

BIBLICAL STUDIES

TIME IN GENESIS 1

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ABSTRACT

How we measure time affects our assessment of the six days of creation in Gen 1. Within the order that God has providentially established, ordinary people usually do not worry about how to measure time, because many rhythms in time, such as the swings of a pendulum or the beat of the human heart or the movement of the sun in the sky are more or less “in time with” each other. But the six days of creation described in Gen 1 are unusual, because some of the rhythms did not exist until a later point in the sequence of days. The cycle of the greater light (the sun) did not exist until the fourth day. The human heart did not exist until the sixth day. The unusual character of the six days poses problems for how we describe the length of the days, and whether we are sure that the rhythms we now experience operated in exactly the same ways before the completion of the created order. This problem of describing length leads to cautions with respect to assessing more than one of the major theories, such as the 24-hour day theory, the mature creation theory, and the analogical theory. It also introduces caution with respect to the presumption in much of mainstream science that the same rhythms investigated today extend indefinitely into the far past. A simple affirmation of six days of creation is simpler and less definite than any of the theories.

How do we relate time in Gen 1 to time in mainstream scientific claims? The question has several dimensions and continues to elicit voluminous discussion.¹ We explore one dimension only, namely the measurement of time.²

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¹ Vern S. Poythress, *Redeeming Science: A God-Centered Approach* (Wheaton, IL: Crossway, 2006), esp. chs. 7–10, 16; J. Daryl Charles, ed., *Reading Genesis 1–2: An Evangelical Conversation* (Peabody, MA: Hendrickson, 2013); David G. Hagopian, ed., *The G3n3sis Debate: Three Views on the Days of Creation* (Mission Viejo, CA: Crux, 2001). These works in turn build on earlier voluminous discussion about the days of creation.

² Poythress, *Redeeming Science*, chs. 10 and 16, touches on the question, but here I want to offer a fuller explanation.

I. *Measuring Time*

Time measurement has a complexity to which we seldom pay attention in ordinary life. We can talk meaningfully about the *length* of a segment in time only by reference to some standard with which the segment can be compared. For example, if we say that we spent fifty minutes eating dinner, the *minute* serves as our standard. In principle, we have a choice between several possible standards, such as a second, a minute, an hour, a day, a month, a year, or a century. Most of the time we do not worry about the standard itself, because we live in a world with chronological regularities, maintained by the providence of God in his faithfulness. Nevertheless, as we shall see, the issue of standard can affect the interpretation of Gen 1.

So let us briefly consider ways of measuring time. To be useful, standards for time must involve recurring events in the world. We measure the time length of some new event by counting rhythmic recurrences of some *other* phenomenon that we consider regular. For example, the sun completes a circuit in the sky once a day. On this basis, we can choose the *day* as our standard. An event lasts four days if its span encompasses four circuits of the sun. More precisely, the standard for a day would be a *solar* day, since the word *day* can also designate the period of daylight *within* a solar day (e.g., Gen 7:12). Once we understand what we mean by *day*, we can talk meaningfully about how many days old Isaac was when Abraham circumcised him (eight days, Gen 21:4). Or, for longer periods of time, we may use *years* as our standard for measurement. For example, we may say that “Abram was seventy-five years old when he departed from Haran” (Gen 12:4). This statement has a clear meaning because the word *year* already has a meaning, and this meaning is tied in with the rhythm of the seasons and the yearly cycle of the sun and the stars.

In the details, there can be some complexities when we try to mesh more than one of these standards. Our calendar months are not the same number of days long. Our calendar year is 365 days, except in leap years, which have 366 days. The sidereal year and the tropical year are standards of measurement that differ slightly from each other and from the calendar year.³

One effect of having multiple standards is that we need ways of transferring from one standard to another. So, for example, we say that a year is 365 days and a day is 24 hours long. The latter statement specifies how we transfer back and forth between a measurement using hours as the standard and a measurement using days as the standard.

But what do we mean by an *hour*? For some centuries, an hour was defined as 1/24th of a day. So if a day is 24 hours long, and an hour is 1/24th of a day, which of the two is our starting point? If we say that either one can be, it can become unclear what it is that we are actually claiming.

³ *The New Encyclopaedia Britannica: Micropaedia*, 15th ed. (Chicago: Helen Hemingway Benton, 1974), 10:808.

And here we already have our first minor difficulty with interpretations of Gen 1. Some Bible interpreters claim that each of the six days mentioned in Gen 1 is a 24-hour day. This theory is sometimes called “the 24-hour day theory.” But if we stipulate that an “hour” is actually *defined* as 1/24th of a day, a day is *by definition* composed of 24 hours. That in itself is just telling us what we want the word *hour* to mean. By itself it gives us no information that separates one interpretation of Gen 1 from another. Other theories, like the day-age theory and the analogical day theory, are also 24-hour day theories if we use this definition of the word “hour.”

Now this difficulty may appear to be a mere quibble. We may imagine a representative figure, named Bob, who will articulate a commonsense point of view. “Surely,” Bob replies, “the meaning is clear. Whatever might be the labels, the 24-hour day theory is talking about days that have more or less the same length as our days have now, while the day-age theory and the analogical day theory are talking about ‘days’ in some metaphorical sense, because these so-called days are actually very long periods of time.”

I sympathize with this reply. It is commonsensical. It is the natural reply as long as we think we are on firm ground with respect to our notions of time. But what is this “firm ground”? In fact, there are mysteries down below. Despite its common sense appeal, the reply skirts a difficulty. We can see its limited viewpoint if we observe that, in Bob’s description of alternate theories, he uses the expression “very long periods of time.” But the expression “very long” implies some standard for measurement. If we were to choose as our standard 100 billion years as our base unit of time, the universe, according to mainstream cosmologists, has not existed very long at all *in comparison to this standard unit*.

But Bob still has a reply, namely that a unit of 100 billion years is completely artificial. For human brings, units like days and months and years are what we must keep in mind.

Yes, this is so. So let us consider these more human-sized units. Bob uses the expression “the same length” to compare the six days in Gen 1 to days in our present experience. The expression “the same length” implies that we have some stable standard for measuring the length. And indeed, a suitable standard is at hand: the day. Using this standard, each day among the first six days is one day long, and each day in our present experience is one day long. But this is a tautology. If the “day” is our unit of measurement, and we measure a day, surely we find that it is a day. According to this definition of length, the day-age theory and the analogical day theory also involve six days, each of which is one day long.

To separate between the viewpoints, we must have some standard for measuring time that is not the same as what is measured. And indeed, we have already supplied this standard earlier, in talking about the *solar day*. A solar day is the length of time in which the sun completes one circuit in the sky. In more detailed terms, the rhythmic recurrence in the movement of the sun offers us a standard for time, in which the standard unit is one cycle of the sun. We then

proceed to measure *other* segments by seeing how many circuits or fractions of a circuit the sun moves during the time segment in which we are interested.

But then, by this definition, the first three days in Gen 1 cannot be solar days. The sun completed no circuits at all, not even a fraction of a circuit, during these earlier time segments. The non-existence of the sun led an interpreter like E. J. Young to say, "The length of the days is not stated."⁴

But again a commonsense reply is at hand. "No," Bob says, "I did not mean that. I did not mean that the sun was literally there during the first three days, but only that the length of one of the early days was the same as the length of a later solar day." To which the reply is to inquire again as to what Bob proposes as a way of understanding the meaning of his expression "the length." That expression *seems* to promise that we are using some standard unit of time. Such a unit would be based on a periodic rhythm within the created world. And—here is the important point—to be usable in practice, the rhythm in question must already be in place *during* the first three days, not merely afterwards.

1. *Different Standards for Measurement*

Now, there are such rhythms—many of them. But, if we are going to have clear meanings, we must begin to specify what these rhythms are in order that one or more of them may serve as a standard. So let us have Bob try again. Perhaps he says, "I mean that it would be the same length as measured by a stopwatch." Very well. But now he has introduced another standard for measurement, namely the stopwatch. The stopwatch has its own rhythms in its internal mechanisms. In addition, it has rhythms that are observable to human users when they watch a second hand or a digital readout that changes over time. The point is that there is no avoiding an appeal to a standard.

Now, stopwatches did not actually exist during the six days of creation. But the principle is still useful. The kind of physical rhythms that are encapsulated in the stopwatch (or some of the rhythms?) did exist during the six days. Any rhythm that existed back then could *potentially* be used as a standard for measuring the length of other events during those times. We could talk about the rhythm of pendulums swinging, or springs coiling and uncoiling, or quartz crystals vibrating, or electric current oscillating in an electric circuit. We could ask, "How does this rhythm correlate with one of the six days? In particular, how many swings of the pendulum take place during the course of the first day, and then the second day, and so on?"

