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**THE MYTH OF
THE SOLID
HEAVENLY
DOME: ANOTHER
LOOK AT THE
HEBREW רָקִיעַ
(RĀQĪA‘)**

INTRODUCTION

Anyone who wishes to study ancient Hebrew cosmology will quickly discover that the common understanding among most modern biblical scholars is that the Hebrews had a prescientific, even naive, view of the universe.¹ This understanding is built around the idea that the Hebrew word *rāqîa‘*, which appears in Genesis 1 and is usually translated “firmament” in English Bibles, was actually understood by the ancient Hebrews to be a solid, hemispherical dome or vault that rested upon mountains or pillars that stood along the outermost perimeter of a circular, flat disk—the earth. Above this solid dome was a celestial ocean (“waters above the firmament”). Attached to the dome and visible to observers below were the stars, sun, and moon. The dome also possessed windows or gates through which celestial waters (“waters above the firmament”) could, upon occasion, pass. On the surface of the flat earth were terrestrial oceans (“waters below the firmament”) and dry land; below the earth were subterranean waters (“fountains of the

1. This chapter was originally published in a slightly different form in *AUSS* 49, no. 1 (2011): 125–147. Reprinted by permission of the author and the publisher.

deep”) and the netherworld of the dead (šē’ōl).² This understanding of Hebrew cosmology is so common that pictures of it are frequently found in Bible dictionaries and commentaries.³

In support of this reconstruction of Hebrew cosmology, supporters bring two lines of argument to bear. The first is textual and linguistic: the context and meaning of certain words such as *rāqîa’*^c support this reconstruction.⁴ Second, this view was common to other peoples of the ancient Near East, especially in Mesopotamia, which was considered the probable source of Hebrew cosmology. This understanding continued to be accepted throughout the early history of the Christian church and the Middle Ages.⁵ It was not, reconstructionists argue, until the rise of modern science that it was finally recognized that the biblical view of cosmology was naive and untenable.⁶

In this chapter, we will examine these two arguments, looking first at the history of the cosmological views of the ancient world, the early church, and the Middle Ages. We will then look at how

2. As will be shown in this chapter, this understanding can be traced back at least to the eighteenth century. One of the earliest is Voltaire, who, in *The Philosophical Dictionary* under the entry “The Heavens” (new and correct ed. with notes; London: Wynne and Scholey and Wallis, 1802), 185–91, suggests that the ancients believed in a dome or vaulted sky that rested upon a flat earth (*ibid.*, 189, 90). He seems to have derived this understanding from his reading of Chrysostom (fourteenth homily), Lactantius (*Divinae institutiones*, b. iii), and Antoine Augustin. Calmet, “Heaven” in *Calmet’s Dictionary of the Holy Bible: With the Biblical Fragments*, ed. Charles Taylor, vol. 1, 5th rev. and enlarged ed. (London: Holdsworth & Ball, 1830), 618. However, as Russell notes, Lactantius’s views were never accepted by his contemporaries or subsequent church scholars. Cf. Jeffrey Burton Russell, *Inventing the Flat Earth: Columbus and the Historians* (Westport, Conn.: Praeger, 1991), 32, 33, 62. Calmet attempts to describe the worldview of the Jews as positing a flat earth capped by a tentlike heavenly vault, a view not shared by many of his contemporaries. See below for further discussion. Other scholars who were early promoters of this understanding include John Pye-Smith, *On the Relation between the Holy Scriptures and Some Parts of Geological Science* (London: Jackson and Walford, 1839), 271–73; Charles Wycliffe Goodwin, “Mosaic Cosmogony,” in *Essays and Reviews*, ed. Frederick Temple et al. (London: Longman, Green, Longman and Roberts, 1860), 219, 20; John William Colenso, *The Pentateuch and Book of Joshua: Critically Examined*, vol. 4 (London: Longman, Green, Longman, Roberts, and Green, 1863), 98; and Andrew Dickson White, *A History of the Warfare of Science with Theology in Christendom*, vol. 1 (New York: Appleton, 1896), 89–91.

3. See, for example, Giovanni Schiaparelli, *Astronomy in the Old Testament* (Oxford: Clarendon, 1905), 38; Samuel R. Driver, *The Book of Genesis, with Introduction and Notes* (London: Methuen, 1904); Hermann Gunkel, *Genesis*, trans. Mark E. Biddle (Macon, Ga.: Mercer University Press, 1997); John Skinner, *A Critical and Exegetical Commentary on Genesis* (London: T. & T. Clark, 1910); Gerhard von Rad, *Genesis: With a Commentary*, trans. John Henry Marks (London: SCM, 1956), 51; Nahum M. Sarna, *Understanding Genesis* (New York: Schocken, 1968), 5; and Claus Westermann, *Genesis 1–11: A Continental Commentary* (Minneapolis, Minn.: Fortress, 1994), 117.

4. See Goodwin, “Mosaic Cosmogony”; also Paul Seeley, “The Firmament and the Water Above,” *WTJ* 53 (1991): 227–40.

5. For example, Gunkel, *Genesis*, 108.

6. Colenso nicely illustrates how nineteenth-century critics argued about how the modern findings of science impacted the traditional biblical interpretation of the cosmos.

nineteenth- and twentieth-century scholars viewed the cosmologies of these earlier periods. We will conclude with a look at the Hebrew words and passages used by these scholars to reconstruct the so-called Hebrew cosmology.

HISTORY OF INTERPRETATION

The following section seeks to provide a succinct history of interpretation concerning the location and shape of the heavens.

BABYLONIAN VIEWS OF THE HEAVENS

During the latter part of the nineteenth century, critical scholars commonly suggested that the ancient Hebrews borrowed many of their ideas, including the notion that heaven was a solid hemisphere, from the Babylonians, probably while the former people were exiled there. The idea that the Hebrews borrowed from the Babylonians was especially common during the pan-Babylonian craze that gripped biblical scholarship for a brief period during the early twentieth century.⁷ Closer comparative analysis between Babylonian and Hebrew thought has, however, found so many significant differences between the two that the idea of direct borrowing has been virtually abandoned by subsequent scholarship.⁸

Still, there have been some who continue to suggest that the ancient Hebrews borrowed cosmological concepts, including the idea of a solid-domed heaven, from the Mesopotamians.⁹ However, even this idea had to be scuttled when more recent work by Wilfred G. Lambert could find no evidence that the Mesopotamians believed in a hard-domed heaven; rather, he traces this idea to Peter Jensen's mistranslation of the term for "heavens" in his translation of the *Enuma Elish*.¹⁰ Lambert's student, Wayne Horowitz, attempted to

7. See, for example, George A. Barton, "Tiamat," *JAOS* 15 (1893): 1–27; Hermann Gunkel, *Creation and Chaos in the Primeval Era and the Eschaton*, trans. K. William Whitney Jr. and foreword Peter Machinist (Grand Rapids, Mich.: Eerdmans, 2006); id., *Genesis*, 1.

8. See Wilfried G. Lambert, "A New Look at the Babylonian Background of Genesis," in *I Studied Inscriptions from before the Flood*, ed. Richard S. Hess and David Toshio Tsumura (Winona Lake, Ind.: Eisenbrauns, 1994), 96–113; Westermann, *Genesis 1–11*, 89.

9. See John William Colenso, *The Pentateuch and Book of Joshua Critically Examined* (London: Longman, Green, Longman, Roberts, and Green), 1863 (pt. 4, 3). For an example of the enduring influence of Gunkel's ideas upon later Bible scholars, see Harry Emerson Fosdick, *The Modern Use of the Bible* (New York: MacMillan, 1958), 46, 47.

10. Wilfred G. Lambert, "The Cosmology of Sumer and Babylon," in *Ancient Cosmologies*, ed. C. Blacker and M. Loewe (London: Allen & Unwin, 1975), 42–65.

piece together a Mesopotamian cosmology from a number of ancient documents, but it is quite different from anything found in the Hebrew Bible. Horowitz's study suggests that the Mesopotamians believed in six flat heavens, suspended one above the other by cables.¹¹ When it came to interpreting the stars and the heavens, the Mesopotamians were more interested in astrology (i.e., what the gods were doing and what it meant for humanity) than they were in cosmology.¹² There is no evidence that the Mesopotamians ever believed in a solid heavenly vault.

