely for doubting his existence seems rather nasty. We wish to grant ourselves many freedoms, but not, apparently, the freedom to doubt god.

If god has come for judgment day, then apparently he means to kill us all. Because what happens when we die: we go to heaven or to hell. On judgment day, he takes the faithful to heaven, and, conveniently for god, earth becomes hell, so no special action is needed. Logically this sounds equivalent to extinction of the species. Everyone is denied the remainder of his natural life on earth, and is immediately given life after death, which must presume that death has occurred for all. Couldn’t he just wait? God will be around for eternity after all.

If it doesn’t seem to be judgment day, but we are convinced that god is here, then perhaps we should look to religious texts or to actual history for clues about his intentions. The bible is filled with many instances of mass murder done by god. Examples include Noah’s flood, Sodom and Gomorrah, plagues and other bad things in Egypt, and more. When he helps out, it is often in the form of assistance in war, i.e. killing enemies of the believers. Sure, he does say “Thou shalt not kill”, but then this apparently doesn’t apply to punishment that is required for various offenses, most notably non-belief. I haven’t done a complete count, and it wouldn’t matter anyway, but it seems likely that god does more bad things than good, on balance.

So if we decide that god is hostile, what do we do? We have been told that god is all-powerful, omniscient, and omni-everything. Furthermore, we have told that everything he does is really for some greater good, no matter how it looks to us. Our puny brains are simply incapable of seeing the big picture. Under these circumstances, resistance is surely

futile. Our best hope might seem to be going to church (or whatever god tells us to do, now that he is here to tell us in person) and hope that this will minimize our punishment.

But it is not universally human nature to simply succumb to hostile domination. Surely some will resist. Surely part of the resistance would involve studying the properties of this hostile god. Is he really all-powerful? What does this mean? Can he violate the laws of physics as we know them? For example, can he communicate with remote parts of himself at greater than light speed? If so, are the laws of physics just something that he enforces on humans? Is he then subject to no physical constraints at all? Is this even a reasonable possibility, from a metaphysical perspective?

Those of us who are left here on earth won't know anything about the heaven where the faithful were taken. But we can surely investigate the properties of the hell that earth has become. One interesting question is whether we can die. Unless we somehow lose the ability to damage our bodies, then we would surely want to know what happens if someone's body is, for example, cremated. Are there other levels of hell that our souls go to, or are we somehow reincarnated in the earth-hell.

The main question, of course, would be whether there is any possibility of defeating god, or at least escaping. Presumably we would find that all of our weapons are useless against his physical manifestation here on earth, but we would still try what we could. Perhaps we could do some damage, but then we would want to see how the physical manifestation related to the infinite being we are told is the real god.

What about escape? Perhaps we would be prevented from building rockets. But what if we did, and we went to Mars? Would there be a hell there too, and would god be there? Would the entire universe be hell? Or perhaps the entire universe would be gone, and Mars along with it. Either way, these are all very interesting questions, to which we would surely want to know the answers. This could involve a lot of new physics.

Now consider the possibility that the aliens are friendly. This would make us more likely to think they are aliens rather than gods, because, as discussed above, the god or gods of most of the major religions seem more hostile than friendly. Be that as it may, how would we respond to a friendly visit? There presumably would not be any demand for worship, as this does not seem consistent with being friendly. Their technological superiority may be such that some people might be inclined to worship them anyway. For others, however, there will be many, many questions.

Since these gods are friendly, presumably they will be willing to answer at least some questions. They may decline to share all of their technology, on the grounds that we might misuse it. But we might suppose that they could divulge the basic extent of their powers, and perhaps enlighten us about basic physics, as well as other sciences. The underlying principle here is that they are part of the same natural universe as we are, and are therefore subject to the same laws of nature. We'll have a lot more to say about this principle later on.

The one thing we really don't want to hear from them would be that our brains are too primitive to understand them, their science or their technology, and that therefore they cannot answer most of our questions. It is certainly conceivable that this is actually true, in which case they would certainly be right in telling us. But still we would plead for help

in understanding what the fundamental limitations are. If you crave knowledge, then you cannot easily settle for knowing that it is somehow inaccessible.

Summing Up

Is there a lesson to be learned from all this? The real point of the chapter is to introduce, in a rather light-hearted manner, some thought experiments that will get you to start thinking about what god is like. Here I mean your god, and what you personally think. I claim that many people have thought more about what space aliens are like than about what god is like. If you are a Christian, then you have spent some time contemplating the life of Jesus. And you probably have some pretty good ideas about how god wants you and other people to behave. But what about god himself (or herself)?

In this chapter we have imagined that god comes to earth in some form. The central question of the chapter is whether you could tell whether a “visitor” is (a) god, (b) kook or (c) space alien. If the visitor is a slimy green reptile, then you immediately say space alien. If the visitor is a humanoid, but does no miracles then you would probably say kook, although you should never underestimate the power of kooks with charisma. But if the visitor is humanoid and does miracles, and makes no claim to being a space alien, then I claim that there is no way you could tell. If you are religious, then the answer is likely to depend on what the visitor says and does. How well does this conform to your ideas about god? But even a humanoid that conforms perfectly to your idea of god could still be a space alien. Who is to say that advanced space aliens would not have evolved to be some sort of invisible energy form that occupies a large volume of space and can manifest as human if desired. How godlike is that?

Now you may well say that you are quite certain that god is no space alien. Perhaps you have some personal experience that convinces you of this, and it has nothing to do with any earthly manifestation of god. We’ll have more to say about this in future chapters. But for me the answer is simpler. We can only act based on what we do experience. If what we experience is indistinguishable from space aliens, then I choose to think that it probably is space aliens, since that seems like the simplest explanation. And why would I want to worship space aliens?

Chapter 3: Intelligent Design

Previously we considered the scenario of an alien visit sometime in the near future. In this chapter we address the question of whether aliens (or gods) have been present on earth in the past. More specifically, the question is whether life on earth has developed entirely through evolution and natural selection or whether there has been some contribution from an “intelligent“ entity or entities. If we want to be open minded about this issue the best response may not be to dismiss intelligent design as unscientific. Instead we can accept the possibility and then probe further, by asking questions such as “Do you mean space aliens”.

Do You Mean Space Aliens?

Advocates of intelligent design generally distinguish themselves from creationists by asserting that the intelligence they are referring to is not necessarily the Christian god. If it is not god, we must surely be curious about the nature of this intelligence. Oddly enough, this question rarely seems to arise in the debates. There are some reasons that it is avoided, which we’ll discuss shortly, but first lets address the question directly. Could it be space aliens? If the ID proponent denies this possibility or finds it laughable, we suspect that he is really a creationist in disguise.

But some ID proponents do accept the possibility of space aliens. Once we get this far though, we naturally have many more questions. Before we start to dig in, here is a list of the many questions that need to be addressed on this topic:

- What are the problems with the theory of evolution that are said to require intelligent design?
- If we accept these problems, what sort of intelligence would it take to fix them?
- Independent of the above, how might we arrive at life as we know it without evolution? How about with a little evolution and a lot of intelligence? How about with a lot of evolution and some help from intelligence?
- If it is not god and it is not space aliens, are there other possibilities?
- Why is it that the debates we hear and read about never seem to address these questions?

Before starting on the questions, we need to set some ground rules. The rules are that the only part of science we are directly questioning is evolution. Other parts, like basic physics, astrophysics (e.g. the big bang theory), geology, paleontology, and so on, we will basically accept, although we may push on them here and there. We make this rule not because it is necessarily true, but just to focus and limit the discussion. A strict creationist would deny most of this because it conflicts with the bible, but we are not discussing creationism, after all. All of the theories of science are open to discussion, of course, but we simply do not propose to do that here.

The Problems with Evolution

ID advocates are fond of saying that “evolution is only a theory, not a fact”. Evolution advocates respond, correctly, that nothing in science is fact, and that theory is as good as it gets. Still, many scientific theories do have problems. From time to time, these problems rise to a level that the theory needs to be modified. Certainly the theory of evolution is far from complete and perfect. So we can well ask whether this theory has enough problems that it needs serious modifications. If it does, then the next question is what sort of modifications would be appropriate. But first, the problems.

The basic problem in evolution theory is to explain how it actually produced life as we know it, including homo sapiens. No one can really dispute the theories of genetics, reproduction, or even some level of natural selection. All of these are easily demonstrated in the lab and in nature by experiment. It has been shown, for example, that the beaks of Darwin’s finches will change size and shape depending on the available food sources.

In spite of all this, it is simply incredible that it produced complex multi-cellular forms of life, including, finally, humans. There are many things that are unknown about how this all actually worked. We understand a fair amount about DNA and proteins and so on, but we really don’t know much about how these things all came to be in the first place. All life that we find uses pretty much the same machinery, but we find no record of simpler forms leading to this already rather complex machinery.

The fossil record, while quite rich and getting better every day, still has gaps that lead to uncertainty about common ancestors, intermediate forms of current species, and so on. To pick only the most obvious example, we haven’t really identified a common ancestor between chimpanzees and humans. We do seem to be closing in on this, but the evidence remains sparse and there is, as yet, little agreement among researchers in this area. If you want to believe in ID, you can point to this and say “aha, it is not certain that humans descended from apes”. In fact there is really no dispute among scientists about the basic picture of descent from apes. Only the details are in question. But until the details are actually nailed down, there is wiggle-room for those who want to dispute the basic claims.

Perhaps the most intriguing problem with evolution is how it managed to accomplish large changes. It is not hard to see how natural selection could favor the change in size or shape of a finch’s beak. But how did it come to have a beak in the first place. Or eyes, or wings, or feet. A currently popular hypothesis is that birds evolved from dinosaurs. But this is quite controversial, and, naively, there doesn’t seem to be much resemblance. There are a few examples in the fossil record of possibly transitional forms, but so far not enough to be really convincing.

Among the difficulties facing the evolution of major features is the idea that transitional forms seem likely to be counterproductive. So, for example, if you want to evolve an opposable thumb, you might imagine that you start with a bump. The bump may well be worse than useless, so you would think that it could never evolve into the whole thumb. Instead, the bump would be eliminated by selection. We have never induced major new body features to evolve in the lab. We can do certain things by manipulating the genes, like add extra fingers, or put the wings in the wrong place. But getting new things to evolve by themselves is for now beyond our ability. The assumption is that this occurs

either too slowly, or with too low a probability, to be expected to happen during the lifetime of any reasonable experiment.

Speaking of probability, there is one other problem that we need to discuss: what is the probability of evolving life as we know it in three billion years. If we assume that the probability of evolving it is non-zero, then, given an infinite amount of time, the probability of getting humans is one, i.e. certainty. It is often said that if you have a monkey type random letters, eventually it will type a Shakespeare play. But it is pretty unlikely that this will happen even in three billion years. Three billion years is a really, really long time. But the probability of a random sequence of letters being a Shakespeare play is so small that even after three billion years it almost certainly will not happen.

Some people may think that evolution is just like the typing monkey, and that life as we know it is like a Shakespeare play. As it turns out, evolution is not at all like the typing monkey, and the probability of evolving life as we know it is certainly much higher. But we really have no idea exactly how much higher it is, so we really can't say whether three billion years would be enough or not. If you are inclined to doubt the validity of evolution, then you may find this argument compelling. It is not a proof, however, and I am not aware of any valid way to calculate these probabilities. Despite the high standing of evolution as a scientific theory, too little is known about the actual mechanisms it uses in practice. We don't even know yet what all of the mechanisms are. New ones are being discovered almost daily.

Are Extraordinary Solutions Needed

Before explicitly discussing space aliens, we must first ask whether extraordinary measures are necessary at all. What sort of extraordinary solutions are we talking about here? In increasing order of disruption, here is my list:

- Completely discarding a theory as being completely wrong. Usually there is a replacement theory that may or may not precede the old one. An example is the theory that heat is carried by a fluid called phlogiston. This is actually the least disruptive, because if a theory is completely wrong it can't have been used for much.
- Modifying or extending an existing theory – here the existing theory is not found to be completely wrong, but some special cases, perhaps unusual ones, need new theory to be described accurately. General relativity is a case in point. Newton's theory of gravity is not really wrong. It describes "everyday" reality quite well. But general relativity provides more accurate predictions, especially in extreme cases involving large masses, for example. This can be fairly disruptive because you have to revisit many results which were previously thought to be correct.
- Invoking space aliens. Of course this hardly ever happens, and no such theory has ever been broadly accepted. Some have been proposed, of course, and we will discuss one of them later. This would be very disruptive. Unless you are quite specific about what exactly the aliens did (or are doing still) there would be considerable confusion about what previous results might have to be revised due to possible alien interference.