Bob may be uncomfortable appealing to a stopwatch because it is a comparatively modern invention. Pendulums are older, but still not old enough. So Bob may try to go back to the old, faithful resource, the sun. He may say, "I mean that, if the sun *had* been there, it would have completed one circuit." If this is

⁴ Edward J. Young, *Studies in Genesis One* (Philadelphia: Presbyterian & Reformed, 1964), 104.

Bob's answer, we are dealing with a counterfactual claim. And it is not always so clear how we check out a counterfactual.

But let us consider the possibility. Suppose that God decided to bring the sun into the created world on the first day or the second day. He can do as he pleases. He can make the sun travel on its circuit at whatever rate he chooses. But it would seem reasonable to many people that he would have it go at the *same* rate on the first three days as on the later days. But then what do we mean by "the same rate"? We can tell what counts as the same rate if we use some measuring apparatus to do it. We take a stopwatch and time the rate of movement of the sun across the sky. But if we do that, our stopwatch has become a standard for measuring time. We are back to where we were before.

Or Bob could try to avoid appealing to another time-keeping device *within* the created world by appealing to God. "God knows what it is for the sun to go at the same rate." But this knowledge does *us* human beings no practical good unless *we* know something about what might count as being "at the same rate." And to know that, we would have to have some standard for measuring time. Without some standard that human beings can potentially access, anyone anywhere could claim that a specific rate is "the same rate."

Human intuition is strong, and some participants might wish that we could leave the discussion with human intuition. Bob, for one, might say, "But we just *know* when they are the same." The trouble is that different people's intuitions do not always agree. If just "knowing" at an intuitive level is the last thing back in the discussion, it runs the danger of making human intuition an unchallengeable fixed point. It is treated as if it were virtually equivalent to divine certainty. And then there is no way to settle quarrels between different intuitive viewpoints. Moreover, the strong intuition that we "know" may still have underneath it, buried in the depths, some unconscious sense of a standard. And, as we have seen, there is more than one possible choice of a standard. So the appeal to intuition can have the effect of concealing the difficulty and then denying that there is a difficulty—because the difficulty exists only at an unconscious level, which has not been analyzed.

We can further illustrate by imagining a situation in which Bob actually asks God whether two periods of time are the same length or two rhythms that are not contemporaneous are going at the same rate. Because God knows everything, Bob expects that God will provide a clear-cut answer: Yes or No. But it is possible that God might respond, "The answer to your question depends on what rhythm you propose to use as a standard." God, who knows everything, knows all about standards for human time measurement. Not only so, but it is he who ordained every aspect of the complexity, and the relations between different possible standards. Bob's question represents an attempt to move beyond what God has ordained. In doing so, he projects onto God's mind his own idea of an absolute measurement not based on any created rhythm. But there is no guarantee that this projection actually represents God's mind. Since it is at odds with what God has actually ordained, it seems rather that it does *not* represent God's mind.

My purpose here is not to settle the questions immediately, or to dismiss the concerns that Bob has, but to point out that there is a difficulty that could use reflection. Ordinarily, we know what we mean when we talk about the length of some time segment. We know because we have a background of stable rhythms, including the rhythm represented by the circuit of the sun. But the rhythm of the sun or the rhythm of a stopwatch is only *one* of many rhythms that we could use.

Now, we can crosscheck the regularity of one rhythm using another rhythm. For example, we check the regularity of the movement of the sun by timing it using a stopwatch. Or, vice versa, we check the regularity of a stopwatch by using the sun as a standard. But all the rhythms are inside the world. We understand them by correlating between two rhythms. The meaning of each rhythm is understood by its correlations with other rhythms. To measure any one rhythm, we have to specify another rhythm as the standard by which we measure it.

Suppose we do a thought experiment. Let us imagine that one day God suddenly doubles the rate of every single rhythm that exists in the universe. Everything is going twice as fast. And of course all the physical laws are adjusted, so that light travels twice as fast, our hearts beat twice as fast, our minds work twice as fast, and so on. What is the difference? There is no discernible difference. The rate of one rhythm within the universe can be measured only with reference to some other rhythm. To speak of “doubling the rate” of every rhythm is to talk nonsense, because such hypothetical doubling cannot be understood except by reference to something *else* that is left undoubled. Changing equally all the standards for measuring time changes nothing at all.⁵

The upshot is that discussing the length of a time segment makes sense only in terms of some standard for measuring it. And that is so even if the time segment is itself one of the possible standards.

2. *The Challenge of Beginning the World*

Genesis 1 presents a special challenge because it tells about the beginnings of things—not only the absolute beginning of the created world, but the beginning of light, the beginning of dry land, the beginning of plants and animals, and the beginning of the heavenly lights. God gives the narrative in a way that is accessible to ordinary people. But he speaks of things that happened once and for all and that the addressees did not themselves directly experience. They can nevertheless understand what God means because the originating events are analogous to things that happen within God’s providential order, within which we now live.⁶

⁵ Could we use angels or God himself as a standard outside the universe? Since angels are created beings, to be thorough we would have to stipulate that their sense of time would be made twice as fast along with the doubling of all the other rates. Since “with the Lord one day is as a thousand years” (2 Pet 3:8), it is not clear how we would compare God himself to rhythms inside the created world.

⁶ Vern S. Poythress, “Correlations with Providence in Genesis 1,” *WTJ* 77 (2015): 71–99; Vern S. Poythress, “Correlations with Providence in Genesis 2,” *WTJ* 78 (2016): 29–48.

We can understand. But we do not understand exhaustively. It should be evident that God's present providential order is not in all respects the same as what is described in Gen 1. If we as human beings simply extrapolate backward from our everyday experience, which is intertwined with the rhythms of everyday life, we can imagine a past in which things were going on in more or less the same way indefinitely, for innumerable millennia. But God tells us that it was not always so. Not all days had an earlier day before them. The ancestry of sheep or the ancestry of human beings does not go back forever into previous generations of sheep or human beings.

So we cannot just extrapolate. During the six days of creation, some things were different. And God does not give us all the details of the *ways* in which they may have been different. The narrative in Gen 1 is sparse. It does not fill in all the details. We can guess about the details. Some of the guesses might be pretty good, because we are made in the image of God and we think "like him." But we are not God. We are still guessing.

So now, what were the six days like? How do we picture one of the days? In particular, what were they like with respect to rhythms in time? Within God's providential order, there are many wonderful rhythmic correlations between ten or a hundred various kinds of time-keeping devices, and correlations between these and the rhythms of the sun and the stars and our own bodies and minds. There are clocks based on pendulum swings, clocks based on spring motions, clocks based on vibrations of quartz crystals. There are clocks with digital readouts and clocks with hands. God's providential order gives us an incredibly rich variety of regularities in rhythms in time, including abstruse rhythms that scientists have discovered only within the past century.

In addition to the rhythms that we associate with technical devices, there are more "homely" rhythms: the psychological feeling that time is passing; the rhythm of eating, working, rest, and sleep within human societies; the rhythm of breathing, or chewing, or swinging our legs when we are walking, or swinging an ax to chop wood. There is a rhythm of a cow chewing her cud, or a seagull beating its wings, or waves of the sea crashing on rocks, or water flowing down a slope. There is a rhythm according to which some kinds of animals have a time of sleep once a day, the rhythm in which flowers open to the sun in the day and close up at night, the rhythm of the seasonal growth of plants and trees, the rhythm in which some kinds of animals bear young at a particular time of the year. The list goes on.

Within God's providential order, a good many of these rhythms keep in time with each other remarkably well. For example, each solar day is about 86,400 seconds, as measured by a pendulum clock. So did all of these rhythms extend back into the six days of Gen 1? And did they all keep in time with each other in the same way as they do now? Perhaps they did. But we have to be cautious because of the uniqueness of the six days of creation in Gen 1. Maybe many of them did, but maybe some of them did not.

When we look at the details, it begins to look complicated. Some rhythms did not continue backward to the very beginning. The rhythm of work, rest, and sleep for human beings does not continue back before the sixth day, when human beings were first created. The rhythm of a cow chewing her cud does not continue before the sixth day, the day when cows were first created. The rhythm of movements of the sun may not have continued before the fourth day.⁷ The rhythm in some plants, which differ in activity in daytime and nighttime, did not continue into the time before the plants were created, on the third day. Some other rhythms, like the rhythm of the vibrations of light emitted by a specific spectral line from a specific kind of atom,⁸ may have continued back to the creation of light on day one.

