

# THE STAR OF CHRIST IN THE LIGHT OF ASTRONOMY

by Aaron Adair

*Abstract.* Centuries of both theologians and astronomers have wondered what the Star of Bethlehem (Matt 2:2, 9) actually was, from miracle to planetary conjunction. Here a history of this search is presented, along with the difficulties the various proposals have had. The natural theories of the Star are found to be a recent innovation, and now almost exclusively maintained by scientists rather than theologians. Current problems with various theories are recognized, as well as general problems with the approach. The interactions between the sciences and religion are categorized and explored.

*Keywords:* astronomy; history; laws of nature; miracles; Nativity; science, Star of Bethlehem

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“Where is He who has been born King of the Jews? For we saw His star in the east and have come to worship Him’ . . . and lo, the star which they had seen in the east went before them, till it came to rest over the place where the child was” (Matthew 2:2, 9 NASB).

With these few clauses, the impact of the stellar light known as the Christmas Star, the Star of the Wise Men, or the Star of Bethlehem is impressive, having generated a substantial quantity of literature (Freitag 1979). Presented here is a two-millennia history of the debate about the Star and its relation to the sciences, with emphasis on the last two centuries. Although there were centuries of astrological speculation, this overview shows that naturalistic theories of the Star are a late innovation that began with apologetic attempts in the nineteenth century and not long after left the mainstream of biblical scholarship, leaving mostly astronomers to give credibility to this tale. With this historical background, an assessment of the interactions between religion and science is provided.

## EARLY COMMENTARY ON THE STAR

By the second century the Gospel of Matthew was well known among Christians, with many stories circulating that derived from the canonical nativity stories, such as the *Protoevangelium* (or *Infancy Gospel*) of James (Miller 2003, 259–306). All these stories describe the Star as an amazing

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phenomenon, adding further miracles (i.e., the Star entering a cave to stand over Jesus's head). Commentaries regarding the Star up to the fall of Rome are numerous and consistent, all indicating the Star was something newly created by God, not a natural event (Allison 2005, 18–20). Astrological connections were also repudiated, often vigorously.

In particular, consider Augustine of Hippo, a former member of the Manichean religion and familiar with astrology before converting to Christianity (*Confessions* 4.1–3; 5.3). He was also familiar with the methods of the astronomers, which ran contrary to his understanding of the Manichean faith and was one reason for abandoning it (Ferrari 1973). Once a Christian, he became a defender of the faith and led attacks upon stellar determinism. In his reply to another Manichean, Augustine repudiated not only fatalistic astrology but any connection it had with the Star at Jesus's birth (*Reply to Faustus the Manichean* 2.6f). His argument concerned the unnatural behavior of the Star, demonstrating it had been a miracle.

A contrasting opinion may be that of the third-century theologian Origen, who compared the Star to a comet. In his main treatise defending Christianity, Origen declared the Star was a new star similar to comets or meteors (*Contra Celsum* 1.58–60). It is important to note that Origen almost never made miracles into natural events; he believed in supernatural occurrences and demonic possession, and he defended Jesus's miracles, virgin birth, and resurrection (McGuckin 2004, 150–2). In actuality, Origen does not say the Star was a comet, but that they are similar in appearances, and auspiciousness. Importantly, at this time comets were viewed as atmospheric aberrations according to Aristotle (*Meteorology* 1.1) and Clement, another Alexandrian theologian known to Origen (*Protrepticus* 10). Elsewhere Origen argues against natal astrology and the influence of the planets (*Commentary on Matthew* 13.6; *Philocalia* 23.14f), and he argues that the Magi came to know of Jesus's birth because their abilities in astrology were demon based, destroyed at the Incarnation; after astrology was destroyed, the Magi saw the Star, heard about biblical predictions, and left to find the Christ Child (*Contra Celsum* 1.60). Decisively, Origen compared the Star to the dove that comes upon Jesus at his baptism, explicitly saying the Star came down to the very place the child was (*Homily on Numbers* 18.3–4). What fragments we have and the background that can be established makes the view that Origen thought the Star was actually an ordinary incident untenable.

We see unanimously from the earliest Christian commentators to the High Middle Ages, that there were no attempts to see the Star as some natural light in the sky or astrological sign, but rather a miracle (Allison 2005, 18–21). In later centuries, views on astrology would change, and likewise interpretations of the Magi story.

## ASTROLOGY APPLIED TO JESUS

With the stance against divination among early Christians, the project would fall upon others to reckon what would have been astrologically significant before Jesus's birth. Moreover, a certain methodology in astrology would need to develop that would allow the supposed prediction of great events and leaders of the past and future. This method was the great conjunctions of Jupiter and Saturn,<sup>1</sup> devised in Sasanid Iran (third to seventh century), depending upon earlier astrological systems and Zoroastrian millennialism (Pingree 1962, 1963). Before then, Babylonian and Assyrian judicial astrology was more concerned about the immediate state and king, and Greek astrology usually considered personal horoscopes.

