

Event Transcript

Religion and Science: Conflict or Harmony?

Monday, May 4, 2009



Some of the nation's leading journalists gathered in Key West, Fla., in May 2009 for the Pew Forum on Religion & Public Life's [Faith Angle Conference](#) on religion, politics and public life.

Francis S. Collins, the former director of the Human Genome Project, discussed why he believes religion and science are compatible and why the current conflict over evolution vs. faith, particularly in the evangelical community, is unnecessary. Collins, an evangelical Christian, talked about his path from atheism to Christianity and his belief that science provides evidence of God. He cited the Big Bang theory and the fact that the universe had a beginning out of nothing. He added that the laws of physics have precisely the values needed for life to occur on earth and argued that would seem to point to a creator.

Barbara Bradley Hagerty, the religion correspondent for National Public Radio, discussed how the brain reacts to spiritual experiences. She talked about the current debate over whether transcendent experiences are merely physiological events or whether they reflect encounters with another dimension. Bradley Hagerty said she believes that "God is a choice," that people can look at scientific evidence and conclude that everything is explained by material means or that they can look at the universe and see the hand of God.

Speaker:

Francis S. Collins, Former Director, National Human Genome Research Institute

Respondent:

Barbara Bradley Hagerty, Religion Correspondent, National Public Radio

Moderator:

Michael Cromartie, Vice President, Ethics and Public Policy Center; Senior Adviser, Pew Forum

Event Transcript



Michael Cromartie

MICHAEL CROMARTIE: Twice a year we meet at the Pew Forum with eight of your colleagues to talk about what subjects you want to discuss in Key West. We do that because we want your input obviously, but also because we really want the topics to be related to what you're working on. So we try to make these topics relevant to the discussions that are going on in our culture and society and public life. One of the topics that's been coming up for several years is religion and science, and we're honored and delighted that Dr. Francis Collins could be with us. After his presentation and after Barbara responds, we're going to hand out some information about a new think tank that Dr. Collins has started called BioLogos.

Most of you, of course, know him by reputation and by all of the good work he's done at the National Human Genome Research Institute and the National Institutes of Health. You'll also notice in his bio that he has an M.D. and a Ph.D., and so he's eminently qualified to talk to us about our topic this morning, "Religion and Science: Conflict or Harmony?" Francis, thanks so much for coming.



Francis Collins

FRANCIS COLLINS: Thanks, Michael. It's great to be here with all of you in this remarkable gathering. I've met some of you individually over the years in various contexts, and it's

wonderful to be here with the whole group. I look forward to the discussion we're going to have, which I anticipate will be interesting, energetic and vigorous.

I thought I would start off with some background in terms of the particular area of science that I have spent a lot of my time on over the last 20 years, namely the study of DNA, and particularly the study of all of the DNA of the human, namely the human genome. With that little bit of brief background, then I'll tell you about my path in the religious realm, going from being an atheist to becoming a believer and, more specifically, a Christian.

But then I'll spend most of the time talking about the current conflict that appears, at least in this country, to be a rather unpleasant one, where the voices that are arguing that science and faith are incompatible are actually quite loud – even shrill at times. I'll offer up from my own perspective why that conflict is an unnecessary one and provide some possibilities of how it might be resolved in a way that I think would be good for our future. I'm sure there will be opinions about this, and those would be great to hear.

So let's start with the science, and, of course, I have to start with something from the media. *Time* magazine, like many other publications, seems to like to talk about DNA, as in this cover story from the time when the human genome was being completed in 2003.



I've noticed, however, that virtually all cover stories about DNA include two kinds of display items. There's the double helix, of course, and invariably there are naked people. (Laughter.) I could ask you what that's all about, but I think I know that it says editors realize that double helixes don't sell magazines. (Laughter.) And they know what does.

I know there's broad diversity and background in this room, but I'm not going to get deeply into the nitty-gritty of genomics. I will simply use this metaphor because I think it's a pretty good one, that the DNA of an organism is its instruction book sitting there in the nucleus of the cell. All of the DNA of any organism is its genome. Ours happens to be about 3.1 billion of those letters of the code.

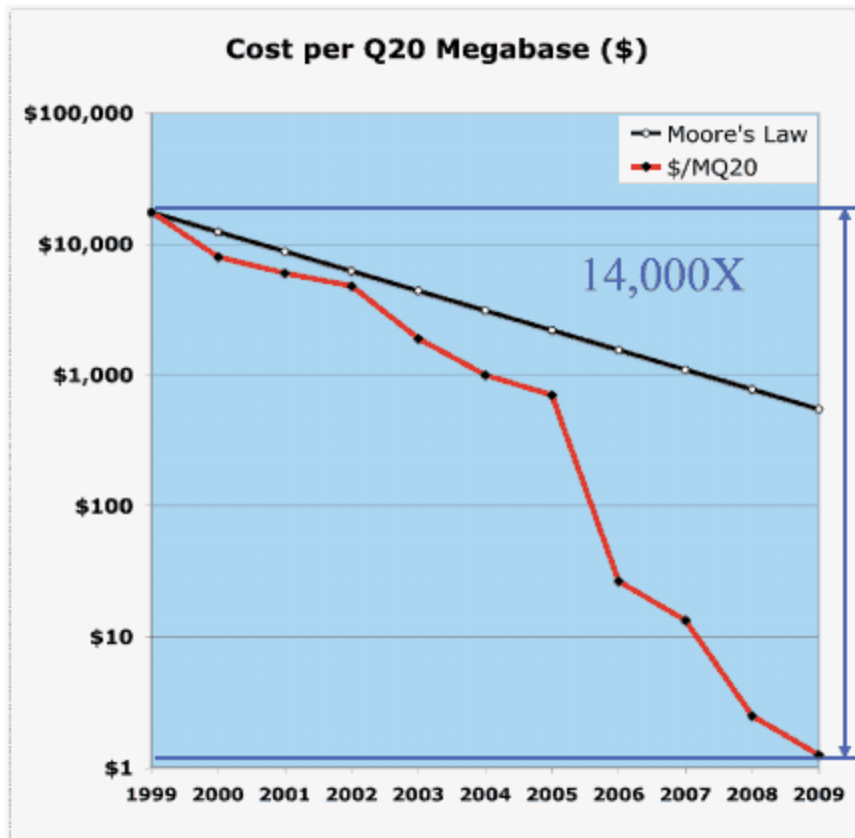
The Human Genome Project set itself up in 1990 as an international effort to read out all of those letters at a time when this was pretty controversial, and many people thought this was foolhardy because the technology to do this hadn't been invented. But due to the ingenuity and commitment of a very dedicated group of over 2,000 scientists that I had the privilege of leading, we did in fact, two-and-a-half years early and about \$400 million under-budget, achieve the goal of reading out all of those 3.1 billion letters in April of 2003 – rather nicely and poetically in the 50th anniversary month of Watson and Crick's publication on the double helix in April of 1953 in *Nature*.

That was six years ago. So what have you done for us lately? Well, a lot of the effort on the genome since that time has been to understand how the instruction book actually does what it does. How do you read these instructions written in this funny language that has just four letters in its alphabet – A, C, G and T – the four bases of the DNA code? But particularly, we've been interested in trying to identify the ticking time bombs in the human genome that put each of us at risk for something. Progress here has been actually quite exhilarating.

It was really only in 2005 that we began to have sufficient power to be able to discover the variations that are associated with common disease, things like diabetes and heart disease. Each year since 2007 we've discovered dozens of genetic variations associated with risks of a common disease. So more than a hundred of these discoveries, each one of which shines a bright light on the possible mechanisms by which diseases come about.

Not only have we had the ability to identify those variations in the genome that are associated with disease, but sequencing the entire human genome in each one of us is well on the path toward reaching a thousand-dollar price tag, which is pretty amazing when you consider that first human genome six years ago cost about \$300 million. This graph here showing you the drop in costs – the red line – of doing a million bases of DNA sequence at high quality is dropping faster than Moore's Law for computers.

Moore's Law put to shame



Courtesy of Eric Lander, Broad Institute

So this is a pretty dramatic time we're in the midst of, and there's no sign that this is about to let up. I think probably within another five years, the thousand-dollar genome will be a reality, and then that will make a very convincing case for including it as part of medical care so the information is in the medical record when you need it. This has created somewhat of a challenge in the research arena because there's so much data coming out of these new sequencing efforts, but we're having fun with it.

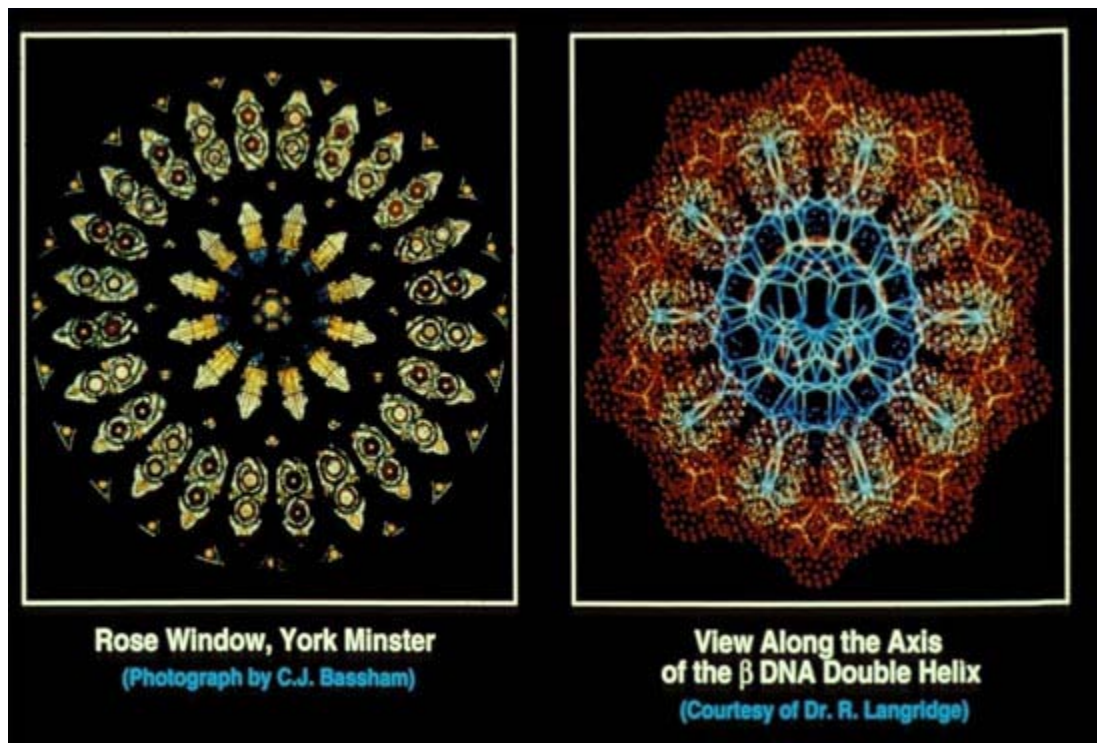
So where this is going as far as medicine – and for me as a physician, this was always the point – is the ability to identify individual risks of disease based on a study of DNA so that we would be able to move from a one-size-fits-all approach to diagnosis, prevention and treatment to something that is more specific for the individual. The way that's going to work is already getting underway. We're identifying all of these risk factors for almost any disease using the tools of the Human Genome Project. That in turn provides the opportunity to identify who's at risk for what. You can already, for \$400, send your money to one of these direct-to-consumer marketing companies, and they will tell you what your risk is for about 20 different diseases.

That leads to the opportunity for preventive medicine, which is obviously something you would like to focus more on instead of waiting for people to get sick and then spending a great deal of

money trying to take care of them. It also opens the door to being able to pick the right drug at the right dose for each person. That's what pharmacogenomics is all about, and that's already happening for about a dozen drugs, although it's slow getting into standard practice. The ability to develop new treatments based upon a precise molecular understanding of disease instead of just trying to guess what might work, although that's the longest in terms of the time course, is probably going to be the most significant development.

So all of that's happening. There's a true revolution going on. I just recently finished a book on personalized medicine, which will be coming out early in 2010, designed to try to explain this for a non-scientific audience, namely the general public, to try to begin the process of people imagining how to incorporate this information into their own health care.

I've been talking about DNA; this is actually DNA. It's a different sort of picture than you're used to, where instead of looking from the side, you're looking down the barrel of the double helix. It's quite a beautiful picture that way, and I think this is a provocative pair of images to introduce the main topic this morning, which is, are those two worldviews that you see there incompatible? On the left is the rose window of Westminster Cathedral, a beautiful stained glass window, and on the right, a picture of DNA.



There are certainly voices out there arguing that you can't have both of those; you've got to take your pick. You either are going to approach questions from a purely scientific perspective or a purely spiritual perspective, and the two are locked in eternal combat. I don't happen to agree with that, so perhaps I should say a bit of a word about how I got there.

I grew up in a home where faith was not practiced. My parents were free spirits in the arts and theater and music. I was home schooled till the sixth grade. I was not taught that faith was ridiculous, but I was certainly not taught that it mattered very much. When I got to college and later graduate school in chemistry, I became an agnostic and then eventually an atheist. In my view at that point, the only thing that really mattered was the scientific approach to understand how the universe worked; everything else was superstition.

But then I went to medical school and discovered that those hypothetical questions about life and death and whether God exists weren't so hypothetical anymore. As I sat at the bedside of individuals who were facing death and saw in many instances how their faith was such a strong rock in the storm for them, I couldn't help but wonder about that. I couldn't help but wonder how I would handle that situation if it were me lying in that bed, and I was pretty sure I would not be at peace the way these folks were.

So it seemed like a time to perhaps look at the question a little more deeply because I realized my atheism had been arrived at as the convenient answer, the answer I wanted, not on the basis of considering the evidence. I assumed there probably wasn't any evidence for the idea that God exists, but I figured it was probably time to look.

A thoughtful person turned me onto the writings of C.S. Lewis, which was quite a revelation in terms of the depth of intellectual argument that undergirds a belief in a creator God and the existence of moral law. I began to realize that even in science, where I had spent most of my time, there were pointers to God that I had paid no attention to that were actually pretty interesting.

One obvious one, although maybe it's not so obvious, is that there is *something* instead of nothing. There's no reason there should be anything at all. Wigner's wonderful phrase "the unreasonable effectiveness of mathematics" also comes to mind – Eugene Wigner, the Nobel laureate in physics, talking about the amazing thing about the whole study of physics is that mathematics makes sense; it can describe the properties of matter and energy in simple, even beautiful, laws. Why should that be? Why should gravity follow an inverse square law? Why should Maxwell's five equations describe electromagnetism in very simple terms, and they actually turn out to be true? A thoughtful and interesting question. This is certainly one that Einstein also wrote about quite significantly.