We may also ask whether the various rhythms always keep in time with each other. For instance, the rhythm of a stopwatch, measuring seconds or even hundredths of a second, correlates with the sun, in the sense that every solar day is almost exactly $60 \times 60 \times 24$ seconds, as measured by a stopwatch. Did correlations in timing like these extend back into the period of the first six days?

Maybe many of them did. But there are questions in some cases. When God planted the trees in the Garden of Eden, Scripture says that he “made to spring up every tree that is pleasant to the sight” (Gen 2:9). It does not say merely that he created the trees, but he made them “spring up.” That description is analogous to the way in which man, in imitation of God, is instrumental in having trees and other plants spring up in a garden that he plants. If God planted the Garden of Eden during a period of one circuit of the sun, we can compare the rhythm of the circuit of the sun with the rhythm of the growth of the trees in the garden. It appears that the relation between the two rhythms was different in the Garden of Eden than what it is now.

One suggestion might be that God miraculously speeded up the growth of trees, so that during the period of one day they grew from seeds or small sprouts into mature trees. But now with the expression “speeded up” we again confront the question of a standard for measurement. The growth of the trees was speedy as measured by the day as a standard. What would have taken years within our present providential order took only one day. Equally, we could say that the passing of the day was slower, when measured by the standard of the growth of the trees. Within providence, a day passes within only a tiny fraction of the period marked by the maturing of trees. But on the sixth day of creation it took the whole time of maturing or longer for the day to pass.

The point here is not to figure out precisely what methods and means God may have used during the sixth day. We might guess, but the text of Gen 1–2 does not tell us. What does seem to be the case is that the two rhythms, the

⁷ I say “may not,” rather than “did not,” in order not to exclude views that think that the sun as a ball of plasma existed earlier, but that on the fourth day it was first made to function as a time-keeper.

⁸ *The New Encyclopaedia Britannica: Macropaedia*, 18:416.

rhythm of the growth of trees and the rhythm of a solar day, may not have had the same correlation to each other that they now enjoy within the stable order of providence.

Similarly, we may look at Gen 1:12: "The earth brought forth vegetation, plants yielding seed according to their own kinds, and trees bearing fruit in which is their seed, each according to its kind." The rhythm of plants growing during day three can be compared to the rhythm marked by the third day itself. It seems that the relation between the two was different then than now. The plant growth was speeded up or the day slowed down. We could mitigate the difficulty by suggesting that the expression "yielding seed" anticipates what the plants *will* do during an entire growing season, not what they have already done by the end of the third day. Maybe so.

Still, it sounds as though, by the end of the third day the earth has brought forth vegetation, plants, and trees. This activity of bringing forth took place during the course of one day. If we think that we need to preserve the timing of all the rhythms in phase, we might picture the trees as being only teeny sprouts, virtually indistinguishable from the other vegetation. Maybe all the vegetation was still in the form of tiny sprouts at the end of the third day. The language in Gen 1:12 does not give us all kinds of detail. But what it does give invites us to think by comparison with plants today, whose growth encompasses not only an initial event of sprouting but continuing growth to be a mature plant. So we may wonder whether the rhythm of plant growth during day three was in step with the rhythm of day three itself, in exactly the same way that we see it now. Or maybe the growth was miraculously speeded up. But then how do we measure the "speed"? We have the same difficulty as we did with the growth of trees in the Garden of Eden.

I conclude that God has not provided a firm guarantee that all the familiar rhythms of the providential order were in place all the time during the first six days. Nor has he provided a firm guarantee that these rhythms were in time with each other exactly as they normally are today.

3. *Two Other Rhythms*

Two other rhythms have been noteworthy candidates for explaining the meaning of the first three days. One is the rhythm of work and rest for *God*. This rhythm makes sense as a reference point, because the rhythm of work and rest for God is the archetype for the rhythm of work and rest for man, as Exod 20:8–11 reminds us.

The other is the rhythm of oscillation of day and night. It is easy to guess that such a rhythm was set in motion by God with the conclusion of the first day, partly because such a rhythm characterizes days within our experience of providential order. In addition, the text mentions evening and morning (Gen 1:5). But a lot depends on what is our focus. Within our setting within God's providential order, if our focus is on the cosmic surroundings, we pay

attention to the oscillation of light and darkness in the sky. If our focus is on personal activity, we pay attention to work and rest. In our experience within providence, morning is not only the time when light begins (cosmically), but the time when work begins (personally). Evening is not only the time when darkness comes, but the time when rest begins.⁹ Genesis 1:3–5 tells us about God's pattern of work. It does not tell us directly about the oscillation of light and darkness. It just says that God called the light Day and the darkness Night. It does not say that there immediately began an oscillation between the two. Nor does it say that the rate of oscillation, measured by a modern time-keeping device, would exactly match what we now measure by such a device, within our stable providential order.

So did an oscillation between daytime and nighttime begin in Gen 1:3–5, and is that oscillation what God designates by "day one"? Or does he designate by "day one" the cycle of work and rest? Or is it both? Human curiosity includes extrapolating and guessing about issues for which we do not always have clear answers. At a certain level, in fact, it seems reasonable to postulate that the six days of Gen 1 were exactly like days in our providential experience, and exactly like such days in every way we can think of. But of course no two of our experiential days are exactly alike. They may be nearly alike with respect to the narrow issue of how many seconds (measured by a stopwatch) compose them. But certainly on the level of ordinary experience each day contains both similarities and dissimilarities to all the days before and after it. Each day is filled with its own host of human activities, both individual and social. God certainly assures us that the six days of creation were like ours in salient ways. But what counts as most important? Is it the seconds on a clock, or is it our activities and our interaction with other people and with the world of plants and animals? It depends on our point of view.

Suppose we hypothesize that the evenings and mornings in Gen 1 designate transitions from light to darkness and from darkness to light. But that does not imply that they were exactly like the experience of light and darkness in an evening in our day. In our time, in an evening, the sun may show itself going down on the western horizon. And there may be red in the clouds on that horizon. The light in the sky gradually dims. For a time, there will be more light in the west than in the east. And in the morning we may see the reverse pattern. Did all the complexities in this pattern characterize the evenings and mornings in Gen 1? Did the pattern exactly correspond to what the sun produces today, except that there was no sun? Genesis 1 does not tell us how much or in exactly what way the phenomena of light and darkness on days one through three were like what we are accustomed to see during evenings and mornings in our own time.

⁹ C. John Collins, *Genesis 1–4: A Linguistic, Literary, and Theological Commentary* (Phillipsburg, NJ: Presbyterian & Reformed, 2006), 77, articulates the correlation of evening and morning with the end and beginning of work. He appeals especially to Ps 104:23, which indicates how man works from morning until evening.

In like manner Gen 1 does not tell us how long each day was, as would be measured by some modern technical time-keeping apparatus. Maybe it was the same length (about 86,400 seconds by a stopwatch) as a modern solar day, but maybe not. And if maybe not, the *point* of the narrative cannot be to inform us about the length of each day in relation to a particular technical time-keeping apparatus. The point must be something else. And that something else concerns the activity of God the creator. His activity comes in cycles of work and rest. And that is fundamental within the narrative in Gen 1. Within the point of view used in Gen 1, a day is *first of all*—in terms of prominence—a cycle of work and rest.

But Bob may be uneasy. He has an objection: “Granted that Gen 1 does not give us details about the length of each day, isn’t it still fair to *infer* that each day has the same length? After all, the six days are all called ‘days,’ and Exod 20:8–11 correlates them with later days, and we know the length of later days.” The answer is at hand: yes. But the practical result of Bob’s inference depends on what standard of measurement one uses to measure the length. Twice in the quotation above, Bob has used the word “length.” And it is ambiguous until he specifies the standard for measurement. If he specifies a stopwatch, that is one possibility. But it is equally possible not to be drawn at all into the concern for a more precise quantitative measurement according to some modern technical apparatus. The reply might be, “Yes, they are all the same length, measured by the standard offered to us by the rhythmic cycle of personal work and rest. Each of them has the same length, in that it consists in exactly *one* cycle of work and rest.”

This appeal to the cycle of work and rest may seem odd. It is odd if we live in a culture that has taught us to orient our lives by the clock. But not all cultures are that way. Many cultures do not have modern technology and modern clocks. They have an “interactive orientation,” which focuses primarily on human action and social interaction.¹⁰ The very word *length* can be a problem for us, because, when we use it, it may already mean for us intuitively that we must focus on some *quantitative* approach to time. And we may feel in addition that our approach must mesh with modern scientific apparatus for measuring time with quantitative precision.