The earliest figure known connecting great conjunctions with Jesus was the eighth-century Jewish astrologer Masha'allah. These planetary alignments were more significant when they started to take place in a different zodiac triplicity than the previous great conjunction, so the great conjunction Masha'allah was concerned with was in 26 BCE in the constellation Leo. We are then told that Jesus was born 13 years later, giving a date of 13 BCE, though 2 BCE is also given (Kennedy and Pingree 1971). Islamic astrologers would use this same astrological technique for the prophet Muhammad and other events important to the history of the religion.

Later the preferred conjunction would change, probably because of chronological issues with Masha'allah's choice. In the ninth century, the Islamic astrologer Abu Ma'shar would incorporate the ideas of the great conjunction but instead choose a 7 BCE conjunction in Pisces as the correct event preceding Jesus's birth. He also placed Virgo in the ascendant for Jesus's birth, appropriately connected with the Virgin Mary, whom Muslims venerate. However, even with this predictive technology, apparently no Islamic astrologers connected the Bethlehem Star with any of the lights in the sky.

Eventually the works of Islamic astrologers would become known to the West in the twelfth century through Latin translations, along with other scientific works (North 1980). About the same time in the Byzantine Empire, a monk named Michael Glycas disputed with the emperor Manuel Comnenus over astrology and its truth pertaining to Matthew's Star. Manuel believed the Star to be a new object (as did Glycas), yet found astrology applicable such that the Magi knew the Star concerned a Jewish king's birth. The monk chastised the emperor's arguments, contending the Magi were inspired by prophecy and angels (Tester 1987, 95–7; George 2001). In the next century, numerous Western publications would nonetheless apply astrology to Christ, such as *Speculum astronomiae* and the pseudonymous poem *De vetula* of "Ovid."

Around this time Albertus Magnus of Germany and Roger Bacon of England were both influenced by the Arab astrologers. To Bacon, God had preconceived when he would enter into the world with the planets as causes. To combat the retort that this meant God was subordinate to nature, Bacon argued that insofar as the Creator was to become a creation, that much of Jesus would be subject to the natural world: growth in a womb, hunger, and subjection to astrological forces (Burke 1928, 1:288–9). Eventually Bacon was condemned in part because he allowed stellar influences on the human nature of Jesus (Sidelko 1996). The Condemnation of 1277 included provisions against deterministic astrology (nos. 76, 154), and so Bacon's viewpoint was prone to disaster.

Since Christ was from beyond the stars, along with the Gospel description of the Star, logic dictated that the Star was a new manifestation of God's will, not some planetary alignment, and the Star was manifested because of Christ, not Christ because of the Star. The paranormal Star is what Albertus would argue, repeated by his contemporary William of Auvergne, bishop of Paris (Sidelko 1996). Additionally, Bacon also seems to compare the Star to the darkening of the world at the Crucifixion, which he considered miraculous, implying the Star was supernatural in Bacon's mind.

With such a fine line when using astrology in relation to religion and in particular the nativity of Jesus, those who continued this line of research had to be cautious. Nonetheless, scholars who were reverent leaders in the Catholic Church would persist in a similar path as previous astrologers. The first complete, extant horoscope is credited to Cardinal Pierre d'Ailly, who placed Jesus's birth at late night December 24, 1 BCE, in Bethlehem (Faracovi 1999, 104). The time of day followed Abu Ma'shar with Virgo on the horizon, and the date was close to the traditional birthday, but this chronology separated the conjunctions of Jupiter and Saturn from the Nativity by six years. Still, d'Ailly incorporated the great conjunction into his astrology, mixing mundane and horoscopic astrology while maintaining a delicate theological balance. This harmonization included undermining the conclusion that Christianity was astrologically determined. D'Ailly, following Aquinas, made astrological influences something that could be overcome with a strong will so that Jesus's humanity could be affected by the stars as in Bacon's system but without becoming overdeterministic, saving Jesus from celestial puppeteering, forced to die on the cross rather than a willing sacrifice. This project was later advanced by Jérôme Cardan and Tiberio Russiliano (Faracovi 1999, esp. 156–7, 67–90). The danger of producing horoscopes for Jesus was still prevalent, and Cardan was sent to prison for several months because of his Christian astrology, while Tiberio barely escaped the Inquisition.

As for the Star itself, it remained a separate event altogether as horoscope manufacturers and others declared the Star itself a miracle from God,

comparable to an angel perhaps in the form of a comet, but never was it considered a normal star (cf. Thorndike 1923–58, 4:159, 322, 417, 566; 7:151; 8:324; Allison 2005, 28–34). This includes d’Ailly, who on multiple occasions stated the object was miraculous; he also ensured his readers that astrological forces only acted on the natural aspects of the faith, while the supernatural was beyond the domain of astrology (North 1980, 201; Smoller 1994, 44–52).

All of these attempts by Christian scholars to try to match astrological circumstances with biblical or prophetic events demonstrate a desire for compatibility between the astral sciences and the religion of the time. The stars should announce the coming of Jesus just as the Gospel seems to say, and so this is what the Christian scholars tried to show through astrology without denying the hand of Providence. The use of divination had at best an uneasy truce with dogma, but the religious atmosphere was about to change.