GREEK VIEWS OF THE HEAVENS

There is good evidence that as early as the sixth century BC, the ancient Greeks suggested that the heavens might consist of a series of "hard spheres."¹³ However, this idea should not be confused with

11. Wayne Horowitz, *Mesopotamian Cosmic Geography* (MC 8; Winona Lake, Ind.: Eisenbrauns, 1998). Horowitz, a student of Lambert, actually found that the Mesopotamians believed the heavens consisted of a series of flat planes that were suspended above each other by a number of strong cables. Yet, this cosmology is not systematically set out and had to be pieced together from a number of sources. In reality, the various descriptions of the cosmos were created in isolation from each other, with no thought of how they might fit together. Indeed, the cosmological description merely provided the stage upon which the gods conducted their activities. The physical setting provided a conceptual vehicle to explain or accommodate certain theological understandings about how the gods related to each other and to humanity. That some of the religious concepts might appear contradictory or mutually exclusive was not of any serious concern to the ancient priests who created them, since they were never intended to be integrated into a single whole. No ancient Mesopotamian ever set out to tie all the fragments together into a single cohesive cosmology—it was not necessary and would have made no sense.

12. *Ibid.*

13. David C. Lindberg, *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, Prehistory to AD 1450*, 2nd ed. (Chicago: University of Chicago Press, 2007); see chapter 2, "The Greeks and the Cosmos." The Greeks envisioned the sky as a "crystal sphere" to which the stars were "nailed." Milton C. Nahm, ed., *Selections from Early Greek Philosophy*, 3rd ed. (New York: Appleton-Century-Crofts, 1947), 67. Robert C. Newman, *The Biblical Firmament: Vault or Vapor?* (Hatfield, Pa.: Interdisciplinary Biblical Research Institute, 2000), 1. This book sees the "crystal sphere" as a reference to a dome, but "sphere" suggests that Anaximenes understood the sky as an orb or globe that completely surrounded the earth—not a dome on a flat earth. For a review of Anaximenes's views, see Daniel W. Graham, "Anaximenes," in *The Internet Encyclopedia of Philosophy* (n.p., October 29, 2009), <http://www.iep.utm.edu/anaximen>. For a convenient, brief summary with citations on the understandings of major Greek philosophers, see Russell, *Inventing the Flat Earth*, 24. Other ancient Greeks not included in this summary include Empedocles of Acragas (495–435 BC), who proposes an outer, hard, universal sphere, upon which the stars are fixed, and an inner sphere of double hemispheres—one of lighter fire for day, one of darker fire for night. For Empedocles's views, see John Burnet, *Early Greek Philosophy* (Whitefish, Mo.: Kessinger, 2003). Eudoxus of Cnidus (410 or 408 BC–355 or 347 BC) was yet another Greek astronomer who suggested models of planetary motion via spheres. In his celestial model, the stars and planets are carried around their orbits by virtue of being embedded in rotating spheres made of an ethereal, transparent fifth element (quintessence), like jewels set in orbs. For Eudoxus's

the solid-vault or solid-dome theory that was suggested by later biblical critics. The critics have envisioned only a hard, hollow hemisphere, resembling half a sphere in the shape of an upside-down bowl. In reality, however, the Greeks argued for a spherical (not flat) earth that was suspended inside a complete, hollow heavenly sphere, which, in turn, was also suspended inside additional outer spheres—a geocentric model. They believed that these spheres were necessary to explain the movements of the sun, moon, stars, and planets. It was thought that these celestial bodies were attached to, or embedded in, these large, transparent, and hard spheres, which carried the celestial bodies along as they rotated in space. A number of different spheres were needed to explain the separate movements of the celestial bodies. Generally, it was believed that there might be at least eight such spheres nested inside each other. The Greeks based the rotations of the spheres (and hence the celestial bodies) upon their own observations and on the written records of the ancient Babylonians. Aristotle (384–322 BC) and Ptolemy (AD 90–168)¹⁴ provide the classic formulations of the Greek celestial-sphere model that influenced all scholars of the early Christian church and the Middle Ages.

JEWISH VIEWS OF THE HEAVENS¹⁵

It was during the Hellenistic period that the Hebrew Bible was translated into Greek. When the translators came to the Hebrew word *rāqîaʿ*, they chose to translate it with the word *στερέωμα* (*stereōma*, “something established or steadfast”). This is not surprising in that the Hebrew text equates *rāqîaʿ* with *šamayim*, or “heavens.” The

views, see James Evans, *The History and Practice of Ancient Astronomy* (New York: Oxford University Press, 1998).

14. Ptolemy played a key role in Greek thought about the cosmos. According to him, “Now, that also the *earth* taken as a whole is sensibly *spherical*, we could most likely think out in this way. For again, it is possible to see that the sun and moon and the other stars do not rise and set at the same time for every observer on the earth, but always earlier for those living towards the orient and later for those living towards the occident And since the differences in the hours is found to be proportional to the distances between the places, one would reasonably suppose the *surface of the earth spherical* Again, whenever we sail towards mountains or any high places from whatever angle and in whatever direction, we see their bulk little by little increasing as if they were arising from the sea, whereas before they seemed submerged because of the *curvature of the water’s surface*.” Ptolemy, *The Almagest*, trans. Robert Catesby Taliaferro (Chicago: Encyclopædia Britannica, 1948), I.4.

15. “Jewish” in this context refers to the Hellenistic-period descendants of the biblical Hebrews, Israelites, and Judahites.

common belief about the heavens at that time (as with Greek views) was that they were solid.

The idea of hard spheres would be picked up by Hellenized Jews as early as the fourth century BC. The pseudepigraphical work, 1 Enoch, discusses a hard firmament with openings through which the sun, moon, and planets move in and out.¹⁶ This work also describes coming to the ends of the earth as far as the heavens; however, there is some dispute about whether 1 Enoch is saying a person can touch the heavens at the ends of the earth or whether there is still a chasm that separates the earth from the heavens. The latter seems more likely. The former would support a domed earth, while the latter is in harmony with the Greek idea of the earth being suspended within a sphere.

Another Jewish pseudepigraphical work, 3 Baruch, recounts the story of men building the Tower of Babel to reach the heavens in order to see what it is made of (3 Bar. 3:7, 8). While some have suggested that this passage supports a dome theory, it can also be understood simply as supporting the idea of a hard heaven, which is not incompatible with the Greek celestial-sphere model. Given the prevailing Greek thought, the latter is more likely.

EARLY CHRISTIANITY AND THE HEAVENS

Early Christians were following the discussions of the Greek philosophers with interest and speculated on how biblical teaching compared to the Greek understanding of the cosmos. They accepted the ideas that the earth was a spherical globe and that the biblical firmament was one of the celestial spheres. But they could not identify which sphere was the biblical firmament, so they tended to add a few spheres to reconcile the Bible with Greek thinking.

Basil of Caesarea (AD 330–379) and Augustine (AD 354–430) are among the early church fathers who attempted to harmonize biblical teachings of the cosmos with Greek notions of the celestial spheres.¹⁷ This can also be seen in Jerome’s translation of the Bible

16. Kelley Coblenz Bautch, *A Study of the Geography of 1 Enoch 17–19: “No One Has Seen What I Have Seen”* (JSJSup 81; Leiden: Brill, 2003).

17. Edward Grant, *The Foundations of Modern Science in the Middle Ages: Their Religious, Institutional and Intellectual Contexts* (Cambridge: Cambridge University Press, 1996), 2–7, 335, 36. This book discusses how early Christian scholars, such as Basil and Augustine, subscribed to the idea that Greek philosophy and science could serve as “handmaidens to theology” and how they dealt with the question of the spheres and their composition. Greek concepts of the celestial spheres are evident in Basil’s discussion of the

into Latin (AD 405). Jerome used the Greek Old Testament (Septuagint) as one of his sources and was undoubtedly familiar with Greek discussions about the celestial spheres.¹⁸ Thus, when he came to the book of Genesis and saw that the Greek word used for the Hebrew *rāqîa'* was *stereōma*, he selected the Latin *firmamentum* to convey the Greek sense of the word. It is from the Latin *firmamentum* that the word *firmament*, used to describe the heavens, came into common usage in English.