The difference between Bob’s answer and the answer in terms of work and rest brings into view larger issues. What is more important in the long run? What is more “central”? And for what purposes? Is it measurements with modern technological equipment? Or is it personal activity? And if it is personal activity, the six days in Gen 1 are not about *human* activity, as their main focus, but about the activities of a personal God, who plans and works and achieves. He rests at the end of each day,¹¹ and then celebrates a big rest on the seventh day. A day is a cycle of work and rest. And so it is for us. And we also have a longer cycle of

¹⁰ Poythress, *Redeeming Science*, 140–43.

¹¹ J. Ligon Duncan III and David W. Hall, “The 24-Hour View,” in *G3n3sis Debate*, 33.

a week, as Exod 20:8–11 points out. A succession of six days in our experience is a succession of six cycles of work and rest. These cycles are really days. And likewise the first six days are really *days*. It just takes an adjustment from modern focus on quantitative, technologically enhanced precision to see that Gen 1 might not have in mind stopwatch measurements.

II. *Theological Foundations*

So why do we like stopwatches? To address the question, let us start with a brief review of the theological foundations that distinguish a Christian worldview from the materialist philosophy that influences the understanding of modern science. We can touch only on some basic features of this foundation.

The world had a beginning in time. God did not. He always exists. According to a plan he had from all eternity, he brought the world into existence at a particular time, “in the beginning” (Gen 1:1).

God is *personal*. When he created the world and when he sustains it, he does so by purposeful, personal action involving the three persons of the Trinity. The world of things includes subpersonal created things like animals, plants, and nonliving things. But God rules them personally. There is no *impersonal* mechanism holding things together. Rather, it is God in his faithfulness (Col 1:17). He is so faithful and consistent that we can describe many regularities, such as the fact that grass grows for the livestock (Ps 104:14). But God for his personal purposes can also act in a surprising way, which we might call a “miracle.”

God made human beings in his image (Gen 1:26–27). He gave us dominion (Gen 1:28). Human beings, as created *persons*, were designed by God to have personal communion with him. We may have personal intimacy with God, we may know him, and we may worship him in awe. These are not possible for animals. We have a uniquely central role in God’s plan for creation.

All of this belongs to the basics of a Christian worldview. It must be contrasted with the atmosphere in the modern West, which is deeply influenced by materialist philosophy. Materialist philosophy says that the basic constituent of the world is matter—or, more elaborately, matter and energy and motion and the physical interactions between these bits. Materialist philosophy is a worldview. There is a widespread impression that modern science supports this worldview, because science is widely interpreted as revealing to us the deepest structure of the world, what really *exists* at the deepest level. That deepest level is physical matter.

But if God is God and is personal, this materialist worldview is an illusion. God is the foundation for everything else. And we as persons have a central role. Science can exist because God rules the world with faithfulness and wisdom. Human thinking in science is one way of thinking God’s thoughts after him, on a creaturely level.¹² Science along with all other areas of academic life ought to

¹² Poythress, *Redeeming Science*, ch. 11.

cohere with reality, and reality involves the centrality of persons. The molecules in our bodies exist, but persons are not reducible to bags of molecules.

1. *The Centrality of Human Experience*

So if God is God, we have to think through carefully what the world is like. We should do so in antithesis to materialist philosophy and its spokesmen, who claim to speak in the name of science and with the prestige of science. We have to think about what is *real*, that is, metaphysics.¹³

For this purpose, let us first consider John Calvin, who in his time interacted with insights that were beginning to come to light with the dawn of modern astronomy:

Moses makes two great luminaries [sun and moon]; but astronomers prove, by conclusive reasons, that the star [i.e., planet] of Saturn, which, on account of its great distance, appears the least of all, is greater than the moon. Here lies the difference; Moses wrote in a popular style things which, without instruction, all ordinary persons, endued with common sense, are able to understand; but astronomers investigate with great labour whatever the sagacity of the human mind can comprehend.... Nor did Moses truly wish to withdraw us from this pursuit [of modern astronomy] in omitting such things as are peculiar to the art; but because he was ordained a teacher as well of the unlearned and rude as of the learned, he could not otherwise fulfil his office than by descending to this grosser method of instruction.... If the astronomer inquires respecting the *actual dimensions* of the stars, he will find the moon to be less than Saturn; but this is something *abstruse*, for to the sight it appears differently. Moses, therefore, rather adapts his discourse to *common usage*.¹⁴

Calvin affirms the importance of two distinct points of view, an ordinary point of view that sees Saturn as a point of light, and an astronomer's point of view, which inquires about "the actual dimensions of the stars." Or, if we may generalize, there is an *experiential* point of view, in ordinary human life, and an *abstruse* point of view, developed in various sciences. Calvin implies that both points of view are legitimate. Moses legitimately "adapts his discourse to common usage" because his purpose (and God's purpose) is to address "all ordinary persons," while the astronomer has a different purpose: to explore "whatever the sagacity of the human mind can comprehend."

After making these remarks, Calvin does not dwell on the contrast between the experiential view and the abstruse view. He moves on quickly to address in more detail the purposes of Scripture and of Moses. That is his calling, Calvin is not an astronomer, but a teacher and pastor and commentary writer. We might say in addition that he is not an epistemologist or a cognitive psychologist, who

¹³ Vern S. Poythress, *Redeeming Philosophy: A God-Centered Approach to the Big Questions* (Wheaton, IL: Crossway, 2014), Parts 2–4.

¹⁴ John Calvin, *Commentaries on the First Book of Moses Called Genesis* (Grand Rapids: Eerdmans, 1948), 1:86–87 (on Gen 1:16) (italics mine).

might want to explore with sagacity just how remarkable and how mysterious it is that human beings have the capability of employing two such different points of view.

It turns out that the contrast between the two views is significant for our understanding of *time*. In the twenty-first century, after further developments in the sciences, we have at least two views of time, namely an experiential point of view and an abstruse point of view.

And now we come to a major issue. Does one point of view give us reality, while the other gives us mere “appearance,” or even an illusion? If the world were indeed the world imagined in materialist philosophy, it would be a world in which persons were an accident. The astronomer’s description might seem to offer us reality, because in certain ways it aspires to be independent of how big Saturn looks to any particular observer’s eye. By contrast to this superior astronomical viewpoint, the world of common sense observation—the world from the personal, experiential point of view—is an accident, a mere chance product. It is merely accidental that somehow persons have come into being in a materialist universe, and that those persons have perceptual apparatus that includes vision. And vision has to be broken down into the effects that certain photons of certain wave lengths have on certain molecules and cells in the human retina, all of which might have been quite otherwise if chance had gone otherwise.

On the other hand, if we live in a personalist universe crafted by our personal God, God has designed us and our perceptual apparatus, as part of the gift of life. Visual perception is real, and it confronts us with reality, because God designed it to be just as it is. Yes, God designed the intricacies that the astronomer explores. But it is just as true that he rules over every instance of human perception throughout history. On a basic metaphysical level, each is just as real as the other, because God’s design and God’s speech governing the world specifies every detail.

In this respect, every created thing is metaphysically on the same level as every other created thing. They are all creatures. And every detail is specified by the speech of God governing the universe (Pss 33:6, 9; 147:15, 18). In two important respects, however, ordinary personal human experience is *more basic* than abstruse science. First, without ordinary human experience, including basic visual and aural perception, science as a human project could not have arisen. We have to observe the world and learn the ways of God in it. To deny the metaphysical reality of human perceptual experience is also to undermine its epistemological reliability, and without that we have no possibility for natural sciences to be forms of knowledge rather than playful dreams.

Second, God made us in his image and cares for us. He reveals himself in verbal revelation in Scripture and in nonverbal revelation through the world he has made (Rom 1:18–23). A rainbow is beautiful and testifies to the beauty of God. The stars are beautiful not only in their appearance but in their courses, which testifies to the wisdom of God (Ps 19:1–6). We are meant to respond to

this testimony by acknowledging God and loving and worshiping him. For the purposes of personal communion with God, this testimony in ordinary experience is central—more central than the abstruse findings in natural sciences, which are not so easily accessible to all people. The abstruse findings have their own testimony, of course. But their testimony does not compete with or undermine the more obvious testimony that we receive in connection with our senses.

Therefore, I conclude, the appearance of the world to ordinary human beings is not *mere* appearance but also reality. It is a reality that is a means for worshiping God. It is a reality in God's sight, and therefore also should be in ours. It is one dimension, and a central one at that, to which scientific investigation can eventually add abstruse layers.