#### NEW THEOLOGIES AND NEW ASTRONOMIES

With the Protestant Reformation came the break from traditional authorities, yet major figures in these movements continued to deny the legitimacy of astrological prognostication. Martin Luther exclaimed that he would never believe in its validity (Garin 1983, 4), and John Calvin wrote a treatise against judicial astrology (1549). Both of these leaders argued against the view that the Star of Bethlehem was related to astrology, pointing out its miraculous nature as so unlike anything in the sky and thus astrology was inapplicable. Even those who regarded astrology more highly would agree that God was the force behind the Star of Bethlehem (Allison 2005, 20–1, 28 n. 34). This was the discussion inherited by Johannes Kepler.

Kepler was both an astronomer and astrologer who defended the latter practice (Rabin 1997), including the system of great conjunctions. His familiarity with great conjunction theory is demonstrated when he tells us in the preface of his *Mysterium Cosmographicum* that on July 19, 1595, he had his epiphany about the planetary orbits while lecturing on these very conjunctions. More pertinent to Star research are later events. In 1603, Jupiter and Saturn came into conjunction as they do about every 20 years but this time in the Fiery Trine (Aries, Leo, Sagittarius). The great conjunctions only slowly move into a new trine, and entering into this particular set of three constellations brought about the greatest conjunction, encompassing a period of about 800 years considering precession or 960 years without. After this conjunction came the ominous massing of Mercury, Jupiter, and Saturn to form a triangle in the Fiery Trine the next year. In October of 1604, an amazing sight was witnessed between Jupiter and Saturn: a bright, new star. Later in the summer of

1605, Kepler came across a book by Laurence Suslyga of Poland arguing that Jesus was not born in 1 BCE per tradition, but in 4 BCE. This began Kepler's thoughts on relating the great conjunction of 7 BCE with the actual time of Jesus's birth (Caspar [1948] 1993, 154–6). It was this innovation that allowed the conjunction to come together with the Star of Matthew. Using the analogy of the new star that formed under the circumstances of 1603/4, Kepler argued for his new chronology with Jesus born in 5 BCE.

The supernova inspiration already existed with the theologian Theodore Beza in his poem *De Nova Stella Judicia Duorum Praestantium Mathematicorum*, declaring the nova of 1572 as the same as that of the beginning of the Christian Era. This poem was preserved by Tycho Brahe in his *Progymnasmata* (1602), published by Kepler (Caspar [1948] 1993, 139), so he was likely aware of this idea. Kepler's definitive work on chronology was *De Vero Anno quo Aeternus Dei Filius Humanam in Utero Benedictae Virginis Mariae Assumpsit* (1614), which devoted only a few pages to the conjunction and Star.

There are several things to note. First, greatest conjunctions involve the Fiery Trine, which excludes watery Pisces. However, the massing of Jupiter, Saturn, and Mars in 6 BCE took place at the edge of Aries, while all the planets remained in Pisces. Since it was the massing rather than the conjunction that was of interest, and the massing was near rather than in Aries, Kepler's hypothesis desperately stretches astrology rules to get the desired results. Second, Kepler claimed the conjunction was a sign that had provoked the Magi to travel, similar to what most modern proponents would argue. Third, and most importantly, Kepler thought the new Star was not the conjunction of the planets but a new star, and that the Star was miraculous. "This star was not of the ordinary run of comets or new stars, but by a special miracle moved in the lower layers of the atmosphere" (Burke-Gaffney 1937). A similar statement is made by Tycho concerning the 1572 nova (Dreyer 1913–29, 1:18) and by the Jesuit astronomer Giovanni Battista Riccioli (1651, 2:179–93). For all these astronomers, Matthew's Star was divine intervention. Centuries would pass until this view was challenged.

#### MIRACLES EXPLAINED AND EARLY NATURALISTIC THEORIES OF THE STAR

Eventually, some did try to view the Star of Bethlehem as following the laws of nature, but the reason this happened was not because of advances in astronomy, but because of the conversation going on in philosophy and biblical studies. Miracles became a philosophical issue with the acceptance of Enlightenment ideals, which tended more in the direction of a deistic theology or natural religion rather than one of supernatural involvement on

the part of God. This philosophy undermined the plausibility of miracles; with a clockwork universe, the disturbing hand of God in the affairs of the world became uncouth.

Beginning with figures such as Hermann Samuel Reimarus (published posthumously in the 1770s by Gotthold Ephraim Lessing), who was greatly influenced by the English Deists, the miracles of the Old and New Testament were argued to not have happened as described, if at all. Reimarus in particular argued that many of these amazing claims in the Gospels were purposefully fraudulent. He also appears to be the first person to question the historicity of the Star, noting its miraculous nature and its similarity to the pillar of fire in the Old Testament (Alexander 1972, 2:536). The publication of Reimarus's fragments in the papers in Hamburg led to public outrage and censorship, but his arguments could not be ignored. Scholars who maintained the historical validity of the Bible while ascribing to a mechanical view of the world created an interesting paradigm that harmonized revelation and natural law: the miracles of the Bible were ordinary events misunderstood. One of the most notable figures in this movement was Heinrich Paulus. In his most famous example, Paulus argued that the miracle of Jesus walking on water was in fact a quite mundane event: Jesus was on the shore on a misty day and the Disciples mistook their master for doing the impossible. This became the background for the next stage in interpreting the Star (Schweitzer [1913] 2001; Lemche 2008, 257–64).