It is important to note that the Latin *firmamentum* conveys the Greek concept of hard celestial spheres that was popular at the time; it should *not* be used to support the dome or vault theory. The dome theory, along with the idea of a flat earth, has been almost universally rejected by Christian scholars, both in the early Christian period and throughout the Middle Ages.¹⁹ It should also be noted that while Jerome's translation may be seen as support for the notion of hard celestial spheres, not all Christians accepted this position. Basil, for example, was inclined to believe in a fluid firmament, not a hard sphere. In the *Hexaemeron*, he wrote, "Not a firm and solid nature, which has weight and resistance, it is not this that the word 'firmament' means."²⁰

Augustine, on the other hand, was not certain of the nature of the other Greek spheres nor of their composition. In some of his statements, he seemed to argue that the firmament of Genesis must be a hard sphere, since it held back the waters above. Yet elsewhere in

firmament in *Hexaemeron*, his commentary on the six days of creation. See *Saint Basil: Exegetic Homilies*, trans. Agnes Clare Way (Washington, D.C.: Catholic University Press, 1963), 42. In his homily on Genesis, Augustine had a chapter titled "The Material Shape of Heaven," in which he dealt with the apparent contradiction between Psalm 103:2, which describes heaven as a stretched-out skin, and Isaiah 40:22, which seems to describe a vault. Augustine, who was well aware of Greek concepts of celestial spheres, wrote: "Our picture of heaven as a vault, even when taken in a literal sense, does not contradict the theory that heaven is a sphere" (*Genesis*, bk. 2, chap. 9, 1: 59–60; for the English translation, see St. Augustine, *The Literal Meaning of Genesis*, trans. John Hammond Taylor [New York: Paulist, 1982], 1:60). Edward Grant, *Planets, Stars and Orbs: The Medieval Cosmos, 1200–1687* (Cambridge: University of Cambridge Press, 1996), 115n38, believes that Augustine was arguing for sphericity.

18. Jerome's earliest translations of the Hebrew Bible were based upon Origen's revisions of the Septuagint; however, around AD 393, he focused on manuscripts written in the original Hebrew. For further discussion, see J. N. D. Kelly, *Jerome: His Life, Writings, and Controversies* (Peabody, Mass.: Hendrickson, 1998).

19. For further discussion of this point, see Basil, *Hexaemeron*, Homily 3, Nicene and Post-Nicene Fathers, Second Series, vol. 8, trans. Blomfield Jackson, ed. Philip Schaff and Henry Wace (Buffalo, NY: Christian Literature Publishing Co., 1895).

20. *Ibid.* For further discussion on this point, see Grant, *Planets, Stars and Orbs*, 335, 36.

the same essay, he spoke of air and fire as the material essence of the heavens, thereby suggesting soft and fluid heavens.²¹

This unwillingness to commit to a hard-sphere theory is reflected in the common tendency by most Christian scholastics to translate the Hebrew *rāqîaʿ* as *expansium* (“expansion” or “extension”) rather than *fîrmamentum*—the former expressions all convey the meaning of expanse and do not commit one to an understanding of something hard. As Edward Grant notes, “most Christian authors and Latin Encyclopedists during late antiquity . . . thought of the heavens (i.e., celestial spheres) as fiery or elemental in nature, and therefore fluid.”²²

LATE MEDIEVAL CHRISTIANITY AND THE HEAVENS

The theory of celestial spheres continued to dominate Christian thinking about the cosmos throughout the Middle Ages.²³ The existence of numerous hollow spheres or orbs around the spherical earth was almost universally accepted.²⁴ However, the actual nature of the spheres was an ongoing topic of debate. Were they hard, fluid, or soft?²⁵ The debate was a theo-philosophical issue, determined by questions such as the following: Were the hard spheres corruptible? Would a perfect God make something corruptible? How, and in what way, were these spheres congruent with the observations of various astronomers?

During the thirteenth century, it seems more scholastics thought of the spheres as fluid.²⁶ However, in the fourteenth century, there was a

21. See discussion of the early Christian Fathers’ views on the cosmos, including Augustine’s, in Grant, *Planets, Stars and Orbs*, 335, 36.

22. *Ibid.*, 336. Grant provides a referenced list of Christian authors and scholars who held a “soft” view of the spheres during this period (see esp. *ibid.*, 336n40).

23. *Ibid.*, 113–22. Muslim scholars were not unaware of Greek and Christian thinking on the cosmos and made their own contributions to the discussions of celestial spheres (*ibid.*, 12–14).

24. *Ibid.* See also the discussion in Russell, *Inventing the Flat Earth*, 13–26. There were a few Christian theologians and philosophers who rejected the theory of celestial spheres, arguing instead for a flat earth and a flat or domed heaven, but these views represented the extreme minority and were considered idiosyncratic; as a result, these views were rejected by almost all scholars of the time.

25. See Grant, *Planets, Stars and Orbs*, 324–70. In this discussion, it is important to note, as Grant points out, that ancient and early medieval scholars did not necessarily equate the word *solid* (Latin, *soliditas*) with hard. *Solid* could also refer to a soft sphere. The equation of solid spheres with hard ones did not come until the seventeenth century (*ibid.*, 345–48). So the context and time of the writing must be carefully considered.

26. Compare *ibid.*, 336, 342. Through an extensive examination of a wide range of scholastic texts, Grant has demonstrated that scholastic philosophers generally considered the celestial spheres to be solid in the sense of three-dimensional or continuous, but most did

shift toward the majority viewing the celestial spheres as being hard.²⁷ It seems this view was widespread among scholars of the fifteenth and sixteenth centuries as well, although there were also many for whom the precise nature of the composition did not matter.²⁸

Therefore, as in early antiquity, Christian biblical and Latin scholars of the early Middle Ages—even into the thirteenth century—did not view the heavens as hard or fiery.²⁹ During the early part of this period, both prominent Jewish rabbis, such as Abraham ibn Ezra and David Kimchi, and Christian scholars of notoriety, including Thomas Aquinas and Durandus of Saint-Pourçain, preferred to translate *rāqîaʿ* as “expanse.”

RENAISSANCE VIEWS OF THE HEAVENS (SIXTEENTH TO SEVENTEENTH CENTURIES)

Three key developments occurred in the late sixteenth and early seventeenth centuries that had significant implications for how the cosmos was viewed. First, the observations by Tycho Brahe of a supernova in 1572 and the discovery of the Great Comet in 1577 seemed to defy the hard-sphere theory. Second, the championing of Copernicus’s heliocentric model by Galileo allowed for the possibility of intersecting planetary orbits. Interestingly, although Copernicus’s heliocentric model called for a different configuration of the celestial spheres, he still thought the spheres were hard, as did Galileo.³⁰ Nevertheless, the work of Brahe, Copernicus, and Galileo all contributed to the eventual rejection of the hard-sphere theory. Thus, by the late seventeenth and during the eighteenth centuries, the idea of hard spheres, which had been popular for three hundred years, was virtually abandoned. Emphasis was again on the notion of soft spheres.³¹

In terms of biblical hermeneutics, however, the Galileo affair led to a third unheralded yet significant development: an essay promoting accommodationism, written by the Benedictine scholar Antoine

not consider them solid in the sense of hard. The consensus was that the celestial spheres were made of some kind of continuous fluid.

27. *Ibid.*, 338, 342.

28. *Ibid.*

29. *Ibid.*, 336.

30. *Ibid.*, 346.

31. *Ibid.*, 345–61.