The Big Bang, the fact that the universe had a beginning out of nothingness, as far as we can tell. From this unimaginable singularity, the universe came into being and has been flying apart ever since. That cries out for some explanation. Since we have not observed nature to create itself, where did this come from? That seems to ask you to postulate a creator who must not be part of nature or you haven't solved the problem. In fact, one can also make a pretty good philosophical argument that a creator of this sort must also be outside of time or you haven't solved the problem.

So now we have the idea of a creator who is outside of time and space, and who is a pretty darn good mathematician, and apparently also must be an incredibly good physicist. An additional set of observations I found quite breathtaking and do to this day is the fact that the physical

constants that determine the nature of interactions between matter and the way in which energy behaves have precisely the values they would need to have for any kind of complexity or life to occur.

Various people have written about this. Martin Rees has a book on this called *Just Six Numbers*. Depending on how you count them up, somewhere between six and a dozen of these constants are independent of each other, and I'm talking about things like the gravitational constant. Theory can tell you that gravity is an inverse square law, but there's that constant in there to say how strong gravity is and you can't derive that by theory. That is something you have to measure experimentally.

It makes you wonder, suppose it didn't have the value that it does? What kind of interesting universe would that be? There are probably days where you think gravity doesn't have the value that it does, when something seems to be pulling you down. But gravity is actually in this precise little zone, and it turns out that if you go through the mathematical modeling of what would happen after the Big Bang if gravity was just a little weaker, things would just keep flying apart indefinitely. And I mean just a little weaker, one part in a billion. If gravity was just a little stronger, things would coalesce into stars and galaxies and planets, but a little too soon, and before we ever arrived on the scene, a Big Crunch would have followed the Big Bang.

Each one of these constants has that same amazing, precise, knife-edge tuning to it. Now some would argue, well, so what? We're here, so it must have been OK, otherwise we wouldn't be having this conversation. But you can't look at those numbers and not marvel at what's going on here. You're basically stuck with two options: Either those constants were set by an intelligence that was interested in having a universe that was not sterile, or the alternative is that actually there are an almost infinite number of other parallel universes out there that have different values of those constants. Of course, we have to be here in the one where everything worked or we wouldn't be having this conversation.

That second hypothesis, the multiverse hypothesis, does require a certain amount of faith because those are not other parallel universes that we ever expect we would be able to observe. So which of those is a more faith-requiring hypothesis? I would ask you to think about that from my perspective, using the Ockham's Razor approach that the simplest explanation may in fact be the right one. This sounds a lot like all of these things are pointing us toward a creator who had an intention about the universe that would include setting these constants so that interesting things might happen.

Then there's C.S. Lewis' point that I discovered while reading the first chapter of *Mere Christianity*, "Right and Wrong as a Clue to the Meaning of the Universe." Where does this notion of morality come from? Is this a purely evolutionary artifact, where we have been convinced by evolution that right and wrong have meanings and that we're supposed to do the right thing, or is there something more profound going on?

That would be a very interesting discussion I'm sure we could get into, and there is lots of interesting research going on about this right now by people like Martin Nowak. But I would submit that evolution would have a very hard time explaining the most radical acts of altruism,

where an individual puts himself and his future progeny at great risk by carrying out a radical sacrifice on behalf of somebody he's never met. Those circumstances don't happen often, but when they do, we admire them. We think of that as the example of what human nobility ought to be. Evolution looks at that and says that's a scandal.

So all of that information, I guess, really began to sink in as arguments that made the plausibility of God actually pretty compelling. Then I had to figure out, what is God like? That meant going and looking at the world's religions and trying to understand what they stood for, and finding that they're actually a lot alike in many ways as far as their principles, but they're also quite different in terms of their specifics.

Never having really known much about Jesus and discovering that he was not a myth because the historical evidence for Jesus was actually much better than I had realized – some would say better than the evidence for Julius Caesar – I began to realize he was a person to take seriously. I encountered this particular verse, which I thought was interesting. Jesus is asked, What is the greatest commandment in the law? He replies, "Love the Lord your God with all your heart, with all your soul and with all your mind." With all your mind! Boy, that doesn't sound like faith and reason are disconnected. If you go back to Deuteronomy, which is where this verse is coming from, the quote is, "With all your heart and all your strength and all your soul." But Jesus adds the word "mind," which I think we were supposed to notice.

So I became a Christian on that basis. That was at the age of 27. Now, 32 years later, I find this to be an enormously satisfying way to be able to answer questions that science can't answer – things like, is there a God, and what happens after we die, and why am I here anyway, which are questions that science basically says, not on the table for us. But they're on the table, I think, for most of us as human beings.

So it shouldn't be a problem, right? Faith and science are two ways of knowing. They have to answer different questions. Science answers questions about "how"; faith answers questions about "why." I like this description, which is not original to me, that basically if you are using both science and faith, you are reading both of the books that God gave us, the book of God's words and the book of God's works, mainly nature. No problem, right?

Well, there seems to be a problem. Have you ever seen the very amusing cartoon about the never-ending debate between cheddar and evangelical Goldfish crackers? In it a somewhat angry Richard Dawkins fish is saying, "We came from cheese," while a Ken Ham fish is saying, "We just appeared in the bag." It's a funny cartoon, but the battle sometimes isn't funny at all. It seems as if we're locked in this kind of deliberation, this debate, which sometimes gets pretty hostile.

But how can you be both a believer and a biologist? I've certainly been asked that question on numerous occasions by people who find out that I'm a geneticist who studies DNA every day and I'm a Christian. How does that work? Doesn't your head explode? After all, don't you realize that evolution is incompatible with faith, so what's the deal here? Do you, Francis Collins, not believe in evolution? If you believe in evolution, how can you be a believer? That's the usual kind of concern.



Francis Collins

First of all, let me say the evidence for Darwin's theory of descent from a common ancestor by gradual change over long periods of time operated on by natural selection is absolutely overwhelming. It is not possible, I think, to look at that evidence accumulated, especially in the last few years on the basis of the study of DNA, and not come to the conclusion that Darwin was right. Darwin was right in ways that Darwin himself probably never could have imagined, not knowing about DNA, not knowing that we'd have a digital record of these events to study – but we do.

Among the evidences are the ability to compare the genomes of ourselves with other species. Not only did we sequence the human genome, as published in *Nature*, but we did the mouse, and we did the chimpanzee, and we did the dog, and the honeybee, and the sea urchin, and the macaque – oh, good heavens – the platypus, and those are just the ones that ended up on the cover of *Science* and *Nature*. By now we've sequenced about 40 different vertebrate genomes.

The ability to do the comparisons is really interesting. You can feed all of that data into a computer and say, make sense of this, without telling the computer anything about what these animals look like or what the fossil record said, and the computer comes up with this analysis with all of these species lined up in order. Humans are there as part of this story, and the computer says, this really only makes sense if you derive this back to a common ancestor in this case of vertebrates. We could even extend this to invertebrates, where we have lots of sequence as well.

When you look at the details of that tree in terms of which animals are clustered close together and how long the branches are, which says something about how long it's been since they diverged, the matchup here with the fossil record and with anatomical descriptions is breathtaking. It's all very internally consistent. You can't help but realize if you read anything about Darwin that that's exactly what he was thinking about. There's a famous page from his notebook with a drawing of a tree with the words "I think" at the top, something that was beginning to emerge in Darwin's own thought process long before he published *On the Origin of Species*. This is the 150th anniversary of the publication of *On the Origin of Species*, and the 200th anniversary of Darwin's birth, so we're hearing a lot about Darwin.

Darwin, of course, has been demonized in many places. I think one of the mistakes maybe we've made is to use the term "Darwinism" to describe a fundamental discovery about biology without

which you can't really understand anything in biology at this point. You wouldn't call relativity "Einsteinism." Darwinism sort of makes it sound like it might be a cult, a personality cult, and probably that hasn't helped in this long history of misunderstanding. So let's just call it evolution.

Now you might say, looking at this tree, that that doesn't prove anything about descent from a common ancestor. If you believe that Genesis says that all of these organisms were created as individual acts of special creation, wouldn't it have made sense for God to use some of the same DNA motifs, modifying them along the way? And wouldn't it therefore seem to show you that DNA is more similar between creatures that look more like each other, so this doesn't prove anything. And that is actually a defensible point if all you have is this kind of information.

But when you start looking at the details, that argument really can't be sustained anymore. I could give you many examples, but I'll just give you one because of the time. Here is one that I think really cannot be easily understood without the common ancestor hypothesis being correct and with it involving humans.

If you look across the genome of ourselves and other species, you find genes in a particular order with space in between them. Here's a place, for example, in the human and the cow and the mouse genome where you have the same three genes. They're lined up in the same order, which also is consistent with a common ancestor, although it doesn't prove it. But I picked these three for a particular reason. These genes have funny names – so what do they actually do?

I'm not going to bother you about two of them, but GULO is an interesting gene. It codes for an enzyme called gulonolactone oxidase. So what the heck does that do? That is the enzyme that catalyzes the final step in the synthesis of vitamin C, ascorbic acid. You probably know that vitamin C is something that's a vitamin because we need it. We can't make it ourselves, and the reason for that is that our GULO gene has sustained a knockout blow. About half the gene has been deleted, and there's a little remnant left behind that you can see. The tail end of it is still evidence that GULO used to be there, but it's not in any of us. In fact, it's not there in any primate.

So somewhere higher up in that lineage this happened in a single individual, and that happened to be spread throughout all of the following organisms, primates and humans. That's why we humans get scurvy if we don't have access to vitamin C. Apparently in most of human history and primate history, there was plenty of vitamin C in the environment, so there was no great loss sustained here until we went to sea for long periods of time. Cows and mice don't need vitamin C; they make their own. They have a GULO gene that works.

Now looking at that, of course, that immediately suggests common ancestry for all three of these species – not only suggests it, but, it seems to me, demands it because if you're going to try to argue that the human genome was somehow special, that God created us in a different way than these other organisms, you would also have to postulate that God intentionally put a defective gene in exactly the place where a common ancestry would say it should be. And that was done why? To test our faith? Does that sound like the action of a God of all truth? It doesn't seem like it. I could give other examples. But it is – once you look at the details – I think inescapable for

somebody with an open mind to conclude that descent from a common ancestor is true and we're part of it.

Despite that, we have issues, especially here in the U.S., about what people believe about this question. You all probably have seen the Gallup Poll that gets asked every year – and we could debate whether the questions are asked in a way that elucidates what people really think. But given the choice among three options, what do people say?

That first option, that God guided a process that happened over millions of years – 38 percent; the second option, that God had no part, that being a deist or an atheist perspective – 13 percent. But the largest number – 45 percent, almost half – choose the third option, that God created human beings in their present form in the last 10,000 years. You can't arrive at that conclusion without throwing out pretty much all of the evidence from cosmology, geology, paleontology, biology, physics, chemistry, genomics and the fossil record. Yet that is the conclusion that many Americans prefer.

The history for that is really interesting. If you have time, read Ron Numbers' book called *The Creationists*, which goes through how it is that over the last 150 years this has become the accepted position for many evangelical Christians, who are taught if that's not your view, then you're probably in danger of a slippery slope that will cause you ultimately to lose your faith. When I spoke in Nashville at a gathering of youth group leaders and youth pastors from mostly evangelical churches last fall, I conducted the same poll of about 7,000 people gathered in the arena. In that instance 90 percent chose the last option. Maybe they raised their hands because they were worried about who was watching them and they felt like that was supposed to be the answer. Maybe in their minds they were thinking, yeah, I don't really know. But we are in a funny spot here in that this has become so widely embraced.

There are a lot of forces that are trying to encourage that view. If you've been to the Creation Museum – I haven't, but I gather some of you have – it will show you this perspective of humans and dinosaurs frolicking together in a way that's consistent in Ken Ham's view with the 6,000-year-old Earth. Again, many children going to see this are probably walking away thinking, yeah, that makes sense.

I get e-mails practically every week from people who were raised in this tradition and perhaps have been to the Creation Museum – many of them home schooled or schooled in a Christian high school where [young Earth creationism](#) is the only view that they're exposed to. Then they get to university and they see the actual data that supports the age of the Earth as 4.5, 5 billion years old, and they see the data that supports evolution as being correct, and they go into an intense personal crisis because they figure that if what they were told about origins from the pulpit and in Sunday school and from their parents and from their Christian high school is wrong, then why should they believe the rest of it? Yet these are often people whose faith is a deep and important part of who they are. We've set those folks up for a terrible struggle by what we're doing right now in this country.

Of course, the argument that comes back is, wait a minute, let's not give up so easily here. If you're saying evolution is true, didn't you just abolish the need for God? There's certainly that

perspective coming through from many articulate writers, not just Richard Dawkins, but particularly Richard Dawkins – the book *The God Delusion*. Of course, Christopher Hitchens, Sam Harris, Dan Dennett – the four horsemen of the atheist apocalypse, as they like to call themselves – are all writing prolifically about this and many times using evolution as a club over the head of believers, saying: Look, evolution is incontrovertibly true; that means your idea of God is wrong and, actually, by the way, religion is evil.

I had the chance to debate Richard Dawkins in a debate that David Van Biema moderated and that is still up there on the Web if you're interested in going to look at this, although it's now been a couple of years since this was published in *Time* magazine. I think that was actually a pretty useful debate in that it was not done in front of a lot of undergraduates, where you're just trying to score points. It was actually done in front of the editors of *Time* magazine, who were quite sober about the whole thing.

I think we had a really interesting conversation, although we probably could have gone even further. Of course, from my perspective, having been an atheist and traveled this path, it seems to me that atheism is, of all of the choices, the least rational because it assumes that you know enough to exclude the possibility of God. And which of us could claim we know enough to make such a grand statement? Suppose the knowledge of God just happens to be outside of your little circle of understanding? Then would it not be the height of arrogance to say, I know there is no God? G.K. Chesterton says this quite nicely: "Atheism is the most daring of all dogmas, the assertion of a universal negative."

Atheism is a pretty dogmatic position to take. It's a fundamentalist position to take, in fact. So atheism won't do. So how, then, do we put this synthesis together? I'll give you the view that I've arrived at, which in my experience is also the view that about 40 percent of working scientists who believe in a personal God have arrived at. And, by the way, it is 40 percent. That surprises a lot of people who think atheists and scientists are synonymous. In fact, 40 percent of us feel quite differently.

So here it is – God, who is not limited in space or time, created this universe 13.7 billion years ago with its parameters precisely tuned – that fine-tuning argument – to allow the development of complexity over long periods of time. That plan included the mechanism of evolution to create this marvelous diversity of living things on our planet and to include ourselves, human beings. Evolution, in the fullness of time, prepared these big-brained creatures, but that's probably not all we are from the perspective of a believer.