The attempt to apply this strategy to the Christmas Star must have begun after 1800 considering that the work of Charles François Dupuis, who tried to use astronomy and astrology to explain all religions, including Christianity, did not embrace an astronomical version of this infancy story and instead considered it a fiction ([1795] 1872, 240). The first person in the nineteenth century who argued for a naturalistic Star of Bethlehem is probably the German Protestant theologian Christian Gottlieb Kühnöl (1807, 23). He contended that the Star was one or more meteors in the direction of Bethlehem, but few accepted his hypothesis. Later, Friedrich Gottlieb Süsskind tried to argue about the meaning of some of the phrases in Matt 2:9, namely how the Star “went before them.” Taking the verb *προάγω* (to lead ahead) that was in the imperfect tense to be read as pluperfect, this seemed to avoid the implication that the Star traveled before the Magi as a guide, making the text amenable to naturalistic readings. Another approach from J.C.K. von Hofmann left the Star in the sky and let the Magi find the child by questioning the locals and only peculiarly referring to the Star as a guiding light (see Strauss 1835, 220–53).

For an actual explanation of the Star that some found convincing, one must turn to another figure whose work is better remembered in the field of archaeology. Friederich Münter, bishop of Zealand, was a member of the Danish Academy of Sciences and one of the early pioneers in decoding

cuneiform texts of the ancient Middle East (Stiebing Jr. 1994, 92–93). His focus on the Star as a natural occurrence seems to have fully begun in 1820 when he presented a lecture on the subject. What Münter had done was drop the new star of Kepler, and using the writings of the Renaissance rabbi Don Isaac Abravanel, he had the 7 BCE conjunctions act as the signal and object that the Magi would notice and follow. With this, Münter initiated the modern hunt for the Star of Bethlehem as a completely natural phenomenon. Along with Münter in promoting the conjunctions as the Star was Johann Wilhelm Andreas Pfaff, a Tübingen-trained astronomer and considered the last great German astrologer, and another astronomer and chronologist named Christian Ludwig Ideler, who would inadvertently attribute Münter's idea to Kepler (Münter 1820, 1827; Pfaff 1821; Ideler 1826, 400ff.; cf. Burke-Gaffney 1937). Paulus would also defer to Münter when he considered the Star (1830, 204–11, 21–2).

In addition, Ideler proposed that the conjunctions of Jupiter and Saturn were close enough that one with weak eyes would see the two blend together, making one star. This became important because Matthew speaks of only one Star (ἀστὴρ), avoiding another term that could mean a plurality or constellation (ἀστρον). Even by his calculations, the planets never came closer than about one degree, and this was made clear by recalculations at the behest of Rev. Charles Pritchard, who argued against this naturalistic view of the Star (1856, 1857). The planets in 7 BCE never came closer than about two moon diameters, an observationally significant distance that cannot be pushed aside by optical issues.

With time, the method that made miracles into lackluster events seemed to more scholars as abusive to the text, not to mention the authors. For Reimarus, the Disciples were fraudsters; for Heinrich Paulus, they must have been hopelessly obtuse. The dissatisfaction with such theories can be seen in the lectures of Friedrich Schleiermacher (between 1819 and 1831), who moves between rationalized miracles and fictional accounts, but generally avoiding the former and the need for historicity as important to theology (Gilmour 1975; see pp. 45–81 concerning the Nativity). The rationalizing paradigm itself was taken to task by the young David Friedrich Strauss in his *Das Leben Jesu kritisch bearbeitet* (*The Life of Jesus Critically Examined*) (1835), where he attacked many of the rationalistic arguments that began after Reimarus and hammered at much of Paulus's efforts. In particular, Strauss did away with the assumption that caused Paulus and others to think so little of the followers of Jesus, namely the belief that the Gospels were eyewitness, historical reports.

Included in his examination was the research by Münter and others on the Star of Bethlehem, demonstrating how it failed to fit what Matthew spoke of, even using suspect grammatical arguments. Strauss pointed out that the context strongly implied the Star was taking some guiding action because it was “going before” the Magi “until” the Star arrived at its location—in this case, when the Star reached the house of Mary and



Joseph—which excluded the verb having a pluperfect sense. Strauss also demonstrated that the story was probably legend, not history, dependent upon the prophecy of Numbers 24:17. The guiding star from Virgil's *Aeneid* was also compared to the Christian Star (Strauss 1835, 220–53). Matthew's story was now considered the active creation of the author using literary tropes and scriptural interpretations, writing myth rather than history.

