Why Things Move: A New Look at Helaman 12:15

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Source: *BYU Studies Quarterly*, Vol. 51, No. 2 (2012), pp. 99–128.
Published by: BYU Studies

Abstract: A verse from the Book of Mormon says, "And thus, according to his word the earth goeth back, and it appeareth unto man that the sun standeth still; yea, and behold, this is so; for surely it is the earth that moveth and not the sun" (Helaman 12:15). The verse has been commonly understood to mean that its author, Mormon, had a heliocentric view of the cosmos. David Grandy explores why that may not be the best way to read the passage and we need not place the words in the context of modern physics. Grandy explains that Mormon is concerned with whether entities of any sort move in response to God's will, and not whether one body is moving around another. Mormon's statement is consistent with the biblical attitude that all nature is mindful of God and quick to move or act in ways that glorify him. This view accords nature the capacity to respond to its creator.

Why Things Move

A New Look at Helaman 12:15

David Grandy

In Helaman 12:15, Mormon offers what has appeared to many readers to be a heliocentric description of the solar system: "And thus, according to his word the earth goeth back, and it appeareth unto man that the sun standeth still; yea, and behold, this is so; for surely it is the earth that moveth and not the sun."[1] For example, the *Book of Mormon Reference Companion* states that "they [the Nephites] apparently had a more accurate understanding of the earth's movement than did their Greek contemporaries who at that time predominantly believed in a stationary earth."[2] It was Nicolaus Copernicus (1473–1543) who first figured out how one could eliminate the planetary

1. The Book of Mormon Original Manuscript of Helaman 12:15 reads, "And thus according to his word, the earth goeth back and it appeareth unto man that the sun standeth still. Yea, and behold, this is so; for sure it is the earth that moveth and not the sun." Royal Skousen, ed., *The Book of Mormon: The Earliest Text* (New Haven, Conn.: Yale University Press, 2009), 548. The modern version will be used in this article.

2. Dennis L. Largey, ed., *Book of Mormon Reference Companion* (Salt Lake City: Deseret Book, 2003), 77. Likewise, Erich Robert Paul, *Science, Religion, and Mormon Cosmology* (Cambridge, UK: Cambridge University Press, 1992), 100–101, states, "As early as 1830 Joseph Smith had already endorsed the notion of heliocentrism (Copernicanism). In the Book of Mormon . . . Copernicanism is presented explicitly," and then quotes Helaman 12:15 and Alma 30:44. And in "Astronomy, Scriptural References to," in *Encyclopedia of Mormonism*, ed. Daniel H. Ludlow (New York: Macmillan, 1992), 82, Paul similarly asserts that, in contrast to the Bible, "the Book of Mormon affirms the sun-centered (heliocentric) view accepted by modern planetary physics." To the same effect, see Joseph Fielding McConkie and Robert L. Millet, *Doctrinal Commentary on the Book of Mormon,* vol. 3 (Salt Lake City: Bookcraft, 1991), 397; George Reynolds and Janne M. Sjodahl, *Commentary on the Book of Mormon,* 7 vols. (Salt Lake City: Deseret Book, 1960), 5:290; and

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For four years I taught a Book of Mormon class at BYU as a transfer professor from the philosophy department. This opportunity allowed me to study and think about the Book of Mormon more deeply than before. Helaman 12:15 particularly intrigued me because I have long been interested in cosmology, both modern and ancient. While I was familiar with the claim that the verse implies a proto-Copernican understanding of the sun and earth, I also realized that Copernicanism, as developed by Kepler, Galileo, Newton, and others, issues up from a metaphysics that is not fully congenial to the scriptural thesis of a God-quickened, God-centered cosmos. What is more, I felt that it might be possible to locate Mormon, the author of the verse, in a much older, premodern stream of thought, one that would affirm his commonality with biblical prophets and, more generally, affirm the historical authenticity of the Book of Mormon.

retrogradations that marred the geocentric worldview by putting the earth in motion around the sun.[3] A moving earth, thus, has been thought to be the common truth that connects Mormon with the modern and "more correct" Copernican heliocentric worldview.

I wish to argue in this article, however, that the attribution of motion to the earth, even with a concomitant recognition that the sun is stationary, should not be construed as evidence that the Nephites had adopted

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Monte S. Nyman, *The Record of Helaman: A Teaching Commentary on the Book of Helaman* (Orem, Utah: Granite, 2004), 389.

3. For an engaging account of this complex mathematical and astronomical story, see Dava Sobel, *A More Perfect Heaven: How Copernicus Revolutionized the Cosmos* (New York: Walker, 2011). While a few ancient thinkers, such as Aristarchus of Samos; Seleucus, a Babylonian; and Aryabhatta, a Hindu, believed in a moving earth (whether rotating on its axis or moving about the sun, or both), that view was lost in the West until the beginning of the sixteenth century. We should note, however, that Nicholas Oresme and Jean Buridan, living just two centuries before Copernicus, entertained the possibility of a moving earth but did not insist on it.

or understood a heliocentric model of the solar system. Put differently, Mormon's lament about the inconstancy of man is not evidence of the Nephites arriving at a scientifically correct understanding of the earth's motion before Copernicus. Rather, it is a case of the Nephites understanding the earth's motion differently from the way it is understood scientifically today. In brief, Mormon's attribution of motion to the earth, like Alma's in Alma 30:44, signifies a different attitude toward motion than that given by modern science. As a consequence, it is hard for modern readers to draw from these passages their originally intended thrust and meaning. Moreover, by limiting the interpretive possibilities to the right-or-wrong of heliocentricism versus geocentrism, we erect a false dichotomy[4] that puts the Book of Mormon at risk of looking like an anachronistic text.[5] For as far as we know, no pre-Columbian American culture espoused a heliocentric

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4. One should not assume there are just two options. Philolaus, for instance, proposed that the earth and sun revolve about a central fire. Heraclides of Pontus believed that the earth spins on its axis while remaining at the center of the cosmos. Going back to earlier models, Thales imagined a flat earth floating in water, while Anaximander characterized the earth as a cylinder suspended in space. The flat-earth Hebrew model is described in the body of this article. Today we know that the earth, like most other astronomical bodies, is approximately round, but the problematic question taken up in this article concerns the earth's *motion,* not its shape. Fully correct understanding of the earth's shape does not imply fully correct understanding of its motion.

5. Chris Carroll Smith, "Michael Walton on Joseph Smith and Natural Theology (Notes from Sunstone)," April 10, 2008, *Mild-Mannered Musings* (blog), http://chriscarrollsmith.blogspot.com/2008/04/michael-walton-on-joseph-smith-and.html (accessed February 6, 2009). Michael Walton sees Alma's God-affirming appeal to nature as a product of nineteenth-century natural theology. What he overlooks, in my mind, is that natural theology was an attempt to hang onto a habit of thought that had once been reflexive among ancient and medieval thinkers. With the rise of the mechanical worldview, however, it became a deliberate and self-conscious pursuit, a way of mitigating the profound severity of a worldview that was not congenial to its fundamental principles. In his commentary on Helaman 12:15, Brant Gardner equivocates between Mormon possessing a Copernican understanding of the heavens and Joseph Smith altering the text to reflect a Copernican understanding. "How did Mormon know such information?" he asks. His tentative proposal: "Mesoamerican cultures were great sky-watchers, so this might have been information available to Mormon." He then adds: "However, I am unaware of any indication that Mesoamericans believed anything other than that the sun moved around the earth. Their typical conception of the sun was that it passed through the underworld after descending in the west so that it could rise in the east. It would seem more likely that Joseph Smith made this emendation." Brant A. Gardner, *Second Witness: Analytical and Contextual Commentary on the Book of Mormon,* vol. 5 (Salt Lake City: Greg Kofford Books, 2007), 169.

worldview, and not until about 1700 (with the publication of Isaac Newton's *Principia Mathematica*) was the worldview question of Aristotle versus Copernicus scientifically decided in Western Europe.

A more comprehensive view of things helps to show that Mormon was not a proto-Copernican, and that "modern science" (I will qualify my use of this term shortly) is not always superior to past understanding. Instead, my submission is that Mormon is thinking along a much older wavelength, one that is more consistent with gospel principles than the one provided by modern science. Thus, I will suggest that Mormon's statements are not anachronistic, but reflect a worldview that lost traction with the emergence of modern science.

My central concern in this article is *why* things move. I believe that this (the "why") is what Mormon is most concerned about. In Helaman 12, Mormon's concern is not about whether it is the sun *or* the earth that moves; or whether either body moves *around* the other, about which no mention is made. Instead, Mormon's concern is whether entities of any sort move in response *to God's will*. This view emerges from the context of the passage, and it is fully consistent with other scriptural descriptions of motion. But without a religious understanding of motion, readers have difficulty fully grasping Mormon's overriding point.

Someone may ask: which understanding is the more correct understanding, the scientific or the religious? Well, each is fitted to serve a different purpose, and each makes different assumptions about the nature of reality. In what follows, I briefly examine the scientific understanding of motion as it developed alongside Copernican astronomy. I then look at Mormon's explanation of the earth's motion. My intent in proceeding in this fashion is to throw into relief the vast divide that separates the two views of motion. Neither view can claim to be absolutely authoritative, but Mormon's outlook, I believe, is far more congenial to our spiritual sense that the universe is informed by God's purpose and presence.