Augustin Calmet.³² Calmet had been asked by the church to write an introduction to Galileo's *Dialogue on the Two Chief World Systems* that would set a proper distance between the church's position and that of Galileo. Calmet was not supposed to endorse Galileo's position. However, he was apparently sympathetic to Galileo's claims and proposed an accommodationist interpretation of the creation account that suggested that the inspired writer, in deference to the lack of knowledge on the part of his audience (the ancient Jews), used language and ideas that would be more easily understood by them. Thus, the heavens were described as a tentlike heavenly vault—perhaps the earliest such claim in which a nonliteral accommodationist hermeneutic was applied! Calmet's ideas would be picked up and promoted by Voltaire. Although a direct connection cannot, at present, be established, Calmet's ideas of what the ancient Jews thought about the cosmos would be very similar to those promoted by nineteenth-century biblical criticism.³³

Meanwhile, the translation of *rāqîa'* as "expanse" was almost universal among biblical scholars during the sixteenth and seventeenth centuries. For example, this idea was reflected in the work of the Dominican Santes (or Xantes) Pagnino, one of the leading philologists and biblicists of his day, who was known for his literal adherence to the Hebrew text of Scripture. In his *Veteris et Novi Testamenti nova translatio* (Lyon, 1527), he consistently translated *rāqîa'* as *expansionem*.³⁴

EIGHTEENTH- AND NINETEENTH-CENTURY VIEWS OF THE HEAVENS

Biblical scholars of the eighteenth century, including Siegmund Jakob Baumgarten (1706–1757) and Romanus Teller (1749–70), continued to endorse *expansionem* as the best translation of *rāqîa'*. An important application of this understanding is found in *The Mosaic*

32. For a full discussion of Calmet's views and his introduction to Galileo's *Dialogue on the Two Chief World Systems*, see Maurice A. Finocchiaro, *Retrying Galileo* (Berkeley, Calif.: University of California Press, 2005).

33. For further discussion of this point, see below.

34. Most of these sixteenth- and seventeenth-century scholars are referenced in John Gill, *An Exposition of the Old Testament* (London: W. W. Woodward, 1818). They include Paul Fagius, Pietro Martire Vermigli, Sebastian Münster, Immanuel Tremellius, John Calvin, Franciscus Junius, Joannes Drusius, Benedictus Arias Montanus, Christoph Rothmann, Johannes Pena, Johannes Piscator, Walter Raleigh, Juan de Mariana, Johann Heinrich Hottinger, Thomas Burnet, and Sebastian Schmidt.

Theory of the Solar or Planetary System, in which Samuel Pye defined the firmament as an expanse or atmosphere of fluid. Significantly, he extended this notion to also include the other planets in the system.³⁵

There are many examples from the nineteenth century that maintained this interpretation of *rāqîa'*. The British Methodist theologian Adam Clarke, who produced *Clarke's Bible Commentary* in 1831, argued that earlier "translators, by following the *Firmamentum* of the Vulgate, which is a translation of the στερέωμα [*stereōma*] of the Septuagint, have deprived this passage of all sense and meaning."³⁶ Similarly, John Murray (1786?–1851), a Scottish scholar with a PhD in chemistry, retooled his expertise in ancient history and languages, including Hebrew, in *The Truth of Revelation, Demonstrated by an Appeal to Existing Monuments, Sculptures, Gems, Coins and Medals* (1831), to argue that the firmament was a "permanently elastic" substance, consisting of a mixture of gaseous matter and vapor that attracted water above it, which was in line with cosmologic views of the time.³⁷ Not only were his views in line with the current thinking of his time, but *The Truth of Revelation* became one of the early books in the emerging biblical archaeology genre.

NINETEENTH-CENTURY BIBLICAL CRITICISM AND THE ORIGIN OF THE FLAT-EARTH-AND-SOLID-DOME THEORY

As we move the discussion into the developments of the nineteenth century, it is important to note two interesting and significant works on the history of science. Historians Jeffery Burton Russell and Christine Garwood respectively debunked the long-held view among modern scholars that ancient philosophers and scientists of the early Christian church, late antiquity, and the Middle Ages believed the earth was flat.³⁸ After an extensive review of the letters,

35. Samuel Pye, *The Mosaic Theory of the Solar or Planetary System* (London: W. Sandby, 1766), 22.

36. See Adam Clarke, *The Holy Bible: With a Commentary and Critical Notes* (New York: Ezra Sargeant, 1811), c.

37. John Murray, *The Truth of Revelation, Demonstrated by an Appeal to Existing Monuments, Sculptures, Gems, Coins and Medals* (London: Longman, Rees, Orme, Brown, and Green, 1831), 16.

38. Russell, *Inventing the Flat Earth*; Christine Garwood, *Flat Earth: History of an Infamous Idea* (New York: Thomas Dunn, 2007). In a lecture at Westmont College for the American Scientific Affiliation in 1997, in which he addressed the themes of his book, Jeffery Burton Russell argued that "the reason for promoting both the specific lie about the sphericity of the earth and the general lie that religion and science are in natural and eternal conflict in Western society is to defend Darwinism. The answer is really only

papers, and books of the major thinkers who wrote during these periods, Russell and Garwood made the surprising discovery that, apart from a few isolated individuals, *no one believed in a flat earth*—indeed, the common consensus throughout this entire period among virtually *all scholars and churchmen was that the earth was spherical*. Where, then, did the flat-earth understanding of early Christian and medieval thought originate? They were able to trace its origin to the early nineteenth century when antireligious sentiment was high among many scholars and intellectuals.³⁹

This is not to say that before this there were not skeptics who believed in a flat earth and domed heaven theory. In fact, this view starts to emerge in the seventeenth and eighteenth centuries. We have already made reference to the significant essays of Calmet. Voltaire also promoted this idea in his article “Ciel Matériel” (heaven) in the *Dictionnaire philosophique* (ca. 1764), in which he wrote the following about the ancient Hebrews’ views of the cosmos:

These childish and savage populations imagined the earth to be flat, supported, I know not how, by its own weight in the air; the sun, moon, and stars to move continually upon a solid vaulted roof called a firmament; and this roof to sustain waters, and have flood-gates at regular distances, through which these waters issued to moisten and fertilize the earth.⁴⁰

However, this was not a widespread view and did not gain a consensus among critical biblical scholars until the nineteenth century.⁴¹

slightly more complicated than that bald statement. The flat-earth lie was ammunition against the creationists. The argument was simple and powerful, if not elegant: ‘Look how stupid these Christians are. They are always getting in the way of science and progress. These people who deny evolution today are exactly the same sort of people as those idiots who for at least a thousand years denied that the earth was round. How stupid can you get?’ Jeffrey Burton Russell, “Veritas Lecture,” 1997, <http://www.veritas-uicsb.org/library/russell/FlatEarth.html>.

39. Russell, “Veritas Lecture.”

40. See Voltaire, *The Works of Voltaire*, ed. Tobias George Smollett et al., vol. 10 (New York: DuMont, 1901), 11, 12. It can be seen from his own work that Voltaire’s understanding of ancient views (flat earthers) was influenced by his reading of Lactantius’s *Divinae institutiones* and by the French Benedictine scholar Antoine August Calmet’s “Sur le Système du Monde des anciens Hébreux” in his *Dissertations qui peuvent servir de prolégomènes de l’Ecriture Sainte*, vol. 1 (Paris: Pere Emery, 1720), 438ff. As noted above, Lactantius’s views were almost universally rejected. Calmet’s views are more interesting—he seems to have wanted to show that the ancient Hebrew view was naive so that Galileo could be justified in appearing to reject Scripture’s literal reading concerning the cosmos.

41. Gill provides a long list of biblical linguists who translated *rāqīa’* as “expanse.” He also endorsed this interpretation. See his comments on Genesis 1:6.

According to Russell and Garwood,⁴² two of the key individuals who helped introduce and popularize the flat-earth myth in nineteenth-century scholarship were the American author Washington Irving (1783–1859) and the Egyptologist Antoine-Jean Letronne (1787–1848). Irving, in *The Life and Voyages of Christopher Columbus* (1828), “invented the indelible picture of the young Columbus, a ‘simple mariner,’ appearing before a dark crowd of benighted inquisitors and hooded theologians at a council of Salamanca, all of whom believed that the earth was flat like a plate.”⁴³ Letronne, who was known for his “strong antireligious prejudices,” “cleverly drew upon both [his studies in geography and patristics] to misrepresent the church fathers and their medieval successors as believing in a flat earth in his ‘Des opinions cosmographiques des pères de l’église’ [‘on the cosmographical ideas of the church fathers,’ 1834].”⁴⁴

In particular, Russell’s debunking of the flat-earth myth is significant for understanding the widely held view among biblical scholars that ancient peoples believed that the sky or heaven above them was a metal vault. This attribution to the ancients of the solid-sky or solid-dome concept appears in Western literature at about the same time as the flat-earth myth. The idea of a flat earth becomes an integral component in the reconstruction of the metal-sky or metal-dome cosmology, in which the hemispherical dome necessarily rests or is anchored on a flat earth.⁴⁵ Thus, it appears that the biblical critics of the 1850s built their ideas about ancient Hebrew cosmology upon the incorrect flat-earth concept of twenty years earlier. Further, they seem to have confused ancient and medieval discussions of hard celestial spheres with the hemispherical solid-dome or solid-vault and flat-earth myths, which were two quite unrelated concepts.