Though Strauss's book was controversial and cost him his theology professorship, he was not far outside of the mainstream of the scholarship at that time (Wells 2009, 74–77). After Strauss, few academic theologians argued for a naturalistic Star, instead either preferring a miracle or accepting the historical-critical approach. The astronomers and reverends Thomas Milner (1843, 348) and Brennan (1898, 178–81) with theologian J. H. Kurtz (1857, 272) all unambiguously called the Star miraculous in their tomes about astronomy and biblical studies, while Frederic William Farrar's popular *Life of Christ* considered the astronomical conjectures an amusing bit of exegesis, but the supernatural was still needed (1874, 23; cf. Andrews 1891, 6–10). While American writings such as Thomas Paine's *Age of Reason* (1807, 10), Thomas Jefferson's Bible, and the Book of Mormon (Helaman 14:3–5; 3 Nephi 1:21) saw the Star as miraculous, they are too early to reflect how scholarship from Europe influenced American thinkers. Nonetheless, the United States was not a safe harbor for naturalized miracles, as seen in several examples. David Addison Harsha, a prolific and well-received student of theology from New York, used the Star as the yarn to stitch together a large work on the nature of Christ and salvation; like many others, he called the Star miraculous (1864). Ellen G. White, prophetess and Seventh-Day Adventists cofounder, directly stated that the Star was not a fixed star or planet but more like an angel (1898, 60). The same attitude favoring the miraculous can be seen in Catholic periodicals around the same time (Searle 1888). One of the very few American writings supporting a natural Star comes from an astronomer and Reformed Church pastor (Appel 1878), but this would appear to be a cry in the American wilderness. The completely naturalistic theories return occasionally among some conservative biblical scholars in a positive light, such as Bernhard Weiss (1883–1909, 1:264–5; cf. Bullinger 1893, 40–43; Seiss 1885, 159–67), but such examples become increasingly rare. Primarily what is seen is skepticism toward the Star of Bethlehem in academia and acceptance of the supernatural otherwise (Paffenroth 1993, 450–2).

Ultimately, naturalistic explanations for the Star of Bethlehem came to exist because of the conflict between the scholars' beliefs in the authenticity of the Bible and its marvels along with the nonmiraculous world. These efforts included reinterpreting—practically rewriting—the texts to make them better fit some possible physical event in order to guarantee the authenticity of the revelation from the Evangelists. The weaknesses in the approach did not take long to be noticed and were in a generation overrun

by what has become the modern consensus: the authors of the Gospels were not concerned primarily with history but with theology, and their stories must be viewed critically.

#### TWENTIETH-CENTURY ASTRONOMICAL THEORIES ON THE STAR

By the turn of the century, the discussion was a shell of its former self within academic circles. Some literature would include the Star, such as that of astronomer Edward Walter Maunder (1908, 383–400), but rarely from biblical scholars. The few theologians who tried to continue the fight over the nature of the Star, including the influential conservative Theodor Zahn (1905, 87–102), often had to reinterpret Matthew’s narrative into something they admitted it did not clearly say. For example, the theologian Heinrich Voigt (1911) tried to argue for an astrological hypothesis, but he considered much of Matt 2:9 to be metaphorical, allowing him to redefine most of the Gospel episode. However, one new step was taken by Voigt concerning the Evangelist’s language. The phrase *ἐν τῇ ἀνατολῇ* in Matthew 2:2, 9 was reconsidered and thought to mean not that the Star was seen “in the East” but “at its rising,” in particular a heliacal rising. Hence, a piece of astronomical terminology was woven into the First Gospel, giving renewed probability to astronomical/astrological Star theories. That the Evangelist used exacting terminology as well as metaphorical language may seem peculiar, but this was the proposed model.

However innovative, his view on the Greek phrase would be attacked and called naïve by no less an authority on philology and ancient astrology than Franz Boll (1917). Voigt was also ridiculed by the famous philanthropist and theologian Albert Schweitzer, saying how Voigt’s astrological arguments were “not worthy of a German professor of the twentieth century,” that “ideas of this sort should not even be toyed with,” and he complained about Voigt’s lack of consideration of objections (Schweitzer [1913] 2001, 464–5). Boll saw the entire effort as fruitless, like finding the variables in the equation  $A = x + y$  with  $A$  unknown, simply something to shake one’s head at because it was such a worthless endeavor, helping neither faith nor history. Schweitzer considered the enterprise pre-Straussian: “What use is any historical scholarship to modern theology if respect for reason is shaken and passion for it cooled?”

As can be seen from the previous discussion, the terminology of Matthew’s account was not read plainly in order to give a naturalistic interpretation of the narrative. This led the respected Catholic scholar Raymond Brown to point out that astronomers do not take everything in Matthew literally. Rather, Brown saw that the biblical scholars and astronomers were talking past each other; the theologian could point out the background for the creation of the story, while the astronomer could identify something that may have inspired the tale. This made available

a spectrum of possibilities, from some astronomical or astrological event that inspired the Magi to travel to Bethlehem, to invention on the part of Matthew or his source ([1977] 1993, 612–3). Brown, following a suggestion from decades earlier, proposed that the procession of Tiridates, king of Armenia—which consisted of Magi and came in the year of Halley’s Comet—may have provided the superstructure of the tale. However, Brown’s observation that the scientists were not reading all of Matthew literally was already changing by midcentury.