- God or other miracles. There is a famous cartoon showing a scientist at a blackboard filled with equations. At the bottom it says “then a miracle happens.” The idea is that the scientist cannot figure out how to complete the work, and so he invokes magic, presumably in jest. Invoking god or magic to explain something is equivalent to giving up. Once you have invoked magic, you are done. It explains nothing, but it completes the job and no further explanation is necessary or possible. God and magic accomplish any required feat without need for any known method or following any known natural laws. In fact if there is a difference between gods and space aliens, this is it: space aliens still have to operate within the bounds of the natural universe, but gods, somehow, may not. We’re getting a little ahead of ourselves here, but the point is that if we are doing science, we cannot use something which doesn’t play by the rules – hence no gods.

Can Space Aliens Fix These Problems

Interestingly, the development of life on earth is one of the few areas where theories involving space aliens have a modicum of respectability. The problem of the initial development of the DNA and protein basis of all current life remains unsolved. Part of the mystery is that we have found no direct evidence of anything on earth preceding the kind of biology we see today. One way out of this dilemma is to imagine that it came from somewhere else.

This idea is called “panspermia”. It doesn’t necessarily involve actual sentient beings coming here in spaceships, although it could. The idea is simply that the basic biology evolved elsewhere, earlier in the history of the universe, and possibly floated here as part of interstellar dust. There is plenty of evidence for the existence of basic organic chemistry in space, both locally, in meteorites, and farther away in the spectral signatures found in interstellar dust clouds. So far nothing as complex as DNA or functional proteins have shown up, but certainly we see amino acids and other basic building blocks.

If we are talking about ID, however, then panspermia by dispersion of, say, bacteria, doesn’t count. We need actual intelligent beings to be involved in some way. Certainly this is possible, for this particular problem (development of the basic biology). They could have come here in space ships, bringing and leaving, intentionally or otherwise, some single-celled creatures. Or if they were sufficiently advanced, they could have designed something specific for earth, perhaps as an experiment, that they thought would do well here.

Could aliens have helped with the other main problem, namely how to evolve the major body features we find around us today? Certainly aliens could have done this, in any of several ways. They could have brought with them all of the species we see today. They could have done this either exactly as they are, including, of course, humans. Or they could have brought with them the basic forms, at some level, and allowed the final details to evolve, much as science currently thinks they do. Or, in either case, they could have designed and created them in place, as part of some plan for planet earth.

One question with regard to all of the space alien assistance is what happened to the aliens. Once again there are multiple tempting possibilities. One is that they just left and have not come back, or at least not yet. Perhaps they will one day return to check up on

us (see rapture, in chapter one). Perhaps they are still here and they are either invisible (like god) or they are hiding, maybe not completely successfully, if you are inclined to believe in UFOs. One of the best ideas of all is that we are the aliens, or rather the descendents of the aliens. Somewhere in history we lost track of our extraterrestrial past.

It is easy to imagine all sorts of fantastic stories involving space aliens creating life on earth. Each of them could be the basis of a nice science fiction story. Any one of these stories could very easily be fact. There is only one problem. There is no actual scientific evidence for any of them. Science requires that hypotheses be testable against some form of empirical evidence. People do sometimes invent theories that are so far untested (e.g. string theories of physics). But they must be testable at least in principle, and if they are never actually tested, they will fade away.

What kinds of evidence might we find that space aliens created life on earth? We might find artifacts buried in the ground, such as spaceships, or life-creating tools, assuming we could identify either one of these. But any clearly inorganic artifact, even completely unrecognizable, would be very compelling evidence of something. The best evidence, of course, would be to meet an actual alien, who would then explain to us about the creation of life. Hopefully we would be provided with more than just a story too. If I show up at your door claiming to be a one million year old space alien who created all life, you would obviously think I was a complete nut case.

Another possible form of evidence could involve the discovery of mathematical patterns within existing terrestrial life, that we could somehow prove are “artificial”, and in some way not evolvable. Some people perhaps think that existing life is so miraculous and perfect that it is clearly non-evolvable. But in reality, it is not at all obvious how you could prove such a thing.

One of the most troubling problems with the idea of space aliens assisting with evolution on earth is what created the aliens in the first place. According to the dominant cosmological theory, the big bang, our universe is about 13.7 billion years old. Remember that we are accepting, for the sake of this argument, other parts of science besides evolution. Of this 13.7 billion, the earth has existed for about 4.5 billion years. If we think that it is impossible or improbable that life evolved on earth in 4.5 billion years, how is it possible or probable that aliens evolved in 13.7 billion and then came here to assist in creating life on earth?

If evolution doesn't work to create life here, then what created the aliens? If we needed intelligent design, then the aliens almost certainly needed it too, so what provided the intelligence for that. If you follow this line of reasoning, you'll see that, in the final analysis, it can't be space aliens after all. So it must be god. The reason god can do it is that he is not subject to any of the limitations of time or space, and he can do anything. But this takes the discussion outside the realm of science, which is why we wanted to talk about space aliens in the first place.

Keep in mind that this entire thread is based on the hypothetical idea that evolution does not work and that life required intelligent design. If we could satisfactorily prove that hypothesis, then we can make a convincing argument that the intelligence involved is probably some god (not necessarily any of the gods we know about, by the way – just

some god). Of course the position of evolution advocates is that evolution works just fine, and the ID requirement has not been demonstrated.

How Much Evolution is Possible Without Design

There are hundreds of different breeds of dog, varying from the Chihuahua to the Great Dane and everything in between. It is clear that this variation was created by humans in the process of domestication and selective breeding. Although all of these animals do have the same basic body parts, the variation in size, shape, color, hair, and so on is really dramatic. So we know that these traits can evolve through selection, and can do so in a pretty short time. These different dog breeds were created in something less than 10,000 years.

Now the evolution of these dog breeds did involve intelligence, assuming you agree that humans actually have some. Many of the extant breeds would not survive in the wild without human care, so they clearly could not have evolved there. Perhaps this is the kind of intelligence involved in ID. It could be that space aliens came here and simply interfered with natural selection in such a way as to produce humans. Did they leave then, to see whether we could survive in the wild? Or are the space aliens still here, lurking invisibly around us, making sure we do survive? Are they even secretly still interfering with natural selection?

So let's accept, based on the dog evidence, along with a very large body of more recent experimental evidence, that living things can evolve at least some traits. It is reasonable to suppose that they have in fact been evolving in at least this way, at least in recent time. And if we accept the fossil record, life has been evolving in some way for over three billion years. So the question is, at which point or points did intelligence intervene? If we again refer to the fossil record, and we deny that major new branches can evolve by themselves, then we have to suppose that the intelligence visited earth on a very regular basis, each time a new branch showed up in the tree of life.

Of course you can deny the evidence of the fossil record and suppose that the intelligence created life mostly as we know it today, and it has only evolved slightly in recent time. Perhaps we started out with only one race of humans, say in the middle east, and then they did evolve from there into the multiple races and regional characters that we see today. There are really endless possibilities here, and the point is that if you advocate intelligent design, you have to explore these possibilities and start to make some specific proposals. If you are going to propose an alternative scientific theory, you have to work on fleshing out that theory (so to speak). It is not sufficient to simply debunk existing theory.

Where Do the Space Aliens Come From?

When I talk about space aliens, do they have to be little green men from another planet, or another star, or galaxy? No. All I really mean is some heretofore unknown life form. It could be from earth itself, and strictly local. Or it could be spread out in space and time, even into multiple dimensions (of the sort physicists talk about). So it may be spread over the entire milky way, for all we know. I am just trying to clarify that my use of the term is not necessarily limited to recognizably "animal-like" things, and may well include things that might seem more "god-like".

If you think about the Star Wars films, you know that they had lots of typical science-fiction space aliens in them. But there was also “the force”. If you think the force was a kind of intelligence, then it probably qualifies as a space alien, even though it is not a “material” being. The only thing that could disqualify it as a space alien would be if it was not subject to the laws of nature. That would make it a god instead.

By extending the concept in this way, it becomes much easier to imagine that the intelligence that designed life on earth is actually some sort of invisible force. It is quite reasonable to suppose that this force could still be present. And there is really no reason to suppose that highly advanced space aliens would not, in fact, take this form, or at least be able to create such an entity.

What is the difference between some powerful, invisible force, and god? If there is a difference at all, it is between the natural and the supernatural. Later we will have a lot to say about the supernatural, but for now, the thing to understand is that the invisible force, as space alien, is part of the natural universe and is subject to all of its laws. It can, in principle, be understood and communicated with. On the other hand god, in some interpretations, transcends the natural universe and can do anything at all. Worse yet, it is, in principle, impossible to understand god, although it may supposedly be possible to communicate.

Why Are These Questions Rarely Discussed

It is curious that the questions I have discussed above never seem to come up in any of the debates on intelligent design that I have heard or read. Both sides seem determined to defend their territory and dismiss the initial position of the other. To some extent this no doubt comes from a sense that an open minded discussion of all the possibilities will be seen as weakness. Evolutionists feel that having any discussion at all with an ID proponent give them too much credit for having a scientifically tenable position. However true this may be, they are passing up a lot of fun with space aliens, and are also exposing themselves to the easy criticism of being close-minded.

But I think there is something more sinister happening on the ID side of things. Historically religion has always been opposed to so-called “free thinking”. Free thinking either was, or lead to, atheism or alternative religions, and this could not be tolerated. When god is mentioned as the reason for something, this is not meant to lead to discussion of why or how god did this thing. It is meant to end the discussion and change the subject. Even though intelligent design is put forward as not specifically religious, I suspect that it is not really meant to be an explanation or to be further explored. The idea is that we were designed, period. End of story. There is nothing more you need to know. So if you have an ID proponent who resists exploring the details of the design and how it worked, then you may be getting the real message.

Summing Up

The subject of intelligent design is a bit of a diversion from the main thread of this book. However, it is so much an issue in current events that I think it is worth examining in some detail. And since creation of life is something that god is claimed to have actually done, it does serve as a kind of segue way to the next chapter. In addition, it does have something to do with space aliens.

My own summary of the matter is intelligent design is this. It is clear that evolution works, at least on a small scale, since we can see it happen in the lab. Furthermore, we actually understand a lot of detail about exactly how it works. And the fossil record is consistent with the idea that all of life as we know it did result from evolution as we understand it. However, it is also true that we don't fully understand in detail how evolution actually produced all of the body forms that we see today. Furthermore, we currently know very little about how life began before evolution took over and did the rest. There is plenty of room here for the participation of space aliens (or god, if you prefer) at some time in the past. It seems improbable, and is not necessary, but it is impossible to completely rule it out. However, there is certainly no evidence for it, and, as with other sciences, we choose not to invoke space aliens just because there is some piece we don't fully understand yet.

Chapter 4: What Does God Do

We have looked briefly at whether space aliens or god was involved in the creation or evolution of life. We will now take a big jump and explore what other things gods or aliens might do, or be able to do. Oddly enough, this is something people rarely seem to think much about. People say they believe god exists, but they don't really have much idea what god can or does do to affect their daily lives. God must do something, or else it seems irrelevant whether he exists or not. Even if he only controls the afterlife, that is still something. So in this chapter we'll explore some of the things god might do, as well as some of the things people apparently think he does do. We'll start the chapter with the most grandiose claim, namely that god controls everything, and progress to some weaker claims that perhaps many more people accept.

I need to make one thing clear before we start: this chapter is about what god does in the "natural" world, namely the world that we humans can experience in some way while we are alive. If you think that god operates entirely in the "supernatural" or "spiritual" world, then in the context of this chapter you think that "god does nothing". We discuss the question of a supernatural world in the next chapter.

God Does Everything

Many people talk as if they think god controls everything in the universe, down to the finest detail. If true, then this would really distinguish god from space aliens, except perhaps for space aliens from a parallel universe. At one level this is a sort of philosophical conundrum, like solipsism, that can't really be disproved, but it is pointless to believe in, because has no explanatory or predictive utility. God would be just another name for the universe and what it does and how it works.

This idea is coupled with the idea of free will. If god controls everything, then he controls people as well. The idea of people doing god's will, or not, becomes meaningless. If it is god's will that you do a certain thing, then he will just make you do it. So if you press people on this, they will have to allow that in some way god doesn't control people, leaving them to do god's will or not, and be judged accordingly. Of course people's choices and actions affect everything they touch, so god must not control these things either. If he did, then we would find that when we push on something, it might move in a different direction, or perhaps not move at all. It is difficult to see, in this interpretation, what is left for god to control.