The flat-earth myth was widely endorsed by critical biblical scholars during the middle of the nineteenth century. At this time, a number of publications emerged that proposed the Bible contained naive views of the cosmos, including the idea that the firmament

42. Russell, *Inventing the Flat Earth*, 43, 49–57; Garwood, *Flat Earth*, 6–8.

43. Russell, “Veritas Lecture,” n.p.; see Washington Irving, *The Life and Voyages of Christopher Columbus*, ed. John Harmon McElroy (Boston: Twayne, 1981), 50.

44. Antoine-Jean Letronne, “Des opinions cosmographiques des pères de l’église,” in *Revue des deux mondes* (March 15, 1834): 601–33.

45. This can be seen clearly in all pictorial representations of the Hebrew cosmology, beginning with that of the Italian astronomer Schiaparelli. See Schiaparelli, *Astronomy in the Old Testament*, 38.

was a hard dome. One of the earliest suggestions of this nature was by John Pye-Smith (1839).

Examining the whole subject, by connecting it with some passages which have been quoted, and some yet to be mentioned, we acquire an idea of the meteorology of the Hebrews. They supposed that, at a moderate distance above the flight of birds, was *a solid concave hemisphere, a kind of dome*, transparent, in which the stars were fixed, as lamps; and *containing openings*, to be used or closed as was necessary. It was understood as supporting a kind of celestial ocean, called “the waters above the firmament,” and “the waters above the heavens.”⁴⁶

Other biblical scholars soon picked up on this flat-earth-and-domed-heaven cosmology. Among the better known scholars was Tayler Lewis, a professor of Greek, an instructor in the “Oriental tongue,” and a lecturer on biblical and Oriental literature at Union College, whose ideas were made popular in his book *The Six Days of Creation* (1855).⁴⁷ Likewise, Charles Wycliffe Goodwin, an Egyptologist, argued in a chapter titled “Mosaic Cosmogony” in the 1860 edition of *Essays and Reviews* that the Bible writer believed in a hard-dome heaven. Concerning *rāqîaʿ*, he wrote, “It has been pretended that the word *rakia* may be translated expanse, so as merely to mean ‘empty space.’ The context sufficiently rebuts this.”⁴⁸ Andrews Norton, an American Unitarian preacher and theologian who taught at Bowdoin and Harvard, pointed out the naivety of the Bible in his book, *The Pentateuch: and Its Relation to the Jewish and Christian Dispensations*, declaring that “the blue vault of heaven is a solid firmament, separating the waters which are above it from the waters on the earth, and that in this firmament the heavenly bodies are placed.”⁴⁹ Also influential was John William Colenso, an Anglican bishop to Natal, who commented:

If it would be wrong for a Christian Missionary of our day, to enforce the dogmas of the Church in former ages, which we now know to be absurd, and to mislead a class of native catechists, by teaching them that the Earth is flat, and the sky a solid firmament, above which the

46. Pye-Smith, *On the Relation between the Holy Scriptures*, 222, emphasis added.

47. Tayler Lewis, *The Six Days of Creation, or the Scriptural Cosmology, with the Ancient Idea of Time-Worlds in Distinction from Worlds in Space* (Schenectady, N.Y.: G. Y. Van Debogert, 1855).

48. Goodwin, “Mosaic Cosmogony,” 220n2.

49. Andrews Norton, *The Pentateuch and Its Relation to the Jewish and Christian Dispensations* (London: Longman, Green, Longman, Roberts, and Green, 1863), 3.

stores of rain are treasured,—when God has taught us otherwise,—it must be equally wrong and sinful, to teach them that the Scripture stories of the Creation, the Fall, and the Deluge, are infallible records of historical fact, *if* God, by the discoveries of Science in our day, has taught us to know that these narratives—whatever they may be—are certainly not to be regarded as *history*.⁵⁰

By this time, the flat-earth-and-domed-heaven cosmology was accepted by both biblical geologists and mainstream historical-critical biblical scholars, in spite of vocal resistance by more conservative and evangelical scholars.

VAPOR-CANOPY THEORY

Around this time, the conservative defense was undermined somewhat by a new theory that returned to the concept of hard spheres—an idea that generally had been abandoned by scientists (Christian or not) during the seventeenth century. The renewed proposal was called the vapor-canopy theory. Specifically, in 1874, Isaac Newton Vail (1840–1912), drawing on the expression “waters above the firmament” mentioned in Genesis 1:7, proposed that the waters for the Flood came from a canopy of water vapor (or liquid water or ice) surrounding the primeval earth.⁵¹ Unfortunately, this theory combined the abandoned hard-sphere theory with the vaulted-heaven interpretation to create a possible model for solving issues for conservative creationist views. This idea still has its defenders today, although its exegetical foundation is rejected by most evangelical scholars and its science is rejected by both evangelical and secular scientists.⁵² Nevertheless, liberal scholars have been delighted to receive support from the more fundamentalist vapor-canopy theorists for their assertion of the ancient Hebrews’ naive views of the cosmos.

PAN-BABYLONIANISM AND THE SOLID DOME

The return to the development of the flat-earth-and-domed-heaven theory among mainstream historical-critical scholars received further energy during the pan-Babylonian craze of the late nineteenth to early twentieth centuries, when it was suggested that the Hebrews

50. Colenso, *Pentateuch and Book of Joshua* (1873), 288n2.

51. Isaac N. Vail, “*The Waters above the Firmament*”: *The Earth’s Aqueous Ring; or, The Deluge and Its Cause* (West Chester, PA: F. S. Hickman Publishers), 1874.

52. See Newman, *Biblical Firmament*.

borrowed the hard-dome concept from Mesopotamia during the Hebrew exile. As noted earlier, Jensen's 1890 translation of the *Enuma Elish* played a major role in contributing to misunderstandings about ancient cosmological views.⁵³ His translation used the noun *vault* to describe the Babylonian concept of the heavens (line 145 of tablet IV), resulting in the notion of the *Himmelswölbung*, or "heavenly vault." This error was caught by Lambert in his 1975 study,⁵⁴ but Jensen's work had already been influential for some eighty years.

During this time, a number of pictorial representations of Hebrew cosmologies were constructed. The first was published by Giovanni Virginio Schiaparelli in his *Astronomy of the Old Testament* (1903–1905).⁵⁵ These cosmologies were patched together from biblical texts taken from different time periods and genres and were based on very literalistic readings. This approach was vigorously opposed by more conservative scholars, such as William Fairfield Warren, who published a detailed response in *The Earliest Cosmologies* (1909).⁵⁶ In this work, Warren argues that the liberal reconstructions would not be recognized by the ancient Hebrews, even if drawn out for them on a piece of paper.

MODERN ADVOCATES OF A FLAT-EARTH-AND-VAULTED-HEAVEN HEBREW COSMOLOGY

In spite of vigorous opposition to the vault theory by more conservative biblical scholars and the demise of pan-Babylonianism, the idea that the ancient Babylonians and Hebrews believed in a hard hemispherical dome continued to be pushed. Harry Emerson Fosdick was an influential advocate and popularizer during the 1930s,⁵⁷ who, like most liberal commentators, continued to accept the view of a naive Hebrew cosmology without really providing careful historical review or in-depth exegetical defense. Liberal views were opposed by evangelical scholars, such as Bernard Ramm.⁵⁸ The most

53. See Peter Jensen, *Die Kosmologie der Babylonier* (Strassburg, France: Karl J. Trübner, 1890).

54. See Lambert, "Cosmology of Sumer and Babylon," 61, 62.

55. Schiaparelli, *Astronomy in the Old Testament*, 38.

56. William Fairfield Warren, *The Earliest Cosmologies: The Universe as Pictured in Thought by the Ancient Hebrews, Babylonians, Egyptians, Greeks, Iranians, and Indo-Aryans: A Guidebook for Beginners in the Study of Ancient Literatures and Religion* (New York: Eaton & Mains, 1909).