Calvin does not yet worry about these issues concerning the metaphysics of reality. He does not need to, because for him the value and authenticity of human experience are not in question. But he uses terms that have the potential to create, in later historical developments, the growth of pride in the superiority of science and the claim that what is ordinary is not real. For example, Calvin says that astronomy comes from the use of "sagacity." No doubt it does. And Calvin can rightly stand in admiration of sagacity as a gift from God. But once it is detached from God, it becomes a source of pride. What is "common usage" then becomes vulgar and inferior. Calvin also employs some other labels for the level of common experience: "unlearned and rude"; "descending to this grosser method of instruction." There is a fine line here between two attitudes: admiration for the gracious benefits from God that we receive in applying ourselves to learning, and contempt for anyone who is not equally as learned as the elite.

I do not think Calvin despises what is ordinary. In fact, as he continues on the same page he calls for all of us to be roused in our spirits to magnify and praise God for his magnificence displayed in creation through ordinary means. Yet the door lies open for later generations, less humbled by the majesty of God than he was, to fall into an attitude of contempt.

What relevance might such things have to the interpretation of Gen 1? They are relevant, because a worldview that *privileges* the abstruse view and downgrades the reality of the experiential view changes our expectations about what we will find in Gen 1. On the one hand, we might be tempted to try to find abstruse truths in Gen 1, in order to show that the Bible measures up to the prestige of modern sciences. On the other hand, if we concede that the content belongs naturally to an experiential view, we may be tempted to despise the Bible as primitive or as trapped in primitive culture.

2. *Experiential Space and Abstruse Space*

We may illustrate using views of space and motion. The Copernican revolution is the main exhibit here. The Copernican revolution placed the sun at the center of the solar system, with the earth revolving around the sun and also rotating along its own north-south axis. This picture is abstruse. Not as abstruse

as some twentieth-century developments in science. But it takes intellectual effort (“sagacity”) to understand, and even more effort to decide whether it is superior to the older model (the Ptolemaic system) and whether and in what sense it is true. The Copernican view contrasts with the experiential view, according to which the earth is fixed and the sun moves in an arc through the sky.

Historically, the conflicts concerning the Copernican theory had many dimensions. But at least one dimension had to do with the differences between the abstruse point of view, which the Copernican theory embodies, and the experiential point of view. An easy resolution lies at hand, namely to say that *both* points of view address various dimensions of reality, but that the starting focus and purpose of each point of view is distinct.¹⁵ And indeed there are three powerful precedents for such a resolution.

The first precedent lies *within* the experiential view itself. Every individual human person has his own personal experience of space, distinct from that of other persons. For example, Emily and Samantha may observe the same rabbit in the backyard. Emily is in the yard and observes the rabbit from close up, while Samantha is inside the house and observes the rabbit from farther away. The rabbit is “bigger” to the eye of Emily. Emily observes the rabbit from in front, and sees both his eyes. Samantha observes from the side, and sees one eye. A third viewer, Victoria, observes from the rear and sees no eyes. It is the same rabbit. And each person’s view of the rabbit is real: it is exactly what God specifies. This illustration shows that there can be different views that are intrinsically compatible with each other. It also shows that the visual “size” of an object depends on one’s point of view.

The second precedent lies in the nature of the abstruse point of view. Even abstruse points of view involve the scientist as a personal participant. It is impossible to understand Copernican theory except as an explanation with regard to things that we see from an experiential point of view. Our starting point for understanding space is our experience of spatial orientation with respect to our own bodies. Moreover, the Copernican theory itself involves picturing the solar system; and any picture, mental or visual, uses a spatial point of view. For example, we picture the solar system as it would look from a point outside the plane of the planets, so that we can imagine ourselves looking down on their circular (or, more accurately, elliptical) motions around the sun.

The third precedent lies in the nature of mankind, made in the image of God. If we reflect on the meaning of the image of God, it eventually leads us back to the unity and diversity in God, one God in three persons. The unity and diversity in human beings, and derivatively the unity and diversity in distinct points of view or perspectives, have their ultimate foundation and archetype in the unity and diversity in God.¹⁶

¹⁵ See Vern S. Poythress, “Three Modern Myths in Interpreting Genesis 1,” *WTJ* 76 (2014): 321–50 (323–29).

¹⁶ Vern S. Poythress, *Symphonic Theology: The Validity of Multiple Perspectives in Theology* (Grand Rapids: Zondervan, 1987; repr., Phillipsburg, NJ: Presbyterian & Reformed, 2001), ch. 5.

Unfortunately, this affirmation of several perspectives was not the main route chosen during the original debates over Copernican theory. Many people seemed to think that if you chose Copernicus you had to deny that the earth was fixed. Not that people would literally deny what they saw with their eyes, but perhaps they thought that either Copernican theory or some view with the earth as stationary must be the *one* metaphysically ultimate point of view. The affirmation of the one was therefore the denial of the other. But the problem was bad metaphysics—the assumption that there must be one perspective that is ultimate, and that therefore degrades all other perspectives.

3. *The Specter of One Perspective to Rule Them All*

I do not know what were all the reasons why people missed out on the possibility of affirming both the experiential view and the abstruse view. But I might suggest that one reason lay in the existence of an abstruse view that was already in place before the time of Copernicus, namely the Ptolemaic system for understanding the motions of the heavenly bodies. This system was endorsed by Aristotle, and Aristotle was respected as “the Philosopher,” some of whose views had been adopted and become entrenched in Roman Catholic tradition. Aristotle claimed to tell us what is metaphysically ultimate. And because Aristotle had suppressed his knowledge of the one, true, *personal* God, his metaphysical system is basically impersonalist. You cannot have personal intimacy with his idea of the unmoved Mover. Therefore, human beings cannot have a central role in the metaphysics of the world.

Yes, human beings may aspire to understand that metaphysics. But they do so by *reason*, conceived of abstractly and therefore impersonally. To reach the bottom, Aristotelian metaphysics has to dispense with personal viewpoints. There is one ultimate metaphysics that is independent of personal perspectives. And, derivative from this, an Aristotelian thinker expects one ultimate astronomical system, which will be impersonalist in that it dispenses with human observers. Within this impersonalist framework, the abstruse Copernican view and the abstruse Ptolemaic view and the ordinary experiential view must duke it out to see which is ultimate. And the experiential view has already lost the battle, at a fundamental level. Centuries earlier than Copernicus, it was shoved aside in favor of the ultimacy of the Ptolemaic system.

All this is now history. But it continues to have an effect. Some scholars continue to bring up the story of Copernicus in order to convince us that, just as the church eventually accepted Copernican theory, so it must now accept the latest “assured results” of modern science, whether it be with respect to the age of the universe or Darwinism or the nonexistence of a single Adam who was progenitor of the whole race. Such arguments need to be examined at more than one level. What is fact and what is assumption and what is interpretation within the latest claims from scientists?

But the arguments also need to be slowed down by refusing to concede that persons and the importance of persons have disappeared from the scene. In the first place, Copernican astronomy never should have been made into an ultimate metaphysics. It never should have competed with the experiential point of view. And it should never be conceded that Copernican theory or any other theory is independent of the persons who have developed it as a perspective. Theories are always embedded in a larger framework of personal understanding, a vast network that explains the meaning of the abstruse point of view to the next generation of inductees, who are themselves persons, and whose starting point can only be with an experiential point of view.

And if persons are indispensable, so is the orientation of their hearts. As Abraham Kuyper and Cornelius Van Til loved to point out, people are either regenerate or unregenerate, either for God or against him. And that affects their worldview, and their worldview affects their scientific research and the metaphysical framework for that research.

We can see the effect also in the feeling of human insignificance. People talk about how insignificant humanity is shown to be, now that we know how vast is the universe. The universe is big, big beyond imagining. And, it is then said, we are merely tiny specks of dust. But note that the measurements for the extent of the universe and the number of stars are abstruse. The numbers are so big that no one can really "take them in" on a direct, personal level of ordinary human experience. Humanity is made to be insignificant because the abstruse point of view swallows up the experiential view and destroys it. That is bad metaphysics at work, a bad worldview. The worldview eats out the humanity of the very people whose humanity, including marvelous intellectual gifts from God, has made it possible to understand the vast abstruseness of modern cosmology. We need to pity such people, and also in the name of God and for the cause of truth to stand up to them and tell them that they are more central to the universe than all the big numbers that they can conjure, because of the very fact that they can conjure them. In other words, they are made in the image of God.