God, in that case, having a house that's now well-designed for it, gifted humanity with free will and with a soul. We could argue about what a soul actually means. And at that point, humans received this special status: made in God's image, not in physical terms, but in spiritual and mental terms. We humans used our free will to disobey God – that's what the story of the Garden of Eden is all about – leading to our realization of being in violation of that moral law. Thus we were estranged from God. For Christians like myself, Jesus is the solution to that estrangement.

Now there's nothing in that synthesis, I would argue, that is in conflict with what I know as a scientist or with a reasonable reading of the Bible. We'll come to "reasonable" in a moment because I think that's where a lot of the arguments tend to get focused.

This is often called theistic evolution. It's not a great term; evolution seems to be put forward as the noun and theistic – not too many people are quite sure what that means anyway. So we need an alternative here. The modest proposal is to go to the Greek and what we're really talking about is life, including our life, *bios*, through God speaking it into being, *logos*, the word. In the beginning was the Word: John 1. Or, more simply, putting it together: BioLogos, God speaking life into being.



Francis Collins

So there are objections to this. No surprise there. Some would say, evolution just doesn't seem like a very efficient method. Why would God spend so much time getting to the point? Remember, a few steps back there, we said the only way you've really solved the creator problem without ending up in an infinite regress is to have God be outside of time. So, basically, it might be a long time to us, but it might be a blink of an eye to God.

That also is a useful thing to contemplate when it comes to this second question of divine action and is God involved in the evolutionary process or did he just set it up and hope it would turn out all right? That latter point doesn't fit very well with the idea of God being interested in us and sending Jesus to die for us.

The intelligent design perspective, which is so prominent now in the evangelical church and, of course, is a flashpoint for debates about the teaching of science in schools, is basically this one, that evolution might be OK in some ways, but it can't account for the complexity of things like the bacterial flagellum, which are considered to be irreducibly complex because they have so many working parts and they don't work with any of the parts dropping out, so you can't imagine how evolution could have produced them.

This is showing severe cracks scientifically in that the supposedly irreducibly complex structures are, increasingly, yielding up their secrets, and we can see how they have been arrived at by a stepwise mechanism that's quite comfortable from an evolutionary perspective. So intelligent design is turning out to be – and probably could have been predicted to be – a God-of-the-gaps

theory, which inserts God into places that science hasn't quite yet explained, and then science comes along and explains them.

I think I would also say intelligent design is not only bad science; it's questionable theology. It implies that God was an underachiever and started this evolutionary process and then realized it wasn't going to quite work and had to keep stepping in all along the way to fix it. That seems like a limitation of God's omniscience.

Of course, the biggest question for most evangelicals is: As soon as you say that Darwin was right, haven't you thrown out the Bible? Haven't you started down a path that, ultimately, will cause you to deny the resurrection? Well, not so. I think we need only go back before Darwin and see what theologians thought about Genesis to have a better conversation about this. Now it's gotten so defensive. But what did people say? Go back all the way to Augustine in 400 A.D. Here is a marvelous quote from a person who I think thought as deeply about Genesis as anybody has since that book was written.

Augustine is writing here specifically about Genesis: "In matters that are so obscure and far beyond our vision, we find in Holy Scripture passages which can be interpreted in very different ways without prejudice to the faith we have received. In such cases, we should not rush in headlong and so firmly take our stand on one side that, if further progress in the search for truth justly undermines this position, we too fall with it." And is that not what is happening in the current climate with, in fact, insistence that the only acceptable interpretation for a serious Christian now is a literal acceptance of the six days of creation, which, again, Augustine would have argued is not required by the language?

There is a wonderful book coming out this summer by John Walton, who is a professor of Old Testament theology at Wheaton College. He takes a completely new view of Genesis, which, by the way, makes me wonder how he could have signed the Wheaton College statement that you're required to about the literalness of Adam and Eve because he comes up with a very different interpretation – and a very interesting one. It takes into account the original language, also the culture of the time – the audience that Genesis was written for – and comes up with a much more allegorical interpretation than I think most would have expected from a professor at Wheaton College.

All of this has led to lots of conversation. I want to finish up here just by telling you a little bit about what this wonderful group that I've been working with on the BioLogos Foundation has tried to do to provide some additional information here. I published a book called *The Language of God* three years ago, trying to lay out the harmony of science and faith that I had found in my own life. As a consequence, I received thousands of letters and e-mails from people who read the book or heard a presentation and wanted to go a little deeper and ask more questions about how to put together various concepts from science and faith.

I could not possibly keep up with all of those, so I have been fortunate to bring into this effort a number of fellows from the Trinity Forum Academy, which is on the Eastern Shore of Maryland, and more recently some other distinguished scientist-believers: Karl Giberson and Darrel Falk. Ralph Veerman, who is here in the meeting, has joined this effort as well. All of this is being

managed by a very talented program director named Syman Stevens. Together with support from the Templeton Foundation, we just launched a website on science and faith – the BioLogos Foundation [website](#). Let me just walk you through it.

Here are some photos from gatherings at the international BioLogos headquarters, which happens to be my dining room table. (Laughter.) It's a rather low-budget affair at the moment but not lacking in spirit and energy.

This is the homepage, which shows you some of the kinds of questions and images that we hope will draw people in. For example: "What's the proper relationship between science and religion?" There are 25 of these frequently asked questions distilled from those thousands of e-mails, from which we have tried to put together thoughtful responses – not necessarily answers because some of these don't have single answers. Some of them have options, various answers that might be consistent with the truth and we are not sure which one is right. But in each instance we think there are some possible ways of resolving conflicts that people are worried about. Each question has about a three- or four-page response, which is well-referenced with footnotes and links to other sites. If you go through the website, it will also tell you something about the BioLogos mission – the questions, again, being the main part of this.

We have other projects that are getting underway – among them the opportunity to run a workshop next November in New York, where we're going to bring together scientists, theologians and pastors in a closed meeting, about 15 of each, and try to see if over a three-day period with people who are willing to be open-minded, we can get beyond this defensiveness between science and faith and into a theology that is celebrating what we are learning about God's creation instead of worrying about it being a threat to God.

We also have started a blog, and, in fact, we have been fortunate to be invited by Beliefnet to post this new blog on their website, which gets 22 million hits a month, in a series called "Science and the Sacred." Karl Giberson, Darrel Falk and I will alternate as weekly bloggers.

On the BioLogos website, we have a news and events page as well, including a reference to the conversation that I had with *Christianity Today*, and shortly the *Time* magazine and the Religion Newswire pieces will be there too. There's a resource page that points to lots of other books and leading figures for people who are interested in knowing what else is published that's out there, with little descriptions of each of these books. On the contact page we provide the opportunity for people to send us queries, which we will try to keep up with, suggestions about new questions that aren't on the list, suggestions about places where they thought the question missed the point. We want this to be an interactive site.

The team is pretty small, but we hope over the course of time to be able to enlarge that. It does seem, at least from the initial reaction in the first few days, that this is finding a niche that was otherwise not much occupied. There's a lot out there in terms of the voices coming from the extreme ends of the spectrum – the atheist fundamentalists or the religious fundamentalists. We hope to make a contribution to filling that void.

So I think with that, I will draw this to a close. I just want to say what a privilege it is to be here to speak in front of all of you and how much I look forward to Barbara Bradley Hagerty's presentation and to the discussion that will follow. Thank you very much.

CROMARTIE: Thank you, Dr. Collins.

(Applause.)

We asked Barbara to respond because, ladies and gentlemen, in two weeks Barbara's new book, *The Fingerprints of God: The Search for the Science of Spirituality*, will be out. Well, it's out now! I mean, I've got a copy right here. But we love having your colleagues respond to subjects, and it was wonderful to find out that Barbara's book that she's been working on for some time was just coming out at the same time as this event. So, Barbara, we're delighted that you can add comments, and then we'll get into the Q&A and the conversation.



Barbara Bradley Hagerty

BARBARA BRADLEY HAGERTY: I was sitting here listening to Francis and the line from Admiral [James] Stockdale occurred, which is – remember, he was standing there in the [1992 vice presidential] debates and he said, “Who am I and why am I here?” (Laughter.) That's a little bit how I feel right now: a religion correspondent following the former head of the Genome Project. But I will plow ahead because that's my mandate. I will not do it without notes the way Francis can do things without notes.

I've thought a lot about the evidence for or against God, or kind of an intelligence that stitches together the universe, over the last few years in terms of writing my book. I remember having an epiphany about four years ago. I was on the Cambridge-Templeton grant. I was doing their fellowship at Cambridge University for two months, and in that fellowship, as you may know, they have a lot of scientists come and speak to 10 journalists that have been selected.

So I was sitting there – it was a day that John Barrow was going to speak. John Barrow is a brilliant mathematician at Cambridge who was giving a presentation about the anthropic principle, the notion of a fine-tuned universe. Sitting at the table with us, actually, right next to me was Richard Dawkins. He wanted to hear Barrow speak. As you know, Dawkins is a very vocal and famous atheist. So as Barrow was speed-walking us through the argument that we live

in an exquisitely calibrated universe, kind of what I think Freeman Dyson said: It's as if the universe knew we were coming. As he was walking us through this, Barrow said almost as an aside, I'm quite happy with a traditional, theistic view of the universe.

I'm sitting next to Dawkins and I'm feeling him kind of roil like a teapot about to blow. So finally he couldn't stand it any longer, and he said: Why on earth do you believe in God? And everyone looked at Barrow. And Barrow said: If you want to look for divine action, physicists look at the rationality of the universe and the mathematical structure of the world. Yes, but why do you want to look for divine action, Dawkins said. Well, Barrow said, for the same reason that someone might not want to.

I remember thinking right there: God is a choice. We can look for or exclude the action of the divine. You can look at the evidence and conclude that everything is explained by material means or you can look at the world and the universe and see the hand of God. I don't think that science can referee this question. I don't think they can actually get at the answer on this because I think, fundamentally, whether you believe in God is a matter of belief.

For the past century, materialism had reigned triumphant. Now Francis said that about 40 percent of scientists believe in God. Very prominent scientists, though, at the National Academy of Sciences, only about 7 percent of them believe in God, and they often are the ones who are driving the debate.

This is radically different from the public. I'm not just talking about people who pray. You know, 90 percent of people pray; even atheists pray, which I've always puzzled over. But the National Opinion Research Center at the University of Chicago has done extensive polling on people who have spiritual experiences – not just believe in God, but a spiritual experience. It turns out that 51 percent of people have had a spiritual experience that absolutely transformed their lives, that they can go back and say, June 14th, 1995, 2:00, that day I felt something different and it transformed my life. That's a lot of people.

So now I think there is a move afoot among scientists to, if not embrace, then at least study this thing called spiritual experience. They can do that because they have the technology to do that or at least to start to make inroads. They have brain scanners and EEGs, which allow them to peer into the brain.

Back in 2006, I took a year off from NPR to just study, to look at what I think of as the emerging science of spirituality. My litmus test in doing my research was this: Basically, if a prominent scientist or if prominent scientists were investigating some aspect of spiritual experience, then it was fair game for me to report on it. So I encountered questions like, is there a "God spot" in the brain? Is there a God chemical? Is God all in your head? These questions are a little bit tongue-in-cheek, but, actually, they let me tackle the science and explore some big philosophical questions. What I thought I'd do today is just talk about a couple of these questions and tell a couple of stories.

First I attacked the question of the "God spot" in the brain: Is there an area of the brain that handles or mediates spiritual experience – by spiritual experience I mean that notion, that

transcendent moment that you have, that sense that there's another being in the room or around you. Is there a place in the brain that actually mediates that? The question is, if you can locate the place that mediates spiritual experience, does that mean that God is nothing more than brain tissue?

People have long suspected that the temporal lobe has something to do with religious experience. The temporal lobe runs along the side of your head, and it handles things like hearing and smell and memory and emotion. The first concrete evidence that there was a connection between the temporal lobe and spiritual experience was made by a Canadian neurosurgeon named Wilder Penfield.

Back in the 1940s and '50s, he began mucking around in the brains of patients as he operated on them. There aren't any pain receptors in the brain, so he'd go in and he could take an electrode and prod a part of the brain – keep them awake – prod a part of the brain and see what part of the body corresponded with that part of the brain. He would prod one little section, and he'd get the right big toe; he'd prod another section, and he'd get the lips. He actually made a map of the brain and how it corresponds to different body parts. Well, when he prodded the temporal lobe, something very strange happened. People reported having out-of-body experiences and hearing voices and seeing apparitions. He hypothesized that he might have found the seat of religious experience, the physical seat of religious experience.

So science figured out that one way to try to explore spiritual experience and look at the brain mechanics of religious experience is to look at people with temporal lobe epilepsy on the theory that the extreme elucidates the normal. Temporal lobe epilepsy is basically an electrical storm in the brain where all the cells fire together.

Usually seizures are really horrible things. I went to a Henry Ford hospital to the epilepsy clinic and I cannot tell you – it was just – it's a horrifying experience to watch a seizure. But in a few rare cases, people have ecstatic seizures, and they believe that they are having a religious experience. They may hear snatches of music or words, presumably from their memory bank, and they interpret it as a message from God or the music from the heavenly spheres. They may see a snatch of light and think that that's an angel.

You can probably see where this is going. Today a lot of neuroscientists have kind of retrofitted a lot of major religious leaders with temporal lobe epilepsy. Like Saul on the road to Damascus – was he blinded by God and heard Jesus' voice or did he suffer, as one neurologist said, “visual and auditory hallucinations with photism and transient blindness.”

Joseph Smith, the founder of Mormonism, did he see a pillar of light and two angels or did he suffer a complex partial seizure? What about Moses and the burning bush, hearing God's voice? The list, which is compiled by Jeffrey Saver at UCLA, who is a neurologist there, includes Mohammed, Joan of Arc, Teresa of Avila, the founders of the Shaker movement, the New Jerusalem Church, the Christian Science Church, 7th Day Adventists, virtually all the mystics. All of these people, they say, suffered from the sacred disease, which actually raises a question.

You being an expert, I'd love to know, Francis, is there a gene – you talked about genes that can be identified with different diseases. I wonder if there is a gene for the sacred disease, which would be religious experience.

CROMARTIE: Andrew Newberg addresses that.

BRADLEY HAGERTY: He does.



Barbara Bradley Hagerty

Now I've got to say, I have a little trouble with this analysis, this kind of retrofitting, because it's hard to imagine something as debilitating as epilepsy being high on the résumé, you know, helpful in writing, say, the bulk of Christian doctrine, as did Paul; guiding a nation through the wilderness for 40 years, as did Moses; or founding one of the three monotheistic religions, as did Mohammed. It's hard to imagine that epilepsy is actually helpful in that.