57. Fosdick, *Modern Use of the Bible*, 46, 47.

58. See Bernard Ramm, *The Christian View of Science and Scripture* (Grand Rapids, Mich.: Eerdmans, 1954).

recent exchange was by Paul H. Seely and Robert C. Newman.⁵⁹ Within Adventist circles, the idea of a naive Hebrew cosmology has been supported by Richard L. Hammill and others.⁶⁰

Of course, even if it can be shown that in the history of Christian scholarship the dome theory is really a recent nineteenth-century invention tied to incorrect medieval thinking, the question still remains: What did the ancient Hebrews think about the cosmos? Certainly, many nineteenth-century scholars examined the Hebrew text, including, of course, the key word *rāqîaʿ*. In spite of the fact that most biblical linguists prior to the nineteenth century translated *rāqîaʿ* as “expanse,” rather than understanding it as something solid or hard (like a vault), many nineteenth-century scholars argued that *rāqîaʿ* was a metal substance, thereby supporting the supposition that the ancient Hebrews thought of the heavens above the earth as a solid vault or dome. Therefore, it seems appropriate to take another look at the Hebrew texts and words that mention the heavens and firmament.

A WORD STUDY OF THE HEBREW רָקִיעַ (*RĀQĪAʿ*) AND RELATED TERMS

It is important to keep in mind that there is no single Hebrew text or passage in which the cosmological elements are brought together to provide a complete, systematic view of the supposed Hebrew cosmology. Rather, scholars have reconstructed the cosmos by piecing together different biblical passages, written at different times, in different genres, and for different purposes—none of which were primarily cosmological.

STATISTICS OF OCCURRENCE IN THE HEBREW BIBLE AND BASIC MEANINGS

The word *rāqîaʿ* occurs seventeen times in the Hebrew Bible in the nominal form: nine times in Genesis (1:6, 7 [three times], 8, 14, 15, 17, 20); five times in the book of Ezekiel (1:22, 23, 25, 26;

59. See Paul H. Seely, “The Three-Storeyed Universe,” in *Journal of the American Scientific Affiliation* 21 (March 1969): 18–22; and Newman, *Biblical Firmament*.

60. Richard L. Hammill, “Creation Themes in the Old Testament Other than in Genesis 1 and 2,” in *Creation Reconsidered*, ed. James L. Hayward (Roseville, Calif.: Association of Adventist Forums, 2000), see esp. 254, 55 and fig. 19–1. See also the recent book by Fritz Guy and Brian Bull, *God, Sky and Land: Genesis 1 as the Ancient Hebrews Heard It* (Loma Linda, Calif.: Adventist Forums, 2011).

10:1); twice in Psalms (19:2; 150:1); and once in Daniel (12:3).⁶¹ In none of these occurrences does *rāqîa'* appear in association with any metal. The passages from Genesis, Psalms, and Daniel all refer to the same heavenly reality described in the opening chapter of Scripture. In fact, the only time the nominal form of *rāqîa'* refers to a solid material substance is in Ezekiel 1:22, where the *rāqîa'* below YHWH's movable throne is said to appear "like the awesome gleam of crystal" [כְּעֵין הַקָּרַח הַגִּבּוֹרָא],⁶² but even here, it is important to note that the text does not say it was crystal—only that it had the "gleam of crystal." Before examining these passages further, let us look briefly at the verbal form of *rāqîa'*.

The verbal form of *rāqîa'* is רָקַע [*rāqa*], which occurs in the biblical text in its various stems twelve times. In its verbal form, *rāqa'* is explicitly associated with metal five times (Exod. 39:3; Num. 16:38, 39; Isa. 40:19; and Jer. 10:9). Three times it is used in conjunction with the earth (Isa. 42:5; 44:24; Ps. 136:6); twice with stamping the feet (Ezek. 6:11; 25:6); and once with smashing an enemy (2 Sam. 22:43). Only one time is it possibly associated with the sky (Job 37:18: "Can you, with Him, spread out the skies, strong as a molten mirror?"); however, the term often translated "skies" in this verse most likely refers to clouds.⁶³

61. For a helpful discussion of the meaning of the word *rāqîa'* [רָקַע] in the Old Testament, see Newman, *Biblical Firmament*, 7–16.

62. Scripture quotations in this chapter are taken from the New American Standard Bible®, Copyright © 1960, 1962, 1963, 1968, 1971, 1972, 1973, 1975, 1977, 1995 by The Lockman Foundation. Used by permission. (www.Lockman.org)

63. Job 37:18 records Elihu's challenge to Job: "Can you, with Him [God], spread out [*rāqa*] the skies [*šĕhāqîm*], strong [*hāzāq*] as a molten [*mûšāq*] mirror [*rē'î*]" Newman, *Biblical Firmament*, 13–15, examines this passage and points out that the Hebrew word *šĕhāqîm* normally means "clouds" and not "skies" elsewhere in Scripture. See *HALOT*, 1464–65. Unless there is unambiguous evidence in the immediate context that the term should be translated "skies," it is preferable to translate it as "clouds" here and elsewhere. Several major commentators (e.g., Tur-Sinai, Dhorme, Gordis, and Habel) have seen a reference to "clouds" and not "skies" in this passage (see NET, which translates the term as "clouds"). Newman, 14, further calls attention to the fact that the word *rē'î*, usually translated "mirror," is not the usual word for "mirror" in the Hebrew Bible and, in fact, is a *hapax legomenon*, translated by the Septuagint as ὁρασις [*horasis*], which means "appearance" in Hellenistic Greek, not "mirror." This translation is supported by a slightly different pointing of the same Hebrew consonants (with a composite *šĕwā'* instead of simple *šĕwā'*) as רָעַ [rō'î], which means "appearance" and is found four times in the Old Testament, including a single passage in Job from the same speech of Elihu (Job 33:21). Newman, *Biblical Firmament*, 15, also notes that *hāzāq* can mean "mighty" as well as "strong," and *mûšāq* literally means "poured out." He concludes that, since in this verse the context is ongoing weather phenomena rather than creation, the following translation of the verse is preferred: "Can you, with Him, spread out the mighty clouds, with an appearance of being poured out?" (ibid.). Regardless of the precise translation of the entire verse, if *šĕhāqîm* means "clouds"

Significantly, the verbal form *rāqa*ʿ does appear in the same sentence as שָׁמַיִם [šāmayim, or “heavens”] in several verses, all of which have a creation context, but it is not used to refer to the heavens. Specifically, in Isaiah 42:5 and 44:24, and in Psalm 136:6, the verbal participle form of *rāqa*ʿ appears in the same poetic sentence as šāmayim but, surprisingly, is not used with regard to the heavens; rather, it is used to refer to the earth. Whereas the verb *rāqa*ʿ is often translated as “stamp” or “beat [out]” elsewhere in its Old Testament occurrences, in these verses, it is regularly translated as “stretch [out]” or “spread [out].” This is because the noun upon which *rāqa*ʿ acts in these verses is not metal but earth. And because *rāqa*ʿ occurs in synonymous parallelism with the verbal participle נֹתֵחַ [nōṭeh], which also means “stretch [out]” or “spread [out],” making it likely that *rāqa*ʿ has a similar meaning in the context of these creation-related verses.

This unexpected “switch” in Isaiah 42:5 and 44:24, and in Psalm 136:6, to linking *rāqa*ʿ with earth instead of heavens, even though “heavens” appears in the same sentence, illustrates a number of important points for understanding the use of the term in the Hebrew Bible. First, the verbal participle *qal*, the stem form of *rāqa*ʿ, does not necessarily refer to the “beating out” of metal. Second, the ancient Hebrews did not have a set, rigid association of the verbal form *rāqa*ʿ with šāmayim. Third, attempts to provide a set and restricted definition of *rāqa*ʿ are inappropriate. Finally, when associated with God’s creative acts in parallel with the act of creating the heavens, it clearly means to “stretch [out].” These facts should serve as a caution for those who would derive the meaning of the nominal form *rāqîa*ʿ solely from verbal forms that are related to the beating out of metal.