More Options than One

At the outset, let me note that the "modern" science discussed below is not a product of recent decades or even of the last century. It is Newtonian physics, which is still a useful scientific theory in that it offers correct or nearly correct solutions to many problems. It has, nevertheless, been superseded by general relativity (inclusive of special relativity) and quantum mechanics. These latter theories not only improve upon the calculations of Newtonian physics, but, more importantly, they shatter many of its fundamental assumptions. Steven Weinberg, Nobel laureate of physics, writes: "Out of the fusion of relativity with quantum mechanics there has evolved

a new view of the world, one in which matter has lost its central role."[6] In developing his physics, Isaac Newton (1642–1727) gave pride of place to physical matter and mechanical force; but for Weinberg and other contemporary physicists, Newton's matter-centered worldview is no longer viable as an *explanation* of reality, although, as noted, it is useful as a calculating instrument. I point this out to clear space for what follows; that is, to suggest that there is more than one option in thinking about physics and why things move.

Because many people do not realize that Newtonian physics (and its account of motion) has been eclipsed by other theories, they still adhere to Newtonian principles as they think about physical reality. And since the principles of gravitational force and Newton's three laws of motion are vastly more intuitive than such esoteric concepts as light-speed constancy, curved space-time, wave-particle duality, and nonlocality, it is reflexive to defer to Newton when making scientific sense of the physical world. Put differently, the really "new physics," as it is sometimes called, has yet to dent the everyday thinking of many people who may be otherwise scientifically informed, evidently because it is so arcane and so contrary to common sense. As Paul Davies observes: "The stunning success of this theory [quantum mechanics] . . . often obscures the fact that the theory itself is based on principles which are so astonishing that their full implications are often not appreciated, even by many professional scientists."[7]

Surely, then, there are other accounts of motion to be explored than Newton's, which is the default concept among modern thinkers. Mormon's account is one of these other accounts, which gives priority to other metaphysical assumptions. To fully appreciate Mormon's perspective, however, we must briefly sketch Newton's account against the backdrop of earlier possibilities. Again, my intent is to clear space for what follows. It is not to decide against Newton in an absolute sense, nor is it to absolutely

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6. Steven Weinberg, *Dreams of a Final Theory: The Scientist's Search for the Ultimate Laws of Nature* (New York: Vintage Books, 1993), 3. Later (p. 12), Weinberg offers this judgment of Newtonian physics: "Newton's great example gave rise especially in England to a characteristic style of scientific explanation: matter is conceived to consist of tiny immutable particles; the particles act on one another through 'certain forces,' of which gravitation is just one variety; knowing the positions and velocities of these particles at any one instant, and knowing how to calculate the forces among them, one can use the laws of motion to predict where they will be at any later time. Physics is often still taught to freshmen in this fashion. Regrettably, despite the further successes of physics in this Newtonian style, it was a dead end."

7. Paul Davies, *Other Worlds: A Portrait of Nature in Rebellion* (New York: Simon and Schuster, 1980), 9.

affirm Mormon. Rather it is to recover Mormon's outlook and, within the framework of his religious beliefs, make it plausible to modern thinkers.

Newton's Account of Why Things Move

No idea is more foundational to our modern understanding of motion than Newton's first law of motion, also known as the principle of inertia. Newton defined inertia as the tendency of bodies to retain their states of motion, and he described this tendency as a "force of inactivity."[8] At first blush, this sounds strange: how could inactivity be forceful? The answer to this question lies in Newton's assumption that physical bodies, being inert or lacking sentience, have no capacity to initiate changes of motion on their own (nonexistent) behalf. Or, to use Book of Mormon language, they cannot "act for themselves" but can only be "acted upon" (2 Ne. 2:26)—acted upon, that is, by outside forces. And once so acted upon, bodies, in virtue of their lifelessness or inertness, do the laziest possible thing by doing nothing—nothing, that is, that would alter their prevailing state of motion. In this way they "inactively" preserve states of motion produced by outside forces.

Note that "inactivity" here refers not so much to the physical activity of motion as to an inner blankness within moving (or stationary) bodies that turns them into lifeless, mechanical objects. As people began to grasp Newton's principle of inertia, the idea surfaced that "matter is indifferent to motion."[9] Indeed, as Newton saw them, material objects are indifferent not only to their motion but also to their location in the cosmos. This indifference, of course, was the result of their inner blankness, their inertness, but it allowed for a vast streamlining of reality. By defining material bodies as inert objects, Newton and others produced "a conception of nature startling in its bleakness—but admirably contrived for the purposes of modern science."[10] A universe consisting of nothing but inert objects would be a mechanical universe, and therefore one that Newtonian science might well be able to fully explain.

This "mechanization of the world picture,"[11] as one scholar has called it, began well before Newton, and it played into the scientific and religious

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8. Issac Newton, *Principia,* ed. Stephen Hawking (Philadelphia: Running Press, 2002), 2.

9. Richard S. Westfall, *The Life of Isaac Newton* (Cambridge: Cambridge University Press, 1993), 168.

10. Richard S. Westfall, *The Construction of Modern Science: Mechanisms and Mechanics* (New York: John Wiley and Sons, 1971), 31.

11. E. J. Dijksterhuis, *The Mechanization of the World Picture: Pythagoras to Newton* (Princeton, N.J.: Princeton University Press, 1986).

resistance that Copernican astronomy encountered. The problem for pre-Copernican theology was not so much the proposition of a sun-centered cosmos; it was the idea, going back to late medieval thinkers and culminating with Galileo, of a universe in which "power need not continuously flow from God once nature became endowed with a uniform intrinsic necessity of its own."[12] The motion of objects, in other words, became self-sustaining: they moved under the force of their own inactivity or lifelessness, not because of an innate responsiveness to God's all-sustaining cosmic influence. For religious believers, this shift in thought relegated God to the role of a First Cause—he need only initiate motion at the moment of creation, not preserve it thereafter. Hence, to follow Louis Dupré, the motion of bodies was no longer seen as evidence of God's continuing involvement in the universe: "The communication of motion [reaching back to God], which had played such an important role in the ancient worldview and on which major arguments for the existence of God had rested, lost its significance in a mechanistic order where bodies, once they moved, would continue to do so until stopped by an external cause."[13]

One need not look far to find this older attitude toward motion. It is implicit in Aristotle's concepts of natural place and natural motion, which assume a body's inclination to move to places cognate with its being. And the ultimate source of this motion was Aristotle's Unmoved Mover, for the motion of bodies, in Aristotle's mind, could neither be self-originating nor self-sustaining: it had to be activated and preserved by some supreme or supramundane principle.[14] Dante, a late medieval Christian with Aristotelian leanings, called God the "All-Mover" and equated God's action in the cosmos with the motion of light-filled astronomical bodies.[15] When Dante is astonished that he is drawn upward through the heavenly spheres, Beatrice, his guide, explains to him that this motion stems from his being caught up in the universe's elemental inclination to draw near unto God.[16]

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12. Louis Dupré, *Passage to Modernity: An Essay in the Hermeneutics of Nature and Culture* (New Haven, Conn.: Yale University Press, 1993), 68.

13. Dupré, *Passage to Modernity,* 68.

14. This is the standard interpretation of Aristotle, but it is not without its difficulties. The Unmoved Mover is posited to prevent an infinite regress of movers, but this original mover must in some sense not move while tripping the first domino, so to speak; that is, while initiating movement in the universe. For an extended discussion of the issues, see Aristotle, *Physics, Book VIII,* translated with a commentary by Daniel W. Graham (Oxford, UK: Clarendon Press, 1999).

15. Dante Alighieri, *The Divine Comedy,* trans. John Aitken Carlyle and Philip Henry Wicksteed (New York: The Modern Library, 1950), 403 (*Paradiso,* canto 1).

16. Dante, 405–6 (*Paradiso,* canto 1).

From this experience Dante learns that God's love "moves the sun and the other stars."[17]

Allowing for cultural differences, this pious attitude is akin to that of the Hebrews, at least insofar as they saw God's handiwork in the starry heavens and the contrapuntal alternation of day and night.[18] There is no reason to suppose that Mormon did not share this outlook, particularly in light of his commentary on the earth's motion, which, I will argue, was motivated by an awareness of God's active involvement in nature and not from a need to make a scientific correction.

It is interesting to note that once motion lost its connection with God, it became, for better or worse, a philosophically problematic concept. The world lost its fixed center, the stationary point of reference from which one could, in an absolutely unequivocal way, gauge the motion of bodies in the universe. Whereas geocentric models of the universe assumed a fixed earth and therefore a motionless center, Copernicus's model quickly lost its sun-centeredness to become an uncentered cosmos in which no object possesses an absolute state of motion.[19] Objects move relative to one another, and since no object can be assigned an unequivocal state of motion from all perspectives, each may have arbitrarily many relative velocities—but no absolute velocity.

This toppling of the idea of absolute motion further weakens whatever vestigial sense we might have that motion in the universe betokens God. For most moderns, this reverential outlook—that things move as they are quickened by God—is a nice poetic sentiment, but not something to invest religious faith in, for religion traditionally deals with absolutes, and motion,

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17. Dante, 606 (*Paradiso,* canto 33).