But I do think that scientists are onto something. I think the temporal lobe may in fact be the place that mediates spiritual experience. One of the reasons I think that – I mean, I did a lot of research here – but one of my favorite stories, one of the people who convinced me of this is a guy named Jeff Schimmel. Jeff is a writer in Hollywood. He was raised Jewish, never believed in God, had no interest in spirituality. Then a few years ago, nine years ago, when he was 40 years old, he had a benign tumor in his left temporal lobe removed.

The surgery was a snap, but a couple of years later, unknown to him, he began to suffer from mini-seizures. He began hearing things and having visions. He remembers twice lying in bed when he looked up at the ceiling and saw a kind of swirl of blue and gold and green all settle into a shape, a pattern. And he's looking at it and he's thinking, what is that? He said, then it dawned on me, it was the Virgin Mary. Then he thinks, why would the Virgin Mary appear to a Jewish guy? (Laughter.) She could do so much better. But a few other things began to happen to Jeff. He became fascinated with spirituality. He found himself weeping at the drop of a hat when he saw pain in other people. He became very interested in Buddhism.

When I talked to him for the first time, I said, how do you measure your spirituality? He said, well, OK – we were on the phone – I'm looking at my mantle and I see one, two, three, four,

five, six, seven, eight, nine, 10, 11 Buddhas sitting on the mantle. I mean, he became fairly obsessed with Buddhism.

But he began to wonder, could his newfound spirituality have anything to do with his brain? So the next time he visited his neurologist, he asked to see a picture of his brain scan, the most recent one. And, in fact, the temporal lobe was very different – he saw the before and after the surgery. It was very different. It had kind of pulled away from the skull. His temporal lobe was smaller, a different shape, it was covered with scar tissue, and those changes had begun to spark electrical firings in his brain. He essentially developed temporal lobe epilepsy. But there was no question in his mind that his faith, his newfound love for his fellow man, all of that, came from his brain.

So this begged a question in my mind: Are transcendent experiences – not just Jeff Schimmel's, but Teresa of Avila's – are they merely a physiological event or could it possibly reflect an encounter with another dimension?

I want to propose that how you come down on that issue depends on whether you think of the brain as a CD player or a radio. Most scientists who think that everything is explainable through material processes think that the brain is like a CD player: The content, the CD with the song on it, for example, is playing in a closed system, and if you take a hammer to the machine, you know, destroy it, the song is not going to play. In other words, no God exists outside of the brain, no God that is trying to communicate exists outside of the brain. All spiritual experience is inside the brain, and when you alter the brain, God and spirituality disappear.

Now there is some scientific support for this line of thinking. These days scientists can make transcendent realities, or God, disappear or appear at will. It's kind of a party trick. Recently a group of Swiss researchers found out that when they electrically stimulated a certain part of the brain in a woman, she suddenly felt a sensed presence, that there was another being in the room enveloping her. A lot of people describe God that way: a sensed presence, a being nearby enveloping them. So they could conjure up God just by poking part of the brain.

Making spiritual experiences disappear is, of course, far more common. It's what epilepsy specialists are actually trained to do: It's called treatment. You remove part of the temporal lobe or you medicate the brain and tamp down the electrical spikes and, voila, God disappears, all spiritual experience goes away.

But suppose the brain isn't a CD player. Suppose it's a radio. Now in this analogy, everyone possesses the neural equipment to receive the radio program in varying degrees. So some have the volume turned low. I would suspect that Richard Dawkins and Christopher Hitchens have hit the mute button. Other people hear their favorite programs every now and again, maybe some of you all, like me, who have had brief transcendent moments. Some people have the volume way too high or they're caught between stations and they hear a cacophony, and those people actually need medical help.

But in this analogy, the sender is separate from the receiver, and the content of the transmission doesn't originate in the brain anymore than, say, the hosts of "All Things Considered" are sitting

in your radio when they're broadcasting, right? So if you destroyed the radio, you're not going to hear "All Things Considered," but the transmission – the words of Robert Siegel or Michele Norris – that transmission is still operating. If the brain is a receiver, then it's picking up God's communications, which never stop, even when the brain does, even when the brain has been altered by surgery or medication or death.

So that's not to say that all of our thoughts come from another spiritual realm any more than all of our thoughts come from "All Things Considered," although I would suspect that all of my thoughts come from "All Things Considered." But it merely suggests that perhaps people who have vivid or frequent transcendent moments are able to tune into another dimension of reality that many of us ignore. Maybe St. Paul and Joan of Arc weren't crazy; maybe they just had better antennae.

So that's one debate about the brain and whether spiritual experience is just something within the brain or something that may transcend the brain. Another argument that God is all in your head comes from neuropharmacologists. They propose that God is nothing more than chemical reactions in your brain.

I remember thinking about this a couple of years ago as I sat for 11 hours, from 9 p.m. to 8 a.m. on the dirt floor of a teepee. I was at a Navajo peyote ceremony in Lukachukai, Ariz. There were about 30 of us. Everyone but me had ingested a whole lot of peyote – the active ingredient is mescaline. It's basically a psychedelic. I kind of wish I had as I watched everyone looking pretty happy, their heads bobbing to the beat of the drummers like little bobbleheads. But, alas, I was there to observe. So there I sat cross-legged for 11 hours.



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Around midnight the woman who was the center of the ceremony broke her silence. Her name was Mary Ann, and she suffered from shingles. She had had it for a couple of months. It had gone untreated, and this was a healing ceremony. Around that time she confessed that 20 years earlier she had accidentally run over a man on the highway. She stated he was already dead when she ran over his head. But at any rate, for the past 20 years, a headless man kept haunting her dreams, and she wanted forgiveness. She wanted the peyote, which Navajos consider to be the mediator between the spirit world and the human world – she wanted the peyote to kind of broker the deal between this guy whose head she had run over and her.

So I looked around to see if anyone else had noticed that we may have just had a confession to vehicular homicide. Everyone was just smiling happily and nodding. A few hours later, after a lot more peyote, Mary Ann announced that the shingles were gone. She said, the spirit came before me and forgave me and now I'm healed.

I'm sitting there thinking, yeah, right, we'll revisit this in a couple of days and see if the shingles are really gone. I called her a couple of months later, and, in fact, she had never suffered from shingles after that moment. I called her just a few days ago and it never recurred.

So what you've got here are three options: Door No. 1, there was a medicinal property to the peyote that cured her shingles; door No. 2, the relief that she felt from her vision reduced her stress and thus her shingles; or door No. 3, that she really did access the spiritual world.

Peyote is like other psychedelic drugs, including LSD and magic mushrooms – magic mushrooms and psilocybin are kind of the same thing. They seem to prompt mystical experience. Scientists have discovered recently that these psychedelic drugs have a couple of interesting things in common.

Chemically, they all look a lot like serotonin, which is a neurotransmitter that affects parts of the brain that relate to emotions and perception. Now scientists at Johns Hopkins University have discovered that they all target the same serotonin receptor, serotonin HT2A. So what that receptor does is, it allows the serotonin or the psilocybin or the active ingredient of these psychedelics to create a cascade of chemical reactions, which then create the sounds and sights and smells and perceptions of a mystical experience. Essentially, they've discovered a "God neurotransmitter," in a way.

So now they can get a sense of what happens in the brains of mystics or you and me when we have a spiritual experience. What's really cool about this is that the war on drugs ended this sort of research for about 35 years, but now at Johns Hopkins and other places, the government's allowing this to go on. They'll be able to give you a capsule of psilocybin, slide you into a brain scan, and actually watch spiritual experience unfold in an FMRI. This has really opened the door for understanding the brain mechanisms of spiritual experience.

So the question is, does that mean that God is just a chemical reaction? I think probably a lot of scientists would say, yes. But Roland Griffiths, who's the researcher at Johns Hopkins, doesn't think so, and he doesn't think so for a couple of reasons. One is that people who have spiritual experiences can do this without help from their chemical friends, right? They can do it through meditation and prayer and chanting and fasting – all of these can spark spiritual experience. Second, he says it's just as plausible that the chemical reactions and the electrical firings in the brain are reflecting an interaction with God or the spiritual realm.

And he uses this analogy: He says, when you eat a piece of apple pie, all sorts of things happen in your brain. The part of the brain that mediates smell will light up or taste will light up. Probably the part of the brain that handles memory will light up as you think about the last time that you had a piece of apple pie. But does the fact that there is this predictable and measurable

brain activity – does that mean that the apple pie doesn't exist? Of course it doesn't. So maybe, Griffiths says, this brain activity is chronicling an interaction with the divine.

He raises a third issue, which Francis alluded to, which is, why? Why are we wired to have mystical experiences in the first place? Is it possible that there is a God or an intelligence who's created this way? I mean, if there is a God who wants to communicate with us, he probably wouldn't use the big toe; he'd probably use the brain. Doesn't it make sense that this is how God would communicate?

Now in the end, I don't think science will be able to prove or disprove God, but I do think there's a really fascinating debate – and I'm going to close with this – that's circling around spiritual issues. We may actually make some headway about it. There may be a way to tackle this issue in a definitive way. It's the mind-brain debate, or can consciousness operate when the brain is stilled?

I just have one more story to tell you to illustrate a point. In 1991, there was a woman named Pam Reynolds. Have you all heard of her? She was found to have had an aneurysm on her brain stem. Her doctor told her that it might rupture at any moment and that she could die at any moment, and so she decided to undergo what was then a very experimental surgery called a standstill operation. She flew out to Arizona to a place called the Barrow Neurological Institute in Phoenix.

Essentially what they did was they put her under anesthesia, they taped her eyes shut, they put in molded speakers in her ears that emitted really loud clicks – about 90 to 100 decibels. That's what a jet plane sounds like when it takes off. So loud clicks were firing in her ears. Then when her brain no longer responded to the clicks, the surgeons knew that they could proceed.

The way they proceeded was, they lowered her body temperature and drained the blood out of her head – kind of like draining oil out of a car engine. The aneurysm sac collapsed for lack of blood. The surgeons then went into her skull, snipped the aneurysm, sewed it up, warmed the blood back up, reintroduced it back into her body, raised her body temperature and brought her back to consciousness.

So she was basically without blood in her head or in a deep coma-like state for over an hour. When she awakened, she had quite a story to tell. Basically, she said that she floated upwards – she had an out-of-body experience and watched part of the operation – not all of it because she had a near-death experience in the middle of it. But what was interesting was, she could describe the operating theater – how many people were there, who was placed – she could tell where men and women were. She didn't know their names, obviously.



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She could describe a very unusual-looking bone saw called the Midas Rex bone saw and the blade container. It's unusual; it looks like an electric toothbrush, so it's not something you see all the time. She heard conversations, including the one where a female surgeon said that her arteries were too small in the left groin for a tube and so the chief surgeon told the other surgeon to try the right side – she heard this kind of conversation. So she saw things, heard things even though her senses were apparently blocked.

And then she had a typical near-death experience – the white light, seeing the dead relatives, yada, yada, yada, yada. Now I'm not all that interested in the near-death experience, but her ability to describe the operation while under deep anesthesia when her eyes were taped shut and her hearing blocked – it raised a question for me: Was Pam's mind or consciousness operating separately from her brain? I've heard dozens of stories about people who died on the operating table or in a car crash and felt themselves float above their bodies and claimed that they could see everything that was going on. I thought they were interesting, but not conclusive stories.

It's entirely possible that their brains were operating and that this is what a brain does when it is shutting down – it creates illusions, it creates sensations. It's entirely possible that this is normal activity that's explained by material means. But Pam Reynolds' story feels a little bit more compelling to me, probably not to a lot of you, but to me it does. For one thing, it's corroborated. A doctor named Michael Sabom got all the hospital records and the transcripts from this operation and found that when Pam said something happened, that in fact did happen in the order that she suggested. It seemed to corroborate her account.

I interviewed the chief neurosurgeon, Robert Spetzler, who confirmed that she was in a deep coma for an hour and could not have seen or heard any of the operation. I asked him how he explained it, and he said that he “had absolutely no explanation from a scientific perspective.” He also said that this has changed the way he thought about reality.

I just want to conclude by observing that in my year of interviewing scientists, I learned something about scientists. When they hear of a case that they don't like – one that doesn't jive with their worldview – they call it just an anecdote. When they like a story, they call it case history.

Now most scientists would probably say this challenge to a materialist worldview is an anecdote. After all, Pam's story could lead to the astonishing notion that somehow we have consciousness or maybe a soul that could survive death. Other scientists – in fact a growing number – will call Pam's story a case history, something to be explored and not just so easily dismissed. But I'm sure of a couple of things. First, this question of consciousness is the next big battle in the emerging science of spirituality. And second, how a scientist comes down on the debate about consciousness will be as much a matter of his own belief system as it will be of the science.

(Applause.)

CROMARTIE: Thank you very much, Barbara.



Kathleen Parker

KATHLEEN PARKER, *THE WASHINGTON POST*: Barbara, thank you so much. I now realize that I have completely misunderstood the G-spot all these years. Alas, my first question is for Dr. Collins. You may have answered this somewhat in your discussion of evolution, but if there is a God outside of nature and time, it would seem he's almost as smart as you are and he would have made some provision for global warming. I wonder if you would just speak briefly on how you see the current debate in light of your scientific outlook?

COLLINS: It does seem that our universe and our planet are remarkably stable in general. For things that you would think might throw equilibrium off, there seems to be a tendency to regain it. But obviously we're threatening that statement now with really dramatic changes in the nature of our planet by human activity. God, for whatever reason, apparently was interested in giving humans free will. That's the story of the Garden of Eden. That's something familiar to all of us.

I think it's pretty hard to make the case that free will is an illusion. I don't think of it as that at all. And that carried with it some expectation that we might screw up, which we did from the very first moment that we had the chance to do so, and continue today. I don't think God necessarily expected to come and be like a kindly grandfather and clean up after the children every time we did something wrong.

So this is our responsibility, I think, to perceive the ways in which free will can, either on an individual basis or on a basis that extends to the whole planet, be misused to cause trouble and

then be used to try to find solutions, as we are increasingly now beginning to realize we have to do. I don't think we can turn this around and say, God just isn't powerful enough because God hasn't solved global warming. If you want to postulate a circumstance where humans do not have free will, you could come up with that kind of model. It wouldn't be very interesting.

PARKER: A lot of people on the far right, now being represented by Rush Limbaugh almost exclusively, claim that global warming is – that God is too great and we are too minor to actually have affected Earth to that extent, and so we ought to just back off and let things resolve themselves. But you would refute that, clearly?

COLLINS: I think God gave us intelligence and curiosity and the ability to develop tools to study our environment, whether it's the universe or whether it's our own planet. I think we're supposed to use those tools, and when those tools give us evidence, which is rigorously determined and leads to a conclusion that we're on a course that can't be sustained, then to simply dismiss that as saying, God wouldn't have allowed that, doesn't seem like the act of a rational person.