4. Experiential Time and Abstruse Time

Now we turn to the topic of experiential time and abstruse time. It should not be surprising that, with the development of modern sciences, there have arisen more and more abstruse treatments of time. It is not a bad thing. Man has a mandate to exercise dominion, and this includes the sagacity and the intellectual exploration that Calvin approved. In the exercise of sagacity, scientists have uncovered layers of abstruse meanings with respect to time. Time can be measured by complex instruments like atomic clocks. According to the special theory of relativity, and even more in the general theory of relativity, abstruse measurements of time and space are interlocked in beautiful ways, and the observer has an indispensable role. The observer! It turns out that echoes of the experiential perspective appear even in the midst of the most abstruse theories.

Some of the lessons to be learned run parallel to what we have observed concerning space and motion and the Copernican theory. For example, abstruse discussions of time include big numbers: 4.5 billion years for the history of the earth, and 14 billion years for the history of the universe. An ordinary experiential view cannot really “take in” such vast stretches of time, any more than it can take in the vast stretches of space. Some people shrink in their own estimation. Humanity is a mere blip on the screen. Ah, that is bad metaphysics, where the abstruse point of view becomes an exclusive metaphysical claim, and the claim destroys persons.

Some of the results of abstruse work with time are around us constantly. There are mechanical clocks, electric clocks, and clocks within computers and cell phones. These are in a sense familiar to us. But their inner workings are abstruse. Very few people have checked out the inner workings. Very few understand in depth the principles by which they work. In one sense, there are as many views of measuring time as there are different kinds of clocks. And then there are different theories in which time plays a role, Newtonian, relativistic, and quantum mechanical theories.

One lesson here is that the presence of these clocks, and the abstruse thinking about time that is behind their manufacture, does not displace or invalidate experiential time. And what is experiential time? It is time as we experience it in bodily and mental interaction with the world. Without the experiential view of time, none of the ways in which scientists and engineers work with abstruse time would have been possible. Abstruse time is an additional layer of conceptual development, based on experiential time.

In addition, we need to reckon with the metaphysical question of what is real about time. The reasoning here is parallel to what we saw about experiential and abstruse views of space and motion. Experiential time is just as metaphysically real as any of the abstruse views. God planned them all; he ordains them all. They are all real. By contrast, if we adopt the view of materialist philosophy, it follows that persons are an accident, and their lived experience of time is an accident. Real time is the impersonal time belonging to physical events, and everything else is built on this fundamental impersonalism.

As with space, so with time there are in fact multiple perspectives on experiential time: there is one perspective for each person. This multiplicity is obvious when we are asleep. If we fall into a deep sleep, we cannot tell afterwards how long we slept. But another person who remains awake can tell, even without reference to modern abstruse technology. The awake person says, “It was only a short time, the time it took me to eat a cluster of grapes.” Or, “it was a long time, and I went to the market and had several conversations.” Each person’s personal experience of time meshes with the personal experiences of other individuals in a larger society.

In two respects the experiential view of time is in fact more metaphysically central than any form of abstruse time. First, as we observed, persons must have a sense of time as the starting point for developing abstruse studies of time.

Without a sense of time, we would not know what we are studying. Second, God cares for human beings, and has appointed for them a central role in his plan. The death and resurrection of Christ are at the center of redemption and the center of the history of redemption. These events took place in the context of human interactions. Personal experience of time is their primary framework. Understanding their significance does not depend on our ability to understand microseconds or the interlocking of time and space within the special and general theory of relativity.

III. *Consideration of Genesis 1*

1. *Genesis 1 as Involving an Experiential View of Space*

Now, finally, we can turn to Gen 1. As many have observed, Gen 1 tells its narrative from the perspective of what a human observer would see from the earth. It does not start with the Milky Way Galaxy, but with earth. It is, in a certain respect, earth-centered. But that is a valid perspective. Because God is communicating to persons, about matters that are important to persons and are not abstruse, it is appropriate and wise for him to use the experiential point of view of space and motion in his narration.

2. *Genesis 1 as Involving an Experiential View of Time*

Similarly, the development in time takes place in six days, including evenings and mornings. The narrative is undoubtedly using an experiential point of view, rather than some modern abstruse point of view, which would involve appeal to various technological products like mechanical or electronic time-keepers.

Let us think for a moment about experiential time. Moving out from an intuitive, psychological sense of time and the passage of time, people gain familiarity with many temporal patterns and rhythms. They engage in activities of conversing, eating, working, walking, running, and resting. They also gain familiarity with the process of human reproduction and growth, from babies to old age to death. Because of people's ability to transcend a focus on the present moment, they are aware of longer-range action, typically consisting in planning, working, and achieving (or sometimes failing to achieve) the planned goal. Some plans and their goals extend over short periods: find your ax and seize it; prepare a meal and then eat it. Others extend over days or years.

One fundamental pattern is the pattern of a day. For human bodily existence, the daytime is typically composed of many smaller pieces of action, but conversation, eating, working, walking, and rest are among the main pieces. At night, we sleep (cf. Ps 104:23). (And many cultures have a midday rest or nap of some kind, 2 Sam 4:5; Gen 18:1.) The daily rhythm of work and rest fits in well with the biological rhythm that makes us feel sleepy at night, as well as the rhythm of light and dark, and the rhythm of the daily cycle of the sun and

the stars in the sky. The rhythms extend outward: many animals sleep in a daily cycle. Some flowers open to the sun in the day in a cycle. There are also longer cycles, the cycle of the seasons (Gen 8:22) and the cycle of the year (Gen 1:14). These cycles may have many purposes according to the plan of God, which is *personal*. But among these purposes, and central to the purpose of human fellowship with God, is a purpose to bless mankind. The cycles all touch on human existence, some more directly (the daily cycle of work, rest, and sleep), some less directly (the seasons for planting and harvesting).

There is a rhythmic correlation between (1) the human rhythm of work and rest and (2) the sun's rhythm in the sky. Which is most important or most central? Well, they are both important, each in its own way, but from different points of view. But in a certain respect it seems that the sun and the heavenly bodies were created for man rather than man for them. They are "for signs and for seasons, and for days and years" (Gen 1:14) in *human* living. "The Sabbath was made for man, not man for the Sabbath" (Mark 2:27).

We can see one example in Scripture in which the rhythms are different from normal. According to Josh 10:13, "The sun stopped in the midst of heaven and did not hurry to set for about *a whole day*." Consider the expression, "a whole day." As usual, we may ask, "A 'whole day' measured by what standard?" It has to be by the standard of human activity, the activity of Joshua's battle (vv. 10–12), not the standard of the cyclical movement of the sun. In this special context, God preferentially chooses to narrate the episode using a standard based on human activity rather than the standard based on the cycle of the sun. The two standards happen not to mesh with each other in the usual way, because the stoppage of the sun is something exceptional. The passage also affirms pointedly the importance of the personal relationship between God and his people: "There has been no day like it before or since, when the LORD heeded the voice of a *man*, for the LORD fought *for Israel*" (Josh 10:14). God shows that the meanings tied to the personal relationship had a priority in comparison to the cycle of the sun.

3. *A Lesson for Modern Scientific Claims*

There are implications for evaluating the claims of modern science and for evaluating attempts at harmonizing science with Gen 1. Let us begin with the modern scientific claims. Modern scientific claims concerning the far past are all based on speculative extrapolation backward in time, using a framework of physical laws that have been inferred from the present providential order. The basic laws of physics and chemistry and the basic regularities in biological development and reproduction are assumed to be the same in the past as they are scientifically described in the present.

Now, hypothetically, these extrapolations might happen to be right. It may be that God in his faithfulness has maintained the same basic physical regularities right back to the first moment of creation. But what mainstream scientists *think*

are the most basic regularities are abstruse in character. And, as we have seen, metaphysically they are on an equal par with an experiential point of view. God is personal. He can work differently from what we now see. Hence, there is no guarantee that these extrapolations are actually correct, either with respect to time estimates (14 billion years for the age of the universe, estimated by abstruse means) or with respect to the overall narrative in the far past that the extrapolations generate.

There is no guarantee, any more than there is a guarantee that the new heavens and the new earth will manifest the very same principles of basic physical law with which physicists now operate. What we are guaranteed is that there will be continuity in *persons*. That is exactly what we would expect from the centrality of persons in the plan of God.

4. *The Mature Creation Theory*

There may also be a lesson for the theory of mature creation. This theory says that by the end of the six days God brought the creation to a mature state that looked old.¹⁷ More precisely, the mature state would look coherently old to a scientist who examined it on the basis of extrapolating the present into the past. For example, the trees in the Garden of Eden might appear to be years or decades old, when a scientist uses extrapolation. Adam might appear to be about twenty or thirty years old. But these scientific time estimates would be contrary to fact. They depend on the false assumption that the regularities of providence, on which the scientist relies, continue unchanged when he projects a reconstruction into the far past.