A related idea is that god actually "operates" the universe, in the sense of creating and maintaining the causality and orderliness that we observe. It is true that we don't really know why the universe behaves the way it does. We do not know why the laws of physics are what they are. Saying that god enforces the laws of physics, however, doesn't change anything. It is just giving a name to our lack of knowledge. We would still want to know how and why. Furthermore, this would be a rather uninteresting god. No "intelligence" is required to operate the universe, any more than intelligence is required to make a clock keep time. Does anyone think that if everyone stopped going to church and praying that the universe would stop working right? Note, by the way, that this idea

is not the same as the idea that god “designed” the universe at its outset, but after that it ran on its own. This is a much more interesting proposition that we will discuss later on.

God Can Do Anything

It is sometimes said in Christian church meetings that “god can do anything.” This is often said in the context that there is a list of problems in the world that god could fix. It somehow doesn’t occur to people to wonder why god hasn’t already fixed them, or why they were allowed to get that way in the first place. Apparently what is meant by this is that there are a lot of bad people in the world who cause the bad things, and that if there were just more proper Christians, then these bad people would either be converted, or otherwise overcome, and everything would be better. Apparently the people already in the church are not enough – more are needed.

So really, in this case at least, it seems that god is not really doing much of anything. What is actually being proposed is that by sheer force of numbers, *people* can do “anything”. God’s role in this may simply be to inspire the people to do good things. Perhaps he provides help in converting more people, so that there are finally enough to do the job. No further assistance from god is mentioned specifically. Now even if god’s only contribution is the inspiration, then that is still something pretty definite that is worth further attention. Many people think that god provides a moral framework without which the good could not be known. So when the good works start to finally get done, either god communicates the directions to the people at the time, or he communicates the morality in advance, and the people use that to guide their actions. Either way, god’s role in this involves mental communication, and we will discuss this much more, later in this chapter.

If you ask people directly about what god does, some fraction of religious people will tell you that god really can do anything. If you press them, you will find that they believe in a kind of invisible superpower. Perhaps they haven’t thought about the following distinction, but in order to discuss whether god really does do superpowered things, I would like to divide these actions into two types: things that ordinary people cannot do, and things that also violate the laws of nature.

God Uses Advanced Technology

Let’s call the first class of things “superman” things. For example, superman can fly, and has x-ray vision. People can’t and don’t. But x-ray machines have x-ray vision, and airplanes can fly. So superman can’t do anything that violates the laws of nature. Curiously no one would equate superman with god. In fact superman is supposed to be a space alien from the planet Krypton. No one thinks that space aliens are gods, but we discussed this whole issue already in chapter one. It is impossible to say this often enough: any sufficiently advanced technology is indistinguishable from magic.

Perhaps invisibility has something to do with it. Imagine that a person is falling from a tall building. Somehow, instead of hitting the street and being killed, they slow down and land softly on their feet. What would people think of this? There are several possibilities:

- It is some kind of movie special effect. You might want to know how they really did it, but many people would walk away without a second thought, now matter how well done it was.
- You think that this person has super powers. Perhaps it is a space alien. If you are the only person who sees this, and this is what you think, then other people will think you are crazy. Perhaps you will avoid telling them. Perhaps you will wonder if you really are crazy.
- The person was saved by an invisible superman. The comic book superman saves people like this all the time. Of course the comic book superman is not invisible, and doesn't even have that superpower, so you probably won't think this. If you did, then see the previous bullet item.
- You think that the person was saved by god. This thinking may be bolstered by the knowledge that the person is a devout Christian, and that the falling was not suicide but was the result of an accident or some dastardly deed done by an evildoer. Not everyone would accept this explanation, because many people do not actually believe in this sort of god, even if they do believe in god. But probably you would not be universally thought to be psychotic if you told them that you believed this. If you do believe that god does this kind of thing, then apparently you believe that god is a sort of invisible superman.

The important thing about this example is that none of the interpretations, even the one involving the invisible god, require any violations of any known laws of nature. Birds can fly, and, with various kinds of technical assistance, people can fly too. I think that this is part of the reason that people don't seem to expect that god will save people falling from buildings, at least not in this rather "ordinary" way. Perhaps god works in ways that are either more subtle or more bold.

God Is Not Subject to the Laws of Nature

Let's explore the "more bold" alternative first, because there are a lot more possibilities on the more subtle side. People may think that god would not stoop to mere technological feats. But they still want to think he can do anything, and don't want to think there are any limitations to this at all. This could mean that god can violate the laws of physics at will. After all, god is commonly thought to be a single intelligent entity that spans the entire universe in both space and time. This seems to imply faster than light communication among the parts of god (in order to form a single intelligence), and also time travel.

What does it mean for science, though, if god can routinely violate its laws? If god did this all the time, then science would be impossible, because no reproducible, consistent experiments could ever be done. Reproducible, consistent behavior is what scientists combine into so-called "laws". But if god regularly did whatever he felt like, then we could observe no such behavior and hence there would be no laws that we could deduce, even though there might be some if god just stopped violating them.

Maybe god only very rarely violates natural laws. Certainly scientists do see glitches in their data from time to time that clearly seem to fall well clear of their other observations.

Sometimes they blame this on glitches in their measuring equipment. Other times they may investigate further but find the problem is not reproducible. Either way the data is usually set aside, and may or may not be recorded for posterity. It is not outside the realm of possibility that these glitches are manifestations of god.

But you will never find a scientific paper that includes a section of results ascribed to god. You will never find a statement like “except when overridden by god, the following observations are seen to hold.” This is not just because many scientists don’t believe in god. It is not even because they don’t believe in a god who routinely violates the laws of nature. There is a deeper reason. When a scientist observes phenomena that cannot be explained using accepted science, they propose new science and then they set about exploring the new phenomena in more detail. The end result may be modifications or extensions to existing theories.

The problem with using god as an explanation for some observation is that this has no explanatory or predictive power. It does not even have reproducibility or even causality. It is just that god decided to do that particular thing on that particular day. If you think perhaps you could find some insight by exploring the mind of god, you will generally be advised that it is impossible for a finite human to understand the infinite mind of god. So this is the equivalent of saying “move along now – nothing to see here.” So if you were ever to invoke god, that would simply be putting an end to that line of inquiry.

Before we leave this subject I need to mention one further possibility. Some people think that god *could* do anything, and is not subject to the laws of nature, but never actually *does* do anything. That is, he never reveals himself to us in this way. This is because, while god expects faith, for some odd reason he insists that it be completely blind. So he somehow prevents our observing anything that would directly prove his existence. This is a little bit like space aliens, in that somehow nobody ever gets a really clear picture of them, but in spite of this many people are convinced they are here.

Now there are two cases to consider here: 1) he does things that we can observe, but somehow, like those frustrating space aliens, we can never be quite sure we saw it, and he never does anything when we’re looking for it. Or 2) he does whatever he wants but somehow tinkers with our observations so that we can never see it. The first of these will always be a possibility. It is just another way in which god is indistinguishable from space aliens. But it does seem to be rather limiting on a supposedly all-powerful god. He can do anything, as long as there is not a camera nearby. At the same time, this would be consistent with the observation that people often have to go to remote, inaccessible places (deserts, the tops of mountains, etc.) in order to have their one-on-one with god.

Finally, consider the second possibility, namely that god does whatever he wants, but then manipulates our observations, memories, or whatever, in order that we cannot actually observe it. This is entirely equivalent to saying that the world is not as we see it, or more precisely, we can observe only a part of the “real” world. I’m going to spend a lot more time discussing this in the next chapter, but the bottom line is that what we can’t observe has, by definition, no effect on us, so consequently it is irrelevant. If god exists but can have no observable effect on us, then he is irrelevant.

Common “Miracles”

Some people say that they know god exists because of the many miracles he performs on a regular day-to-day basis. In this section we'll examine some of these miracles to see whether these are things that god does. As we'll find out, the reasoning goes like this: you already believe in god. You see something unusually good, and, naturally you give credit, or partial credit, to god. Therefore god exists. Of course if you are predisposed to think that god plays a role in everything, then certainly you will see his good works everywhere you look. But in every case, if you ask whether any particular miracle actually *requires* god's participation, you will find that the answer is no. Here is a joke that explains what I mean. One farmer is admiring a second farmer's beautiful field of corn, and says “you and god have certainly done a miraculous job with this land.” The second farmer responds “I didn't notice that god had done much with it before I got here.”

Miracles in Everyday Life

Very often when a child is born to a friend or relative someone will say that childbirth is a “miracle”. What do they mean by this? They are not necessarily referring to god. The process of development of an entire new human being starting from sperm and egg is so remarkable that it does seem like a miracle that it works, despite the fact that it happens several times a second somewhere in the world. Science is a long way from a full understanding of this process, but we do know enough to say that it is certainly a normal biological one. There is no need to invoke anything supernatural to explain childbirth. As far as we know, there are no space aliens of any kind attending the delivery. On the other hand, if you already believe in god, then most likely you also believe that god plays some role in childbirth, even if it is only to impart a soul to the child at conception, or perhaps somewhere else along the way. We'll have more to say about the soul elsewhere, but if you also think that god had something to do with the biology, then it is incumbent upon you to say something more about which parts were done by god. Maybe you simply think that god created the initial conditions in the universe, thirteen billion years ago, that led to this, and therefore made it possible. This too will be discussed in detail elsewhere.

Another sort of everyday experience that people sometimes associate with god is the beauty and majesty of nature itself. A view of the ocean, or a sunset or a striking mountain range can be spectacular. A view of animals going about their routine activities can be inspirational. Watching birds in flight is not only beautiful, but their abilities seem almost magical. How do they do that, anyway? Is it a miracle? Surely this cannot have developed by chance. Or can it? Although birds still have a few things to teach us about aeronautics, we do know quite a bit now about how they fly, and even about how they came to have their specific abilities, species by species. So again, there is no reason to think that birds are space aliens, or that invisible aliens are pushing them through the air, or even that they were designed by space aliens and not by evolution.

The Miracle Cure

One of the all time favorite tricks that religious people perform is to heal the sick. Of course it is well known that many “faith healers” are complete fakes. The people they seem to heal are just actors who are not even sick in the first place. Still many people of faith do believe that god can heal the sick. If you have a friend or relative who is sick,

and you pray for him to get well, and he does, then god answered your prayers and healed him. If he dies instead, well then, that is because god decided that his time was up.

In order for a person to become a saint, that person must have performed “documented” miracles. The latest pope, John Paul II, is on the fast track to be made a saint, and he apparently already meets this requirement. It turns out that many of his miracles involve curing the sick. Can the pope really cure sick people? In a curious sort of way, he probably can. Let’s see how this works.

There are many ways in which diseases, especially viral or bacterial diseases, but also cancer, can clear or at least go into remission. Sometimes this involves drugs, but most commonly it involves at least some participation with the person’s immune system. The human immune system is extremely complex and much still remains to be understood about how all of the parts work together. One of the things that remains poorly understood is how the higher levels of the brain may influence the functioning of the immune system. There are hints, however, that one’s state of mind may have some significant effect. If you are depressed and hopeless, your chances of recovery may be worse than if you are optimistic.

So let’s say you are very sick, but you believe that if you could just get a visit from the pope that you would be cured. And then you do get a visit from the pope. Now you are not only spiritually inspired by the experience, but you now really believe you will get well. This may just be enough to actually kick your immune system into action so that you do get well. So in a way, the pope did cure you. But was it god? I don’t think so. External events influence the brain, which helps boost the immune system, which cures your disease.

You may ask “wouldn’t it just be simpler to say it is god?” Isn’t the simplest explanation more likely to be right? Yes, if it were an explanation. But as I will say as often as I can, god has no explanatory power, and no predictive power. Some research has shown that prayer does not help the sick. But it may well be the case that cheering them up will help them.

Miraculous Manifestations

In 1976 the first Viking orbiter at Mars took pictures of a formation that looked like a face. Subsequent pictures at much better resolution by later orbiters showed clearly that this was an ordinary geological formation and that the resemblance to a face was just an accident of the time, viewpoint, and low resolution of the early images. In spite of this, a small group of individuals cling to the idea that this is a real artifact, built by space aliens, perhaps by Martians. What this illustrates is the extraordinary psychological power of belief. Once a belief takes hold in your brain, it can become totally convincing, even when faced with contrary facts.