Lauren Green

LAUREN GREEN, FOX NEWS: One of the things I've noticed that several scientists have said about evolution is that there's no evidence from the fossil record of macroevolution, which means one species actually developing, evolving, into another. But there's much evidence of microevolution – you know, blue birds turning into red birds, or something like that. Your presentation, obviously, with the DNA is quite believable, so are we going to have to let go of the idea that the fossil record's going to be out there to prove evolution and really start focusing on something else?

But also, one of the things that I thought was very interesting, Dr. Gerald Schroeder, who believes in evolution but also believes that the first six days of the Bible can be summed up through time dilation – that the reference point is somewhere else in the universe, but that by the time Adam arrives, God's time and our time then go on a parallel motion, a parallel track.

CROMARTIE: Who are you quoting there again, Lauren?

GREEN: Dr. Gerald Schroeder.

CROMARTIE: And who is he, again?

GREEN: He is a physicist and a theologian.

COLLINS: The fossil record is expected to be incomplete and it is. Most organisms leave no trace of their having been on this planet. Only in exceptional circumstances is that something that we would find a record of. It is remarkable, though, how much we've learned about the fossil record in the course of the last 15 years, and a lot of comments about the incompleteness of the fossil record really need to be updated with new findings. It used to be said, for instance, that there's no evidence of an intermediate between fish and land animals.

Go and look at the Canadian outcroppings where this amazing organism now called *Tiktaalik* was discovered, which clearly would represent a very good example of that, with the kinds of forelimbs that could both support weight on land and could be used also for locomotion in water, and with a breathing apparatus that might also be successful in both environments. Similarly, people will cite, well, there's no evidence for a fossil intermediate that led to whales. Not true. There's some incredibly interesting stuff coming out of that.

Just the same, I think it is not going to be the case that we find every possible connection between every possible species. Recognize, of course, most species became extinct before they gave rise to anything. So when you look at what's alive today, you see the outcome of all the branches that actually survived, and most of the fossils you find are probably from branches that didn't survive, just on the basis of the odds. I think for anyone to try to use the fossil record as an argument against evolution is not well-supported, just in terms of what the expectations would be anyway.

I do think the study of DNA has taken this whole field over because of the digital evidence it provides in a way that you just can't do by looking at anatomy of bones that have been in the ground for a long time. Certainly, that requires the greatest attention. If one is going to oppose macroevolution, then how can one come up with the explanation of these DNA relationships? In terms of macroevolution, it is hard to find examples that the skeptics will accept because macroevolution occurs over millions of years. We are not given the chance to observe it happening.

Microevolution, on the other hand, is all around us. Influenza viruses changing, as they just have, is a great microevolution example, as is bacteria becoming resistant to antibiotics. Nobody could really look at that data and not be convinced. But to see a whole new species arise – we do not expect to have that opportunity in our lifetime. We are just this tiny, little blink on the scale of time that's necessary for that.

You can see some interesting molecular examples of the consequences of macroevolution however. Look at fish that are swimming around under the ice cap at the Arctic Circle and ask, why don't they freeze? All of these fish have various antifreezes that they've developed. They're a good example of what's called convergent evolution. Different species have actually taken different proteins that were used for other things – a particular example is the enzyme trypsin, which we use to digest proteins. Trypsin, it turns out also, if you mutate it just a little bit here and

there, can be an antifreeze, and these fish have copied that gene over and over again. So they make a lot of it in their blood, and it keeps their blood from freezing. Fascinating, and it's hard to look at that and not say, well that's pretty macro!

CROMARTIE: Can you buy it over the counter, though? That's what I want to know.

(Laughter.)

COLLINS: Yeah, maybe with your peyote; it might be just right.

CROMARTIE: Bring it on!

COLLINS: I think with the evidence, if one is willing to look at it, you really can't walk away from macroevolution being a reality. The comments from Gerald Schroeder about time, I'm not familiar with the details of that. I've certainly seen examples of that put forward. Frankly, they strain one's imagination and one's understanding of physics to the breaking point. And the idea that there would be this kind of discontinuity in time is not something that there is any other evidence to support. So you can only arrive at that if you insist from the get-go that there must be some way to have an Earth that's only 6,000 years old.

GREEN: His point was that the Bible was not a science book and that even in the Bible, the account of creation is saying that the Earth brought forth life, not God created it. So he's saying that it actually supports the idea of billions of years. But they were counting the first six days as some kind of understanding of time dilation that could have occurred, and then by the time Adam arrives on the scene, somehow that starts the motion in parallel with –

COLLINS: – more traditional time, right. That would be consistent with some of the older versions, called the day-age theory or the gap theory of creation. I think John Walton's book, *The Lost World of Genesis One*, takes a totally different tack on this and says even with that perspective we're probably straining the Scripture verses in a direction they didn't belong to try to make sense of those six days. Those first three days when there was no sun, how could there be a 24-hour clock? A little hard to figure that out.

GREEN: Actually, he explains that too, but we will talk about that later.

COLLINS: OK.



Ross Douthat

ROSS DOUTHAT, *THE NEW YORK TIMES*: Dr. Collins, I wonder what you think about the idea that a lot of the resistance to the Darwinian narrative in the Christian community, and especially in the evangelical community, has less to do ultimately, maybe, with what Darwinism says about the existence of God and more to do with what Darwinism is taken to mean about the nature of God?

It seems like if you go back to the debates over Darwinism running back into the 19th century, a lot of the Christian resistance has been driven by the idea that – you can accept the idea that God would use a gradual process to bring life into being, but the idea that God would use a gradual process that is in a sense drowned in blood and animal suffering and “nature red in tooth and claw” and so on, that seems to be more a manifestation of an already fallen world, I guess, even before Adam and Eve come on the scene.

It seems to me that that’s a deep driver of Christian discomfort with Darwinism and a deep, I think, theological challenge for Christians in the wake of the Darwinian revolution. I think there’s also the reason that attempts to build moral philosophies around Darwinism historically have tended to take a more Nietzschean view, in some sense, and emphasize ideas of struggle and violence and so on as being at the heart of creation. So I’m just curious what you think about that set – that nest – of issues.

COLLINS: That’s a very important set. By the way, one of the questions on the website is evolutionary harshness and how do you put that together with a loving God. Certainly for many Christians, the idea of there not being death before the fall is a major stumbling block to accepting evolution in the first place. Readings of the Bible and the way this is referred to subsequently in the New Testament, particularly in Romans 5 and in 1st Corinthians 15, seem to suggest the idea that death came about through Adam’s sin and was not previously present.

That interpretation actually, if you look closely, does not fit well with what the original Genesis account in Scripture says. It’s clear animal death is not being talked about; it’s human death, and it’s probably human spiritual death. So the notion that Scripture somehow would not allow an evolutionary process that includes death of animals – you really can’t make that story out of the Scriptures if you look carefully at the words. And it seems that Adam must have been familiar with death; otherwise, why would he have been afraid of the concept of that being a consequence of sin? Presumably Adam knew that animals died.

Obviously from a scientific perspective it gets really difficult to go very far down the path without saying, come on, people, the evidence for death down through the hundreds of millennia, through the fossil record and lots of other perspectives, is overwhelming. Had there not been, you can imagine in a Malthusian way how the world would be truly unsustainable because of the difficulty in population explosions.

Part of the issue is that we humans are very schizophrenic in our thinking about death. We think that, in a certain way, death is evil and harsh and mean-spirited and no one should have to suffer that. Yet at the same time, we know that we will. We know also, if we're believers, that the point of our existence goes beyond our earthly life, and so death is a necessary doorway.

So why then, from that perspective, would the notion that evolution also involves life and death be such a wrenching discontinuity with our view of God? It's not a question that has easy answers, and I'm not providing them. Again, if you go to that particular question on the website, you'll see we don't have an answer – we have a set of responses. Scientifically, death has clearly been part of what's going on.

Biblically, it's clear also that death is consistent in the animal kingdom with God's plan. So then you're left with some questions: Why is that the best plan and why wasn't there some other plan where everything could have been nicer and smoother and nobody had to suffer the nature red in tooth and claw part? Couldn't we just have a God who is a kindly grandfather and wanted everybody to have a good time everyday? Well, apparently, that's not the God we have.



David Van Biema

DAVID VAN BIEMA, *TIME*: I actually have two questions for Dr. Collins. One of them involves time. Lauren brought up this notion of Gerald Schroeder's of time dilation, which you seem skeptical of, but it does seem to me as though, if you're talking about the six numbers, that the idea of a God who is outside of our notion of time is one of the more fundamental ideas.

And yet, the notion of a being who stands outside of time is sort of inconsistent with our personal experience and seems in some ways one of the more arbitrary notions involved in the argument. So my easy out for you is to ask you what else stands outside of time because I imagine physicists have some idea about that. But then to ask whether, whatever the answer to that may be, whether that can truly be applied to a being of the sort that we have in mind with God, or

whether that's just something that we choose to believe in order to believe in God – that's the first question.

The second question – and I'm not certain whether I'm messing up Barbara's argument – but it seems to me that to a certain extent she's suggesting that a lot of what she has researched comes down to a little bit of a six-of-one, half-a-dozen-of-the-other, that you can interpret these things one way or you can choose to interpret them the other way. It seems to me that that is kind of a situation that many atheists or atheism-leaning agnostics would accept, that they'll accept what they see as a microscopic chance of God as being the explanation for these things in a whole universe of other chances if the believers are willing to say the same. Two very different questions.

COLLINS: So the question of time. Again, I don't think it's just an arbitrary, ad-hoc effort to try to solve the problem about how evolution can still involve God to say that God is outside of time. I think you come to the God-outside-of-time answer from a different perspective, which I touched on but probably didn't articulate very well. It essentially involves the whole idea of the creation because, of course, go to Dawkins' book and what is the argument that he sees as the strongest against a creator God? It is, then who created God? Another one of the FAQs on our website, by the way.

If you have a God who lives within time, then you are obligated, I think, to address the question of what came before. If God, on the other hand, is outside of time, that question no longer makes sense. It's a category error. So I think one is forced to that timelessness conclusion. The point you made I've certainly heard as well, which is, if God is outside of time, how does that mesh with the fact that we believers claim a personal relationship with him but also attest to the historical nature and person of Jesus Christ as being God's son – part of the Trinity? How can that work? Can God actually be both outside of time and in time?

I would say, yeah. What's against that? And admittedly, this is a problem for us because our experience and our brains are not set up to imagine what being outside of time would be like, and I don't think there are other aspects of physics that fit nicely into this. So at this point, we're waving our hands. I think we're forced to the conclusion of a God who's not limited by time, but if God is God, that doesn't mean that God cannot invade the natural world, including the axis of time, in ways that suit God's purposes. And who would we be to say, oh, no, no, no, no, that's not our idea of how you should be able to behave?

Putting that into the equation, you still have this interesting debate about whether evolution was pre-loaded by God with the seeds of its potentiality, which is actually Augustine's view. Remarkably, he's way pre-Darwinian but actually sounding quite like that – prescient, even. If you read in Alister McGrath's Gifford Lectures, which were just published, his chapter on Augustine, where he goes through this concept of the seeds of potentiality that Augustine puts forward, my goodness, it sounds like evolution some 1,400 years ahead of schedule.

Or, on the other hand, is God inhabiting evolution in some way that we cannot and will never perceive, not in an intelligent design way of fixing up the bacterial flagellum, but by participating in some way in this remarkable process with an intention toward certain outcomes?

I can't distinguish the differences between those options. I don't think we have the tools to distinguish them. And either way, you can say that this is not a godless process, that God does have God's hand upon it – whether in a timeless or a time-specific way, I can't answer.

Your question about the six-of-one, half-a-dozen-of-the-other – I think the one option, though, that is taken off the table by the data that Barbara nicely described is the idea that spiritual experiences are just made up, that people are faking it. There are people who have argued that, and they've now had to be quiet. Clearly there are brain-image defined patterns that tell you something really remarkable is going on when a Carmelite nun is deep in meditation.

So it's not just one of those things where you were told as a child, well, you should have these experiences, so you try to pretend that you are. There's something much more going on. But I like the CD player versus the radio analogy. I think the people who like the CD player model will continue to like it, but as you said, maybe opening the door a crack to the idea that there's actually a signal coming from somewhere, and maybe we all would be better off, as you said, if we would admit that we're not absolutely sure of our own position on any of these matters. I'm not. That's why it's called faith.

BRADLEY HAGERTY: Can I just jump in here?

CROMARTIE: Please, jump in. I'm just trying to sort it all out.

BRADLEY HAGERTY: One of the interesting developments, of course, in the last few years is the rise of the new atheists, and what Dawkins and others would have you believe is that they can prove there is no God. The reason I decided to look at the “science of spirituality” is because science is really in some ways our religion in the 21st century. It's what we trust, the unbiased referee about what is true and what isn't.

And so if Dawkins is right and God is a delusion and he can prove that scientifically, that's bad news for the Christian home team or Jews or whatever – believers of all stripes. What I was interested in seeing is, does spiritual experience in some way stand up to science, not proving that there is a God, but at least holding its own? My view on this is that – what, 96 percent of the universe is dark matter – there's a lot that we don't understand about the world, and for people to say that absolutely they can prove there is no God or an intelligence that stitches together the universe, I think that's a bit arrogant.

I think it's also arrogant to say there absolutely is a God and if you don't come to Jesus as your personal savior, you're going to go to hell. Both of them are arrogant positions, it seems to me. I wasn't indifferent. I don't think anyone's indifferent to the question; I think everyone has his personal beliefs. But I think maybe the good news for believers is that the non-believers haven't proved their point and that there's a lot more research to be done. I think scientific tools will allow us to further improve and explore the issue.

E.J. DIONNE, *THE WASHINGTON POST*: Thank you for great presentations. I think all of us are going to be carrying CD players and radios in our – and I never thought before, but now I believe that Robert Siegel and Michele Norris – there is that analogy to the Almighty.

(Laughter.) And if you remember, it gives new meaning to Dan Rather's famous line, "Kenneth, what's the frequency?" (Laughter.) It's a spiritual thought.

I wanted to ask Dr. Collins two questions. The first is, I can't tell whether you are making a case for faith or a case for a humble and open-minded agnosticism, which is to say, I think you make a powerful case against a dogmatic atheism. You have three propositions: Belief in God is incompatible with reason. I think you knocked that one down. But then there are two other possibilities. Belief in God is compatible with reason. Or, the existence of God can be proven through reason. Those are two different propositions.

One might look at these scientific facts and have them lead you to God or one might look at these and decide there is no evidence that God is there. You said, I think rightly – you rejected the idea we know enough to exclude the existence of God. But do we know enough to include the existence of God? I thought one of the most powerful things Barbara said is, God is a choice, which suggests that there's a certain subjectivism underlying this argument.