During the first half of the twentieth century, little progress can be said to have been made in deciphering a naturalistic explanation for the Star. Often old ideas were repeated and their objections muted. Some supposed that the rising of a single planet such as Venus or Mars was sufficient to explain the Star (cf. Fotheringham 1908; Chapman-Rietschi 1996), but such views created no consensus and disappeared from discussion. When the omen tablets of the *Enuma Anu Enlil* and astrological epistles from Babylonia and Assyria had begun to be translated, it was poured over by some proponents, but little has been made of these old collections of astrological prognostications. The discovery of a Babylonian star almanac forecasting the positions of the planets in 7/6 BCE had a mixed effect, some sighting it as evidence that the eastern astrologers knew of the conjunctions, while others used it to point out how uninterested the Babylonians were in these events (Sachs and Walker 1984). The last professional book on the subject by an academic theologian was a student of Zahn, Oswald Gerhardt in 1922, and by 1970 nothing in the peer-reviewed biblical journals was being written by professional Bible scholars defending the historicity or physical nature of the Star (for the last such article, see Gaechter 1968).

With the idea of a physical Star dead or dying in theological circles, the early twentieth century seems to be the time when astronomers became the primary advocates. Starting in the 1930s, there were numerous planetariums in major cities, and from these earliest times they had Christmas and Star of Bethlehem shows. It may be here that the transition took place as astronomers either became interested in the subject on their own or because of public curiosity (cf. Richardson 1937). Popular literature around this time also becomes more favorable to naturalistic theories, much of it coming from planetarium employees.<sup>2</sup> In popular writing and shows, scholarly detail has a tendency to wither, especially when researched by nonexperts, and many errors began here that are often repeated in Christmas shows (Mosley 1981). On the other hand, the scientific, peer-reviewed literature was bereft of such speculations for nearly a century until David Hughes’s paper in 1976,<sup>3</sup> leaving the conversation almost entirely in a nonacademic realm.

In the late 1950s, the Austrian astrophysicist Konradin Ferrari d’Occhieppo would begin publishing on Matthew’s Star in popular press (1958), with more notable publications in later decades. Examining

translations of ancient astronomical tablets from Babylon, he argued that the Magi were interested in the heliacal rising, retrograde, and stationary acts of the planets, especially during the triple conjunction in 7 BCE that they could predict in advance. As such, when Matthew said the Star “went before,” he is referring to the retrograde motion of one of the planets, probably Jupiter. Similarly, “stood” must have meant that the Star came to a stationary point (1978; 1999). Ferrari d’Occhieppo’s work initially was not well known outside of German readership, as seen by the absence of his ideas in Hughes’s article in *Nature* (1976). After publishing in English in 1978, his ideas became well known through Hughes’s book the next year (1979).

While Ferrari d’Occhieppo’s semantics have become central to recent discussions about the Star among scientists, his suggestion that the addition of the zodiacal lights can explain the Star has received virtually no support, and most astronomers were still ensnared by the conjunctions of Kepler and its drawbacks. Even those who proposed a comet or supernova as the Star returned to the conjunction to give it the astrological weight needed to coax the Magi to make the trip from afar. One notable exception is Ernest Martin, a former meteorologist who became an evangelical Christian in the Radio Church of God (or the Worldwide Church of God) founded by Herbert W. Armstrong. Martin’s Star research dwelt on an extremely close conjunction of Venus and Jupiter in 2 BCE in the constellation Leo, as first noted by Roger Sinnott (1968). This theory looked attractive because it would better explain Matthew’s description of one Star. Martin came to an exact date for the birth of Jesus: September 11, 3 BCE. The hypothesis’s most noteworthy flaw was in chronology: according to Matthew, Jesus was born before Herod the Great’s death, but Herod expired some time before Passover in 4 BCE. So Martin tried to move the date of Herod’s death to 1 BCE, comprising the majority of his writing on the subject (1980; 1991), which has been unconvincing to most historians (cf. the essays in Vardaman and Yamauchi 1989). Nonetheless, Martin’s hypothesis has become one of the most popular demonstrations in holiday shows in American planetariums and elsewhere since the 1980s, in part because of the support he received from John Mosley of the Griffith Observatory (Mosley 1987).

Separate from Martin’s ideas is the work on the nova/supernova hypothesis. There is virtually no mention of such an idea in the nineteenth century that is understood scientifically. Rather, a nova is simply a new star and was seen as incredible, even miraculous (cf. Upham 1873, 109). The mechanics of “new stars” were not yet well understood, making the novae of the past all the more mysterious, which had the advantage that their timing could be neither predicted nor disproven. The earliest use of novae understood as natural objects<sup>4</sup> for the Star in the professional literature comes from Charles S. Smith (1932) arguing for a nova flare-up with perfect timing such that the Magi looked toward Bethlehem and saw

the Star with renewed brightness. The nova option was later entertained in popular writings (cf. Gamow 1940, 176–7) but rarely advocated. A decade later, Knut Lundmark, a Swedish astronomer who was an early pioneer in using novae to find the galactic distances, ventured into the realm of Star scholarship. In particular he cited Oriental sources indicating cometary objects in 5 and 4 BCE, and he would argue one of these comets was a nova (1953). Another proposal for a supernova from H.A. Blair (1959) consisted of a nova in the constellation of Cancer, a star pattern he contended was called “the manger,” and this was the place where the Star stood.