18. Psalms 19:1–2. God's purpose and presence is seen not just in the starry heavens, but also in the weather (snow, rain, dew) that links the earth and heavens. See Hugh Nibley, "Treasures in the Heavens: Some Early Christian Insights into the Organizing of Worlds," *Dialogue: A Journal of Mormon Thought* 8 (Autumn 1973): 76–98; also in *Old Testament and Related Studies,* eds. John W. Welch, Gary P. Gillum, Don E. Norton, Collected Works of Hugh Nibley, vol. 1 (Salt Lake: Deseret Book, 1986), 171–214.

19. Alexandre Koyré, *From the Closed World to the Infinite Universe* (Baltimore, Md.: Johns Hopkins University Press, 1968). Not long after Copernicus set forth his revolutionary thesis, his followers realized that the sun has its own proper motion. Now we say that it moves about the center of the Milky Way galaxy, with its revolving planets in tow. But the Milky Way galaxy is gravitationally attached to other galaxies, which orbit about a common center. Where this hierarchy of motions ends—if indeed it does—no one can say. More fundamentally, relativity theory teaches us that there is no universal rest frame, only particular frames where motion and rest are keyed to particular, but relative, points of view.

as we now know it scientifically, is not absolute and therefore not indicative of God. And yet much of the drama of modern science has been caught up in the aspiration to detect absolute motion in a flat, mechanistic cosmos that offers no vantage point for the detection of such. This is a story that runs from Newton to Einstein, each man reaching for absolutes to affirm his belief that science trades in certitudes that originate with God.[20] I make this point to propose that the mechanistic ontology of modern science is too sparse to fully resolve the question of why things move. That question is still very much alive, and Mormon helps us answer it in a different way.

Thus, in what follows, I first outline Mormon's worldview by looking at some of the imagery of the passage from Helaman. I then build on this assessment by examining the passage's chiastic structure. These aspects of the passage, I argue in the final sections of the article, combine to prompt the suggestion that this is an ancient text and that Mormon's sensibility with regard to motion coincides with attitudes found elsewhere in scripture.

Mormon's Worldview Reflected in Helaman 12

Living in the aftermath of the rise of modern science, we might wonder how premodern people could ever attribute sentience or life principle—or at least the capacity to respond to nonmechanistic influences—to things we "know" to be lifeless.[21] Would it not be obvious to every thinking person,

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20. Einstein's belief in what he called "Spinoza's God" is well known; that is, an impersonal God who embodies the laws of nature. If anything, Newton was more religious than Einstein, and his concepts of absolute space and absolute time may be understood as divine aspects that serve the scientific function of affording us absolute or near-absolute knowledge of motion in the universe—of helping us see things in a manner approximating God's experience. See Koyré, *From the Closed World to the Infinite Universe,* 221–34. I should note also that Newton had profound misgivings regarding the capacity of bodies to indefinitely conserve their motion, and this is why he wondered if God might intervene to recharge motion through the medium of a universal ether. See E. A. Burtt, *The Metaphysical Foundations of Modern Physical Science* (Amherst, N.Y.: Humanities Books, 1999), 264–82. Like other architects of modern science, Newton straddled the past and the future, often pondering issues that now strike us as unproblematic. It was only in Newton's wake that the mechanical worldview achieved its apotheosis, and this in part because later thinkers succeeded in giving us "Newton's physics without Newton's God." Peter Gay, *The Enlightenment: An Interpretation,* vol. 2 (New York: Knopf, 1969), 140.

21. Of course, LDS thought allows for the belief that things such as rocks are sentient or intelligent (and therefore responsive to God) in some rudimentary way. Brigham Young remarked that "there is not a particle of element which is not filled with life. . . . There is life in all matter, throughout the vast extent of all the eternities; it is in the rock, the sand, the dust, in water, air." *Journal of Discourses,* 26 vols.

regardless of background or era, that rocks are inert entities? In a word, no, for whatever stance we take on the question of a rock's inner experience (or lack thereof) may be traced back to metaphysical leaps of faith made by others before we begin to make sense of the world.[22] With respect to the mechanical universe, it is easy to see the leaps. Probably the most dramatic case in point is Johannes Kepler's declaration that he had decided to quit thinking of the cosmos as a divine organism so that he could begin thinking of it as a mechanical clock—the most compelling machine of the era.[23] Preparing the way for Newton and living at a tipping point between two worldviews, Kepler appreciated the epistemic value of the clock metaphor: a mechanical universe would be much easier to explain than one informed by living powers, some of them divine.

This brings us directly to Mormon, who I believe would have been more comfortable with the metaphor Kepler abandoned. This is not to say that Mormon would have embraced that metaphor uncritically, just that it overlaps with his belief that nature is responsive to something other than brute mechanical force. In Christian scripture in general and latter-day scripture in particular, the motion of bodies signifies acquiescence to God's will, which in turn implies a capacity on the part of those bodies to sense or "know" their place in the cosmos and to move in ways that bespeak God's "majesty and power" (D&C 88:47). That this outlook informs Mormon's claim about the moving of the earth and its hills, mountains, bedrocks, and waters can be seen in Helaman 12.

(Liverpool: F. D. Richards, 1855–86), 3:277, March 23, 1856. See also David Grandy, "Heaven-Earth Wedges: The Mormon Experience," *Proteus: A Journal of Ideas* 15 (Fall 1998): 59–65.

22. Alfred North Whitehead has compellingly argued that the worldview of modern science—the clockwork universe composed of lifeless cogs—is not a palpable, self-evident fact of nature. It is, instead, an idea abstracted from an interpretation of nature that prizes mechanism and materialism. Not that this abstraction is wrong in all cases. When limited to its obvious function, that of grasping and exploiting nature's mechanistic aspects, the abstraction has demonstrated its utility and epistemic legitimacy many times over. As Whitehead says, "The narrow efficiency of the scheme was the very cause of its supreme methodological success." Nevertheless, "when we pass beyond the abstraction, either by more subtle employment of our senses, or by the request for meanings and for coherence of thoughts, the scheme breaks down at once." Alfred North Whitehead, *Science and the Modern World* (New York: Free Press, 1967), 17. For anyone wishing to get back to a worldview more along the lines of Kepler's divine organism, Whitehead is an excellent option.

23. Johannes Kepler to Herwert von Hohenberg, Catholic Chancellor of Bavaria, February 10, 1605, quoted in Alfred W. Crosby, *The Measure of Reality: Quantification and Western Society, 1250–1600* (Cambridge, UK: Cambridge University Press, 1997), 84.

Mormon devoutly desires that humans should be subservient to their Creator and Benefactor, although often they are not—as Mormon knows from his own personal efforts to lead his unruly people. He writes that some humans "do not desire that the Lord their God, who hath created them, should rule and reign over them; notwithstanding his great goodness and his mercy towards them, they do set at naught his counsels, and they will not that he should be their guide." Indeed, Mormon continues, such humans "are less than the dust of the earth," for "the dust of the earth moveth hither and thither, to the dividing asunder, at the command of our great and everlasting God" (Hel. 12:6–8).[24] What is more, "the hills and the mountains tremble and quake," and "by the power of his voice they are broken up, and become smooth, yea, even like unto a valley" (Hel. 12:9–10). Finally, "by the power of his voice doth the whole earth shake" and "the foundations rock, even to the very center" (Hel. 12:11–12). And so, Mormon concludes, with all this movement, this responsiveness on the earth's part to God's commands, it naturally follows that if God "say unto the earth—Move—it is moved" (Hel. 12:13). To follow the critical text version supplied by Royal Skousen:

> Yea, and if he saith unto the earth: Move!
> —and it is moved.
> Yea, if he say unto the earth:
> Thou shalt go back, that it lengthen out the day for many hours
> —and it is done.[25]

"If God say unto the earth: Move!—it is moved." This is conditional language suggesting that the earth's motion is, like that of dust storms and earthquakes, episodic or intermittent rather than constant and periodic. There is no hint here that the earth is moving under the force of mechanical necessity. Rather it moves *if and when* God commands it to move, or, like the calm that precedes and follows storms, it ceases to move *if and when* that is God's will.

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24. In response to this passage, Joseph Fielding Smith stated: "The point he is making is that the dust of the earth is obedient. . . . Everything in the universe obeys the law given unto it, so far as I know, except man. Everywhere you look you find law and order, the elements obeying the law given to them, true to their calling. But man rebels, and in this thing man is less than the dust of the earth because he rejects the counsels of the Lord." Joseph Fielding Smith, in *Official Report of the Ninety-Ninth Annual Conference of The Church of Jesus Christ of Latter-day Saints* (Salt Lake City: The Church of Jesus Christ of Latter-day Saints, 1929), 55, quoted in K. Douglas Bassett, *Latter-day Commentary on the Book of Mormon* (American Fork, Utah: Covenant Communications, 1999), 386.

25. Skousen, *Book of Mormon: The Earliest Text,* 548.

The imagery of the passage is clearly biblical—dust of the earth, quaking mountains, and so on—and consequently evocative of biblical cosmology. While we cannot know for sure how Mormon or any ancient prophet would have drawn the cosmos, the cosmos as it is described in the Old Testament is often drawn as it is in figure 1.[26] In this view, there would be no allowance for either the sun or the earth to fully orbit the other body. This is because the earth was not imagined as a round body hanging freely in space—that possibility was not broached by pre-Socratic Greeks until a full century or more after Lehi's departure from Jerusalem.[27] Instead the earth was thought to rest on subterranean waters, which God had separated at the creation from waters now situated above the firmament: "And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so" (Gen. 1:7).