And the second question I can't resist asking is a theological one really, which is, even assuming that your account is true and that God created the universe, why do you believe we are obligated to love him or her?

COLLINS: I do not believe that we will be given proof of God's existence. I don't think that's forthcoming, no matter how clever we get in discerning all of these attributes of God's creation. For whatever reason, I don't think it was part of God's purpose to make it that easy. I think we were going to be faced with a choice, and that was part of the intention of our relationship with God.

I do think, though, that God gave us some pretty interesting pointers, and I tried to describe some of those. Some of them are about matter and energy, which makes them sound more sort of deistic, but some of them are about ourselves, and particularly this existence of the moral law – this universal knowledge down through history in all cultures and all times of what the difference is between right and wrong and that we're called to do the right thing.

I continually come back to that as a pretty interesting place to find this pointer to God. When we search our own hearts, this is what we learn about ourselves. Now across cultures we will differ a lot in terms of what we call right and what we call wrong. Influenced by our culture around us, we may put things in different boxes depending on what our culture tells us. But we don't differ in the idea that there is a thing called right and we're supposed to do that. It's an interesting law because we break it every day, and then we make excuses, which basically say we know we're actually supposed to adhere to this law, otherwise we wouldn't bother making the excuses.

If you're looking for evidences – not proofs, but evidences – of God, this seems like a pretty powerful one that applies to each one of us. But then what does it say about God? If God is the author of this moral law, then it seems God must stand for what is good and holy. So it's telling us also about the character of God. If we are in some way becoming aware of that, and at the same time aware of our own imperfections, you can't stand in front of that evidence without

feeling both in awe and also humbled, I think, as a creature that is falling short of what God expected of you.

That part of the awareness of God, maybe, is not so much initially love as it is, frankly, fear. It was for me. In fact, this is one of the things that brought me, after my search through all the world's religions, to realize that Christianity was going to be the one that made the most sense, because that fear of the widening gap between the holy God and my unholy self desperately needed a solution. As I began to learn about this figure of Christ and read the historical record, well-documented by witnesses, of what it is that Christ said God was like – that's where a lot of the sense of God's character, for me, came from – then this became both a bridge to reach out to that holy God, despite my imperfections, and a description of what God must be like on the basis of what Jesus was like.

So all of that, over the course of two years, not five minutes before the coffee break – (laughter) – kind of came together in a fashion that made the most incredible sense, even though a few years earlier, that same story would have sounded to me like utter gibberish. And again, maybe that's the mark of a religious conversion, when things that sound like gibberish suddenly become the greatest truths. I don't think I'll get further than that, as far as proof of God's existence. And I have doubts. I mean, don't we all, whatever our position is? Paul Tillich said that doubt is not the opposite of faith; it's an element of faith, if you're being honest. So, OK, my faith is honest then because I have doubt in there as well.

But still, coming back to this synthesis of the pointers to God from nature, the pointers to God from within myself, and then the person of Jesus teaching me something about what God must be like and providing a solution to my imperfection – it all hangs together and it leads me to a perspective of being in awe and worship and love for God the creator.



Michael Gerson

MICHAEL GERSON, *THE WASHINGTON POST*: As I have talked to Andy Newberg about this and visited his lab and other things, Andy has a much tougher time than Francis does and I do with specific religious commitments, not for a metaphysical reason but for an epistemological reason. The brain research indicates that human beings have a tremendous desire for certainty, a kind of artificial certainty that comes from the brain. And it makes him very skeptical of specific religious affirmations, not because they're impossible but because they're culturally conditioned. We're wired for certainty.

So the question doesn't become questioning the existence of God but questioning our own certainties, given the predisposition of the brain and whether truth in these matters is accessible because of the way we're wired. I'm interested in what your reaction to that argument is and maybe Francis' too in this case. The reality is people in various cultures believe that their tradition is absolutely true, and it seems to be related to the brain. How does that affect the nature of belief and our confidence in our beliefs?

BRADLEY HAGERTY: I actually found Andy's research theologically the most disturbing for me, personally, because everyone has a belief system. They have a way to make sense of the world. If you're spiritual, you often do it through some type of religion or not, Judaism or whatever. If I can just tell you what Andy found when he looked at different types of religious people doing their religious practices, whether it was Franciscan nuns or Tibetan Buddhist monks –

CROMARTIE: Barbara, tell them who Andrew Newberg is.

BRADLEY HAGERTY: Oh, I'm sorry. Andrew Newberg is a neuroscientist and radiologist at the University of Pennsylvania, who has basically been running people through brain scans to see what happens when they engage in religious practices.

CROMARTIE: We had him here. If you go to pewforum.org, you can see the [dialogue](#) we had with Dr. Newberg.

BRADLEY HAGERTY: What he has found is that generally much of religious practice looks the same in the brain. So whether you're a Sikh chanting or whether you're a Carmelite nun or a Franciscan nun –

CROMARTIE: Pentecostal.

BRADLEY HAGERTY: Well, actually that is a big exception. I'll tell you about that. Whether you're a nun or a Buddhist monk or even a Sufi, basically the same types of brain activity occur. It's like one is taking Google Maps and the other is taking MapQuest, and neurologically they get to the same place, this undifferentiated state, using the same neural network.

The big exception is Pentecostals, which I just love. In nuns and monks and all of that, the frontal lobes activate, increase in activity, which shows that they're concentrating. It's the executive area of the brain. And the parietal lobe, which orients you in time and space, it goes dark, so that they don't have a sense of where their body ends and the universe begins. So there is a sense of merging with Christ or merging with the universe.

These things happen with Buddhist monks and nuns and all that – Sikhs – except when you get to the Pentecostals, and actually the reverse is true. Their frontal lobes shut down – which is not good news for the home team – but their frontal lobes shut down and their parietal lobes activate. So it's like they are not in control of this process of speaking in tongues. But they maintain a relationship in a sense of their own boundaries, and they maintain this relationship, they believe, with Jesus.

So at any rate, I found – especially the first part – very, very disturbing from a theological point of view. And his interpretation of this is, it's all the same stuff. Spirituality is spirituality is spirituality. It's just a matter of how you interpret it at the end of the line. So the nuns will see it as a union with Jesus, and a monk will see it as connecting with the ground of being. I guess I find that a little bit – just from a personal point of view, that's, on the one hand, hard to take.

On the other hand, I think it demands a little bit of humility because it seems to me that it's hard for a religion to claim truth, absolute truth, when basically the same thing might be going on in the brain during different types of spiritual experiences, and they essentially connect in the same way. So at any rate, I guess the short answer to your question is I find that from a theological point of view difficult. I also find it a source of humility on my part. It has forced me to be humble about my own truth claims or the truth claims that I seem to adhere to.

GERSON: I just wanted to ask Francis' view on this question because it's kind of the epistemological question: Does your study of the mind make you suspect of the mind's ability to know these questions?

DOUTHAT: I just wanted to quickly follow up, Barbara, whether it's worth, in this regard – and this may go back to some of the debates about temporal lobe epilepsy – but making a distinction between ordinary and extraordinary religious experience because it seems pretty clear if you look at the sweep of religious history that yes, most people are having pretty similar religious experiences that are fitted then within whatever prevailing religious framework they have.

But the crucial events in the development of religion in the history of the world have been much more extraordinary and particularistic, and it's very hard to imagine how you would hook up Muhammad's experience in the cave or the disciples' experience of the resurrection to – if you can run a believer through an MRI machine, aren't they almost by definition not having a truly extraordinary religious experience?

CROMARTIE: Hold your answer on that. Think about it. And then Francis, you go, and then Barbara.

COLLINS: Mike Gerson, I think, has raised an interesting question about how we can trust our own brains with things that we consider to be certainty when we recognize the mind has its own properties for wanting to arrive at certain conclusions. Actually, I think this is a good thing. I think we should be learning increasingly not to trust ourselves to arrive at certainty about issues for which there is insufficient evidence to claim certainty.

At the same time, I do think we can adhere to the notion that there is an answer; there is truth. I'm not a post-modernist in that regard. In fact, frankly, I don't know any scientists who are post-modernist about their scientific explorations. They believe that there is a phenomenon to be studied and that if you do the right experiment, you're going to figure out what's really going on. But your brain may prevent you from being able to make the right interpretation. Or it may lead you to an interpretation that's wrong because you just have this determination on the basis of your humanity to get somewhere that feels comfortable. But ultimately, the truth will come out.

I think when it comes to this question, though, about how does this fit together with which particular faith you attach yourself to, I guess I would make the case that you can look at pointers from nature and arrive at a comfortable recognition and embrace of a loving, monotheistic God. But it is not going to be the case, I don't think from the evidence from science, that you will be able to make a clear distinction between the various options there. That's going to come from somewhere else.

And so it doesn't surprise me then that the brain, in the presence of spiritual experiences, is tapping into the same places. Maybe this is like the theological concept that there is general revelation, the recognition of something outside ourselves, and then there is special revelation. The brain apparently is wired for general revelation, and then the special revelation part comes through other sources, and it's basically the responsibility, I think, of all of us to try to figure out what those answers are – to be skeptical, to worry about whether we're arriving at a conclusion because we wanted to, to constantly sift the evidence. But that's how we grow, and that's how our own sense of what is real about our faith evolves over time.

CROMARTIE: I want to hear Barbara's answer.

BRADLEY HAGERTY: Ross, I think you bring up a really, really good point. These people who are going into the brain scans are having something of a spiritual experience, and these tend to be what I think of as spiritual virtuosos. The monks who do it usually have 10,000 to 60,000 hours of meditation training under their belt – or under their robes, whatever you want to say. The nuns are Franciscan nuns. They live in a cloistered situation, and so they tend to pray and meditate a lot.

But you are right; they are not Muhammad or St. Paul on the road to Damascus or anything like that. And we don't know what those people looked like. Does special revelation look different from general revelation? We don't know. The problem is that spiritual experience is such a slippery little devil. You don't know when you're going to have one. You don't know when you're going to see Jesus on the road to Damascus. And your point is a good one, that true religious leaders – I mean the greats – didn't have an undifferentiated state from the way that they described it. They heard the voice of Jesus or the voice of Allah or Yahweh.

Now maybe that was just the context in which they were living. That wouldn't be true with Muhammad. But maybe it really was that in those extraordinary cases, they heard something that was uniquely Christian or Muslim or Jewish. The thing is we don't know. But your point is really good, that these experiments are in their infancy. They're really crude, for one thing. Trying to chant and reach a mystical experience in a brain scanner, which is shrieking at you – I mean, it's like a fire alarm is going off. I wonder really how they can do it. But your point is a good one, I think.



Adrian Wooldridge

ADRIAN WOOLDRIDGE, *THE ECONOMIST*: Could I ask a different question for each person? I just wanted to ask Professor Collins, yours was a very Christo-centric or Christian-centric account of what's going on. I just wondered if you could give us a sense of the debate about the relationship between science and religion and various different religious traditions, and specifically, what the sticking points are, whether there are any interesting differences in the tensions between science and religion and different religious communities.

And for Barbara, I just wanted to ask about the gender differences because there seems to be a significant gender difference between men and women in terms of their spirituality, that predisposition to believe – quite a marked difference. I just wanted to add that surely with the Pentecostals, it's not Jesus but the Holy Spirit.

COLLINS: Basically, if you look at Judaism and Islam, you will find a range of views about origin. Certainly in Judaism, conservative and reform Jews are generally accepting of evolution, and a lot of Orthodox Jews are as well. Maimonides is often cited here as a reason to assume that if you have a conflict between science and the Torah, there's been an error and a misinterpretation, not that science is evil. But there are certainly ultra-Orthodox Jews who oppose evolution and old Earth. A particular debate centers on Rabbi Slifkin, who is called the Zoo Rabbi because of his popularizing the love of animals. But since he also supports evolution, he's received very strong criticism, and his books have been banned by the ultra-Orthodox.

In Islam, the Koran certainly encourages scientific knowledge. But it also describes a six-day creation and that Adam was made from clay. There's a lot going on now where people are seizing particular verses in the Koran and trying to say that those presaged some scientific discoveries that are only just now being made. You can look at those and decide whether you think that evidence is compelling. But I think there's a great concern among scientists over a growing trend to reject evolution in many Muslim countries.

If you have seen the website for Harun Yahya, you will see where a lot of that is coming from. Yahya is a well-funded individual, whose *Atlas of Creation* has been sent around to thousands of people – a very fat and beautiful book, which basically argues that there are no old species that have become extinct, that every fossil represents an organism that's alive now, which means that there is no need to have an ancient Earth. One story on the website is titled, "Fifteen Proofs that Disprove Darwin on the 200th Anniversary of his Birth." The story goes on to say: "No matter

what, Darwinists will be unable to alter the fact that Darwinism is dead and buried. There is literally nobody left in the world to support evolution.” This is having a very strong impact in the Islamic world.

I couldn't help but notice when I went to this site and scanned through it that one piece of evidence for this perspective provided by Yahya is this little clip from CNN, which is about me. The caption reads: “Collins: Why This Scientist Believes in God.” The implication, therefore, is that I must not believe in evolution. That's a little scary. I guess the bottom line is that the subject of origins is a topic of major interest to all religions, and you find wide interpretations. The extremist views do appear in each of these, showing no signs of dissipation.

BRADLEY HAGERTY: I'm afraid I'm not going to have a very satisfying answer because I actually didn't look at gender differences. Francis would be much better at talking about this. But women's brains and men's brains do – they are different. For example, the areas that handle compassion seem to be larger in women than men. But it seems to me that would drive women toward religion and church, as opposed to spiritual experience.

And what I don't know is whether, for example, in the study at the University of Chicago they broke it out by gender. They probably did. I don't know if more women say that they have had spiritual experiences than men have. I just don't know the answer. I suspect it has something to do with wiring in the brain that allows women to be more compassionate, and maybe that's spiritual as well, but I don't have a satisfying answer. Sorry.

COLLINS: I think despite a trend in the past few decades to try to diminish the biological differences between maleness and femaleness, there is clearly a lot of biology there. It is reflected in the brain, in the presence of particular structures in larger or smaller size depending upon gender. Exactly how that translates into real human behaviors is a topic of a good deal of appropriate controversy. It's one thing to describe anatomy. It's another to describe what that means for the individual, especially when you consider individual differences are so broad and are so heavily influenced by culture and learning and mentoring and role models and all of that.