Perhaps more influential was the short science fiction story by Arthur C. Clarke that received the Hugo award. Based on an earlier piece for popular press, the story has a future astrophysicist on a research mission discovering a star that exploded, which would have had its light reach Earth at just the time needed for the Magi. However, Clarke’s tale had the supernova destroy a peaceful civilization, causing a deep crisis of faith for the Jesuit protagonist (1955; 1972, 32–41). The previous works of Smith, Lundmark, and Blair were forgotten, unlike Clarke’s tale, and popular media speculations would continue sighting the nova hypothesis.

Finally, arguments favoring the supernova Star would enter into scientific literature with David H. Clark, J.H. Parkinson, and F. Richard Stephenson (hereafter CPS [1977]), who had rediscovered the comets from about the time of Jesus’s birth recorded in Chinese and Korean annals. Claiming in their paper about the Star not only to have given the conjunction hypothesis its “quietus,” the team argued that the “broom star” the Chinese reported was in fact a nova, and this was what Matthew described. Remarkable was their attempt to turn reports about two comets, one with an observed tail, into one nova. Their argument was primarily based on the reading of a Korean record of a tailless comet in 4 BCE. The team argued that this was another attestation of the Chinese record, the Korean one erring in date because of sloppy handwriting. The Chinese and Korean objects were also a considerable distance apart, about 20 degrees, so CPS took an average of its location.

The primary claim that the Korean record refers to the older Chinese record was contradicted by Chinese historian Christopher Cullen (1979), noting that the Korean record is dependent on an older Chinese document, so the Chinese viewed two different comets in 5 and 4 BCE, the latter occurring after Passover and Herod’s death. This seriously undermined the primary argument that the 5 BCE object was a nova. After Cullen had sent his critique, CPS were given the opportunity to respond, but opted not to. No counterarguments have been published by CPS or anyone who utilizes their research.

While the late 1970s saw a surge of papers and books on the subject, the next decade had little to call upon that was innovative except perhaps the suggestion that the Star was an early sighting of the planet Uranus

centuries before its discovery by telescope and yet forgotten (Banos 1981). But the following decade would be more prolific, with the publication of more papers and books by scientists that make the current debate. Today the diversity of opinions has not diminished but bifurcated along all natural propositions. Instead of one planetary hypothesis, there are several: the great conjunctions, Martin's Venus-Jupiter conjunctions, and recently Michael Molnar's horoscope with a Jupiter-Moon occultation (1999). Mark Kidger's (1999) work on the supernova hypothesis builds on the research of CPS, while comets are proposed despite the near-universal belief that they are a terrible omen (cf. Humphreys 1991), and both theories employ the great conjunctions of Kepler. These views on conjunctions, novae, and comets also contend with other suggested hypotheses (and combinations thereof) including meteors, bolides, meteor showers, eclipses (lunar and solar), twinkling stars, variable stars, single stellar risings (i.e., Sirius, Spica), single planetary risings (all classical planets and Uranus have been suggested), the transit of Venus, planetary discoveries, asteroid discoveries, constellations, aurora borealis, zodiacal lights, precession of the equinoxes (Stasiuk 1980), ball lightning, and UFOs (Downing 1970, 134). "Anything that has ever moved across the canopy of heaven, as well as much that has only existed in men's imaginations, has been dubbed the Star of Bethlehem" (Keller [1955] 1995, 325).

#### CURRENT AND FUTURE EFFORTS

New books and articles about the Star are almost annual, and a consensus is hard to find. This is in part because each of the theories that have been presented has serious undermining issues. Supernovae do not move against background stars, making it hard to explain how they can "go before" the Magi and stand over a particular place. Conjunction hypotheses have the problem of making multiple stars into one Star. The phrases "went before" and "stood over" are read in many ways, such as the Star was at the zenith or when viewed from Jerusalem it appeared near the horizon to the south or anywhere in between the horizon and zenith in the direction of Bethlehem; on the other hand, Ferrari d'Occhieppo, Molnar, and others read these phrases as astronomical terms. Molnar's occultation of Jupiter by the Moon is seen by him as a strongly regal astrological configuration, while others point to Assyrian and Babylonian records that say this foretold the death of kings (Adair 2007). Comets are usually seen as evil objects by the ancients, yet the extremely few exceptions are pointed to as if they were the rule. These solutions fail to be convincing to those who believe another hypothesis, and none have persuaded biblical scholars in general who read the story in light of the tale's cultural background.

One trend in this research from the early nineteenth century onward has been trying to treat the language of Matthew more literally. Since

Voigt, there have been attempts to make the Greek words of Matthew correspond to astronomical terminology, with Molnar as the prime recent example. This trend may be seen by proponents as more rigorous and thus more desirable than metaphorical understandings of the Gospel. Moreover, there is cognitive dissonance in maintaining that Matthew relates natural, historical facts while insisting there is poetic license. The astronomers thus become more literal-minded in their interpretation, yet avoid the miraculous.