One positive point concerning the theory of mature creation is that the theory is perceptive about the unique character of the first six days. The work of the first six days cannot be pinned down confidently merely by naïve extrapolation. Since that is so, mature creation becomes a viable option.

But the theory also has a hidden weakness, when it comes to measuring time within the six days of Gen 1. One of the purposes of the theory is to reconcile the backward extrapolations of science with the six days of Gen 1. The activities during the six days must have been radically different, it is reasoned, because by extrapolation mainstream scientists claim that the universe is 14 billion years old. But the scientific claim about age is an abstruse point of view. Once we adopt the experiential point of view in reading Gen 1, we do not know how long the days were when measured by a modern abstruse scientific time-keeper. And indeed the theory of mature creation agrees with this principle, because it affirms that once we enter the period of the six days, things are different. Thus, it cannot be assumed that modern time-keepers still operate during the six days in the way that they do within the mature world.

¹⁷ On the main theories, see Poythress, *Redeeming Science*, chs. 7–10.

But if so, the theory of mature creation has deprived itself of any means of measuring the length of the first three days using some technical time-keeper. And this seems at least partially to undermine the need for the theory in the first place. After all, the theory came into being partly to deal with an apparent discrepancy between an estimate of the length of days based on science-based backward extrapolations and a “length” based on Gen 1. But the apparent discrepancy disappears if there is no clear technical standard for measuring the length of the days in Gen 1.

The same principle also weakens the ability of the theory to specify the length of the last three days. To be sure, during the last three days the sun is there. But the differences between the six days and providence might mean that the sun was not cycling in tune with other possible means of measurement, like modern clocks. If we cannot use scientific time-keepers to measure the length of the six days, it is not clear how the theory of mature creation makes anything more than a minimal negative claim that we cannot be dogmatic about processes during the six days. Would it then be compatible with other theories that also believe in a mature endpoint—virtually any of the other major theories for harmonizing Gen 1–2 with modern scientific claims?

5. *The Analogical Day Theory*

The analogical day theory may also have something to learn. This theory, in its most common form, says that the six days in Gen 1 are analogous to human work days within the present providential order—analogous, but not equal. Genesis 1 does not specify the length of each day, as measured by some modern technological time-keeper. The days might be either short or long. Genesis 1 does not say. But part of the point of the analogical day theory is often to suggest a harmonization with modern science. So, when we undertake harmonization, the claim is that the days in Gen 1 were actually long periods of time, millions of years.

The problem here is with the language of description, and particularly the word “actually” in the preceding sentence. Whatever may be the intent of the people who initially crafted the analogical day theory, other people, when they hear it, may apply terms like “actually” and “long periods of time.” In using such expressions, they may move the language in the direction of acceding to the modern philosophical view that abstruse descriptions of time are metaphysically ultimate. The word “actually” can hint that the measurement of time with modern technical apparatus gives us the real thing; it gives us “actuality.” In response I say no. The abstruse framework for time gives us a perspective that is no more ultimate than the perspective of the experiential point of view. Moreover, it gives us something abstruse, less integrally related to the central issues of human existence and struggle. So, actually, the six days were six *days*. Really, actually, from an experiential point of view. The modern cosmological description offers an abstruse description that may be true, given its peculiar,

specialized definitions of time measurement. But they are peculiar, and they do not destroy the experiential point of view, nor the validity of its “measurement” of days using a cycle of personal activity and rest.

I may put it another way. I am uneasy, not with the underlying intent of the analogical day theory, but with some of the assumptions that may creep into explanations of it. Some of the language used by proponents in describing the analogical day theory may unwittingly push us to accept the modern metaphysical claims. These modern metaphysicians, who speak in the name of science, imply that their system for time gets to the bottom—or nearer to the bottom—of the metaphysics of the universe. If we concede their point of view, Gen 1 becomes merely an accommodation to unfortunate limitations in earlier human culture. To this claim I say no. It is the modern metaphysical claim that is limited by its reductionism. It overlooks the obvious, namely the involvement in theory-making of the sagacity of particular human beings, made in the image of God, who develop in the form of modern cosmology an insightful but *limited* perspective on time.

6. *Lessons Concerning Basic Affirmations about Genesis 1*

There may also be lessons for other readers of Gen 1. Some people in the West and also in the rest of humanity believe that God created the world in six days, and they leave it at that. It might seem to many modern analysts that these people hold to a form of the 24-hour day theory. But if they do not choose to go beyond a simple affirmation, they are not committing themselves yet to any particular theory about the relation of Gen 1 to mainstream scientific claims, nor are they committing themselves to any particular theory about the *length* of the six days, when measured by abstruse technological apparatus. If they belong to cultures outside the West, they may not even be familiar with such apparatus. These people therefore may not manifest a clear commitment to *any* of the detailed modern theories for harmonization. Let us call this approach the *simple affirmation view* of days of Gen 1.

In a way, some of these people may be closer to the analogical day theory than to the 24-hour day theory, because they can recognize that one central point of Gen 1 is to indicate the analogy between God’s work and human work. The person who is content with the sparse description in Gen 1 knows that the first six days were like our days within providence, but also unlike, because they were days of God’s activity of initially creating instead of God’s activity of sustaining providence. That is, a person is content to know that the six days were like later days without insisting that the likeness had to extend to every detail that might be important for efforts in speculative scientific reconstruction of the past.¹⁸

¹⁸ And what about scholars who interpret Gen 1, and in addition say that they are not going to discuss how to harmonize their interpretation with mainstream science? Some of them may hold

7. *Lessons for the 24-Hour Day Theory*

Finally, there may be lessons for the 24-hour day theory. What is the 24-hour day theory? It has more than one form. In its most well-known forms within the last century, the 24-hour day theory seeks to address apparent tensions between its claims and the explanations of mainstream science. But in the *way* that it does so, it makes additional assumptions.

One thing that seems to count is that the days of Gen 1 had a 24-hour length. And what does this mean? The claim has to be further defined by specifying the standard for measuring 24 hours. Does an hour mean 3,600 seconds measured by an appropriate technical apparatus? Representatives of the 24-hour day theory have a minor problem, because most of them do not directly address the issue of how they measure the length of the six days. If they do not define the length of a day with reference to some standard for measuring time, their view is not clearly distinguished from the analogical day view. If they want to pick some specific way of measuring, they have to specify what it is.

With respect to this choice people have several options. First, 24-hour day advocates may decide that they do not want to make a choice, but simply to specify that the six days were days, and leave it at that. Then they hold the simple affirmation view described above.

Second, a 24-hour day advocate may choose to specify a particular standard for the length of the days. One such standard would be the cycle of light and darkness. But, as we have seen, the evening and morning may designate the times in which there is a gradual disappearance and appearance of light, or they may designate the end and the beginning of a workday. Moreover, if there is an oscillation of light and darkness during the first three days, it takes place without the sun “ruling” it, and so it is not so clear that we should think of it as being the “same length,” when measured by some technical apparatus.

Third, a 24-hour day advocate may choose to specify some modern means of measurement, such as a stopwatch. But since there are many modern means, what motivates the choice of one means rather than another?

Fourth, an advocate may propose to measure the length of the six days in Gen 1 not by any one time-keeping apparatus, but by using the assumption that all the temporal rhythms were basically the same during the six days as they

the simple affirmation view. But many of them talk about 24 hours or ordinary days or normal days or literal days. What do they mean? Usually, I cannot tell. Many of these people attempt to advocate a 24-hour day theory without specifying how to measure the length of hours or days. And, as we have seen, that lack of specification leaves their work ambiguous. Despite their protestations that their view differs from the analogical day view or the day-age view, they have just given us ambiguities, not a theory at all. If, on the other hand, they told us how to measure the length of a 24-hour day or an ordinary day or a normal day within Gen 1, they would by that commitment begin to wrestle with the issue of time measurement, and they could not altogether avoid dealing with the present providential order in time, and the possibility of a difference between the providential order and the six days of Gen 1.

are today. This assumption may seem reasonable. If the six days are really days, they must be like our providential days. And so it seems reasonable to ask for a maximal amount of likeness, at least with respect to rhythms in time.

But can we be sure? The content of divine activities during the days is spectacular. The days are not altogether like our days. It would be convenient if they were still like our days with respect to all the rhythms. But has God guaranteed it?