To be sure, this picture of reality is unfamiliar—and scientifically implausible—to modern thinkers. We want to know what happens to the sun after sunset, or what supports the waters of the great deep. These are scientific questions, but typically ancient people were differently oriented. John H. Walton, a scholar of the Old Testament and its Near Eastern milieu, observes that when God revealed his truth to the Israelite prophets, he "did not think it important to revise their [cosmological] thinking."[28] This,

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26. The ancient prophets probably did not see the cosmos as did Galileo or Newton, but The Church of Jesus Christ of Latter-day Saints has made no official statement on ancient cosmology or the meaning of "firmament." The manual currently used by the Church Educational System suggests that "the division of the waters under and above the firmament, or expanse, is explained simply as the natural phenomena of the earth" while also citing a source that suggests that, according to the Bible, rain comes from "above the vault which spans the earth." *Old Testament Student Manual, Genesis to 2 Samuel* (Salt Lake City: The Church of Jesus Christ of Latter-day Saints, 2003), 30, citing C. F. Keil and F. Delitzsch, *Commentary on the Old Testament,* vol. 1, *The Pentateuch,* trans. James Martin (Edinburgh: T. and T. Clark, 1885), 53–54.

27. Parmenides (c. 515–450 BC) appears to have been the first person to propose a spherical earth. See Daniel W. Graham, trans. and ed., *The Texts of Early Greek Philosophy: The Complete Fragments and Selected Testimonies of the Major Presocratics*, part 1 (Cambridge, UK: Cambridge University Press, 2010), 241. The extent to which Aristarchus of Samos, living in the late third century BC, understood the universe to be heliocentric is a fascinating question, but I see little reason to assume that the Nephites had developed a similar understanding on their own, having left Jerusalem more than three centuries earlier.

28. John H. Walton, *The Lost World of Genesis One* (Downers Grove, Ill.: InterVarsity Press, 2009), 16. As Bernhard Anderson puts it, "The biblical view of creation is not an effort at primitive science." Bernhard W. Anderson, *From Creation to New Creation: Old Testament Perspectives* (Minneapolis, Minn.: Fortress Press, 1994), 1.

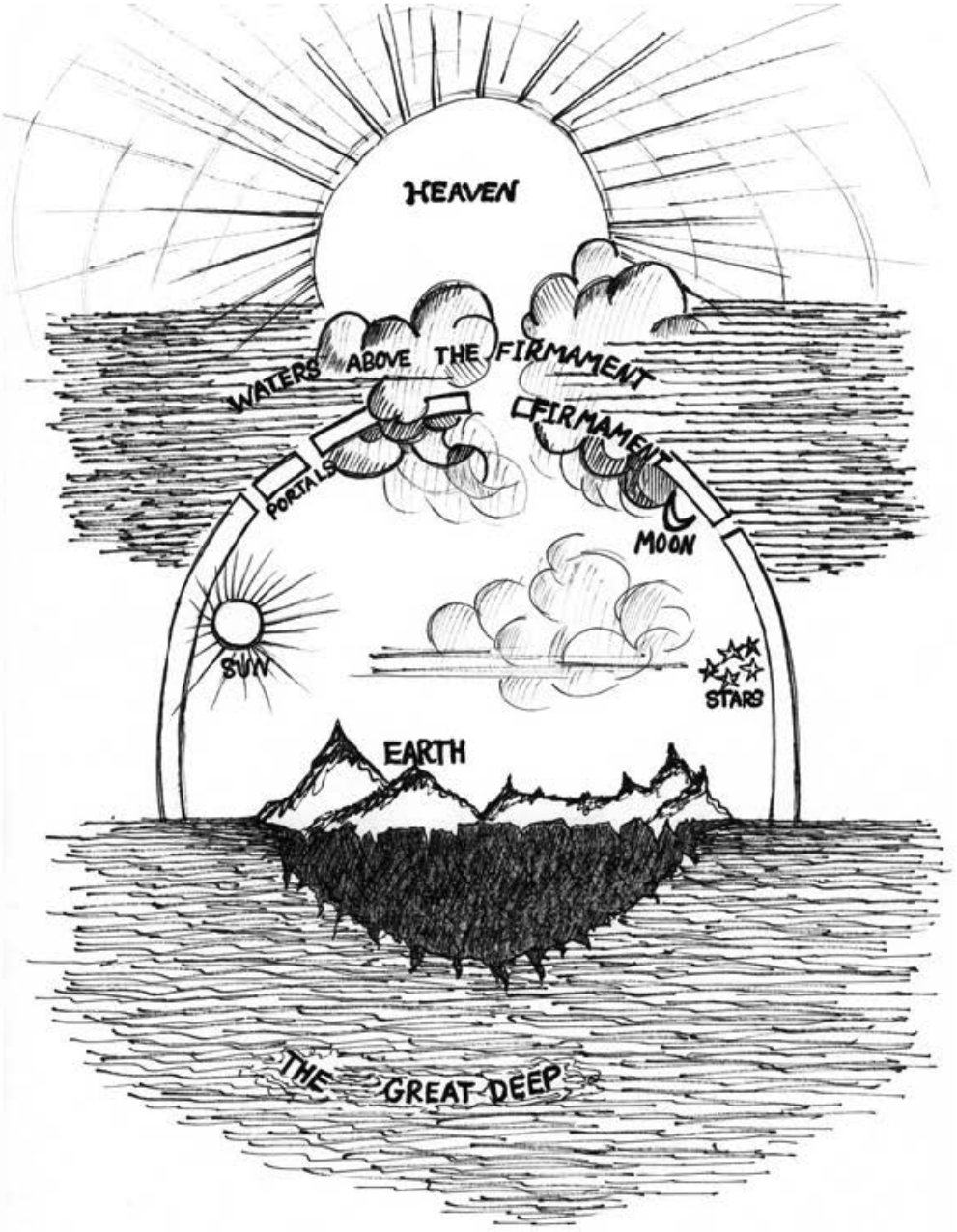

Figure 1. The ancient Hebrews saw the earth as roughly flat. Beneath were waters of the great deep, which sometimes seeped upward to the earth's surface. Above were waters held back by an overarching firmament, except when portals were opened to release rain or snow. This worldview was somewhat figurative, and it was neither heliocentric nor geocentric in a scientific sense, for it made no allowance for either the sun or the earth (which was not seen as a heavenly or astronomical body) to fully orbit the other. Drawing by Janet Grandy.

he goes on to argue, was because God was addressing *their* cosmological concerns, and those concerns centered on their role in the universe. For people of the Old Testament, things existed not in virtue of their material properties, but rather in virtue of their function within the cosmos. Each thing, says Walton, was felt to have its own "sphere of existence,"[29] a sphere that integrated purposefully into the larger sphere of God's creation.[30]

In its meaning, "sphere of existence" suggests "measure of creation," a distinctively LDS phrase connoting a person's calling in life. To fill the measure of one's creation is to actualize possibilities beyond one's material properties and the mundane needs that arise therefrom: the need for food, sleep, and so on. Interestingly, this ancient emphasis on purpose, order, and integration—rather than mere material existence—coincides with LDS thought in another way. Joseph Smith taught that creation occurred with the *organization* of previously unordered matter[31]—a view that lines up with Walton's point that "unless something is integrated into a working, ordered system, it does not exist."[32] For example, one may think of a theatrical production, which does not exist until all its parts—lights, stage, props, actors, audience—combine in a meaningful, organized fashion. Likewise, a musical composition goes unrealized until tones are systemically and intelligently ordered. Each tone by itself fails to break the threshold we associate with musical creativity. Thus there is no display of creativity, no creation, until purposeful organization or arrangement occurs.[33]

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29. Walton, *Lost World of Genesis One,* 26.

30. Bernhard Anderson similarly insists that for ancient Israelites the creation primarily entailed cosmic order and purpose rather than cosmic origination: "It is not just that the cosmos originated in the creative will of God, but that God is the one who gives order to the vast cosmic whole in which everything from the least particle to the largest star has its proper place and function." Anderson, *From Creation to New Creation,* 103.

31. *Teachings of the Prophet Joseph Smith,* selected and arranged by Joseph Fielding Smith (Salt Lake City: Deseret Book, 1970), 350–52.

32. Walton, *Lost World of Genesis One,* 27. Michael Welker argues that modern cosmologists dimly grasp the question of creation, at least as the question was taken up in antiquity. They think of creation as an "initial ignition," not as an integrative event whose force is still felt in the way the universe is organized and held intact. Michael Welker, "Creation: Big Bang or the Work of Seven Days?" *Theology Today* 52 (July 1995): 173–87. Paul Tillich similarly wrote: "The doctrine of creation is not the story of an event which took place 'once upon a time.' It is the basic description of the relation between God and the world." Paul Tillich, *Systematic Theology,* 3 vols. (Chicago: University of Chicago Press, 1951), 1:252.