The human brain is very finely tuned (by evolution, of course) to recognize human faces. If you stare at a complex pattern for a few minutes you will begin to see little faces in the pattern. This happens all the time, and most people don’t think they are seeing miracles. Every so often, however, someone stares at a piece of wood, or a tree, or even a grilled cheese sandwich, and begins to think they see the face of christ or of the virgin mary. They can become convinced that they have witnessed a miracle. This conviction can

quickly be reinforced by their religious faith and then become certainty. When other people are shown the same pattern, they often see nothing unusual until they are told what to look for. Still, under the right circumstances, such a sighting can become widely accepted as an actual miracle from god. Apparently all of these people think that the likelihood that a pattern formed by wood grain resembles a face is so low that it must surely have been put there intentionally by god. If this is what you think, then there is probably no further argument that could convince you otherwise.

God Plays At Dice

When Albert Einstein famously said “God does not play at dice,” he wasn’t making a religious statement, but was using “god” as a metaphor for “the universe” or for “the laws of physics” if you like. Since that time, many physicists have tried desperately to prove that Einstein was right. So far no one has succeeded. As more and more experiments seem to confirm the correctness of quantum mechanics, many people feel forced to accept its statistical interpretation as a fundamental property of the universe. This has allowed some people to further conclude that this property of quantum mechanics is the source of free will, since it is the only source of true non-determinism in an otherwise deterministic universe. Amazingly, it has even allowed Roger Penrose to suggest that humans can exploit this non-determinism to circumvent Godel’s incompleteness theorem and gain the ability to prove mathematical theorems that a deterministic computer couldn’t prove.

One of the more interesting ideas about god is that he can manipulate random events to achieve desired outcomes and still avoid detection. Recall that many modern christians believe that god never reveals his existence because, for some incomprehensible reason, he insists that faith be blind. I guess the idea is that if god plainly demonstrated his existence every day, then it would be easy to believe in him and so everyone would. Thousands of years ago, everyone believed in some god, because the sun kept rising and the crops kept growing, and these were clearly the work of some god. It was only a question of which one: Zeus or Yaweh. Today, there are still choices, but atheism or agnosticism has become one of them. God apparently wants you to be free to choose between him and nothing, so he must be careful not to reveal his actions in a measurable way. You may think that he could exploit randomness to this end. We’ll see here that this is harder than it may seem.

Let’s start with a coin-flipping experiment. Suppose we have one person flip a coin, and we have a second person pray to god that the coin comes up heads. I think everyone would be pretty surprised if this worked and the coin came up heads every time. This would be true even if the prayer was a devout person and was honestly praying for heads. Of course no one, even the most devoutly religious, think that god explicitly answers every prayer. Instead it is believed that he hears them all but somehow picks and chooses which ones to fulfill.

In any case, it turns out that coin flipping, like many apparently random processes, is really not very random. Given the same initial conditions, the result will almost always be the same. The biggest variable is the initial position and momentum given to the coin by the flipper. Then there is the density and motion of the air. And then add to this any microscopic variations in the shape of the coin, the table, and so on. If god modifies the

conditions on any of these levels, then he is not really changing the probabilities of truly random events, but is simply modifying normal things. Even a space alien could do this. Not to mention that gambling cheats routinely do such things as introducing loaded dice and unfair coins. You may think that god can and does do these things too, but either way, we have discussed that elsewhere.

That leaves the possibility of quantum uncertainty. Since coin flipping is a macroscopic phenomenon, it is not known for sure exactly how it is affected by quantum uncertainty. Assuming it plays some role, it is probably very small, but it might be measurable.

So suppose that god decides to answer the prayers by skewing the probability just a little, so that just a tiny extra fraction of flips come out heads. Say 51 heads out of 100 flips. If this happened in one experiment, it would be well within the bounds of normal statistics. There would be no reason to believe that anything unusual was going on, but still the prayer would be getting his wish in a small way. But if we did this experiment 100 times, and got 5100 heads out of 10,000 flips, now we have a different story. Now the results are statistically more significant. If you think you have an effect which is too small to confirm with a single experiment, you can get more data, and eventually you'll have enough to either confirm or disprove your hypothesis (in this case, that god is influencing the outcome). Sometimes different people do similar experiments over an extended time, and a statistician collects them and combines the results to draw a statistically significant conclusion. This is called a meta-analysis. The point is that if god is going to manipulate the outcome of coin-flipping experiments like this, he must be very careful. He cannot manipulate them all, or some meta-analysis will show that god (or something, or someone) is interfering with the experiments. He must carefully pick and choose to manipulate only a very few of them.

Perhaps you think that god wouldn't waste his time with silly coin-flipping experiments. He has more important things to do. Of course an infinitely powerful god would have plenty of time for anything, but still, coin-flipping may be too frivolous for him. But you still think that he decides where and when to send earthquakes, tsunamis, and hurricanes. You think maybe god sent Katrina specifically to New Orleans for some reason. Surely there were devout people in New Orleans, praying that the hurricane would not kill them, but it did. Certainly there were a lot of "immoral" people there too, and god, in his own inscrutable way, despite his power to do anything, decided not to just punish the bad people with heart attacks and cancer, but instead to punish the whole city for allowing things to get so out of hand.

So perhaps god used his ability to influence the apparent unpredictability of weather patterns to make a hurricane go to New Orleans. We have records going back quite a few years detailing the paths of all major Atlantic storms. One could easily do a statistical analysis on these and see if there was anything unusual about the sequence. Probably the single event of a hurricane going to New Orleans wouldn't show up as anything special in this analysis. On the other hand, if every hurricane had been directed by god we would very likely see something funny. It is conceivable that god directs all of the hurricanes, but somehow does it in a way that still satisfies all of the statistical tests one could do. But this would be like saying that the coin flipping experiments all come out 50-50, but god picks which 50 will be heads. This is in turn equivalent to saying that god actually

controls everything but always does it in a completely regular way, so that it follows all the rules of physics and statistics, and hence, does not seem particularly godlike.

The bottom line here is that, while god could have brought Katrina to New Orleans, and that might not be noticed by itself, he had better not do any more hurricanes for a while or we might notice. This means that god's power to influence random events is really very limited, so if this is the best that an all-powerful god can do, I'm not very impressed.

God Gets Inside Your Mind

Perhaps most common of the things that people think god does is to communicate with people through their minds. If god listens to prayers, he clearly does it by reading your mind. If you pray out loud it is only to help other people pray with you, or to ensure that they are thinking or praying the same thing you are. It is not because god will hear it better. So if you think that god listens to prayers, you almost certainly think that he reads minds. If you don't think he listens to prayers, you probably don't think he speaks to people through their minds either. But if you do, and you think that god has some effect in the world, other than what we have already discussed, then chances are pretty good that you think god communicates to people through their minds. But there are many possibilities as to exactly how and when, and to whom, he does this. At one extreme, we have the simple idea of conscience or moral sense, and at the other extreme we have partial or complete periodic mind control.

Is Your Conscience God Speaking?

If you are on a diet and you are tempted by a dish of ice cream, there is a sort of "little voice" in your mind that tells you not to do it. It is not obvious that god takes an interest in your personal diet, but then he is infinite and all-powerful, so it would be a small thing for him to help you out here.

Now if you are contemplating murder or physical harm to someone you have come to dislike, that same little voice tells you it would be wrong. Now this is clearly a moral issue, even if you think the dish of ice cream is not. Many religious people seem to think that morality can only come from god. The question is how it comes. Does it come to you personally? If so, is this voice of conscience just the voice of god?

If Morality Comes From God, How Is It Communicated?

Let's take a moment to discuss the question of morality. Despite what some people think, atheists do have moral principles, and they are generally comparable to those of religious people. It is not my intent here to present a general theory of secular morality. There are plenty of other books that address that issue. What interests me here is this: if people do get morality from god, how do they get it? One possibility, as we just mentioned, is that god communicates it to all people through mental communication of some form. One form might be conscience, but there are plenty of others. In any case, if morality comes through individual communication, what exactly is communicated, and when? It seems pretty unlikely that god gives you your complete moral code all at once. I doubt anyone would suggest this. Most likely you would get some communication on a particular issue just when it is relevant, such as just before you are about to violate god's rules, and for some time afterward, regardless of which choice you make. Also, when someone else

takes some notable action, there are often plenty of people around who claim to know whether this action is moral or not. Interestingly, these assertions are not always in agreement. Now god can clearly have only one opinion on the matter, so if people are getting their morality from god, then some of them are getting it wrong.

It could be that god doesn't talk to everyone about morality, but only to priests or better. So individuals then get their morality from the church. The pope must have the best channel to god, since he is thought to be infallible at certain times. The catholic church has always claimed that god speaks only through the church and never to unsanctified individuals. The protestants mostly think that god talks to everyone. Apparently no one can tell, because for hundreds of years, people fought wars over this issue. What god was apparently telling them was that he would continue talking to whoever won the wars, in whatever subset they thought was right. Nowadays people think that god wants them to stop fighting over this, but clearly there has been no decision about who was right. Of course there are now, and always have been, plenty of people who claimed that god has spoken directly to them, but hardly anyone seems to think this is evidence on the issue any more.

Finally, on this question of communicating morality, it could be that morality comes only from the bible. It still could be that god communicates with people, but not to answer moral questions. Many people believe that the bible is a complete and perfect moral code. Now even those who believe that the bible is the literal word of god generally don't believe that god physically wrote it. But they apparently believe that it was written by some very special people who were channeling god. Obviously god was communicating with these people. I'm guessing that he didn't dictate it out loud, but gave it to them in visions or whatever. So this was probably some form of mental communication, but the interesting thing is that god apparently stopped doing this long ago and has never communicated in this form since. I think that some people would go so far as to say that god no longer communicates in any form at all. He simply gives us a soul when we are born, and then transfers the soul to heaven or hell, depending on how well we follow the rules in the bible during our lives. This is actually one form of the "god does nothing" position, which we'll come to shortly.

We return now to the question of conscience. There is no question that conscience is a real part of human experience. Though there are no doubt some exceptions, almost everyone has this experience, including atheists and people of all religions. Freudians refer to this as the superego. So if your conscience is god talking, then he doesn't discriminate based on what you believe, or on anything else, since he apparently talks to everyone. A natural question is whether he gives consistent moral instruction to everyone. You may say, for example, that he tells everyone not to kill. But when people go to war, the picture is less clear. Some soldiers do have to overcome a twinge of conscience in order to kill the enemy, but not everyone has this problem. Some soldiers believe that god is telling them that it is a good thing to kill the enemy. As a soldier god still tells you not to kill yourself or your friend standing next to you, though. But apparently god is telling your enemy the exact opposite, namely that it would be highly desirable for him to kill you and your friend.

God Talks To You In Your Dreams

It is very common for people to dream that they are flying. It is very rare, however, for people to wake up and believe that they can fly. And yet some people seem quite willing to believe other things that they see in dreams. Suppose you dream you are abducted and medically examined by space aliens. When you wake up you might think “wow, interesting dream”. But if you are inclined already to believe that space aliens are real, you might well be convinced that the dream is in some way related to actual reality. If you think this, others might think you are just a little crazy.

Lets say you see your mother in a dream. Your psychologist would probably consider this significant, without necessarily thinking you were crazy. But could it be real? If you mother is dead, you may well be inclined to think that you have communicated with the ghost of your dead mother. Since no one can refute this, you may well continue believing it. You may learn, over time, to communicate with other dead people as well. Since a very substantial number of people believe that humans have souls which live on after death in some spiritual realm, a large subset of them also believe that some people are able to communicate with them. Remarkably, despite the obvious religious connections here, you don't often hear much about the circumstances of the ghosts. Are they in heaven or hell, and what is it like there? Apparently this is not important. Rather they came back to give us some advice. It's always about us.

What if your mother is still alive? How real can that be? If your mother is actually asleep in the next room, perhaps you think that you had a mutual dream. Perhaps in the morning you find that she had a dream involving you. Not at all unlikely, but this could be a powerful confirmation that the dream world somehow touches another kind of reality. Yet another confirmation can come like this: you believe that time travel is possible in dreams, and you see your mother involved in a traffic accident. Given the relatively high probability of traffic accidents, it is quite likely that unless she is very old, or never travels by car, that at some future time your mother actually will be involved in a traffic accident. There are plenty of people who become certain, via some sequence of not-improbable events, that they once had a dream containing a vision of the future.

Obviously none of these dreams *requires* a supernatural interpretation. But many people *want* to believe the supernatural interpretation. At least as long as it is not too freaky or nonsensical, and is not obviously false. Curiously, people would be less likely to believe that you had obtained the ability to fly in a dream, than that your dead uncle had become an angel with wings, and could now fly. So humans seem to have a strong psychological desire to believe in “supernatural” things. They seem to have no particular desire to know how such things work, or even if they *could* work. Such knowledge is considered either forbidden, impossible, or, at best, disappointing. Although we don't have any real idea how it would work, it is not inconceivable that you could communicate, in a dream, with your living mother in the next room. But knowing that you could, and knowing how it worked, would somehow rob it of its mystery.

