Marc Roby: We are resuming our study of biblical theology today by continuing to look at external evidence that corroborates the Bible. Last time, Dr. Spencer, you argued that the Genesis account of creation is not intended to be a scientific description of *how* the universe was created and also that it was not intended to tell us *when* the universe was created. You then briefly outlined what is important for a Christian to believe about the Genesis account of creation. So, I think we are now ready to discuss how the Genesis account of creation can possibly be consistent with our modern scientific understanding. How would you like to proceed?

Dr. Spencer: I'd like to proceed by giving a sampling of different ideas that have been proposed for how to reconcile the apparent differences between what we know from Genesis and our current scientific understanding. It would take far too long to go into any of the proposals in great detail, and I don't think it would be profitable for most of our listeners, but I will give some references for those who want to look into this topic in more detail.

What I hope to accomplish is simply to demonstrate that there are a number of possible ways in which our modern scientific understanding might be in complete harmony with the truth presented in Genesis chapters 1 and 2. So, if you are a believer, you should not in any way fear science, nor should you think that science is entirely wrong. And if you are an unbeliever, I hope to make you realize that you don't have to abandon science or reason to believe the Bible, nor do you have to believe that Genesis is just a myth. The rest of the Bible treats Genesis as factual, and so should we.

Marc Roby: Fair enough. The controversy really centers on how we interpret the six days of creation; so, what about the days in Genesis 1? What do you think about them?

Dr. Spencer: There are a number of different views about those days and I'm not certain which one is correct. I do, however, favor the idea that they are normal days, not long epochs or mere literary devices, but, I must emphasize that I would not be dogmatic on that point.

Also, even if they are indeed real days, that still does not by any means settle the question about how long the process of creation described in Genesis 1 took. I would like to briefly examine three possible ways to understand these days.

First, it has been suggested that these days could be normal 24-hour days that are markers at the end of long periods of time, so they are six normal days, but they are not consecutive. This suggestion can be found, for example, in the book *Genesis One and the Origin of the Earth*, by Robert Newman and Herman Eckelmann, Jr.[1], although there are others who hold the same view. The book is a bit old, but it still provides a reasonable summary of the scientific evidence pointing to the age of the Earth and then also a reasonable possible exegesis of Genesis 1.

If you read the Genesis account carefully, even in the English, you will note that it does not say that all of the creative activity took place on the day mentioned; rather, it lists the activities for a given period of time and then concludes by saying, "and there was evening, and there was

[1] Robert C. Newman and Herman J. Eckelmann, Jr., Gensesis One and the Origin of the Earth, Interdisciplinary Biblical Research Institute, 1977

morning, the first [2nd, or whatever] day". [2] So, it is certainly possible that there were extended periods of creative activity separated by special days called out by God as markers.

Marc Roby: OK, you mentioned three views that you wanted to examine; what is the second?

Dr. Spencer: The second view I want to mention has to do with the point of view of the one writing the Genesis account. If you are going to try and read Genesis 1 in what I would describe as a woodenly literal way, then you have a problem to deal with. The sun and moon are not mentioned until the fourth day, and many take this to mean that that is when they were created. But, of course, we define a day by the rotation of the earth and the concomitant appearance of the sunrise and sunset, so how do you know the length of the so-called days that occurred prior to the fourth day?

Newman, and others, have proposed that the description of creation in Genesis 1 is from the perspective of an observer on the surface of earth, and have pointed out that the sun and moon would not have been visible to this observer at first because the atmosphere was originally opaque. The appearance of plants on earth however, which consume carbon dioxide and produce oxygen, helped to change the earth's atmosphere so that it was no longer opaque. Therefore, after plants had been around a while, the sun, moon and stars would become visible to this earth-bound observer. And remember that plants are created on the third day, so the sequence is correct in saying that the sun, moon and stars would then become visible on the fourth day. If you don't adopt something like Newman's view, you have a problem determining the length of the first three days.

Marc Roby: Alright, what is the third view you want to mention?