An additional challenge arises because, as we have seen, some of the rhythms do not exist during the first few days. The rhythm of the human psychological sense of the passage of time does not exist until the creation of man. The rhythm of various aspects of plant and animal life does not exist until plants and animals exist. The Garden of Eden apparently grew trees in one day.

An advocate can still try to hold to maximal likeness in rhythms, but allow for a number of exceptions. He could begin with the principle that all the rhythms that we see today extend back into the first six days, and also that the rhythms keep in time with each other in the same way in which they keep in time today. The first exception would be to allow that some rhythms did not exist until God created the things with which the rhythms are associated. In addition, the advocate could allow an exception for new rhythms. He could say that a newly created rhythm may not be in time with the rest of the rhythms until the end of the day during which it is initially established. But on the subsequent days, all the rhythms that are not newly established are assumed to be in time with each other, in a way exactly parallel to the way that they are in time with each other in our own environment.

So, for instance, the initial act of creating plants on the third day would be miraculous. Immediately after the initial act of creation, the growth of these plants might be miraculous, and might involve something other than the normal rhythm for growth of plants. But after the third day, the plants would have rhythms that are in time with all the other rhythms, and these rhythms remain in time with each other in the same way up until the present day. (Of course, we also have to make an exception for trees springing up in the Garden of Eden.)

This proposal has three appealing aspects. First, it allows that God could act in special ways when he initially sets up a particular set of features of the created world, like the plant kingdom or the heavenly bodies or the sea animals or the land animals or the Garden of Eden. Second, it tends to maximize the degree of continuity between the six days and the later days of providence, thus assuring us that we have a pretty detailed picture of what went on during each of the six days. Everything is “normal” about plants on all the days after the day on which they are initially created. And the same is true for light (day 1) and the expanse (day 2) and dry land and heavenly bodies and birds and sea creatures and land animals. Third, this proposal provides a detailed set of assumptions to use when we are trying to extrapolate backward from the present state of the world. A scientist can reason with confidence concerning the six days, because the proposal gives him clear guidelines as to what *kinds* of continuity he can expect with existing scientific laws, which describe God’s providential order. A

particular law or regularity can be extrapolated backwards all the way until the day *after* the time when the pertinent element of order was first created during the six days. Let us call this proposal *the continuity hypothesis* with respect to the six days of creation.

8. *Difficulties with the Continuity Hypothesis*

What do we think of the continuity hypothesis? It has a certain commonsense appeal, because it seems plausible to postulate that the first six days were like our days *maximally*. However, three difficulties need to be noted.

First, do 24-hour day theorists actually hold to the continuity hypothesis? It is not clear that they do. Some of them seem at times to talk in ways that suggest that they may hold to it. But many times they simply do not become specific. If they are not specific, is it fair to classify them as holding to the simple affirmation view? Probably not, because many representatives vigorously repudiate the alternative theories. Many 24-hour day theorists use labels like “ordinary day” or “literal day,” and seem to want with these labels to distinguish their view from some of the other major views. But until they specify a standard for measurement, their labels do not resolve the ambiguities as to what kind of measurement they have in mind.

Second, the continuity hypothesis is, in the end, a hypothesis. It is one possible, plausible inference from the text of Gen 1. But Gen 1 does not clearly affirm it or endorse it. Genesis 1 does not specify in exactly what ways the six days are like and unlike our days within the providential order. I suggest, then, that advocates for this form of 24-hour day theory might avoid rhetoric that denounces all other views as unbiblical or irresponsible.¹⁹

Third, the continuity hypothesis does not provide useful guidance with respect to some *portions* of modern scientific research. One of the strengths of this hypothesis is that it does appear to provide some guidelines, at least in a general way. It says that each of the regularities familiar to us in providence is available from a certain point onward. But when we go out and look at the world, some questions remain. In particular, how do we reconcile the continuity hypothesis with the proposed science-based explanations that young-earth creationists are currently providing?

For instance, if the rate of radioactive decay of radioactive elements is regular after the sixth day, how is that consistent with young-earth theorists’ advocacy of large-scale changes in the rate at a later point in time (around the time of

¹⁹ Not all advocates use the same rhetoric. But *some* of them are accustomed to denouncing alternative theories. Moreover, advocates who are not ready to commit themselves to the continuity hypothesis are admitting that they are not so certain as to what exactly might be the points of continuity and discontinuity between the six days and later days. If so, are they certain that the kind of the continuity and discontinuity proposed by the analogical day theory or the mature creation theory is impossible? They too might consider avoiding denunciatory rhetoric.

Noah's flood)? If the patterns for animal reproduction are fixed after the sixth day, how is that consistent with young-earth creationists' proposal that there was super-rapid speciation right after the flood of Noah? If the creation of sun, moon, and stars takes place during the fourth day, why not say that it is a sheer miracle, rather than engage in complicated nonmiraculous explanations that have now appeared among 24-hour day theorists? And how can these nonmiraculous explanations fit all the astronomical data from the Milky Way Galaxy into the fourth day?²⁰ It looks as though 24-hour day theorists do not in practice hold to the continuity hypothesis. They introduce exceptions. But if they do not hold to the continuity hypothesis, what do they hold to? It is not clear that they have any coherent theory about the way in which the past rhythms are in continuity with the present. If there is no specification as to what are the continuities between providence and the six days, no scientific extrapolations based on such continuities are possible. In that case, a coherent form of young-earth creationism has not yet begun.

The 24-hour day theory is motivated by an admirable impulse, to make sure that we believe that the Bible is true in all that it affirms and that we not compromise that truth with strange hermeneutics when it comes to Gen 1. This impulse is indeed admirable. But how do we work it out in detail? Some 24-hour day theorists might say that they want "literal" hermeneutics.²¹ They want to say that the days of Gen 1 are "literal" days. But this by itself does not tell us what *counts* as literal when it comes to picking out a standard for measuring the length of the day. What is the standard?

The word "literal" also has a way of pushing us toward *maximal* continuity with our days within providence.²² The tendency is to expect that one of the six days can only be a truly "literal" day if it matches our experience. And this kind of uncritical desire for literalness can easily push us toward the continuity hypothesis, even though a more measured reading of Gen 1 would recognize that Gen 1 does not teach maximal continuity. Maximal continuity is a *hypothesis*. The 24-hour day theory runs the danger of confusion. A label like "literal" seems to invite us to confuse loyalty to maximality with loyalty to biblical teaching.

²⁰ I am thinking particularly of the efforts to explain the apparent age manifested in stars and in distant galaxies. To deal with the difficulty, various theories have arisen within the general orbit of 24-hour day theory. These theories may appeal to variations in the speed of light or the variations in time measurement involved in the general theory of relativity, or enhancements that involve changes in the theory of relativity itself (by adding extra terms to the fundamental equations). All of these are nonmiraculous explanations that depend on abstruse notions of time. And all of them have difficulty when it comes not to rescaling time in general, but rescaling the physical processes among the stars so that everything fits neatly into the fourth day (and not the third or fifth day). Why not just admit the miraculous and say that we do not know the details? Or miraculously speed up the heavenly processes with respect to everything outside the earth itself?

²¹ On problems with the word *literal*, and alternate terms like *plain* and *normal*, see Vern S. Poythress, *Understanding Dispensationalists*, 2nd ed. (Phillipsburg, NJ: Presbyterian & Reformed, 1994), ch. 8.

²² Poythress, "Correlations with Providence in Genesis 2," 44–48.

To its credit, this position still strives to produce Bible-affirming answers. Unfortunately, the foundational confusion about continuity has a tendency in some cases to produce an environment in which reasoning that arrives at the right conclusions pushes out reasoning that asks hard questions and is forthright about limitations. I would rather that people would say, “We believe that the Bible is true. But we don’t really have a thorough explanation for how to put it together with the claims of mainstream science. We have some tentative ideas, and we are working on it. *Part* of the explanation may just be that God, for his own purposes, did things differently than what we expect.”

With my own voice, I would add, “And one of the things that we might not expect is that he describes the six days from an experiential point of view, not an abstruse point of view. In doing so, he describes a day as a cycle of personal work and rest.”

IV. *Conclusion*

More than one of the main proposals for harmonizing Gen 1 with modern science has not sufficiently reckoned with the difficulty in time *measurement* and the possibility of more than one perspective on time. When we include this difficulty in our thinking, we can see that the proposals themselves are not always clear about what they mean in their pronouncements about time in Gen 1. A simple affirmation of creation in six days by people unfamiliar with technical time-keepers is simpler than any of the detailed theories, and is compatible in principle with several of them, because it is less specific.

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