So with this as background, consider what happens when a dream involves a conversation or other interaction with a person matching someone's image of god or Jesus. Surely there would be a strong tendency to believe that this was a real conversation with god. It is actually surprising that this doesn't happen more often than it does. Perhaps people

simply don't report it because they assume it happens to everyone. If you reported such a dream, other people of your religion would mostly accept it without question as being literally true. Agnostics and atheists might question it silently, but would give you wide latitude to believe what you wanted about this dream, and would not question your sanity. But just try reporting that you were visited by real space aliens in a dream, and see what people think about your sanity.

Suppose one day that you are reading a book containing descriptions, or maybe even pictures, of hindu deities. And then that night, you are visited by shiva in a dream. Perhaps last week you read a book about coal miners, and you had a dream about them. Most likely, if you are a christian, you would equate these two dreams as both reflecting something derived from your daily activities. And yet if you had a visit from jesus, you might be inclined to think there was now something truly mystical in it. You might resist, perhaps because you are a scientist and you think that dreams are all made out of the same imaginary stuff, no matter how interesting this might be from a psychological standpoint. Still, you might well feel the tug of a wish that this dream – your dream – was really something different.

Now my point in going through all of this is not to try to prove that dreams are not contacts with god. I can't do that, any more than having such dreams proves that they are contacts with god. This discussion proves nothing one way or the other. What I hope it does, however, is provide a framework for thinking about the really interesting things people think about dreams.

Does God Appear To Your Waking Mind?

Suppose that one day a man shows up at your door and claims to be god. He is clean-cut, wearing a dark business suit. You are not fooled. He is not god – he is a Jehovah's Witness. Still, he repeats his claim that he is actually god, and that you deny this at your peril. You're still not buying it. What would it take to convince you? It would help if he *looked* like god – white hair, beard, maybe a long flowing robe. Anyone could dress up like god though, so his Halloween outfit is still not enough. A visible halo or some other kind of aura might do it. But in any case it would definitely take a lot of convincing.

But one thing is for sure: *some* man came to your door and claimed to be god. If someone tried to convince you that you made this up, you would be prepared to have a fight. You do not remember falling asleep or waking up, and the experience had nothing resembling a dream-like quality. You don't take drugs, and have no history of hallucinating. So this experience was *real*. You *know* this with certainty.

Now let's change the experience a little. We'll put you into a *trance* first. I'm not talking about anything mystical or supernatural here. There are many known, documented, reproducible ways to induce specialized mind states, and I am going to call these trances, just to have a common name for them, even though they may differ in various ways. What do trance states have in common? Even though you remain awake and aware, your perceptions are generally modified, and your level of control and suggestibility may be altered.

It is far beyond the scope of this work to explore the trance state in any detail. Perhaps this is a mistake, since the trance state, for many people, is probably the central

mechanism that confirms their religious faith. However my personal expertise in this area is very limited, and there are many other works, such as *Why God Won't Go Away* that do explore this in detail. For our purposes it is enough to discuss how the trance state seems to change people's perception of reality, and how they can come to see god within this new perception. There are many ways that the trance state can be induced. Among these are meditation, hypnosis, and various forms of rhythmic music and dance.

So now, in your trance state, let's say you have something like the same experience I described above. You meet a man who claims to be god. Because you are aware of your trance state, you are conditioned to have different expectations regarding your experiences. You may well view the trance state as a kind of portal to a parallel or even supernatural existence. You are already willing to believe that anyone or anything you see there is in some way a resident of the special world that you are visiting. So his burden of proof is much lower regarding his claim to be god. So anything godlike might be enough.

What is really remarkable about the trance state is that experiences there are viewed with the same kind of certainty that accompanies normal waking experience. If you become convinced that you spoke with god while meditating, then you are just as certain of that as you are that a Jehovah's Witness came to your door. I believe that this is the mechanism by which many people become "born again". Many religious ceremonies have the ability to create trance states. You may attend a religious ceremony at a time when you are especially susceptible to entering a trance state. It could therefore happen that by the end of the ceremony you find you now have an absolute certainty about your religious faith where before you had doubts or perhaps just lack of interest.

The two interesting properties of trance states are 1) the susceptibility to "supernatural" experiences during the trance state, and 2) a tendency to "know" for certain that waking experiences, and especially the trance-state ones, are "real". I will cite two recent experiments that bear on each of these properties.

It was discovered, by accident, during a brain surgery procedure, that electrical stimulation of a certain part of the brain could cause the person, who was awake at the time, to have an out-of-body experience. When the stimulation was turned on, the individual immediately perceived that they were floating at the ceiling, observing their own body and the operation in progress. When the stimulation was turned off, this perception immediately stopped and the person was back in their normal body. This sort of out-of-body experience is commonly reported as well. The latter experience is apparently so compellingly real that it is taken as "proof" that the mind contains a soul or a spiritual component which is separable from the body. The brain stimulation reveals, however, that the experience is actually a neurological one which, however surreal it seems, is actually pre-wired into the brain. It is a matter of serious debate among scientists as to what evolutionary purpose, if any, could be served by this apparently special wiring. Regardless of how it came to be, it seems clear that the human brain has the propensity to have "supernatural" experiences during trance states.

The second experiment I will cite is one involving sensory illusions. In particular, it is possible to induce a false sense of being touched by some object, such as a feather. The goal of the subject is to try to distinguish the illusory touch from the true one. The

interesting thing about the result is that some subjects were so convinced that the touching was real that they accused the experimenter of lying to them, rather than accept that they had been “tricked” into having a false sensation. What this shows is that primary sensory experience gives some people a sense of certainty that leaves no room for consideration of subsequent contradictory information. If you too had the experience, they will say, then you would believe. If you haven’t, then you simply don’t “know” as they do.

Where Does This Leave Us?

We began the chapter with the idea that perhaps god does everything, and ended with the idea that the human mind can contact god in the supernatural world by entering a trance state. The latter is “almost nothing” in the sense that it involves only a limited sensory experience of the “supernatural” realm. Still, it results in a contact with the natural world that has direct effect there on the subsequent actions of the individuals involved. In the next chapter we’ll leave the natural world aside and discuss what this supernatural world might be like.

But we can’t finish without mentioning that many people profess the idea that religious faith is, or should be, completely blind. This is equivalent to saying that god does nothing. There is no contact at all possible with god, but nevertheless he exists, and it is important to believe this. Mostly this still assumes that you have a soul which at death, under the control of god, goes to heaven or hell. So there is still a supernatural world involved, but in this view it is totally invisible during life. We will address this view further as well, once we have discussed the supernatural in general.

I believe that most people who say that god does nothing really mean that god affects people’s minds, and this is how we find out what god is like and what he wants us to do. If he truly does nothing, then there would be no way to know anything about god, including how he wants us to behave so that we can go to heaven. Another variation is that god did write the bible but then he stopped, and he does nothing now. This position is very problematical, as most religious people believe lots of things that are not mentioned in the bible. This position ultimately resolves to the idea that god does communicate to at least some people in their minds.

Summing Up

My goal here was to show that all of the things that people think god does are either nonsense, not observed, or do not require the existence of god to understand. In my view, this is sufficient to conclude that there is most likely no god. I don’t actually expect to convince you of this, but I hope you found the thought process worthwhile.

If you followed all the logic, and you agree with it, then I’m guessing that you think god talks to people in their minds, and you think that a real god is a better or simpler explanation for this phenomenon than a scientific one based on brain function. After all, no one has proved yet that all of these personal experiences are really just artifacts of the human brain.

This is a place where science comes into conflict with religion. Science always attempts to understand phenomena in terms of more primitive components that are already

understood. This doesn't always succeed, for reasons I won't take the time to discuss here. In those cases, a new concept may be needed. The new concept is just a label at first, for something that demands further research. A scientist would not use space aliens or god as a label, since, despite having no explanatory power, such a label tends to suggest a stopping point, rather than a starting point for further research. So, even if the phenomenon in question looks and smells like god, or space aliens, a scientist must go to the lab and not to church.

Chapter 5: Is There A Supernatural?

A thousand years ago, people believed that the earth was surrounded by a celestial sphere. Outside this sphere was heaven, and the stars were tiny holes in the celestial sphere that let in the light from heaven. So heaven was a real place in those days. God lived there, and good dead people, and angels, and so on. Hell was also a real place, that was underneath the earth. The earth itself was the knowable *natural* world in between, and heaven and hell were, by definition, *supernatural* and unknowable. They were not subject to the same rules as the natural world. The natural world was subject to scientific and philosophical inquiry. The supernatural world was off limits, and in any case, far beyond the abilities of our feeble minds.

Of course the residents of heaven and hell were also supernatural, and they could come to earth in various forms and perform supernatural acts. They could also confer supernatural powers on ordinary humans.

Nowadays we know that there is no heaven over our heads, and there is almost certainly no hell underground, inside (not underneath) the earth. If you think god might be a space alien, then perhaps heaven and hell are on another planet, or planets, somewhere. But chances are that if you still think there is a heaven and a hell, you think they are *all around us*, in some sort of parallel universe or extra dimensions. Now you may recall that I extended the common notion of space alien a little so that they could come from a “place” like this too, rather than having to come from some other planet somewhere. This was done mainly to get around the objection that god can’t be a space alien because god is from right here on earth, and space aliens come from other planets.

Perhaps you’ll object at this point that I have subverted the term “space alien” in such a way that it is simply synonymous with “god” and you can substitute one for the other by definition. This is almost true. The exception is that space aliens still have to obey the (natural) laws of physics, whereas god does not, depending on what you think god can do. But, leaving aside this minor exception, if you think that god does have to obey the laws of physics, then you can choose whichever term you prefer and discard the other. Just keep in mind that if you choose to keep “god”, and discard “space alien”, that your god remains indistinguishable from a space alien.

Now in this chapter, my goal is something similar. I want to play word games with “natural” and “supernatural”, until you are convinced that one of them should go away. I hope the one you decide to keep is “natural”.

A Definition of Supernatural

One way to tell whether you have a useful concept is to try to make a definition for it that captures the concept that you have in mind. If you can’t do it, then there may be something wrong with your concept. We’ll now try to do that for the concept of supernatural.

The List Definition

The simplest definition would seem to be “not natural”. For this, of course, we first have to define “natural”. There are many different meanings of “natural”. The one we have in mind, of course, is something like this: “the universe of what is knowable or understandable”. So in a very simple-minded way, we would divide the universe (or reality, if you like) into two parts: the parts we know and understand, which would be “nature” or “natural”, and the parts we don’t, which would be “supernatural”. Now right away, I want to point out an important distinction between the preceding sentence and the one before it. That is the distinction between what we know and what is knowable. There are plenty of things we don’t know, but much less that is not knowable. Just how much less is what will be important, of course. But lets just make a list of things we don’t know about, and see if that satisfies us regarding a definition of supernatural.

Hundreds of years ago, there were many phenomena which were so mysterious that nobody could imagine any hope of understanding them. Such things were considered to be knowable and controllable only by a god or gods. The gods themselves were in the same category. Just to make sure, many religions forbid any attempt to actually explore the nature of god. So all of these things, including god, were, at least at the time, in the realm of the supernatural. Nowadays we pretty much think we can understand anything that we can reproducibly experience. Even if it is not reproducible, we still have a shot at understanding it, at least if is specific and reliable. Still, there are quite a few things left that we don’t “know” about, but which at least some people believe are true.

What about space aliens? I always start with space aliens. They are both more fun and more tantalizing than the other possibilities. Natural or supernatural? There are plenty of purported sightings. There are apparently none, however, that are so definitive that they cannot be rejected by “reasonable” people. It is not my purpose here to start a discussion of whether we have ever actually seen any space aliens or their spaceships. For the purpose of this discussion, let’s just say that no one has ever actually seen a space alien. So under this definition, space aliens are unknown, and, hence, supernatural. Even though many of the same people who reject all of the UFO sightings accept the likelihood that they exist somewhere, it must still be said that we know nothing about them.

What about extra-sensory perception (ESP) in its various forms, such as telepathy, telekinesis, and so on. As long as it doesn’t require time-travel, there is nothing physically impossible about these. However, since no controlled study has yet demonstrated any one of them to be true, we have to say that we don’t know anything about them. Before you start muttering about science and controlled experiments, be patient. I’ll be getting to that in a moment. But for now, ESP is supernatural.