In the verbal form, *rāqa*ʿ usually describes a process (after all, it is a verbal form) that enables any given substance to cover or encompass a larger area by becoming thinner. The material acted upon may be any substance that can be spread or expanded by being

and not “sky,” there is no reference to a solid-domed sky in this passage. Instead, we have an example of “a nonsolid object (clouds) being spread out with the use of the verb *raqa*” (ibid.). Alternatively, if one insists on translating šēḥāqîm in Job 37:18 as “skies” or “heavens” and כְּרַאִי מִצֶּקֶק as “like a molten mirror,” as in many modern versions, the passage still does not imply a solid metal dome. Kenneth Mathews, *Genesis 1–11:26*, NAC 1A (Nashville, Tenn.: Broadman & Holman, 1996), 150, who follows this traditional translation, points out that “Job 37:18, which describes skies without rain as a ‘bronze’ expanse (cf. Deut. 28:23), is figurative and does not support the common contention that the ‘expanse’ was considered a bronze dome by the Hebrews.”

stretched, hammered, or heated to a melted or liquefied state. There is, of course, a distinction in the concepts of stretching, hammering, and heating. Stretching occurs when the substance is grabbed on its outer edges and pulled away from the center. Hammering is when the substance is pounded in the center, forcing the material to move out to the edges. When something is heated to a sufficient temperature, the force of gravity will cause the melted or liquefied material to thin and expand. The net effect of all three processes is essentially the same in that the substance will cover a larger area as a result of having become thinner. In the case of metal, the process transforms the material into a thin, flat layer so that it can be used as an overlay. All three of these processes for expanding materials are employed in the Hebrew text, and each is described by the term *rāqaʿ* (with reference to, e.g., various hard metals, molten metal, earth, cloud, dust). The basic meaning of to *expand* in these uses of *rāqaʿ* suggests that the noun *rāqîaʿ*, which corresponds to the verb and depicts various materials that are expanded, may appropriately be translated as “expanse.”

THE HEAVENLY *RĀQĪAʿ* IN GENESIS 1 AND ELSEWHERE IN THE OLD TESTAMENT

When we look at the use of *rāqîaʿ* in Genesis 1, the meaning of “expanse” fits the immediate context, and the context also gives clues regarding the nature of this expanse. First, the function is to “separate the waters from the waters” (v. 6). As Kenneth Mathews restates this purpose, “God formed an ‘expanse’ to create a boundary, giving structure to the upper and lower waters (1:6, 7). The ‘expanse’ is the atmosphere that distinguishes the surface waters of the earth (i.e., ‘the waters below’) from the atmospheric waters or clouds (i.e., ‘the waters above’).”⁶⁴

That this expanse is not a solid dome is evident from a second clue in the text: not only are the greater and lesser lights placed *בְּרָקִיעַ* (“in the expanse”) on the fourth day of creation (vv. 15, 17), but also the birds created on the fifth day were to fly *עַל־פְּנֵי רָקִיעַ הַשָּׁמַיִם* (“in the open expanse of the heavens,” v. 20). Mathews elaborates:

There is no indication, however, that the author conceived of it [*rāqîaʿ*] as a solid mass, a “firmament” (AV) that supported a body of waters

64. Mathews, *Genesis 1–11:26*, 150.

above it [. . .]. The “expanse” describes both the place in which the luminaries were set (vv. 14, 15, 17) and the sky where the birds are observed (v. 20). Thus, Genesis’ description of the “expanse” is phenomenological—to the observer on earth, the sun and stars appear to sit in the skies, while at the same time, birds glide through the atmosphere, piercing the skies.⁶⁵

A third clue in the text is that the *rāqîaʿ* is given a name in verse 8: “God called the expanse ‘sky’ [*šamayim*]” (NIV). Regarding the various usages of *rāqîaʿ* in Genesis 1, John Sailhamer asks: “Is there a word (in English) or idea that accommodates such a broad use of the term ‘expanse’?” He rules out such terms as *ceiling*, *vault*, or *global ocean*, proposing:

[They] suit neither the use of the term in v.20 nor the naming of the “expanse” as “sky.” Such explanations, though drawn from analogies of ancient Near Eastern cosmologies, are too specific for the present context. [And we would add that such terms do not represent the ANE cosmologies, as demonstrated above!] Thus it is unlikely that the narrative has in view here a “solid partition or vault that separates the earth from the waters above” (Westermann, 116). More likely the narrative has in view something within humankind’s everyday experience of the natural world—in general terms, that place where the birds fly and where God placed the lights of heaven (cf. v.14). In English the word “sky” appears to cover this sense well.⁶⁶

What is true with regard to the sky in Genesis 1 also holds for the rest of the Hebrew Bible. Although *rāqîaʿ* and parallel expressions depicting the sky are used in various poetic contexts employing different similes, there is no hint that the sky is a solid dome. C. F. Keil and F. Delitzsch provide a succinct summary regarding the meaning of the term *rāqîaʿ* with reference to the sky in Genesis and elsewhere in the Old Testament:

רָקִיעַ, from רָקַע, to stretch, spread out, then beat or tread out, means *expansum*, the spreading out of the air, which surrounds the earth as an atmosphere. According to optical appearance, it is described as a carpet spread out above the earth (Ps. civ. 2), a curtain (Isa. xl. 22), a transparent work of sapphire (Ex. xxiv. 10), or a molten looking-glass

65. Ibid.

66. John H. Sailhamer, “Genesis,” in *Expositor’s Bible Commentary: Revised Edition*, ed. Tremper Longman III and David E. Garland, vol. 1 (Grand Rapids, Mich.: Zondervan, 2008), 59.

(Job xxxvii. 18); but there is nothing in these poetical similes to warrant the idea that the heavens were regarded as a solid mass [. . .] such as Greek poets describe.⁶⁷

WATER ABOVE

If the *rāqîaʿ*, or “expanse,” is the sky (*šāmayim*) in Genesis 1:6–8, then the mention of “the waters [מים, *hammayim*] which were above [מעל, *mēʿal*] the expanse” (v. 7) is very likely a reference to clouds. This interpretation is supported by intertextual parallels to Genesis 1 in other Old Testament creation accounts. Note especially Proverbs 8:28, where what exists “above” (למעלה, *mimmāʿal*) the “sky” or “heavens” (*šāmayim*) is explicitly described as the “clouds” (*šēḥāqîm*). Many modern translations recognized that *šēḥāqîm* has the primary meaning of “clouds” and not “skies,” and these translations have rendered it thus in this verse (e.g., KJV, NEB, NIV, NJB, NKJV, NLT, RWB, TNIV).

Psalm 78:23 likewise describes the “clouds above” (למעלה מן המעלה, *šēḥāqîm mimmāʿal*). Mathews notes that elsewhere in the Old Testament “there is evidence that the Hebrews understood that clouds produced rain and thus, from a phenomenological perspective, ‘water’ can be described as belonging to the upper atmosphere.”⁶⁸ Old Testament passages depicting clouds producing rain include Deuteronomy 28:12; Judges 5:4; 1 Kings 18:44, 45; Ecclesiastes 11:3; and Isaiah 5:6.⁶⁹ Thus, there is good evidence to conclude that the waters

67. C. F. Keil and F. Delitzsch, *The Pentateuch: Three Volumes in One*, 10 vols. (repr.; Grand Rapids, Mich.: Eerdmans, 1976), 1:52, 53. H. C. Leupold, *Exposition of Genesis* (Columbus, Ohio: Wartburg, 1942), 60–61. Leupold refers to these various figurative descriptions of the *rāqîaʿ*, adding that “these purely figurative expressions . . . are such as we can still use with perfect propriety, and yet to impute to us notions of a crude view of supernal waters stored in heavenly reservoirs would be as unjust as it is to impute such opinions to the writers of the Biblical books. The holy writers deserve at least the benefit of the doubt, especially when poetic passages are involved. Again: the view expressed in this verse [Gen. 1:6] is not crude, absurd, or in any wise deficient.”

68. Mathews, *Genesis 1–11*:26, 150.

69. An alternative interpretation of the term “above” is that it should actually be translated “from above,” denoting direction of flow and not the position above the *rāqîaʿ*. According to Genesis 1:6, 7, the *rāqîaʿ* was formed to separate “waters above” from “waters below”—the key point is the relative position of the waters in relationship to each other. Interestingly, the expression “waters above” [*hammayim* . . . *mēʿal*] does not appear again in the Hebrew Bible except for in Psalm 148:4: “Praise Him, highest heavens, and the waters that are above the heavens!” This passage, of course, is figurative since the heavens don’t literally praise God; thus, it should not be examined too closely for accuracy with regard to physical realities. A key word is מעל [*mēʿal*], which is found approximately 140 times in the Hebrew Bible, always in adverbial or prepositional phrases. It is comprised of two elements: the prepositional *m*, which is often translated “from,” and על, which means “above.”

above are equated with clouds in ancient Hebrew thinking, as opposed to a celestial ocean of solid water above a vault.