33. Terence Fretheim offers the earth as an example of this process whereby something is creatively ordered so that it comes into existence. In Genesis 1:2 the earth is described as "without form, and void." Several verses later, after God has

Walton's broader point is that the ancient Hebrews attached cosmological significance to purpose and integration, whereas Newtonian science keys its analysis to material bodies and properties deemed void of purpose, at least at the elemental (atomic and molecular) levels. The starting point, the point at which creation is said to occur, is very different, and consequently the resulting cosmologies are very different. Mormon, I submit, is attuned to the understandings of Hebrew cosmology, all of which take purpose and organization as a starting point. Thus he is concerned with human disobedience; that is, the failure of humans, as creatures of God, to integrate into God's created order. For Mormon, this failure would have been particularly egregious in light of the fact that humankind, the only species created in God's image, was the very species to betray God by abandoning that image or stewardship. "The image [of God]," writes Bernhard W. Anderson, "refers, above all, to the God-given commission to 'image' God on earth, that is, to be the agents who represent and realize God's benevolent and peaceful sway on earth."[34]

Like many others in the seventeenth century, Newton did not share Mormon's deep prophetic concern for humankind's tendency to abandon its *Imago Dei* commission. Although possessed of an "overbearing sense of a divine presence,"[35] Newton was intellectually responsive to the newly emerging mechanical philosophy that portrayed physical reality as a congeries of lifeless, self-contained particles whose interactions were blindly mechanistic but fully transparent to human reason. This outlook would have been foreign to Mormon. His mention of the "waters of the great deep" (Hel. 12:16) not only denotes his commitment to the ancient Hebrew worldview; it also alerts us to the nonmechanical aspect of that worldview. Water, of course, is a life principle, or element essential to life, and, as described in Genesis 1, the Spirit of God—another life principle—"moved upon" the primeval waters prior to their separation. By God's command, powers or principles come together and separate to facilitate the creation of a world in which plants, animals, and humans may grow and flourish. What is more, when brought into existence—when organized—nature possesses a creative, godlike impetus of its own. Hence we read: "And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, . . . and it was so. And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was

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arranged the elements, the earth "appears" as "dry land"; that is, as a new setting whereupon humankind can arise and flourish. Terence E. Fretheim, *God and World in the Old Testament* (Nashville, Tenn.: Abingdon Press, 2005), 5.

34. Anderson, *From Creation to New Creation,* 108.

35. John Hedley Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge, UK: Cambridge University Press, 1991), 137.

in itself, after his kind" (Gen. 1:11–12). The double but not fully overlapping description signifies nature's responsiveness to divine command. First God commands and then the earth, quickened by the command, fulfills it.

Why does nature have an impetus toward obedient goodness? Because (to echo the Psalmist and other biblical authors) the universe is "full of the glory of God."[36] For ancient Hebrews, this statement was not a softly focused gloss on the beauty of the earth, but, given the Lord's organization of the cosmos and his decision to dwell therein, literal fact. "The most central truth to the creation account," writes Walton, "is that this world is a place for God's presence."[37] Accordingly, Walton deems Genesis 1 a temple text, calling the universe a "cosmos-sized temple" and noting that the divine "glory" that fills creation is the same glory—denoted by the same Hebrew word—that was said to fill the Israelite tabernacle and temple.[38] Jon Levenson similarly insists that "the Temple is a visible, tangible token of the act of creation, the point of origin of the world, the 'focus' of the universe."[39] The same point is made by Jean Daniélou: "At the birth of mankind, the whole creation, issuing from the hands of God, is holy; the earthly paradise is nature in a state of grace. The House of God is the whole cosmos. . . . In the cosmic Temple, man is not living primarily in his own house, but in the house of God."[40]

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36. See, for example, Psalm 8; Psalm 19:1–2; Psalm 72:19; Numbers 14:21; Isaiah 6:3; and Romans 1:20.

37. Walton, *Lost World of Genesis One,* 85. Fretheim writes that "these people [the Israelites] lived close to the ground, if you will, and the natural world filled their lives. Creation was a lively reality for them prior to the development of specific ideas about creation. It would seem likely in view of this experience that the God in whom they believed . . . was linked to creation as a matter of course. Given the fact that the texts often speak of such everyday realities as family and clan, the birth and growth of children, homes and fields, wild and domestic animals, and weather with its effects for good or ill, it may be that 'blessing' was a basic and early understanding of Israel's God as Creator." Fretheim, *God and World,* xv. In other words, creation was, for the Israelites, close at hand and regulative of the flow of everyday life. What is more, the divine goodness of the creation, as manifest in ongoing operation of nature, remained in effect to bless all who followed the Creator's commands.

38. Walton, *Lost World of Genesis One,* 83. In the dedicatory prayer of Solomon's temple, Solomon asks: "But will God indeed dwell on the earth? Behold, the heaven and heaven of heavens cannot contain thee; how much less this house that I have builded?" (1 Kgs. 8:27). At first blush this question might appear to weigh against the thesis that God dwells in Israel's temple, but the context marks Solomon's question as a contrite expression of his hope that God will take up residence in the temple.

39. Jon D. Levenson, "The Temple and the World," *The Journal of Religion* 64 (July 1984): 283.

40. Jean Daniélou, *The Presence of God,* trans. Walter Roberts (Baltimore, Md.: Helicon Press, 1959), 9, 11.

Among LDS thinkers, the image of the cosmos as a temple is a familiar idea that Hugh Nibley explored at great length.[41] As a rule, however, modern readers of the Book of Mormon do not automatically bring the cosmos-as-temple understanding to the sacred text, even though they may be able to articulate it as an aspect of ancient biblical thought. Hence they generally do not think of God as residing in his cosmic temple and governing the world from that holy center. But that is how Israelites thought of God. "The world," states Levenson while describing ancient Israel, "is the manifestation of God as he sits enthroned in his Temple."[42] These views are not to imply that God micromanaged nature, but that his glory was on full display and was fully evocative of the commands he uttered at the creation: plants brought forth seed after their kind, day followed night, stars moved in the heavens, and animals and humans reproductively multiplied. The glory of God could not be gainsaid because the ongoing cycles of nature were felt to reenact the primal rhythm of creation.

One may appreciate that within this worldview, little room exists for objects moving without reference to God. Dust, mountains, seas, even the foundations of the earth, Mormon says, move according to God's commands. But these commands—and this point is foreign to modern thought—have as much to do with the regularities of nature as they do with human behavior. There are not two sets of laws, one natural and amoral that governs the operation of nature and the other moral that is meant to govern the actions of human beings; there is one set of laws or commands whose beneficent intent is to structure a world in which humankind can flourish.[43] "Israel was early impressed with the regularity of nature," writes William Irwin, and this regularity

> was an evidence of the grace of God: he chose so to order his world for the benefit of man. The promise was of divine grace that,
>
> > While the earth remaineth,
> > seedtime and harvest, cold and heat,

41. Hugh Nibley, *Temple and Cosmos: Beyond This Ignorant Present,* ed. Don E. Norton, Collected Works of Hugh Nibley, vol. 12 (Salt Lake City: Deseret Book, 1992).

42. Levenson, "Temple and the World," 290.

43. According to Bernhard Anderson, "The cosmos [for the ancient Israelites] is not an autonomous whole, governed by its own laws, but is completely dependent on the God who transcends it. Moment by moment it is held in being by the sovereign will of the Creator. Even the regularities of 'nature' are not iron-bound laws but are expressions of the Creator's faithfulness and trustworthiness (cf. Gen. 8:22)." Bernhard W. Anderson, "Mythopoeic and Theological Dimensions of Biblical Creation Faith," in *Creation in the Old Testament,* ed. Bernhard W. Anderson (Philadelphia, Penn.: Fortress Press, 1984), 13.

summer and winter, and day and night,
shall not cease [Gen. 8:22].[44]

Put differently, so long as the earth endures, the creation commands that brought about its purpose and contrapuntal operation will continue to bless its inhabitants. All law is God-given and hence possesses moral import, all ultimately reaches back to the creation, and the lawful, orderly operation of nature manifests the glory and beneficence of God. Thus there is no natural law in the modern sense; that is, there are no explanatory principles that are indifferent to the question of God's existence and purpose. If indeed Mormon was attuned to this older outlook, and the biblical imagery of the passage suggests that he was, it is highly unlikely that he would have been trying to make a correction on behalf of an intellectual enterprise that does not explicitly acknowledge God.

The Chiastic Structure in Helaman 12:6–21

Further evidence of Mormon's premodern mind-set may be found in the possible chiastic structure of the passage under consideration.[45] In broad terms, its central structure can be seen as follows:

A Men who *reject* God as ruler over them are less than the dust of the earth (12:6–7)
  B Dust of the earth moves and divides asunder [*opens*] at the command of God (8)
    C *Mountains* and hills tremble, break up, are made smooth at God's command (9–10)
      D The primordial *foundations* of the earth rock at the power of God's voice (11–12)
        E The *earth moves* as God so commands, whereby the day is lengthened (13–14)
          X "Thus, according to his word, the earth goeth back" (15)
        E′ "For surely it is the *earth that moveth* and not the sun" (15)
      D′ The waters of the *great deep* dry up if God so commands (16)
    C′ *Mountains* move, are raised up, and bury cities at God's command (17)

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44. William A. Irwin, "Man in the World," in *The Intellectual Adventure of Ancient Man,* ed. Henri Frankfort and others (Chicago: University of Chicago Press, 1946), 295.