What about ghosts? It is difficult to know what the physical basis would be for the minds of dead people to wander around having physical effects on the real world. Plenty of people believe in them, but no proposals have been made for how they might work, so I have to say that there is nothing really known about them, aside from the fact that they seem to show up only in dark places. So ghosts would be supernatural under this definition.

Is God Supernatural?

It would seem that if anything is supernatural, surely god must be. So let's see if god is supernatural by this test. It might seem that we know god quite well, given the volume of work both in "original" holy books, and by theological scholars over thousands of years. There are three problems with this work:

- It is mostly very old. Most books of this vintage have turned out to be mostly wrong, at least regarding their observations of nature.
- There are no useful recent observations. If you show people ink blots, some of them will see a picture of god. Others will see other human body parts. If you think that a smudge on a grilled cheese sandwich is useful evidence for the appearance of god, then we will say that, for you, god is not supernatural. He is known, and is made of bread and butter.
- The several major religions mostly disagree on the detailed properties of god. They don't even agree on the physical body shape and appearance, let alone his moral character. If you take everything that they agree on and say that this must be god, you may not have much to go on.

Now let me point out the subject of the last chapter. "What Does God Do". The point of this chapter was to demonstrate how little we actually know, or think we know, about what god does. In fact I think the smart money these days would come down on the side of "god does nothing", at least in the natural world. That leaves god operating entirely in the supernatural world. Based on this and the above three bullet points, I am going to go out on a limb here and say that we do not know enough about god to say that he is natural. So put god down on the supernatural side, when it comes to making lists.

The Trouble With the List

The problem with making a list of supernatural things is that the contents can change with time. Things that used to be magic can leave the list, either by becoming known, or by being proven to be impossible. And new kinds of magic can be thought up. It could happen, for example, that telepathy is really possible and that we just haven't worked hard enough to discover it. Maybe it only manifests itself "retrospectively" outside of controlled studies. Scientists don't much like retrospective studies, in which you get the information from people who have experience with the phenomenon in the past. But it is still science and you can still get knowledge from such studies. A lot of proponents wouldn't be very happy to have telepathy be real and fall into the hands of scientists, if only because they prefer to think of it as supernatural.

So let's try for another definition that could capture the concept better.

Everything That Is Not Knowable

This definition turns out to be a little trickier than it might at first seem. It is easy to get this to be "everything". It is pretty easy to get it to be a non-empty subset of things, but it is not clear that this would capture what we want at all. It is also easy to get it to be empty, or at least effectively empty.

In philosophy one of the few things we seem to “know” is that we don’t “know” anything with 100 percent certainty. We don’t even know that the sun will come up tomorrow, let alone what color it will be if it does. We can talk about other properties of the sun that we “know” even less well, and make a convincing case. But we cannot prove it. Thousands of years ago, the sun really was in the supernatural class, and it took gods to move it around. But relatively few people would argue today that we should take the sun to be supernatural.

Here is a harder one. Is the weather knowable? Certainly the weather is “understandable” in the same sort of way that the color of the sun is understandable. There is a stochastic (i.e. modeled as random) process involving thermal energy and so on that in the sun makes a yellow glow, and on the earth makes hurricanes. But we can no more predict the detailed trajectory of a molecule of air on the earth than we can predict the equivalent for a molecule of hydrogen on the sun. So, while there is a lot of work to be done in refining models of both of these phenomena, we would still say that we “know” or “understand” both of them pretty well.

Finally, consider the possibility that everything observable is knowable. You can probably tell where I am going with this. It can be viewed as more of an approach, or an attitude than a formal statement about reality. The question is how we respond to new observations: by going to church or by going to the lab. Two thousand years ago a bright new star in the sky was definitely a religious event. This was in part because people believed that they had no hope of ever understanding this event, and that in any case it came from heaven, which is where the starlight comes from. Today, few people would think of going to church on such an occasion. But are there other events that we would still judge today as unknowable? I would argue that the answer is no. It might take years to gain any real understanding of a new phenomenon, but we would start none-the-less. At the very least we would begin to catalog and classify the observables. If you go to church, on the other hand, it is certain that you will never know anything about the new observations. Ultimately, the church may tell you that you *cannot* inquire into some new phenomenon.

So if we can agree that inquiry is permitted, does this mean that everything is knowable? To answer this question definitively would require a book-length treatise on epistemology. So we’ll have to be satisfied with a slightly vague discussion in order to avoid attempting a precise definition of knowledge. One of the major questions in this arena is whether there are some fundamental limits to what the human brain can know. If there are, is there some other form of intelligence (e.g. god) that is not subject to these same limitations, so that it could know things that we can never know?

There are two ways that something might be unknowable. One is because they are not observable, and the other is because, even though something may be observable, humans are simply incapable, even theoretically, of understanding it.

Things That Are Not Observable

There may be things in the universe that we cannot observe. There are some of these that we already know a little about. Some things may be too far away for light, or space aliens, or any other information to have reached us. Since nothing, not even light, can escape from a black hole, we cannot observe things that have fallen into black holes.

Although we don't know with 100 percent certainty about either of these things, but right now the smart money says that black holes do exist, and that the universe is larger than what we can see with telescopes.

The interesting thing is that, even though we cannot directly observe either of these kinds of thing, we can still say something about their properties, by inference. For those parts of the universe that are just too far away, we would be pretty surprised if they were any different than the parts that we can see. We may not know the color of the space aliens there, but we can imagine that there are some. Similarly, although we don't fully understand what the interior of a black hole is like, we think it is unlikely to be conducive to any kind of life we understand, so most likely there are no space aliens there. This is a lot to know about things we cannot see. Enough so that no one is likely to consider either of these classes of thing good candidates for supernatural.

In physics these days, there are many exotic conjectures involving parallel universes, extra dimensions, and so on. None of these has yet risen to the level of general acceptance, although some of them are taken seriously by at least some portion of the physics community. In at least some of these cases, the universes, dimensions, etc., are completely unobservable. And since the conjectures in question are generally not worked out in enough detail, there is little, if anything, that we can say about the content of any such universes.

Suppose one of these theories is true. Could that be the supernatural we are looking for? Could it hold dead people, god, heaven and hell, and so on? Anything is possible, of course, but it seems unlikely, and here's why. Suppose that we had a new theory of physics which was a grand unified theory of everything, and it matched everything we know and can observe about our physics today. And suppose that the mathematics of this theory required exactly one extra "universe" parallel to our own. Because this theory worked so perfectly in all respects, we would have some confidence that this parallel universe actually does exist. More importantly, the theory would surely tell us quite a bit about the nature of this universe, even if we could not observe it directly. Perhaps it would be a time-reversal dual of our own, for example. If, somehow, it was inhabited by dead people, this would come out of the theory, and would consequently be "understood". If this did happen, then we would probably stop thinking of it as supernatural. If the theory didn't allow for dead people there, then we would have to say that either the supernatural doesn't exist, or we haven't found it yet.

What if there were a parallel universe, and dead people do go there, but it is completely unobservable, including the fact that dead people go there. Sometimes the argument is made that we should act as if such a place exists, just in case. That is, we should be "good" on the grounds that this would get us into the "heaven" part of this unknowable universe, and not the "hell" part. But this argument assumes that we do, after all, know something about this universe. If we really can't observe it at all then there is no way to know what parts it might have, or what actions in life are relevant there. Many of our existing religions say that there is such a place, of course, If they all agreed on the properties of this place, and what the conditions for entry were, then it might seem like a good insurance policy to practice those conditions, just in case. Unfortunately, both the descriptions and the conditions differ from one religion to another, so there is actually no way to know how to act in life in order to gain entry to heaven when you die. Not to

mention that the differences among religions make it rather difficult to believe that such a place exists at all.

Could there be anything else that we can't observe, or that we haven't observed? Actually, the distinction between can't and haven't is important. If we can't observe it, and we can't infer any of its properties from theory, then it is irrelevant. It could be that dead people go there, but we couldn't see them go, or discover anything about what happens to them there. Not observable can only mean exactly that. If it can be seen in dreams, or séances, or whatever, then it is observable, and therefore "natural". If we think that god lives mainly in the supernatural, but can communicate with us, either now or in the past (e.g. by directing the writing of the bible), then god himself is forms a kind of observable conduit to this otherwise unobservable dimension. In this case both god and the supernatural are, to this extent, observable and hence, knowable. If we say that god does nothing, we must mean that he doesn't communicate either, and in this case even if heaven and hell and god all exist, there is exactly nothing we can know about them.

Suppose there is something else that we just haven't been able to observe yet. Suppose there is some kind of radiation called Q-radiation, and it affects only brain cells. People use it for telepathy, and god and ghosts use it to communicate with us in dreams and in other trance states. We have never been able to measure it, because it affects only human brain cells, and only in complete, operating brains, and only when the brain is first put into the special trance state required of it. Perhaps it is also possible to communicate via Q-radiation when you are operating a rebel spaceship attacking the death star. (Use the force, Luke.) There is nothing impossible about any of this. You can see how difficult it would be to measure Q-radiation. And yet, in principle, it *is* measurable, and I have confidence that ways could be found to measure it. Once it is measured, and characterized in detail, then it becomes part of the natural world, and is not supernatural at all.

Are There Things We Can't Understand?

It is often said that the mind of god is beyond human comprehension. This is often said at times when some natural tragedy occurs and god is believed to be responsible. The idea is that god has his reasons, and humans could never hope to understand them, so we can only just accept god's will and move on. Why must this be? What is it that limits human minds relative to god's mind?

There are some limitations that we know about. One is simply that the brain is finite. At some 10 billion neurons, it is pretty big, but only a fraction of this is used for memory and for "logical" thought processes. So the size could be a problem. Also, we know that "mechanical brains" (i.e. computers) are subject to the Gödel incompleteness theorem, or the equivalent Turing machine halting problem, if you prefer. This theorem limits their ability to discover proofs of certain formal mathematical statements. Although some people think that human brains are somehow not subject to this same limitation, we may as well suppose here that it is. If it is not, then that only helps the argument at hand. A second kind of limitation that existing computers have is that certain problems are so difficult to solve that they are effectively unsolvable in any realistic amount of time. A new class of computer, the quantum computer, can solve these problems, if it can be built

at all. Perhaps the brain is a quantum computer. But perhaps the brain is also subject to this limitation.

So let's talk about size first. Could a larger brain comprehend more of nature than our existing, finite, brains? Theoretically, it could. Some particular thing might be so complex that its description wouldn't fit in memory. Of course we don't really depend on our memories to hold the things we figure out – we write them down somewhere. But in order to “comprehend” it, we may need to get it all into our brain at once. For the sort of complex things we already know about, we do this by finding structure in things, and then understanding the parts and then understanding the whole at a higher level. One of the remarkable things about the universe (Einstein himself remarked on this) is that we have always found that it does have the sort of structure that helps us to understand it.

Still, it could, in theory, turn out that there are single, unstructured entities that are too big for one finite human brain to understand. We don't know of anything even remotely like this, but it does seem like it could happen. What could we do? One possibility would be to build a computer with a big enough memory, and use this to enhance our brains. This combination could potentially solve this problem. Another solution might be to get together a large group of people, and somehow use their combined brain power to comprehend this complicated problem. So, basically, within some very extreme limits, it is possible, theoretically, to extend our finite brains to whatever size we need, and so we probably are not constrained by the finiteness.

What about the other complexity measures besides sheer size. Mathematically, at least, there are both unsolvable problems and intractable problems. When I say mathematically, I am referring to certain formal systems, which include computers. Now some people say that human brains are not computers and so there is no reason to suppose that they are subject to these limitations. If they are not, then so much the better for our case here. So let's assume that human brains are in fact limited in the same way that computers are. I think that there are four ways that we can think about the issues that this raises:

- Does it matter? It may be that it does not require a brain to surpass these limitations in order to understand the universe. I think there is a good chance that it does not matter that we cannot solve the unsolvable problems. On the other hand, I think it would likely be quite helpful if we knew some way to solve the intractable ones.
- Is there any workaround? Is there any way that we can enhance our brains so that we are capable of understanding the universe despite these limitations.
- If our brains cannot surpass these limitations, is there any reason to suppose that some other brain could? Could space aliens have better brains? Does god have a better brain?
- Should we give up hope? Suppose we conclude that our brains are indeed limited, so that some kinds of knowledge are truly beyond our grasp. Suppose we are even convinced that space aliens would do a better job. Does this mean that we should give up trying?