Dr. Spencer: The third view I want to mention again has to do with the location of the observer through whose eyes, if you will, the creation account is described, and I must warn you and our listeners that this view is a bit difficult, but I will keep the description as brief as I can and then will also summarize the main point at the end to try and make it clear.

Marc Roby: Thanks for the warning – we all know to listen a bit more carefully for a while. So, what is this difficult view?

Dr. Spencer: Well, we tend to think of time as immutable, but this is not at all the case. One of the most shocking developments of 20th-century science was Einstein's theory of relativity, which clearly shows that under some conditions the passage of time is different for different observers. And I don't mean that their subjective experience of time is different, their perception of time is actually the same. I literally mean that time *is* different for different observers under some conditions. This sounds very much like science fiction to most people, but it absolutely is

[2] All scripture quotations, unless otherwise indicated, are taken from the Holy Bible, New International Version®, NIV® (1984 version). Copyright © 1973, 1978, 1984, 2011 by Biblica, Inc.™ Used by permission of Zondervan. All rights reserved worldwide. www.zondervan.com The "NIV" and "New International Version" are trademarks registered in the United States Patent and Trademark Office by Biblica, Inc.™.

not fiction. The theory of relativity has been experimentally verified time and time again and has been proven to be correct.

Now, there are really two theories of relativity, one dealing with observers moving at a constant velocity relative to each other, this is the special theory of relativity, and the other dealing with observers who are accelerating, or, equivalently, are in a gravitational field, this is called the general theory of relativity. In any event, the special theory shows us that if you are sitting stationary on the earth and I am moving past you at some constant velocity, you will observe my clock to be running slow compared to your clock. And this has been confirmed experimentally many times. The difference is extremely small at normal speeds, but at speeds approaching the speed of light, the difference can become quite large.

The general theory of relativity says that clocks also run slower when they are accelerating, or equivalently, when they are in a gravitational field.

Marc Roby: Alright, that is very troubling. Does this mean that the movie Back to the Future might describe something that is actually possible?

Dr. Spencer: Not at all. Time travel, in the sense that science fiction presents it, is not possible. What is possible, is for two different people to age at different rates.

Marc Roby: I'm glad I don't need to worry about anyone going back and changing the past. But, can you give us any common examples where these theories make a difference?

Dr. Spencer: Absolutely, let me give you one concrete example with which everyone is familiar and where relativity matters a great deal. That example is the GPS system most of use for navigation. The operation of that system depends critically on being able to accurately measure time. But, the GPS satellites are in orbit around the earth and so are moving very rapidly relative to us on the ground, which causes their clocks to run slower than ours in accordance with special relativity. In addition, the satellites are in a smaller gravitational field than we are here on the surface of the earth, which means that we observe their clocks running faster than ours in accordance with general relativity. It turns out that the gravitational effect is the larger of the two, so overall, we observe the clocks in the satellites running faster than ours do, but both effects must be taken into account, or the GPS system will not work properly. And the error that would occur if we didn't take these effects into account is not small, one estimate I found[3] said that the errors would accumulate at the rate of 10 km per day if relativity were ignored!

Marc Roby: Wow, that is a huge error. But, I think it's time to slow down a bit now because a lot of people might be confused at this point. How is this relevant to our understanding of Genesis 1?

Dr. Spencer: Alright, this is the most important point certainly. It's relevant because of the fact that time progresses at different rates for different observers. And, when you are talking about extremely large gravitational fields and high velocities, as would have been present everywhere in the early universe, the difference can be massive. So, where you place the observer in Genesis

[3] See http://www.astronomy.ohio-state.edu/~pogge/Ast162/Unit5/gps.html

One can make a huge difference in the length of what is called a day. My basic point here is simply that time is not the absolute, immutable thing we think it is. So, when it comes to saying how long it took to create the universe, you have to know where the observer is. This particular view is explored in an interesting book by Gerald Schroeder called *Genesis and the Big Bang Theory*.[4]

Marc Roby: That reminds me of what you said last time about God not experiencing time the same way we do.