45. I thank John Welch for pointing out this chiasm to me and encouraging me to discuss it in this article.

B′ At the command of God the earth hides [*closes up*] treasure because of iniquity (18–19)

A′ God will *reject* and cast off men because of their iniquities (20–21)

While this text manifests several types of parallelism and repetition,[46] the most important point throughout this passage is that the various elements of nature (whether dust, mountains, earth, water, and so on) all move *according to God's word*, a theme made emphatically clear by this passage centering on this very point. Thus, in Mormon's perspective, it is the earth that moves and the sun not only appears to stand still, but indeed, says Mormon, the sun does stand still, all "according to his word." But Mormon is positing just one instance. At another time, God might conceivably have occasion or context in which to command the sun to move, and it would so move. Furthermore, the fact that God commands the earth (or the sun) to move implies that it was not previously moving, at least not in the way it thereafter moves, and so this is not a description of periodic motion, Copernican or otherwise.

While Mormon knows that God has ordained the regularities of nature, he also knows that human disobedience runs counter to those regularities (A-A′) and thereby necessitates corrective action on God's part. These corrective actions are also part of God's glory and are bound up, one may presume from numerous scriptural narratives, with earthquakes, floods, famines, and the kind of calamities now called "natural disasters." By "natural" one implies that their causes run back to blind forces of nature, not to God.[47] Mormon, however, is far removed from that sort of naturalistic

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46. See further, for example, the repetition of synonymous terms in verses 3 and 4, the alternating juxtapositions of "quick" and "slow" in verses 4 and 5, the four-time use of "voice" in verses 9–12, the four-time use of "if he say" in verses 13–17, the four-time use of "shall say" in verses 18–21, the resumptions of "iniquity" from verse 5 in verses 21–22, and of "hearken" from verse 4 in verse 23, and the contrast between "sparing their lives" in verse 2 and being "eternal life" in verse 26.

47. When viewed through the lens of modern secularism, the ancient biblical attitude toward nature may appear unenlightened, but, as with any worldview, much depends on initial choices and assumptions. Victor Matthews and Donald Benjamin write, "In the world of the Bible . . . Yahweh was all powerful. Anything which happened, good or bad, happened only because Yahweh decreed it. Yahweh was the cause of everything, a world view called 'primary causality.' This world view is not the result of ignorance, but of choice. Villagers in early Israel knew that death was the result of accident, widespread disease, or epidemic, but they chose to attribute it to Yahweh." Victor H. Matthews and Donald C. Benjamin, *Social World of Ancient Israel: 1250–587 BCE* (Peabody, Mass.: Hendrickson, 1993), 116. Put differently, ancient Israelites *chose* to see God in the everyday events of life. Moderns, on the other hand, generally *choose* to see natural processes in those same events.

outlook, just as he is far removed from the related deistic sensibility of a clockmaker God implementing at the creation scientific laws of nature which thereafter govern nature without his active involvement. This reality is elaborated throughout this passage, every aspect of which is suffused with religious significance and pitched toward singular events whereby God reminds disobedient humans that they indeed are less than the dust of the earth. God can use mountains (C) to bury cities (C′), when their inhabitants do not obey God. Humans cannot bury their instruments of sin from God (B′), for at his command, the dust of the earth "moveth hither and thither" and opens "asunder" (B) to hide or reveal those instruments as God wills. Even the great sources of human and earthly stability—those that undergird human achievement—are not immune to God's rearranging power. The earth's "foundations rock" at God's command (D). Perhaps Mormon is thinking here of the Shetiyyah stone, the foundation stone that was said to center and stabilize (normally) the cosmos and upon which the Jewish temple rested. Interestingly, this stone was associated with the life-giving primeval waters,[48] a link that coincides with Mormon's coupling of the earth's foundations with the waters of the great deep (D′).

Neither choice can be shown, in any absolute sense, to trump the other, for each is a metaphysical leap of faith—that is, an outlook underdetermined by the events that capture our interest. To follow Albert Einstein and Leo Infeld: "Physical concepts are free creations of the human mind, and are not, however it may seem, uniquely determined by the external world. In our endeavor to understand reality we are somewhat like a man trying to understand the mechanism of a closed watch. He sees the face and the moving hands, even hears its ticking, but he has no way of opening the case. If he is ingenious he may form some picture of a mechanism which could be responsible for all the things he observes, but he may never be quite sure his picture is the only one which could explain his observations." Albert Einstein and Leopold Infeld, *The Evolution of Physics* (New York: Simon and Schuster, 1966), 31.

48. Raphael Patai writes, "Nor was the cosmic significance of the Temple exhausted with the light that emanated from it. In the middle of the Temple, and constituting the floor of the Holy of Holies, was a huge native rock which was adorned by Jewish legends with all the peculiar features of an *Omphalos,* a Navel of the Earth. This rock, called in Hebrew *Ebhen Shetiyyah,* the Stone of Foundation, was the first solid thing created, and was placed by God amidst the as yet boundless fluid of the primeval waters. Legend has it that just as the body of an embryo is built up in its mother's womb from its navel, so God built up the earth concentrically around this Stone, the Navel of the Earth. And just as the body of the embryo receives its nourishment from the navel, so the whole earth too receives the waters that nourish it from this Navel. The waters of the Deep crouch underneath the *Shetiyyah* stone at a depth of a thousand cubits, and down to them reach the *shitin,* the shafts, also created according to legend in the days of creation." Raphael Patai, *Man and Temple: In Ancient Jewish Myth and Ritual* (London: Thomas Nelson and Sons,

In brief, the structure and logic of this passage instruct us that God's word is the true center of existence and the only absolutely secure reality. All else is at the mercy of God's command, and so all else moves or ceases to move accordingly. It is easy, however, to miss the central importance of verse 15, because, having only secondhand familiarity with Mormon's ancient worldview, contemporary readers reflexively fall back on the modernistic Newtonian understanding of motion.

An additional difficulty surfaces when we try to accommodate Mormon's description to Newtonian physics, believing there is only one correct account of motion. When we let Newton's account dominate, we do violence to Mormon's account, which is just as correct as Newton's, given the initial assumptions of either model. Mormon starts and ends with God; Newton starts and ends with material bodies and mechanical force. This is not to say that there is no final or absolute answer to the question of why things move, only that, within the modest scope of this article, these two accounts of motion represent divergent perspectives, each of which conveys correct information built upon different premises and oriented toward a different end. If we fail to understand Mormon's perspective because our thinking is colonized by Newton's, we also fail to understand Newton's perspective, for his—as he well realized—leaves important questions unanswered.[49]

1947), 85–86. See also Louis Ginzberg, *The Legends of the Jews,* vol. 4 (Philadelphia, Penn.: The Jewish Publication Society of America, 1947), 96. A biblical reference to the stone and water may be found in Job 38:6–8. John Welch proposes that the Shettiyah stone, given its bedrock stability and association with water, whether life-saving or life-threatening, informs numerous biblical passages. For example, the parable of the wise and foolish builders wherein the wise man built his house upon *the* rock (not just any rock) that subsequently protected the home from wind, rain, and flood (Matt. 7:24–25), the story of Moses striking with his staff the rock at Meribah to produce life-preserving water (Num. 20:8–11), Paul's characterization of Christ as the Rock that supplies "spiritual drink" (1 Cor. 10:4), and many others. John W. Welch, *The Sermon on the Mount in the Light of the Temple* (London: Ashgate, 2009), 179–82.

49. I have already observed (note 20, above) that Newton felt that the motion of astronomical bodies would "decay" unless somehow recharged. He was also much vexed by the idea of action-at-a-distance (noncontact) forces, the like of which his theory of universal gravity seemed to embody. How does the moon reach across 240,000 miles of apparently empty space to cause the tides on earth? Here again, the ether appeared to offer a possible solution to this problem, but Newton eventually concluded that a mechanical ether would bring planetary motion to a halt. After deciding that an immaterial ether was also unsatisfactory, Newton at one point proposed that God mediates force and that he also holds the stars and planets in their courses, not in a deistic fashion, but from moment to moment. At other times, he confessed that he did not know how force is transmitted across

The View Shared by Mormon, Joshua, Samuel the Lamanite, and Alma the Younger

Galileo famously insisted that, as it is expressed in scripture, "the intention of the Holy Ghost is to teach us how one goes to heaven, not how heaven goes."[50] His point was that the Bible speaks to matters of salvation, not to the fully naturalistic concerns which he and others were then pioneering under the banner of science. Far from disparaging the Bible, Galileo saw it as a book whose saving efficacy transcends the cosmological understanding, or misunderstanding, of those who believe in it. Thus, it did not ultimately matter that people in Joshua's day believed that the Lord stopped a moving sun to lengthen the day of Israel's combat against the Amalekites, when Joshua spoke to the Lord and said "in the sight of Israel, Sun, stand thou still upon Gibeon; and thou, Moon, in the valley of Ajalon. And the sun stood still, and the moon stayed" (Josh. 10:12–13). The absolutely central point—the turn of events that sparked saving faith—was the Lord's power and miraculous intercession. This view was shared by Mormon, Samuel the Lamanite, and Alma the Younger.

Although we cannot say for sure, it is probable that Mormon, from his reading of the plates of brass, had the Joshua story specifically in mind when he wrote about the earth's motion. If so, he seems to have invoked that episode in terms appropriate to his argument, which is not concerned with astronomical or scientific correctness but with "how slow [the children of men are] to remember the Lord their God" (Hel. 12:5). Thus, after describing the earth's motion as a consequence of God's command, Mormon writes: "And thus *according to his word*, the earth goeth back and it *appeareth* unto man that the sun standeth still. Yea, and behold, this is so; for surely it is the earth that moveth and not the sun" (Hel. 12:15; italics added).