So does it matter? First of all, does it matter with respect to the unsolvable problems? My personal belief is that this doesn't matter. This is a fairly esoteric area of formal

mathematics and philosophy, and perhaps it is beyond the scope of this discussion. So let me just say this little bit about it. The unsolvable problems are ones whose proofs are unbounded (i.e. infinite). The ones with finite proofs can in principle be proved, although we cannot give a method that will find the proof in any specified finite time. There are many mathematical theorems which are very hard to prove. Some are still awaiting proof. Some have taken years to prove, but have just recently yielded to the effort – for example Fermat's last theorem and the four color theorem for coloring maps.

Another reason why the unsolvable problems may not matter is that science, at least the science we do today, does not depend as much on mathematical rigor as one might think. For example, the standard model of particle physics uses mathematical methods (quantum electrodynamics and quantum chromodynamics) which have not been validated with the kind of rigor that a mathematician would demand. But because they yield results that perfectly match all of the measurements, they are accepted as almost certainly true.

Now what about the computationally intractable problems? Do they matter? This is another rather esoteric mathematical distinction. The intractable problems I am referring to are those whose solution grows exponentially (as opposed to polynomially) with the number of inputs. The archetypal problem of this sort is called the traveling salesman problem, but there are many, many provably equivalent variations. This sort of problem arises all the time in engineering, but is perhaps less prevalent in basic science. Today, basic science spends a great deal of time solving problems which are overwhelming in terms of sheer numbers (stars, molecules, cells, and so on) without actually being intractable in this esoteric mathematical sense. Regardless of all this, there is little doubt that a brain which could solve the computationally intractable problems in polynomial time would be a huge benefit to all of science. Having said this, it is less obvious that the lack of such a brain is actually preventing our ability to understand the universe.

Now we move along to the question of whether there is anything we can do to deal with these fundamental limitations that the human mind most likely has. For unsolvable problems the answer is most probably no. With respect to computers, all of the computers anyone has built or suggested have proven to be equal in this regard. For this reason, few professionals think that it is possible to build some better kind of computer that is able to solve the unsolvable problems, or even to solve more problems than the computers we already have. Many people think that the brain is not a computer, and that it can already solve problems that computers could never solve. But there is no proof of this. At the same time, there is no proof that a better computer cannot be built. My own personal opinion is this: brains differ both structurally and in sheer size from any of the computers we can build today. However, neither of these differences confers the ability to "solve" any larger class of theoretically complex problems than the computers that we can build today. I'm not going to debate this here, but merely conclude that there is some room for argument on this point.

Moving on to the merely hard problems, there is more hope here. A new kind of computer, called a quantum computer, has theoretically been shown to be able to solve the exponentially difficult (also known as NP-complete) problems much more efficiently. No one has built a quantum computer yet, but some simple elements have been built, and it is probably just a matter of time before someone builds a quantum computer big enough to do useful work. Once this is done, then if necessary, we can enhance our brains

with such computers and be able to solve the intractable problems in a feasible amount of time. It could also turn out that our brains already take advantage of this quantum mechanical technique, and so we don't really need the quantum computers.

So now we come to the question of whether some other non-human brain could be better. We have mostly addressed this question already in previous paragraphs, but we'll repeat what we said there in this context. First of all, with respect to sheer size, we can always be outdone. Even if we take the size of all existing human brains, and add the size of all the computers we have built that are still working, the result is still finite. This can always be outdone, so it is certainly possible that a god or a space alien could have a larger brain. Consequently such a brain could have a broader or more complete understanding of the universe. Whether this increment in understanding would qualify as a qualitative difference (i.e. something important) or only as a quantitative difference is something we don't know at this point.

Returning briefly to the unsolvable problems, it seems likely that neither god nor space alien brains can solve them either. That is to say that all brains are equal in this regard. This is not to say that space aliens, for example, couldn't have brains which are better at solving math and physics problems than human brains – even enhanced human brains. This is largely a matter of size and organization. It is highly likely that any space aliens we meet in the near future will have a much better understanding of the universe than we do at present. But this is not the question here. The question at hand is whether, given enough time, our human brains could reach the same level of understanding and knowledge that any space aliens might have. The answer to this is very probably yes, although I don't believe there is any mathematical proof of this.

It is often said that the mind of god is infinite. Now if this were true then this would be a different kind of brain indeed. It would almost certainly have capabilities beyond anything that our finite brains could achieve. However, such a brain would have to violate so many laws of physics and mathematics, that this seems likely to be simply impossible. But certainly if you are convinced that god is not subject to any such "laws" then you may just as well believe that it has an infinite brain whose capability puts ours to shame. I can only counter this by saying that there does not appear to be any actual evidence suggesting the existence of such an entity.

I'd like to make one final point here which is more of an observation about attitudes than about actual capabilities. Even if we thought that our brains were in some way fundamentally limited relative to a space alien's brain, why would that prevent us from trying to understand nature. Perhaps we would indeed find that there were certain pockets of nature that we somehow could not comprehend. We certainly don't know what those are right now, and that would not prevent us from trying in any case.

Is There a Supernatural?

So let's review the situation now. We have explored three possible definitions for what "supernatural" could mean. The first is just a list of what we don't currently know or understand. The second is a list of what we can't observe. And the third is a discussion of what we can or can't know or understand, in principle. It turns out that only the first of these, even though it is not at all satisfactory as a definition, is possible as a useful one.

Things that are not observable can have no effect, and thus are irrelevant. And it seems likely that there is nothing in reality which we are not capable of understanding, at least in principle.

The list definition is unsatisfying for two reasons: first because things will leave the list as soon as we understand them; and second, because there is nothing on the list for which there is any current evidence. The items we listed: ghosts, ufos and aliens, esp, and, of course, god, are all items for which existence is claimed by some people, but for which no actual evidence has yet been found. Certainly few people would argue that space aliens, if they are real, are actually not part of the natural world. Probably the same is true for ghosts and esp. That leaves god, heaven, and hell. We'll try to finish off with god in a moment. Then we'll move on to heaven and hell in the next chapter. Meanwhile, the conclusion that I am trying to suggest you draw here is that the notion of a supernatural is not a very useful one.

Is God Supernatural?

Clearly one of the following must be true: 1) god exists and there is evidence available (i.e. god is observable), 2) god exists but is not observable, so you must have blind faith in his existence, or 3) god does not exist. Many people clearly believe the first of these, although few people seem to think much about what god does, or what the evidence is. This was the subject of chapter four. Remarkably, many people believe (2). This chapter was really an attempt to show that such a belief is pointless. If there is no evidence, i.e. god is not observable, then it is completely irrelevant what you believe. Even if you think that god can observe you, even though you cannot observe god, then it is still pointless to believe, because there is no possible way to know what god wants you to do. In order to know that, you would require an observation, which contradicts the idea that god is not observable. Many people believe that god is not observable, but that heaven and hell are real. But if they, like god, are not observable, you still don't know how to act in life, so you might as well act as if god doesn't exist, unless perhaps you think that god was observed (and maybe written down) at some time in the past, but has since become non-observable. All of this serves as a kind of segue way to chapter six.

Chapter 6: What Happens When We Die?

What I have to say in this chapter will often reiterate things I have said earlier. Still, this is an incredibly important topic, and thus perhaps the material deserves repetition. You may, for all I know, be reading only this chapter. Not only is life-after-death a significant factor in almost every major world religion, but many people who are not otherwise religious feel compelled to believe that there is more to life than just the time during which our bodies are alive.

The Mind-Body Problem

A lot of the trouble here started hundreds of years ago, when people began to wonder how the mind and body were connected, since it seemed like our minds followed our bodies wherever we went. Actually it probably started in prehistoric times, when people could not imagine that thinking or feeling could simply be things that were done by some part of the mechanical body.

Now that we know a little bit about what the brain does, most people can accept that the brain moves your arms and legs, but they still hold out that words like consciousness, love, imagination, and, especially, “soul” are not actually electrochemical processes in the brain. These are the functions that religions say continue to exist after death. For the sake of discussion, let me just lump together these functions and call them all part of the soul. So the soul is the seat of consciousness, the soul that loves, and the soul that survives death.

Although different religions have very different ideas about what happens to the soul after death, the idea that it does survive, and that it has a separate existence from the body, is so pervasive that we have to wonder how people come to have this idea. Just to illustrate how strong it is, try this experiment. Ask a group of people which ones believe in god. Assuming that a few of them answer no, then ask this subset whether they would be willing to sell you their soul for, say, one dollar. Most of the non-believers will none-the-less be unwilling to undertake this transaction. They would probably argue that they weren't really certain about god, and so they didn't want to take the chance. But I wonder if there is no more to it than that. Just so you know where I stand on this question, I personally agreed to sell my soul one day for twenty-five cents. I took and kept the quarter, but I didn't notice anything go missing. How many reasons can you think of why I might not have noticed? Furthermore, I would do the same thing again. Would I be cheating?

It seems that almost everyone, even atheists, want to think that their thoughts have some existence independent of their physical bodies. Most importantly, they imagine that they will still be thinking after they are dead. Later we'll discuss how this could possibly be true. First, it is interesting to speculate on where this idea may come from.

The simplest source may just be a normal fear of death. When confronted with the certainty of your bodily death it is comforting to think that you won't really die but will continue thinking, perhaps in some sort of different body, but in any case presumably in a different location or dimension. This idea is so powerful that people will eagerly embrace it, especially when every religion has something to say about life after death.

Perhaps another source of this concept is the dreaming state. It is easy to imagine that death is something like sleeping. Since we dream when we sleep, and since dreams don't seem to require our physical body, this seems like evidence that body and mind are separate things. You can even see where the idea of heaven and hell come from. Some dreams are nightmares, while others are pleasant dreams involving flying, sex, and so on.

An even more powerful source of the separateness of mind from body is meditation. Whether coupled with religion or not, people who meditate regularly report reaching a state in which they lose their sense of self. They identify this state as being a kind of connection with a universal life-force, or god-force if you prefer, that exists independently of their own flow of consciousness. Out-of-body experiences are fairly common, which serves to reinforce the idea that the mind is something separate from the body.

Other experiences that probably mimic those of meditation include religious rituals and hypnosis. Some common elements that seem to induce these experiences involve low light conditions combined with rhythmic repetitions of sights and sounds.

Yet another type of experience seems to be the most compelling of all, at least for those who have had this experience. This is the near-death experience. People who are rescued from death after, for example, cardiac arrest, almost invariably report common experiences such as bright light, a tunnel, the appearance of dead relatives, and so on. People who have been through this often have an unyielding certainty that the visions are real and prove that there is life after death.

Why These Experiences Do Not Prove Life After Death

I am going to suggest two reasons to be skeptical about these experiences. One is simply that we do not need to have life after death in order to understand them. And second, we would need to find *something* that is doing the thinking if it isn't the brain. As usual, I'll warn you that I won't prove anything here. Instead, as students of nature, we try to find the simplest explanation we can for what we observe. For me, the simplest explanation is that we think with our physical brains, and when our brains die, our thinking stops. If, after working this out for yourself, you disagree, then one can expect no more.

The dreaming hypothesis is the easiest to debunk. First of all, we know from brain measurements that the physical brain is involved in dreaming. Just because we don't move our limbs, this doesn't mean that our brains have stopped working. Second, we also know that we do not dream during the entire time that we sleep. We also frequently have the experience of falling asleep and waking up with the sense that no time has passed – we have had dreamless sleep. Also, there are conditions similar in some ways to sleep, such as anesthesia and coma, that do not involve dreaming. So we can get from this information two things: first, it is entirely possible to be unconscious without thinking or dreaming. That is, it is possible for thought to simply stop. Second, when thought does continue, at least during dreaming, we know for sure that the brain is involved in this.

The experience of meditation can apparently be quite compelling for those who have practiced at this skill. The sense of disconnect from the “self” seems to be almost universal. When people have common experiences under controlled conditions, there is reason to suppose that they are common witnesses to an objective reality. At the very

least, it bears further study to understand the nature and cause of this experience. In this case we need to take special care to understand the role of the brain itself in creating this experience. The reason is that in this case the brain must be prepared by a sort of ritual induction, in order to have the experience. Unprepared waking individuals do not generally have the same experience.

We all know, for example, that optical illusions can be very compelling. The mirage of seeing water at the end of a hot asphalt roadway is universal, but also universally wrong, since there is actually no water there. What makes the meditation experience particularly interesting is that we cannot easily guess at either the mechanism, or the value, of having the brain generate these experiences as pure illusion. Under these circumstances it may seem simpler to accept the idea that there is a real external reality, be it a life force or a god, that becomes accessible via meditation. Of course if one does proceed down this path, extensive additional research would be necessary to further understand this new sort of reality.