Dr. Spencer: That's true, although there are actually two different points, both of which may come into play. One is that God is a completely different kind of being than we are; as we noted last time he experiences all moments in time – what we call the past, present and future – with equal immediacy. The second point, is that even creatures like us will have time pass at different rates if they in different gravitational fields or moving very rapidly relative to each other. And, while I think this view is extremely speculative, it does give us an example of how we need to be humble. A hundred and twenty years ago, no one on earth would have had any basis for proposing such an idea, but now this idea has a solid scientific basis.

Marc Roby: Well, that view certainly stretches the mind a bit. Do you want to say anything at all about other possibilities?

Dr. Spencer: I do want to mention one more, but first, I would like to summarize the main point I'm trying to make with the examples I've just given; namely, I think it is safe to say that there are multiple ways in which the modern scientific view that the universe began around 14 billion years ago can be true, and yet be completely consistent with the Genesis account of creation, which I am absolutely convinced is true, even though I'm not completely certain about how best to interpret it.

I do want to remind everyone of what we said last time though, and that is that how we, as Christians, interpret the Genesis account of creation is extremely important theologically. But, exactly how long it took God to create the universe, and when, exactly, he began that creation, have no theological importance whatsoever.

Marc Roby: OK. Now, what is the last view that you want to mention?

Dr. Spencer: I want to mention that it is possible, although I personally find it unlikely, that the universe is actually relatively young and God simply created it with the appearance of age.

Marc Roby: But, wouldn't that be a deceptive thing for God to do?

Dr. Spencer: That is certainly the main objection that's usually raised against this view. Why, for example, would God create light on its way to earth, apparently showing us things that never really happened? We see many super novae for example, each one of which appears to be the

[4] Gerald L. Schroeder, Genesis and the Big Bang Theory: The Discovery Of Harmony Between Modern Science And The Bible, Bantom, 1990

death of a star that occurred billions of years ago, but if the universe is truly only thousands of years old, then these events never actually happened.

But, I think it is worth mentioning a response to that objection given by Vern Poythress in his book *Redeeming Science*.[5] In that book he discusses what he calls a *coherent* mature creation, and by that he means that God created a universe in which things that were directly created by God are coherent with things that then later arise through natural processes. For example, the ground in the Garden of Eden probably had nutrients in the soil that we would conclude came from decaying plant material even though no plants had existed before.

The point is that God could have created a world in which it was possible for man to learn about the physical laws God put in place by examining that world, and, therefore, the things that God created directly had to look as if they came about by those natural processes; there would then be continuity between the present and what Poythress calls "ideal time", which is the time before creation, which never really existed, but is coherent with real time. I've summarized his argument very briefly, but I hope not unfairly, so if anyone is interested, I recommend that they read his book. The references for all of the books I've mentioned today are given in the transcript of this session, which you can find online at whatdoesthewordsay.org.

Marc Roby: I must say that's an interesting view. There are, of course, other views you have not mentioned, aren't there?

Dr. Spencer: There are a number of other views. For a discussion of some of them I would recommend the book *Seven Days that Divide the World*, by John Lennox.[6] I think this it's a marvelous book, and it is quite short and easy to read.

And, I really want to say that if some of our listeners are Christians who believe in a young-earth and are bristling about some of what I've said, I would encourage them to read James Boice's commentary on Genesis,[7] particularly Volume 1, or, if they want something much shorter, Wayne Grudem does an excellent job in Chapter 15 of his Systematic Theology text.[8]

I would also point out to them that it simply is not true that people only disagree about how to interpret the days because they are capitulating to modern science. For example, in his essay *The Literal Meaning of Genesis*, St. Augustine – who lived well before modern science existed – proposed that the universe was created in an instant!

Marc Roby: Very well. I think that wraps up our time for today, I look forward to continuing our discussion of the evidence corroborating the veracity of the Bible next time.

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[5] Vern S. Poythress, Redeeming Science: A God-Centered Approach, Crossway Books, 2006
[6] John C. Lennox, Seven Days that Divide the World: The Beginning according to Genesis and Science, Zondervan, 2011
[7] James Montgomery Boice, Genesis: An Expositional Commentary, Zondervan, 1982
[8] Wayne Grudem, Systematic Theology, Inter-Varsity Press, 1994