Rather than confirming Copernican cosmology, this verse suggests that Mormon is invoking Joshua's event, not because Joshua's account is scientifically inaccurate and therefore in need of correction, but because it reinforces Mormon's own admonition that humans, being indigenous to the earth (their bodies made of the dust of the earth), should follow the many examples of responsive obedience they witness among things with which they are intimate—dust, hills, mountains, the foundation of the earth, the great deep, and so on. Human beings are not exempt from this great pattern of earthly obedience, although, Mormon says, they often think they

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empty space or how heavenly bodies conserve their motion. See Margaret Osler, *Reconfiguring the World: Nature, God, and Human Understanding from the Middle Ages to Early Modern Europe* (Baltimore, Md.: Johns Hopkins Press, 2010), 154–64.

50. Galileo Galilei, "Letter to the Grand Duchess Christina," in Stillman Drake, *Discoveries and Opinions of Galileo* (New York: Doubleday Anchor Books, 1957), 186.

are. Seen in this light, Mormon's argument is significantly geocentric, albeit in a religious rather than scientific sense: he is reminding his readers of their place in the cosmos, of their earthly limitations, and of the need to be responsive or obedient to divine command.[51] The earth's obedience, demonstrated by the motion of its constituent parts, makes it relevant to our own circumstance and place in the cosmos, given that we live on the earth and know it intimately. Mormon, wanting to impress upon earthbound humans the need for obedience and using the moving earth as an example of obedience, keeps the sun stationary and lets the earth do all the moving. Thus he drives home the point that it is contrary to our earth experience, to the witness of terrestrial nature, that humans should ever settle down into self-satisfied pride and thereby stop moving, obeying, repenting, and growing.

Still, for modern readers, two great sticking points remain to be addressed. The first has to do with Mormon's statement that when the earth "goeth back," it "appeareth unto man that the sun standeth still" (Hel. 12:15). Modern readers may interpret this to mean that when the earth stops its axial rotation, the sun appears to stand still in the sky. But, not only does the biblical imagery and Mormon's central point about the earth and all things moving as God commands not support this interpretation, neither does Copernican or Newtonian science, for even in such an interpretation God's powers would have to be somehow involved to mitigate the tremendously destructive dynamical effects that would necessarily accompany the cessation of the earth's axial rotation. Indeed, Mormon never describes the earth as going *around* the sun, nor does he talk as if the earth were spinning on its axis. Readers bring those elements of the Copernican picture of reality to the text and then, at Mormon's mention of the earth's backward motion, read that interpretation into the passage.

Several interlocking considerations work against this modernist interpretation. Recall the ancient Hebrew worldview depicted in figure 1, evidently known to the Israelites at the time of Joshua. The earth, in that cosmology, is not simply another astronomical body or sphere in the solar system. The earth is typologically different from the sun, moon, and stars, and thus we would expect that its motion would be different. Mormon reflects his understanding of this difference in his description of the movement of earthly matter, which is "hither and thither," beginning and ceasing as the Lord commands. This is

51. John Walton writes, "The Old World Science in the Bible offers the perspective of the earthbound observer. One could contend that there are some ways in which it is more true that the earth is the center of the cosmos. This does not mean to suggest that there are many truths, but that there are many possible different perspectives that can each offer truthful information." Walton, *Lost World of Genesis One,* 61.

not to say that celestial bodies, such as the sun, moon, and stars, are not also under God's sway, or that their motion might also define their nature in some way, but from the distant vantage point of the earth, all that Mormon can describe is the periodic motions of those heavenly bodies. Things are quite different, however, for Mormon at the ground level, so to speak. He knows, of course, the earth's diurnal and seasonal regularities, but other forms of episodic motion are also ubiquitous, and these are the kinds of motion that God employs to correct sinners: the intermittent movement of dust, the leveling or quaking of mountains, the drying up of seas, and so on. Indeed there are times, Mormon tells us, when God speaks so powerfully that "the *whole earth* shake[s]" and "the foundations rock, even to the very center" (Hel. 12:11–12, italics added). This is the kind of motion—episodic or start-stop motion—that Mormon attributes to the whole earth when he states that at the Lord's command, the earth moves. Said differently, the earth for Mormon is not a heavenly or astronomical body and consequently cannot orbit the sun. It can, however, episodically shake or move—go back and forth—as a single entity when God so decrees.

The second sticking point, related to the first, concerns Mormon's statement "for surely it is the earth that moveth and not the sun." Here it almost sounds as if Mormon grasps the distinctly modern concept of Galilean relativity. That is, by keeping the sun stationary so that the earth can do all the moving, he appears to anticipate the scientific idea that motion is a two-body affair—a relational coupling of bodies in which either body (take your pick) may do all the moving.[52] But whether physical motion might occur this way or not, or whether Mormon thought of heavenly bodies moving in a Galilean way or not, he is not concerned on this occasion with that sort of thinking. His description of the earth's motion in this passage is merely what occurs as we shape language to different ends, emphasizing a particular perspective on one occasion while minimizing it on another occasion.

As a case in point, just two chapters after Mormon states that the sun does not move, he records Samuel the Lamanite's prophecy of extended daylight despite the sun's rising and setting: "for ye shall know of the rising of the sun and also of its setting; . . . nevertheless the night shall not be darkened" (Hel. 14:4). Why does Mormon let stand this description of a moving, rising and setting, sun shortly after he had stated in chapter 12 that the sun does not move? Perhaps because he knew full well that "at the going down of the sun" in 3 Nephi 1:15, light would indeed miraculously

52. Here I am thinking of the principle of relativity which asserts that the laws of physics are the same for all inertial bodies. Einstein's equivalence principle generalizes this claim to include noninertial bodies.

come from some other source. But more than that, Mormon in Helaman 12 is not concerned with what we would call scientific consistency; nor is he demonstrating a protomodern understanding of relative motion, which concept is completely unmindful of God's involvement in the universe. For Mormon, the overriding imperative is the elucidation of God's purposes in the everyday events of our lives, and each passage is shaped toward that end. The deep familiarity that all people have with the changing, moving earth makes it the perfect witness to the truth that obedience entails change and movement toward repentance—let the earth, therefore, be nature's great exemplar of change and motion. When, however, the obviously sun-related phenomena of day and night are given prophetic consideration, as they are with Joshua, Mormon, and Samuel the Lamanite, let the emphasis fall on that body and its evident motion—as Joshua, Mormon, and Samuel the Lamanite do—without worrying about whether that motion is real or apparent. Such worry comes naturally to people who do not link motion with God; but Mormon makes that link reflexively, and so for him all motion is real because it denotes God's reality.

Likewise, responding to Korihor's request for a sign, Alma the Younger makes a similar point, reasoning from the same assumption of God-related motion: "All things denote there is a God; yea, even the earth, and all things that are upon the face of it, yea, and its motion, yea, and also all the planets which move in their regular form do witness that there is a Supreme Creator" (Alma 30:44). Here Alma ascribes motion to both the earth and the planets, and he portrays the fact and form of that motion as evidences of God's involvement in the cosmos. He describes planetary motion as "regular," which is how it generally appears from earth.[53] This adjective, however, is not applied to the earth's motion, a point that might be taken to imply that Alma, like Mormon, reflexively thinks of the earth's motion as irregular or episodic.[54] More to the point at hand, Alma seems to imply that were there no God, there would be no motion, because there would be no stream of divine power flowing throughout the cosmos, and indeed, as Lehi said, "And if there

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53. I say "generally" because planets (the word itself meaning "wanderers") are bodies distinguished from the so-called fixed stars by occasional irregular motions (stations and retrogradations), which were, however, reduced to rules by ancient observers and thereby predicted. Before Lehi's departure from Jerusalem, the Babylonians had developed some planetary understanding which may have diffused throughout the Near East. For the relevant chronology, see James Evans, *The History and Practice of Ancient Astronomy* (Oxford, UK: Oxford University Press, 1998), 296–98.

54. Grammatically, I take the relative pronoun "which" in Alma 30:44 as referring only to "the planets" and not to "the earth" (a remote antecedent) or to "its motion" (which would yield a redundancy).

is no God we are not, neither the earth" (2 Ne. 2:13). Again, the concern is with motion as an expression of God's involvement in a world that is responsive to that involvement, not with whether one body, rather than another, moves.