Dan Gilgoff

DAN GILGOFF, U.S. NEWS & WORLD REPORT: Dr. Collins, I have two questions for you. The first is you gave that tale about making the presentation at a conference of youth pastors and taking your informal survey and being kind of – maybe not surprised, but struck by the 90

percentile rejecting evolution. I'm wondering if you could talk a little bit more broadly. It's been three years since your book, *The Language of God*, was issued. Could you talk about what your reception among the Christian evangelical audience has been, particularly among – it's interesting to hear about the rank and file – but about opinion-shapers and influencers in that community, and whether that has given you any insight into whether there's a growing debate about how to reconcile belief with evolution and what kind of shape that debate takes?

And then secondly, I know you were on the transition team for the Obama administration on bioethics issues. The stem cell guidelines – the embryonic stem cell research – and Obama's executive order were recently big news. I'm wondering if you could give us a heads-up on what else, as journalists, we should be looking to cover, particularly this year, on that constellation of issues for the Obama administration on bioethics.

COLLINS: Two complex questions, but I'll try not to take too much time. I think the reception to the publication of *The Language of God* and to the many talks that I've given about it since then has been mixed. I've certainly gotten some strong encouragement from people who felt that it was time to have this conversation, who were uneasy about only hearing from the extreme voices and nothing much coming from the idea that there might be harmony here.

I've been asked on several occasions to speak on college campuses about this through the Veritas Forum, which is an organization that sponsors such presentations around the country. I've spoken at MIT, at Yale, at Cal Tech, at Stanford, at Purdue, at Tulane, at Rice and at Ohio State. And in each of those instances, the turnout has been amazing. At Stanford, there were 2,200 students who showed up to hear a talk about science and faith on a school night and wanted to stay and keep asking questions long after the organizers thought the whole thing would be over – same at many other campuses.

That is encouraging. That tells me that this is a topic that particularly younger-generation participants are interested in hearing about, and they're not hearing about it enough and maybe particularly because universities are a little nervous about getting into this territory. On the other hand, certainly when it comes to interactions with, perhaps, what I would hope would be the audience that I might have the best chance of reaching out to and making a difference – the evangelical Christian community – it has been quite mixed. I was invited to speak at The Gathering, which is a wonderful gathering of Christian philanthropists in Florida.

On a Saturday night the organizer, Fred Smith, took a good deal of a risk here, I think, by having me as a speaker. At the end of the talk, a very strange thing happened. About half the audience stood up and gave me a standing ovation, and about half sat on their hands and looked very unhappy. So that tells you something about just how mixed this conversation is in that community.

I can see why, and I don't in any way mean to imply that those who are having trouble with this are somehow intellectually impaired in some way. This has been presented as such a core of what it means to be a serious Christian that people are understandably distressed about the idea that what they have been told all this time might actually not be true. They are worried about starting down a slippery slope that would lead to a very distressing outcome, namely, the fear

that they might lose their faith altogether. I want to try to provide some reassurance that that has not been the case for those of us who have gotten to this synthesis. But still, it's deeply disturbing for many.

There are some evangelical leaders who are comfortable going into this space and even willing to be outspoken about it. We have a conference coming up in November. Tim Keller, the pastor of Redeemer Presbyterian Church, is going to be the local host. Tim's book, *The Reason for God*, very much gets into this territory. And there are others as well. But it's been decades of this particular perspective being connected with evangelical Christianity as a central part of the package even though this is not what faith is all about. This is a cul-de-sac, a side issue. But it's so distracting. It gets in the way, unfortunately, of a lot of other more meaningful conversations about what God is really all about.

So, I think we have got a long way to go. That's another reason to have this BioLogos Foundation with its various projects. One of the things we're trying to do, which we're just getting started on and don't currently have any support for, is to design curriculum for Christian high schools and Christian home schools so that we don't continue to propagate, generation after generation, this young Earth creationist view as the only acceptable one for a believer and then set up this whole battle over and over again. There has to be a better way to prepare true, dedicated Christians for the future rather than feeding them that particular line, which ultimately is going to lead to a major crisis in their lives when they figure out it's not true.

Also, we're trying to set up short courses for students, for faculty at Christian schools, for pastors, who are regularly confronted with this and don't know what to do. So many pastors say, I'm just not going to preach on Genesis because I know it's going to start a fight. Well, that might not be the best way to get us toward the truth. All of these are projects the BioLogos Foundation would like to undertake if we can develop the support for it.

Your second question on stem cells requires a potentially long answer. Basically, what the president's executive order said and what the NIH in its draft guidelines has now made more clear is that federal funds will be allowable, assuming these draft guidelines get finalized, for stem cell lines that were developed from leftover embryos from in vitro fertilization clinics. And in a way, this is not very radical because that's what Bush said in August of 2001 when he became the first president to authorize federal funds for embryonic stem cell research. Remember, it wasn't allowed at all before his statement. But he said only lines that were developed before 9 p.m. on Aug. 9, 2001, could be used, which obviously seems like a bit of an arbitrary deadline.

Now Obama is saying, what about the 700 lines that have been developed since then, which are actually scientifically more useful? The early lines had problems. These new lines will now be allowed as well. Remember, though, that just means the funds will be allowed for the study of those lines, not for creating new ones. That is prevented by the Dickey-Wicker amendment, which people expect will probably remain there unless Congress decides to take it away. My bet is that they probably won't, and I'm not sure that it's necessary for them to do so in terms of supporting research. The use of private funds to develop new lines might be sufficient.

There was a pretty strong reaction to the executive order in some quarters. Some commentators interpreted this as, “Science trumps all and we’re not worried about ethics anymore.” Having been on that transition team, I can certainly vouch for the fact that that was not the case. I think when the dust has all settled, what has really been done is a pretty modest but defensible step forward. That, of course, then got attacked by both sides, which is what happens when you take a modest step forward in a controversial area.

As far as what else is coming, those draft NIH guidelines will get finalized in July after taking into account public input. I’m sure there must be tens of thousands of comments coming to NIH about those draft guidelines. So there will probably be some modifications, and then they will be finalized and issued, and that will then become the policy, at least for this administration. There may well be an effort in Congress to try to do something to formalize that position so that it doesn’t get changed in the future if a different administration comes in and doesn’t like what we’ve got. Whether that actually takes off or not with all of the other things that Congress has to do, who knows? But there are certainly some noises about that.

Other ethical dilemmas that are going to be in front of us – I actually think that’s the big one. There will be a lot of policy questions. A big one from my perspective is going to be whether we need to impose some additional oversight, even regulation, on genetic testing in the era where lots of people are now finding out about their DNA. Perhaps we need to do something to prevent some wild claims that are out there on the Web from being marketed to consumers without scientific evidence.

You can go to the Web and order a test to find out if your kid is likely to be susceptible to ADHD based upon a genetic test that has never been validated. And what do you know? Most of the time, the test is positive, and then the company will sell you nutritional supplements for thousands of dollars that will keep your kid from falling over the edge into bad behaviors. I mean, this is snake oil. And yet there’s no particular oversight of this kind of direct-to-consumer genetic testing. There’s a lot of discussion going on about whether something ought to be done about that.

NAOMI SCHAEFER RILEY, *THE WALL STREET JOURNAL*: On the first question that you just answered, you said you were developing Christian school curriculums. I was wondering if you have looked into public school curriculums. What are kids learning that is leading them to have these beliefs about evolution in the first place?

COLLINS: It depends if they live in Texas or not, right? We recently had this Texas Board of Education event, where there was a debate about whether Texas would have language in its education standards that would imply that evolution was not very well supported. This was actually quite a messy situation. On the first day of the debate, it looked as if that language was being stricken. Then the next day it came back with slightly different wording clearly suggesting that students in Texas will need to understand that evolution is potentially flawed and that intelligent design might be a better solution. Just the kind of thing, of course, that in Dover, Pa., was considered to be out of bounds by Judge Jones.

And this is going to keep happening. But at the moment in most schools that is not the case. It's only in certain states where that battle is going on at the school board level. But frankly, my sense is – and this is based on some data, although I don't have the complete grasp of what's going on in the whole country – is that biology in general is being badly taught in public schools. It is largely a descriptive science. You memorize various kingdoms and genera and species – all those things I hated and why I went into physical chemistry.

You have to learn the parts of the crayfish, and you never get the sense that there are really principles here. Certainly evolution is going to be given short shrift because it's clear in many schools that the parents are going to be in the classroom the next day if they find out that Junior has been taught about Darwin, so teachers are inhibited. I've spoken on several occasions at the annual meeting of the National Association of Biology Teachers, who are out there trying to deal with this. That is a heroic group of very embattled people, who at least in most schools that have a heavy population of evangelical Christians are under attack for trying to teach the principles of evolution.



John Siniff

JOHN SINIFF, *USA TODAY*: Actually, I have questions for each of you. First Barbara, Dr. Newberg has delineated between those who follow a loving, compassionate God and those who believe in an angry, vengeful God. Of the latter category, he says that that belief system activates the primitive, emotional limbic areas involved in anger, rage, fear and stress. So I was wondering in any of the research, did you delve into the area of religion and violence because that is, of course, what atheists point to as one of the ultimate flaws of religion, that it leads to world conflict?

BRADLEY HAGERTY: That research came out after I had done my own research about the primitive – the whole amygdala is activated and it creates fear and anger. The amygdala actually does more when it comes to bad emotions. You think about it a lot with fear and anger. I think of it as a Rottweiler of the brain. You have a response and it's a Rottweiler response. So he has made that distinction. Frankly, I can't really comment very much on that because that research was done after I had done my book.

COLLINS: Actually, it's just related to something that you said, which atheists do commonly point to, that religion is the source of anger and aggressiveness and violence. Let us not forget to note that in the 20th century, the greatest human slaughter came at the hands of atheist regimes –

the Stalinist regime in the Soviet Union and the Maoist regime in China. The atheists conveniently seem to overlook that and point to other examples. Let us say the lesson is here that humans are capable of great cruelty, and they will use whatever worldview they wish to blame for their behavior or to excuse themselves. But aggressiveness and violence don't seem to be exclusive to any particular group.

SINIFF: Dr. Collins, you started to answer this at the end of E.J.'s question, but was there anything in your scientific discovery that led you to the path of Christianity versus some other faith tradition?

COLLINS: I don't think the scientific perspective pushed me particularly in one direction or another, with one exception and that is, evolution does lead you to this concern that was raised earlier about suffering and why is that necessary as part of God's creation? I don't know a good answer to really satisfy somebody who is concerned about that. But I do know, as a Christian, that I can say categorically that God knows what suffering is about, that God in the form of Jesus Christ suffered in ways that none of us could possibly imagine. So as much as we hope to avoid suffering ourselves, if it comes, we can hardly claim that God doesn't know what we're experiencing.

SINIFF: But in your search of the world's religions, I was curious, during that time, was there any point in any of your self-discovery where you thought the science kind of leads me this way?

COLLINS: I don't think so. I think my leaning toward Christianity came on grounds other than on science.

BRADLEY HAGERTY: Actually, can I jump in? I want to just mention one thing that I observed in talking to various scientists, which was there seemed to be a sense that cultivating spiritual practices didn't make you aggressive but actually made you more compassionate and kind of self-sacrificing. For example, I think about two particular scientists. One is Mario Beauregard up in the University of Montreal, who studied people who meditate. Another guy is Michael Persinger, who is up in Canada as well, who has a completely atheistic view. He thinks that if you tickle the temporal lobe, you'll create a sensed presence and that God is all in the brain.

While Mario Beauregard believes in a God who tickles the temporal lobe and Persinger believes that there isn't a God but it's just all material processes, they agree on one thing, which is that people who seem to go through these practices or have an excitation of their temporal lobes seem to be better people. Persinger wants to use his "God helmet." He's got this God helmet that he puts on. I did this, put it on. It's great radio, I've got to tell you. You'll hear it in a couple of weeks. You put this thing on and he tries to stimulate your right temporal lobe with weak magnetic fields, and then you're supposed to feel a sensed presence and all of that.

But he feels that if you can do these things from a mechanical point of view, then you can circumvent God or the belief in God. If people would just do some of these practices that aren't connected with God but just chanting or whatever, you can create neural networks that make you a better person, and love and peace will reign in the world. Mario Beauregard believes that it's

God who creates these circuits and who gives you spiritual epiphanies, but that also if you use these practices, love and peace will reign in the world as well.

The point is that both the atheist and the theist believe that these practices create better people, people who are more self-sacrificing, peaceful, calm, loving, all of that. So no one is recommending that you learn how to stimulate your amygdala – I mean maybe that happens – so that you’ll get to be more warlike. I think spiritual practice generally leads toward good results, rather than negative results.

CROMARTIE: I want to know where I can get one of those helmets.

JONATHAN KARL, ABC NEWS: Dr. Collins, I wanted to come back to Genesis. In your view I guess we’d call it evolutionary creationism or creationist evolution. We all essentially evolved over the course of 12 million years or so. Then at some point, God grants humanity a soul. I’m wondering, is it your belief that perhaps that’s what we see happening described in the story of the Garden of Eden? At what point does Genesis or does the Bible become something approaching a historical record? Clearly you see that in the case of the New Testament, and I assume for much of the Old Testament. At what point does it go from being something we have either greatly misinterpreted or just wrong to something that is historically accurate?

COLLINS: It’s a great question, and the answer of course – or maybe it’s not an answer; there are answers, plural. It requires you to be a scholar of the Old Testament – which I am not, although I have read those who are – in terms of applying an appropriate hermeneutic to understanding the context of particular Scriptures. What was the original wording, and what did those words mean? What were the contexts in which they were written, both in terms of who wrote them and the audience they were written for? And in that context, what was the difference between reality and myth? Is the language that of a historical eyewitness description or of something that seems more like a morality play?

When you apply all of that to various parts of the Bible, different people will come out slightly differently. Certainly when it comes to the Garden of Eden, a question often asked is, were Adam and Eve literal, historical figures? It’s one of the questions on the BioLogos website. One thing I think we can rule out as a possibility is that Adam and Eve were created as special acts, separate from the rest of the animal kingdom. I tried to go through some of those arguments with the vitamin C problem, why we really can’t say that humanity can be separated out from that tapestry of diversity of other species.

On the other hand, I think you could make a plausible argument that Adam and Eve were historical figures, a pair of Neolithic farmers, at a time where the brain had reached the point of sufficient complexity for the arrival of the sense of free will – which then got misused – of the moral law and of the soul. Or, you could also make the case that Adam and Eve are standing in for that whole group of about 10,000 ancestors from which we are all descended. And that’s about the number. It wasn’t two; it was about 10,000. Just looking at the diversity and complexity of the human genome, you can’t really shrink it back much more than that. Or, some would argue that Adam and Eve were never intended to be historical. They’re allegorical; they

represent all of us, and we are all going through that same experience of being given great gifts and then using our free will to break God's law.