Keil and Delitzsch present a clear summary of the meaning of “waters above”:

The waters *under* the firmament are the waters upon the globe itself; those *above* are not the ethereal waters beyond the limits of the terrestrial atmosphere, but the waters which float in the atmosphere, and are separated by it from those upon the earth, the waters which accumulate in clouds, and then bursting these their bottles, pour down as rain upon the earth.⁷⁰

WINDOWS OR DOORS OF HEAVEN

It is often suggested that the Hebrews believed there were literal windows or doors in the firmament or *rāqîaʿ*. However, in Genesis 7:11, it is the windows of the *šāmayim*, or “sky,” not the windows of the *rāqîaʿ*, whence the waters above fall. Windows or doors never appear with *rāqîaʿ* nor with the expression “waters above” (*hammayim . . . mēʿal*), which occurs only twice in the Hebrew Bible (Gen. 1:7; Ps. 148:4).

Psalm 78:23 is decisive in understanding the meaning of terms “windows” and “doors of heaven.” In this verse, the term “the doors of heaven” is explicitly associated—by means of poetic synonymous parallelism—with clouds: “Yet He commanded the clouds [*šēḥāqîm*] above and opened the doors of heaven.” This verse indicates that “doors of heaven” (and the parallel phrase “windows of heaven”) is to be understood figuratively as a reference to clouds. “According to the Old Testament representation, whenever it rains heavily, the

It most frequently refers to spatial relationships or locations described as “above” or “upward.” In Psalm 148:4, *mēʿal* is used to describe the relationship of the “waters above” with the “heavens.” It is usually translated as “the waters *above* the heavens.” However, in other verses the word is used to convey the idea of “downward from,” “descend from above,” or something that comes “from above” (e.g., Gen. 24:64; Deut. 9:17; Josh. 10:27; Judg. 1:14; 1 Sam. 4:18; 1 Kings 1:53). In each of these verses, the subject is being moved from a higher to a lower place—down from the altar, down from the donkey, down from the trees. From those usages, it could be suggested that Psalm 148:4 be translated as “the waters that descend from the heavens above.” At the very least, these variances suggest caution against a more rigid understanding than the author intended to convey of the actual spatial relationship of the “waters above” to “the heavens.” This understanding is made more apparent by parallel expressions, wherein moisture comes from heaven “above” (as opposed to the water above the heavens), such as is found in Genesis 27:39: “Behold, away from the fertility of the earth shall be your dwelling, and away from the dew of heaven from above.”

70. Keil and Delitzsch, *Pentateuch*, 1:53, 54.

doors or windows of heaven are opened.”⁷¹ Other Old Testament references make clear that the phrase “windows of heaven” and parallels are figurative expressions.⁷²

If the “windows of heaven” refer to the clouds in the sky, then it is reasonable to suggest that the opening of the windows of heaven, mentioned for the first time in connection with the Flood, may imply that there was no rain on the earth (but only a mist which watered the ground, see Gen. 2:6, 7) until the time of the Flood. This would be in harmony with the explicit statement of Ellen White: “The world before the Flood reasoned that for centuries the laws of nature had been fixed. The recurring seasons had come in their order. Heretofore rain had never fallen; the earth had been watered by a mist or dew.”⁷³

DAY TWO OF CREATION WEEK: MATERIAL AND FUNCTIONAL CREATION

According to Genesis 1:6–8, on the second day of creation week, God was involved in both material and functional creative acts. Verses 6a, 7a, and 8 describe the material creation: “Then God said, ‘Let there be an expanse in the midst of the waters . . .’ God made the expanse, and . . . called the expanse heaven.” Verses 6b and 7b describe the functional creation: “‘Let it [the expanse] separate the waters from the waters.’ God made the expanse, and separated the waters which were below the expanse from the waters which were above the expanse.” Both material creation (the making of the sky) and the assignment of the function of that creation (to divide the upper atmospheric heavens, containing water-bearing clouds from the surface waters of the earth) are integral parts of God’s creative activity during creation week.

An interpretation of Genesis 1 published by John Walton seriously challenges the traditional understanding of creation week.⁷⁴ Walton argues that the seven days of Genesis 1 are literal days but refer to the inauguration of the cosmos as a functioning temple where God takes up His residence. The six-day creation week, according to Walton, refers only to functional and not to material

71. *Ibid.*, 1:54. Besides Ps. 78:23, see also Gen. 7:11, 12; Job 36:29; Ps. 104:13.

72. See, for example, 2 Kings 7:2, 19; Isa. 24:18; and Mal. 3:10.

73. Ellen G. White, *Patriarchs and Prophets* (Mountain View, Calif.: Pacific Press, 1922), 96–97.

74. John H. Walton, *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate* (Downers Grove, Ill.: InterVarsity, 2009).

creation. The week describes God's establishment and installation of functions. There is need for a thorough critique of Walton's thesis in another venue. But here, we note that one of Walton's major theses is that nothing material was created during the six days of creation. He facilely explains away the other days of creation but faces a serious obstacle with regard to the second day. He acknowledges: "Day two has a potentially material component (the firmament *rāqî'a*)."⁷⁵ His explanation seeks to sweep away this material component: "No one believes there is actually something material there—no solid construction holds back the upper waters. If the account is material as well as functional we then find ourselves with the problem of trying to explain the material creation of something that does not exist."⁷⁶ However, if, as we have argued, the Hebrew word *rāqî'a* does not refer to a solid construction but to the atmospheric heavens or sky, which we still today believe constitutes a material reality (a real location called the "sky"), then material creation was indeed part of day two, not merely a function established. Taking this into account, Walton's general thesis that there was no material creation during the six days of Genesis 1 falls to the ground.⁷⁷

CONCLUSION

The idea that the ancient Hebrews believed the heavens consisted of a solid vault resting on a flat earth appears to have emerged for the first time only during the early nineteenth century when introduced as part of the flat-earth concept introduced by Washington Irving and Antoine-Jean Letronne. Scholars who supported this idea argued that the flat-earth-and-vaulted-heaven theory was held throughout the early Christian and medieval periods and had originated in antiquity, particularly with the ancient Mesopotamians and Hebrews. However, more recent research has shown that the idea of a flat earth was not held by the majority either in the early Christian church or among medieval scholars. Indeed, the overwhelming evidence is that they believed in a spherical earth, surrounded by celestial spheres (sometimes hard, sometimes soft)

75. *Ibid.*, 94.

76. *Ibid.*

77. For further critique of Walton's view that Genesis 1 is only an account of functional origins and not material origins, see for example, Jacques B. Doukhan, "A Response to John H. Walton's *Lost World of Genesis One*," *AUSS* 49, no. 1 (2011): 197–205.

that conveyed the sun, moon, stars, and planets in their orbits around the earth. Moreover, the concept of a heavenly vault does not appear in any ancient Babylonian astronomical documents. Rather, this notion was erroneously introduced into the scholarly literature through a mistranslation of the *Enuma Elish* by Jensen.

A review of the linguistic arguments that the Hebrews believed in the idea of a flat earth and vaulted heaven shows that the arguments are unfounded. The arguments derive from passages that are clearly figurative in nature. One of the great ironies in recreating a Hebrew cosmology is that scholars have tended to treat figurative usages as literal (such as Psalms and Job), while treating literal passages, such as in Genesis, as figurative. The noun form of *rāqîaʿ* is never associated with hard substances in any of its usages in biblical Hebrew—only the verbal form *rāqaʿ* is. Even the latter cannot be definitely tied to metals; rather, it is understood as a process in which a substance is thinned—this can include pounding but also includes stretching and heating. The noun *rāqîaʿ* is best translated as “expanse” in all of its usages and has reference to the sky in Genesis 1. The waters above and the window, doors, or gates of heaven are figurative references to the clouds, which during the Noahic Flood and thereafter would produce rain. On the second day of creation, God was involved in both material and functional creation. He made the *rāqîaʿ* (“sky”) and also assigned its function—to divide the upper atmospheric waters contained in clouds from the surface waters of the earth.