I believe, however, that answers to both of these requirements, the mechanism and the value, are within sight. First, the mechanism: we now know, due to a fortuitous unplanned experiment, that a vivid “out-of-body” experience can be generated by simply stimulating a few specific neurons in the brain. This was quite surprising to discover. Now one could argue that these neurons are simply part of the “sensory” mechanism that connects the brain to the same external reality as meditation. But at this point it becomes simpler to suppose that this process is entirely a function of the brain.

Now as for the value, it seems entirely possible that this mechanism co-evolved in support of religion. In ancient times, people who had or could have at will, this sort of experience would likely interpret it as communicating with the “holy spirit”, and might be taken to be prophets. It is far beyond the scope of this work to explore this subject in detail, especially as this has been done at length by Dennett and others.

It is a bit easier to explain the near-death experiences. Like the experiences involving the meditative mind-state, the near-death experiences have enough in common to suggest that they really do involve some sort of contact with a separate reality. In this case the reality would be one involving life after death. People have such a strong wish for immortality that they have no trouble seeing this suggestion as actual proof of existence. Curiously, people are satisfied to stop investigating at this point, rather than making much further effort to understand in detail how this other reality might work, or how it relates to the one we know about. All of this remains a mystery.

Of course we do not need an alternate after-death reality to understand near-death experiences. It is sufficient to observe that in all of these cases, the brain is being deprived of oxygen. The cells don't simply go from life to death all at once, as a group. Rather, many of them cling to life by activating biochemical programs which have evolved to limit oxygen consumption. It seems likely that this activity, which is probably common to almost all brains, leads to the similarity of experience that people report after being revived. Alternatively, it could be activity on the part of neurons that, after becoming dormant, become over-active when the oxygen supply returns. Either way the fact that the experiences activate salient memories, such as images involving loved ones, should come as no surprise. Once again, Occam's razor is quite clear on this matter.

Given the alternative of a natural explanation versus a fantastic and mystical one that would involve an entire new set of physical laws, we can only reasonably choose the simpler one. The idea of life after death may seem simple, but that is only because there has been no attempt to properly understand it. If you still believe it is the better explanation, then you should support an effort to understand it better.

How Does the Mind Work After Death?

If you believe in reincarnation, then you simply believe that your soul is transferred into some new body. Leaving aside the question of when and how the transfer occurs, at least there is some mechanism whereby the subsequent thinking can occur. While we're on this subject, though, we might as well observe some things. First of all, there seems to be no evidence of any real continuity between the thought of any child and that of the individual being reincarnated. Sometimes people do report a sense of having had prior lives, but this rarely happens before adulthood, and in any case, the thoughts in question are only the vaguest fraction of what purports to be the mind of a former live person. So we can probably rule out ordinary reincarnation as the basic mechanism of thought after death, and, indeed, most religions do not propose this in any case.

What they propose instead is that the soul goes to a different place, either heaven or hell. Most descriptions seem to have the implicit assumption that you get a corporal body of some sort when you get there. After all, what good are seventy-two virgins if all you have is a mind to think about them? Now we discussed in the last chapter the question of whether heaven and hell are actually observable or not. If it is actually observable, then we ought to be able to learn something about it by observing ghosts and similar occult phenomena. People have tried, of course, but so far without any reputable degree of success. So for now, we cannot say that we have any real knowledge about either place.

Of course it may be that they are actually totally unobservable. In this case there is almost nothing we could say about them, including whether they exist at all. But even in this case, it seems like it ought to be possible to observe something about the transfer process. Some people claim that the soul is really a physical part of our bodies and that when we die it is physically transferred. In fact people have supposedly weighed bodies before and after death, and found a small discrepancy, which they assert to be the weight of the soul. (Note: I have no reference for this.) One problem with this idea, apart from there being other explanations for the weight loss, is that, when we do surgery on living people, we never find any parts which are later missing from dead people when we do an autopsy. Perhaps the soul is implemented by just a tiny fraction of each brain cell, so they all just shrink a little bit.

I think that a more common view is that the soul is implemented, both before and after death by some sort of life force which we cannot measure, but which pervades both the observable world and also heaven and hell. This soul is somehow tied to our body during this life, and, assuming there is a body for it in heaven or hell, it becomes freed from the body at death, and tied to the new body in heaven or hell. This model has many difficulties too. The main ones are, first, to explain why it is that we can't measure anything about this life force, and, second to explain exactly how the soul is tied to the body, and why we apparently cannot measure that either. And can I really sell my soul? How would you tell?

Do Animals Have a Soul?

I think that most religious people would say that only humans have souls and not animals, although I am pretty sure that there are also some who say that animals also have souls. If you think that the soul is the seat of consciousness, then I claim you will have to take the latter position, at least for higher animals. If you watch a cat or dog, it seems pretty clear that they have an awareness and a decision-making process that is akin to human consciousness albeit simpler and more predictable. It has always been interesting to ask whether animals “think”. The answer obviously depends on your definition of thinking, but I believe that the predominant opinion currently is that at some basic level they do. So it seems to me that if you believe humans have souls, then at least some animals have them too.

Does this mean that animals also have life after death? Not necessarily. They could get some kind of limited soul that disappears at death. If they do have life after death, do they go to heaven or hell? Since they don’t have religious faith, some religions would have them all going to hell, which hardly seems fair. Other religions might let the “good” animals go to heaven at least. Maybe there is a special heaven and hell for animals.

How Does the Soul Work?

If there is a soul, we need to study it, and understand what it is made of and how it works. There are a few things we can say already. It is apparently invisible and indestructible. We can’t see it anywhere, so it must be invisible. It must be indestructible, since no matter what happens to the body, the soul still exists. It might have mass, but further research on this would be needed. So far, this is interesting because there appears to be some substance known to physicists, called dark matter, which has just these properties. It has mass, but does not interact with “normal” matter, so that it is invisible and indestructible. So far we have not been able to detect it in any way other than through its mass, but there may yet be other possibilities once more is known about it.

So we could imagine that the soul is made out of dark matter particles. But there are potential problems with this. We don’t know, for example, whether the soul is divisible into particles, the way normal matter is, or whether it is one indivisible piece of soul stuff.

And then there is the really difficult problem of how the soul interacts with the body. If it doesn’t interact in any way, then it might as well not exist, since it cannot influence anything we do or think. Assuming, then, that it does have something to do with thinking, it must be interacting with neurons in our brains. Dark matter does not interact with normal matter in any way, so far as we know, so the soul can’t be made of dark matter. It must be made of some other invisible, indestructible stuff.

There is plenty that we don’t know about the way the brain works, but we do know quite a bit, and we know even more about how neurons work. We know that neurons in the brain interact to control muscle movement, and we pretty much know how that interaction works, at least at a cellular level. It seems likely that the soul would have to influence neurons in some way. No one has ever seen any behavior, at the level of neurons, that cannot be explained by known mechanisms. In other words, there is no

behavior in the brain, that we know of, that requires the introduction of any kind of invisible stuff.

There is also the reverse direction to be considered. When we die, the soul presumably retains all of our memories, at least, plus probably other aspects of our living state. It seems unlikely that the soul actually implements our memories. First of all, even though our understanding is still very incomplete, we are beginning to understand how the brain stores memories. Second, clearly animals have memories too, so we would have to give them souls, unless we suppose that their memories are implemented completely differently from human memories. We could suppose instead that the soul gets a copy of our memories. This is certainly possible, but it would reflect badly on god, since the design seems rather inefficient.

The reason I am making this argument is not so much to convince you that there is no soul (although I think it should), but rather to illustrate the ways in which religious claims, and claims about the soul in particular, can be investigated. You will never hear a preacher describe the soul in this way, but these are the sort of questions I would ask if you make a claim for the existence of the soul. This is what it means to me to be an atheist: not to try to prove all religious claims false, but to investigate them scientifically.

Summing Up

I have attempted to show in this chapter that notion of a soul which survives death, and that implements some aspect of the mind, is so problematical that it almost certainly doesn't exist. Instead, all of the properties of the mind, including consciousness, are simply emergent properties of the complexity of the physical brain. This is simply a way of saying that when systems reach a certain level of complexity, they commonly begin to exhibit behaviors that are unanticipated based on the nature of the individual parts.

Lacking any mechanism for the continuation of life after death, it seems most likely that there simply isn't any. This remains true despite the common reports of near-death experiences, which are almost certainly just hallucinations produced by the dying brain. Nevertheless, for those who remain convinced that there is more to this than hallucinations, keep in mind that these reports can be studied just like any other natural phenomenon, and it may be possible to determine whether there is anything in the reports that could not be a result of hallucination.

Chapter 7: Conclusions

There are two main points that I have tried to make clear in this book. The first is that everything in the universe that is observable is subject to scientific scrutiny if we so choose. And second, anything that is not observable is irrelevant and hence cannot sensibly be a matter of faith.

Observables

Every chapter of this book has been an example of how we could handle evidence of god, if we were to experience any. In chapter two, we discussed how we might react if god physically showed up on earth. We concluded that there was no way to distinguish god from a space alien, so we might as well behave as though it is a visit from a space alien.

In chapter three we looked at the question of evolution versus intelligent design. We asked the question of exactly what role space aliens might have played in the creation or development of life on earth. Although evolution is entirely adequate to explain the development of life, it is certainly possible that space aliens did participate in some way. It seems most sensible to ask just how and when that might have happened, and then look for evidence in the fossil record of such an event.

In chapter four we examined various things that people think god actually does. Most of these can easily be dismissed, but along the way we can see how each kind of action could be studied scientifically if indeed there were statistically significant evidence for that action. Even the realm of private, personal experience, which many people may suppose is beyond the realm of scientific inquiry, is actually entirely accessible. We could study reports of these experiences, and, in cases where they involve contact with god, we could see if they are consistent among themselves. Of course they are not, but supposing they were, we could build up a picture of the nature of god, and this would tell us quite a lot.

In chapter five, we examined the nature of the supernatural. We found that things as parallel universes and multiple dimensions may well exist. If they exist and are observable, then they are not supernatural. If they are not observable, then they are irrelevant, so it does not matter whether you can them supernatural. The crux of the matter here is whether observable and natural are simply synonyms. I obviously believe the answer is yes, and chapter five touched briefly on the philosophy behind this claim.

In chapter six, we explored the notions of soul and life after death. We found the soul to be both problematical to define, and thoroughly lacking in evidence. We looked at the properties a soul must have and the kinds of evidence we would expect to find. Without a soul, it is hard to see how there could be life after death, but in any case, reports of contact with dead people, as well as reports of near-death experiences, are certainly subject to scientific scrutiny.

So the bottom line here is this: even though there is no good evidence for the existence of the gods of the world's major theistic religions, as open-minded, free-thinking people we should all be prepared to examine claims of evidence in a scientific way.

I would like to say that I have succeeded in debunking the idea that “science and religion are just different ways of knowing.” However, in order to do this I would have to go into the philosophy of knowledge (epistemology), and that is well beyond the scope of this book. What we have actually explored is understanding, and that is rather different from knowledge.

Relevance

The main purpose of chapter four was to explore the kinds of evidence people may have, or think they have, for god’s existence. My conclusion there is one I want to repeat here: if you think that faith does not require evidence, then the faith is irrelevant. It may make you happier somehow, and there is no doubt that it can contribute to your social life. But it is still irrelevant in the sense that it cannot contribute to any decision you make. You may think that your moral sense comes from god. If so, that is evidence. Perhaps you’ll say that you can ask your religious friends for guidance. Then you are getting the decisions from your friends, not from god, unless you think that perhaps they talk to god, even though you don’t personally. In the latter case, your friends are evidence.

Regarding heaven and hell, we discussed the afterlife in chapter six. If you think you know something about heaven and hell, then you must have gotten this information somewhere, and that would be evidence. If you are not sure about heaven and hell, but just want to live a god-approved life, just in case, then how can you know what constitutes a god-approved life? If you got this information somewhere, then that is evidence. If you don’t know where the rules came from, but still want to avoid the risk of going to hell, how can you do this? The rules of different faiths are all different. This is true even within Christianity, let alone the several other organized religions that talk of an afterlife. Even if one of these turns out to be right, you have no basis for choosing, without evidence.

So how can you maintain an irrelevant faith? For some people it is evidently easier to believe, especially given the social pressures and rewards that confront them. For me this would be a difficult belief to hold and maintain, given that it might not survive a close examination. If you are one of these people, let me just suggest that in many places there is a surprisingly large community of non-believers to welcome you, and you might find that the social ostracism you fear is not as bad as you might imagine.

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