Final Considerations

Unlike the Greeks, the ancient Hebrews did not take up the question of motion in a formal and intellectually rigorous way.[55] We can surmise, nevertheless, a great deal about their attitude toward motion by their descriptions of moving objects and, more generally, by the way they describe nature. This is what I have tried to fathom by examining Mormon's and Alma's mention of a moving earth. When taken in context, Mormon's and Alma's mention of a moving earth is fully consistent with the biblical attitude that all of nature is mindful of God and quick to move or act in ways that glorify him. The Psalmist, for example, instructs us to praise the Lord, but then adds that our praise will be mingled with that of the angels and, further, with the praise of many things that we would probably regard as unmindful of the Lord and even lifeless:

> Praise ye him, sun and moon: praise him, all ye stars of light.
> Praise him, ye heavens of heavens, and ye waters that be above the heavens. . . .
> Praise the Lord from the earth, ye dragons, and all deeps:
> Fire, and hail; snow, and vapour; stormy wind fulfilling his word:
> Mountains, and all hills; fruitful trees, and all cedars:
> Beasts, and all cattle; creeping things, and flying fowl. (Ps. 148:3–4, 7–10)

As Jeanne Kay remarks while commenting on this passage, "In the Psalms, hills are girdled with joy, valleys shout for joy (65:13–14), floods clap their hands, the whole earth worships God and sings praises to His name (66:1–4; 89:6)."[56]

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55. Noah Efron states, "*Nature in the Bible is nowhere captured in theory*. . . . There is no evidence that ancient Hebrews made detailed observations of the heavens, kept records, or calculated and predicted the motion of the stars. In this, they differed from the nearby Assyrians, for instance. There is no evidence that they constructed even rudimentary theories or models of how the heavens were structured, or hypothesized about what the objects they encountered were made of. Nor is there any evidence that Israelites mused about a possible relationship between number and nature. While ancient Hebrews believed that the workings of nature were, for the most part, lawful, they did not labor to articulate these laws." Noah J. Efron, *Judaism and Science: A Historical Introduction* (Westport, Conn.: Greenwood Press, 2007), 31, italics in original.

56. Jeanne Kay, "Concepts of Nature in the Hebrew Bible," in *Judaism and Environmental Ethics,* ed. Martin D. Yaffe (Lanham, Md.: Lexington Books, 2001), 90. Here one is reminded of Mircea Eliade's claim: "What we find as soon as we place ourselves in the perspective of religious man of the archaic societies is that *the world exists*

Although more widely scattered, similar passages may be found throughout all scripture.[57] In his address to the leading men of Athens, for example, the Apostle Paul stated: "For in [God] we live, and move, and have our being" (Acts 17:28). King Benjamin likewise recognized God as "preserving [us] from day to day, by lending [us] breath, that [we] may live and move and do according to [our] own will, and even supporting [us] from one moment to another" that we might serve, thank, and praise him (Mosiah 2:21).

With so many scriptural reminders of God's moment-to-moment sustenance and mercy, why do modern believers find it difficult to embrace the scriptural premise that God is intimately involved in the operation of nature, and that stars, seas, mountains, and the like are quick to respond to his directives and no less quick to praise him? The problem, it seems to me, is not that we do not read the relevant passages of scripture, but that they do not register as literal truth. For anyone steeped in the metaphysics of Newton's claim that objects move under the "force of inactivity" (that changes in motion, owing to an inner blankness, cannot be self-initiated), the idea of a star praising God can only be poetic sentiment—that is, a pleasant diversion from the hard work of learning the scientific truth about nature. But such scriptural declarations rang true for ancient Hebrews, Nephites, and early Christians because they accorded to nature the capacity to act on its own behalf while responding to its Creator: to sing, to praise, and to move in ways that reverence and glorify God. What is more, because nature was felt to be exquisitely responsive to God's will, believers could discern his will in the jostlings and vicissitudes of everyday life. Note the beneficent (that is, human-correcting, human-blessing) action of God amid nature's depths and elevations in the following biblical passage:

> They that go down to the sea in ships, that do business in great waters;
> These see the works of the Lord, and his wonders in the deep.
> For he commandeth, and raiseth the stormy wind, which lifteth up the waves thereof.

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because it was created by the gods, and that the existence of the world itself 'means' something, 'wants to say' something, that the world is neither mute nor opaque, that it is not an inert thing without purpose or significance. For religious man, the cosmos 'lives' and 'speaks.'" Mircea Eliade, *The Sacred and the Profane: The Nature of Religion,* trans. Willard R. Trask (San Diego: Harvest/HBJ, 1987), 165, italics in original.

57. One of the most compelling is Romans 8:19–21 (New International Version): "The creation waits in eager expectation for the sons of god to be revealed. For the creation was subjected to frustration, not by its own choice, but by the will of the one who subjected it, in hope that the creation itself will be liberated from its bondage to decay and brought into the glorious freedom of the children of God." Paul seems to suggest that nature is mindful in some way of the drama of salvation being played out on its stage. See also Moses 7:48–49.

> They mount up to the heaven, they go down again to the depths; their soul is melted because of trouble.
>
> They reel to and fro, and stagger like a drunken man, and are at their wits' end.
>
> Then they cry unto the Lord in their trouble, and he bringeth them out of their distresses.
>
> He maketh the storm a calm, so that the waves thereof are still.
>
> Then are they glad because they be quiet; so he bringeth them unto their desired haven. (Ps. 107:23–30)

Moderns are not inclined to ascribe the "stormy wind" to God, supposing instead that it is blindly brought into existence by the laws of physics. But they might, in a moment of extremity, ask God to calm the storm by finessing or overriding the laws of physics. For us God works at the far side of nature; we tend to see him not in the immediate and ordinary circumstance of the world, but at the moment of his extraordinary intervention. For the ancients, however, nature had no autonomy apart from God's purpose, and so the everyday operation of nature—the change or motion inherent in the weather, seasons, and so on—manifested that purpose. Not surprisingly, this ancient religious attitude toward motion carries over into modern revelation: "The earth rolls upon her wings, and the sun giveth his light by day, and the moon giveth her light by night, and the stars also give their light, as they roll upon their wings in their glory, in the midst of the power of God. . . . Behold, all these are kingdoms, and any man who hath seen any or the least of these hath seen God moving in his majesty and power" (D&C 88:45–47).

Passages such as this are easy to gloss over, for, as noted, they strike us as softly focused religious sentiment rather than hard-edged fact. Attuned as we are to the flat, matter-of-fact language of science and confident that the motion of astronomical bodies is merely the self-sustaining movement of lifeless objects, we discount scripture's clear witness of divine action in the moving heavens. We also discount the everyday witness of terrestrial nature, a witness that for Mormon is bound up with the obedient, God-centered motion of the earth and its constituent parts. So oriented, we tend to read Helaman 12:15 with a scientific correction in mind, not realizing that Mormon's concern is the correction of human disobedience.[58]

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58. Affirming Claus Westermann's claim that "the [biblical] stories of origins are concerned with the subsistence of the world and of mankind, not with the intellectual question of the origin," Bernhard Anderson ventures that it "may be time for biblical theologians, like Job, to 'repent in dust and ashes' in the face of the cosmological mysteries of creation." Anderson is suggesting that our intellectual

What is more, we may fail to realize that Mormon offers us a worldview vastly more promising and expansive than Newton's mechanistic cosmos. Although motion is conserved in Newton's system, it is not conserved indefinitely: entropy, the irreversible tendency of closed systems toward disorder (what Paul calls creation's "bondage to decay"[59]), has the final word, and so, to follow Bertrand Russell, "the whole temple of Man's achievement must inevitably be buried beneath the debris of a universe in ruins."[60] Believers may counter this dark prospect by relying on the Atonement of Jesus Christ.[61] This is Mormon's stance, but for him the saving power of the Atonement is already on offer: it is fully manifest in the everyday operation of nature, or, to use scriptural language, the glory of creation. Like Lehi, he understands that without a merciful, atoning God, "we are not, neither the earth; for there could have been no creation of things" (2 Ne. 2:13). That is, we would not exist to exercise agency and to take up such questions as why things move. For Mormon, God has already rescued humankind from oblivion, and the created universe is the living revelation of that rescue. "The heavens declare the glory of God," wrote the Psalmist, "and the firmament sheweth his handywork" (Ps. 19:1).

It is interesting that when Copernicus, Kepler, and Galileo advanced the heliocentric worldview, each argued that the sun, owing to its God-like radiance, deserves to occupy the center of the cosmos.[62] Thus each man was alive, at some level, to the older sensibility of a God-centered, God-quickened universe. Mormon clearly shares that sensibility, but given the steep attrition of modernity, the full scope of his prophetic pleading is not easy for us to recover. Newtonian physics offers a very different sensibility or thought world, one that has gotten tremendous scientific and technological leverage on physical reality by characterizing the universe as a mechanistic system. Certainly this has not been a bad development—modern science

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deliberations on scripture sometimes miss the mark. Anderson, *From Creation to New Creation,* 101.

59. Romans 8:21, New International Version.

60. Bertrand Russell, "A Free Man's Worship," *Mysticism and Logic* (Garden City, N.Y.: Doubleday, 1918), 45.

61. See Hugh Nibley, "The Meaning of the Atonement," in *Approaching Zion,* ed. Don E. Norton, Collected Works of Hugh Nibley, vol. 9 (Salt Lake City: Deseret Book, 1989), 603.

62. For Copernicus, see Nicolaus Copernicus, *On the Revolution of the Heavenly Spheres,* ed. Stephen Hawking (Philadelphia: Running Press, 2002), 25–26. For Kepler, see E. A. Burtt, *Metaphysical Foundations of Modern Physical Science,* 58–60. For Galileo, see "Letter to the Grand Duchess Christina," in Drake, *Discoveries and Opinions of Galileo*, 212–13.

and technology have blessed our lives in many ways. But Newtonian physics need not be taken as absolutely authoritative in its explanation of why things move. Mormon's explanation, like Newton's, is rich, distinctive, and highly compelling.

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