I think outside of the one that science won't allow you to accept because it predicts things that can't be justified with human genetic diversity, all those other options are potentially plausible. I think all are consistent with reasonable readings of the Old Testament from people from Augustine to C.S. Lewis, who, by the way, is regularly quoted by evangelicals as if he didn't believe in evolution. Well, read his description of the Garden of Eden in his book *The Problem of Pain*. It's exactly along the lines of what I'm saying in terms of the various options of what Adam and Eve must have been all about.

A really wonderful book by Denis Alexander called *Creation or Evolution: Do We Have to Choose?* goes through many of these arguments in a similar way. It seems to me, given the complexities of interpretation of Genesis, that there's a lot of leeway there to fit that together with scientific interpretation. Genesis does not read like a scientific textbook. Where in the Old Testament do you get to the point where you need to say, this starts to sound more like a historical description? It depends on which book of the Bible you're looking at.

Certainly there are parts of the Old Testament that very much read that way. There are other parts, like the Book of Job, that I think reasonable people might argue are more allegorical than historical. It goes to people with greater theological expertise than I to say in any particular situation how close to that boundary you are. But you're right. When it comes to the New Testament, that certainly does not fit in the same realm at all of something that sounds allegorical. It sounds very much like historical records of eyewitnesses.



Claire Duffy

CLAIRE DUFFY, NBC NIGHTLY NEWS: This is just actually a really quick follow-up to Adrian's question. Is there a counterpart? Do you have any counterparts in other traditions? Who is the Hindu Francis Collins? Is there one? And why or why not? I'm just curious, is the level of scholarship on this question similar in other religious traditions?

CROMARTIE: Eastern religions in general?

DUFFY: You addressed it a bit in the PowerPoint. I'm just wondering, are there other thinkers out there who are trying to grapple with these questions from a non-Christian point of view?

COLLINS: There are, although I don't think they've necessarily felt quite as much of an urgency about speaking up because I think it is in evangelical Christianity and perhaps increasingly also in fundamentalist Islam where this battle is really raging and doing a lot of collateral damage to people who are trying to make sense of it.

I think in Hinduism and in Buddhism and actually in Catholicism, it's just not that big a deal in terms of the perceived conflict between science and faith. Certainly the Dalai Lama from that perspective has been a wonderful voice for reason in terms of a synthesis of science and the spiritual. You can't do a lot better than the ways in which he has written about that and spoken about that. So I guess I'd point to the Dalai Lama as maybe the best non-Christian example.

FRED BARNES, *THE WEEKLY STANDARD*: Dr. Collins, I wanted to ask you as a Christian and a scientist how you regard the miracles? You just mentioned a couple of moments ago about the eyewitnesses. In some cases the Bible mentions pretty persuasive eyewitnesses – I think for the resurrection – but not for others, and for things in the Old Testament as well. So how should we regard them as Christians? I guess my view is that if you believe in the resurrection, which is fundamental – if you don't, as Paul wrote, we have nothing as Christians. But if you do believe in it, then you should believe in all of them – except I have trouble with a lot of them. So what about the miracles?

COLLINS: I think that's a question a lot of scientists ask me when they hear that I'm a believer. They say, well, that's fine for you to have those spiritual leanings, but surely as a scientist, you don't accept the miraculous claims of the Christian faith? I think basically the real question is, do you believe in a God who is outside of nature and who is the author of the laws of nature? If the answer to that is yes, then I don't see that it's a big leap at all to say that God might also on rare occasions of great significance invade nature and suspend those laws in order to convey an important message to God's people.

At those "great ganglions of history," as C.S. Lewis calls them, where something really important is being conveyed, a miraculous event is a pretty powerful way to do so. And why would we be surprised that an all-powerful God would choose to do that from time to time? So in that regard, I have no rational objection at all to miracles. I do believe in the resurrection as a literal rising from the dead of Jesus Christ in a fashion that N.T. Wright's book, *The Resurrection of the Son of God*, describes. It's a particularly interesting discussion of the subject, from both biblical and non-biblical sources, and arrives at the same conclusion – that this is the most reasonable answer. But, of course, it is the cornerstone of my Christian faith.

CROMARTIE: Seven-hundred-and-eighty pages worth.

COLLINS: Yeah, it is a bit of a long read – not one of those things to try to do on a short plane flight. But it is a wonderful book.

CROMARTIE: Christopher Hitchens once said, send me that book. And I did. Then I asked him later if he read it, and he said, if he takes over 700 pages to prove a resurrection, I don't even have the time to read it.

BARNES: My question is not whether it's possible to believe in the miracles, but whether we should believe in all of them.

COLLINS: So again, that would force me into theological territory that I'm –

BARNES: I don't mind doing that.

COLLINS: – probably not qualified to do. I mean, for instance, was Jonah really in the belly of the whale? I have trouble with that particular one, both in terms of the scientific improbabilities and what I have learned from theologians who are not convinced that that story is intended to be a historical story as opposed to a morality play. I have trouble with the literal standing still of the sun in terms of what that would mean for all kinds of laws of physics. At the same time, if God decided the sun needed to stand still, I presume God could figure out how to deal with those laws of physics for a little while too. I don't have a great answer. But I don't find it a particularly difficult area for a believer in that if God chose to do every one of those, that's OK with me. And if some of them are beyond human understanding, that's OK with me too.

BARNES: That's OK with me. I don't mean to belabor this point, but would you say there is a difference between the Old Testament miracles and the miracles in the New Testament, which were done by Jesus?

COLLINS: I think there's a difference in the language of those Scriptures that we should pay attention to. The fact that the New Testament Scriptures are very much written as witnesses describing history of real events is not something to discount, whereas some parts of the Old Testament don't have that same flavor, so a hermeneutic approach would allow a different conclusion.

CLARE BRINBERG, CNN: I'm wondering how as a scientist and as a Christian you're able to pick and choose. When you were speaking about Adam and Eve, you talked about the whole concept of things that science won't allow us to accept. Science doesn't allow us to accept any of these miracles. So how do you, as an individual, make the distinction between what you choose to accept as something that actually happened and something that did not?

COLLINS: I think God gave us these two books: a book of God's words and a book of God's works. If we are empowered and given the opportunity to read both of them with the confidence that there should be consistency, then when we encounter something that seems to be an inconsistency, we have the tools at hand to try to sort it out. So when science tells me in a way that seems incontrovertible from many directions that the universe is 13.7 billion years old and not 6,000, then I'm convinced that that is an answer that is trustworthy and that is a reflection of God's plan for creation. Therefore, a particular interpretation of a part of the Bible that's been subject to a lot of deliberation long before we knew the science, namely, what is the age of the Earth, could be melded with that in a fashion that is not picking and choosing. It's basically

taking the truth that we have access to from all sources and trying to put it together in a fashion that's coherent.

On the other hand, when it comes to a miraculous event like the resurrection of Jesus Christ, I don't have any scientific data there. If somebody will present me a bone and convince me that that's Jesus Christ, then my belief in the resurrection would be under severe threat. But that has not been presented. I suspect it will not be. So in that situation it comes down to the question, can I, as a scientist, accept the idea that at those very rare moments where science is not likely to provide you any data that God could suspend the natural laws? And I see no reason why that could not be the case.

DANIEL BURKE, RELIGION NEWS SERVICE: Dr. Collins, I'm wondering how your work on genetics affects your theological views on predestination. It seems that a number of our cards are dealt before free will or even consciousness arises. So what does that tell us about human behavior, free will and how we are ultimately judged by God?

COLLINS: Great question. We do know from the study of identical twins, long before we even had specific DNA analyses to back it up, that an awful lot of human behavior is in some way strongly influenced by heredity. If you measure various aspects of human personality like risk taking or whether you're an anxious person or whether you're interested in novelty, those all come out to have significant contributions. Anybody who knows identical twins will recognize that yeah, there are some similarities there in those personalities. So you might say, well, that's not fair. People are already given a certain pathway by their genes that might make it more or less difficult for them to find God.

At the same time, looking at whether the glass is half full or half empty comes in here. There's a huge amount of all those parameters that is not determined by any hardwiring and that is a consequence of learning and experiences in childhood and also, very importantly, free will. Free will is not going out the window on the basis of the study of the genome. We're not going to discover that we really are helpless victims of our DNA. That's just not the answer that's going to be out there.

Yeah, it's true we're all dealt a set of cards. But it's also true that it's up to us to figure out how to play the hand. And that is a free will decision, which every person has to make in terms of moral decisions, in terms of life choices, and yes, in terms of whether to be interested in pursuing the question of God or to let that one go. Predestination is too strong. Predisposition, yeah, OK, we've got that.



Reihan Salam

REIHAN SALAM, FORBES.COM: A friend of mine was telling me last night about Barbara's report on the Quiverfull Movement, a group of folks who want to procreate so as to affect the survival of their religious tradition in the world. A lot of Dr. Collins' remarks seem to be related to the problem of this young person who runs into a scientific truth and how that could lead to a crisis of faith. I wonder if the 51 percent of folks who believe in revealed religion in this very robust, orthodox way when it comes to evolution – I wonder if that's less a problem than actually a good thing, viewed from the perspective of how religion is a competency, something that actually one wants to cultivate.

Given that we have a lot of pluralism in our society, is it possible that we are looking at this the wrong way? You have seen a variety of religious traditions that have tried to effect a modernist compromise, and those seem to be the religious traditions that are actually least robust, least likely to survive, least likely to adapt in a society that doesn't lend itself to the competencies that surround religious belief.

BRADLEY HAGERTY: First, could you speak a little faster for us?

CROMARTIE: He actually can. That was Reihan is slow motion actually.

BRADLEY HAGERTY: Do you want to jump in –

COLLINS: I'll start while you're thinking. It seems to me you're proposing the idea, if I understood you, that maybe it's a good thing to have religious traditions that continue to propagate the idea of a biblical literalism because – well, I can't go there. It just doesn't seem to me that you have a future if what you're trying to propagate is based upon a house of cards. If you actually believe there is a true answer and if you're also a believer in God, then shouldn't God be aligned with the true answer and not with the false answer, or you're ultimately setting up what has to collapse.

The God of all truth cannot be well-defended by a lie, no matter how noble the intentions of those spreading the lie might be and no matter how unaware they might be of the fact that they're spreading untruths. Ultimately, I think the truth is going to come out. If you have your religious

traditions based on premises that are going to be seen as flawed in a fundamental way, how can they then survive?

BRADLEY HAGERTY: I guess what I would say is it seems to me that the nation is going the other way – not going the Quiverfull Movement way. The Quiverfull Movement, by the way –

CROMARTIE: Yes, what is that?

BRADLEY HAGERTY: I did a story about this a few weeks ago. It's basically a group of Christian fundamentalists who take the line from the Bible – I can't remember where it is in the Psalms, but it says, "Blessed is the man who has many children. They are like arrows in his quiver." So their thought is that you have as many children as possible – 10, 15, however many – and you beat out the Muslims, essentially. That's what they're trying to do is out-propagate the Muslims. They talk about that a lot.

CROMARTIE: Where are they located?

BRADLEY HAGERTY: They're located mainly in the Midwest and South. Not surprisingly, they are not on the two coasts. You have these extreme movements, but I actually think that the country – A, I don't think that that's particularly good for religion to have those kind of extreme movements. But also, I think the country is going in a different way. When you look at the [Pew study](#) that recently came out, what you find is that there are a lot of people who are not going to church, for example. But those people still consider themselves drawn toward God. It's not because they don't believe in God. It's because church doesn't meet their needs.

When I look at those Pew numbers, there are two things going on. One is that people have not lost that urge for a connection with the mystical or the Almighty, that somehow that may be hardwired into us – that desire. The second is that people are rejecting the fundamentalists on either side. Both fundamentalist atheists and fundamentalist Christians or religious folks. I have a sense that where the country is going is in a much more pluralistic, tolerant way.

The problem, though, is as you said. It's like a lot of the mainline traditions are considered wishy-washy, which is why I think you see so many people not going to church – still desiring the divine, but not going to church. I think we're in this squishy place right now, where people are rejecting – especially after the last maybe eight years – the culture wars and the religious wars, but not quite knowing what to do to meet their spiritual needs.

CROMARTIE: We're going to have a first here at these events. One thing you don't know about Dr. Collins: He's also a banjo player, a guitar player and a singer, and he's written a song on religion and science. He wouldn't do it unless we had a guitar and a certain kind of pick – finger pick. Well, through the help of Peb Jackson – I think he went up and down Duval Street – he found all these things. So we're going to hear Michelle's question, the answers and then, Dr. Collins, could you end with a song?

COLLINS: Oh Lord, OK. You're going to be sorry about this, I think.



Michelle Cottle

MICHELLE COTTLE, *THE NEW REPUBLIC*: Dr. Collins, you were talking about the reception you've had for your book and the presentations that you give, and you mentioned Stanford and students and the interest with younger people. You also talked about a mixed reception in the evangelical community. Do you see a generational divide within the evangelical community? We hear a lot about this with different views on gay rights and things like that within the community and what younger Christians believe versus older Christians. Does that apply here that you've found?

COLLINS: Yeah, I think it does. Although, it's probably not as clean a distinction as it might be, for instance, in environmental justice, where I think there is quite a clear dividing line. But certainly I think the receptivity to the idea that evolution can be consistent with God's plan is pretty limited when we look at the senior leaders of the evangelical community. Many of them, of course, have established such a strong record of attacking this that it would be difficult now to step away from that without losing constituencies that people don't want to lose. I think there is more of a flexible view in younger Christians on this.

But at the same time, those people I talked to in Nashville – they were all 30-somethings. They had clearly embraced the young Earth creationist view because it's pretty much all they had ever heard as being acceptable for the rest of their community and their worldview. If that's the case, we have a long way to go before the real transition can occur.

CROMARTIE: Peb, could you bring the guitar up, please, sir?

COLLINS: Oh, man.

CROMARTIE: This is a first for our conference, but I might as well take advantage of it. I'm doing the interpretive dance.



Francis Collins

COLLINS: Let me see. Since I still have my computer up here, I might make you all join in on this. This is even in tune. Thank you, Peb. Although the pick has this interesting sort of overheated tip that may mean that I catch it on strings that I don't mean to. So it's the pick; it's not me. This is a familiar tune, but the words are written by Thomas Troeger, who is a professor of divinity at the Yale School of Divinity, which I think are a wonderful, evocative way of putting together these themes of faith and learning. And it goes like this.

(Singing.)

Praise the source of faith and learning that has sparked and stoked the mind
With a passion for discerning how the world has been designed.
Let the sense of wonder flowing from the wonders we survey
Keep our faith forever growing and renew our need to pray.

(Applause.)

CROMARTIE: Let's thank our speakers, please. (Applause.) Thank you, Dr. Collins, for being so agreeable on the spot.

This written transcript has been edited by Amy Stern for clarity, grammar, accuracy and to eliminate references to some PowerPoint slides that could not be reproduced here.