Perhaps the most frustrating issue in the search for the Star has been discovering what would have been astrologically important to the Magi. For example, in trying to find the correct constellation that represented Judea, one can find literature supporting Pisces, Aries, Aquarius, Gemini, Scorpio, Capricorn, Virgo, Leo, Cancer, Coma Berenices, and Andromeda.<sup>5</sup> Analysis of ancient Western astrological texts can be misleading, since not only is there uncertainty in what the Eastern astrologers were doing with their horoscope methods, but the early Western records are scarcely harmonious.<sup>6</sup> Tamsyn Barton (1994, 114–42) also demonstrates that ancient astrology tomes cannot tell us how astrologers actually made their predictions in the first place.

Little suggests a consensus is likely to emerge in the near future among the scientists that explore this issue, while biblical scholars either ignore this area of inquiry or do not accept the results while make passing and dismissive remarks about Star scholarship (cf. Brown [1977] 1993, 610–13; Beare 1981, 75, 80; Davies and Allison 1988–1997, 1:246–7; Luz 1989, 132; Allison 1993; Funk 1998, 508; Freed 2001, 92; Dunn 2003, 343–4; Holtmann 2005, 13, 153; Nolland 2005, 109–16; Borg and Crossan 2007, 182; France 2007, 68–69, 74; Ehrman 2009, 32). As one scholar puts it, “The leading of this star is so obvious that it requires no scholarly interpretation. It points out the exact house where Jesus has been born. As a sign, it appears to function as a divine portent so blatant that any fool could follow it” (Powell 2000, 11). Another says, “If the apologists are right [about the Star], the Bible is wrong” (Price and Lowder 2005, 13). More notably, “No recognized New Testament scholar, Catholic or Protestant, would today seriously defend the historicity of these narratives” (Spong 1992, 44–45).

If any breakthroughs are likely to happen, it will be concerning either the history of astrology or the Greek of Matthew. Molnar has already tried to relate particular words from the Nativity to astronomical/astrological language, which has not been accepted by Greek-reading scholars. While the phrase *ἐν τῇ ἀνατολῇ* likely pertains to the rising of the Star, reading this as a heliacal rising is unlikely, since the term used by ancient astronomers was *ἐπιτολή* (Boll 1917; Roberts 2007, 120–1). The inability to read Greek is a pervasive issue among Star proponents who make numerous and sometimes ghastly mistakes.<sup>7</sup> In spite of these rationalistic

labors, some astronomers have called the story a legend, especially when comparative mythology place the tale in the same category of many other legends of past heroes (cf. Cullen 1979; Voigt 1989; Berman 2001; Jenkins 2004; Hansen 2005; Adair 2007; Plait 2009, 59–67). To quote Otto Neugebauer on recasting miracles including the Star: “I think it better simply to discard such sources for the reconstruction of historical data” (1975, 608).

### THE INTERACTION

With this long history of many voices, the overall interaction between the sciences and religious claims is complex, but there are enough similar responses that can be categorized using the headings supplied by Barbour (1997): conflict, independence, dialog, and integration. His relations between the sciences and religion focused on larger exchanges such as in cosmology and evolutionary biology rather than the minutia of particular historical claims, but they ought to be applicable. However, there are two things worth noticing that make these groupings more dynamic: in many circumstances the interactions cannot fit into a single category, and conflicts push for resolution either by one side “winning” or by some compromise or re-imagining.

For much of early Christian history, the Star and astronomical sciences were directly in conflict: the story details a nonscientific miracle, full-stop. A supernatural Star was beyond what these stargazers could explain, and our ancient sources mistrusted deterministic astrology in large part due to their religious convictions. The argument was resolved for most of these figures in antiquity and into the medieval period by discarding astronomy and denouncing astrology; the quarrel ended because there was a clear winner.<sup>8</sup> The conflict between astrology and the story from Matthew became a more considerable problem when the former was taken seriously by scholars such as d’Ailly and Kepler. As this dispute could not be resolved by downgrading stellar interpretation, integration was sought either by claiming that celestial lights were not fully deterministic or that the planets only acted as signals for the Magi.

Later, the advent of higher biblical criticism with Reimarus and Strauss brought about a new conflict: the dogma of the Gospels’ historicity and the critical methods that question this assumption, making the old integrations untenable. This struggle was resolved in four ways: accepting the historian’s position and altering dogma; rejecting historical methods and believing in miracles; rejecting religion because of historical methods; or using the sciences to find some possible way to explain the tale without recourse to the impossible. The first could be categorized as independence, since figures like Schleiermacher held that the core of Christendom did not rest on these historical claims but more spiritualistic aspects; theology is primarily informed not by what actually happened but through the message



of the Gospel. The second is clearly holding to conflict in much the same way as found in antiquity with the Star and astrology or among modern creationists where science loses; the rejection of unfavorable historical evaluations maintains the creed. The third is similar to the second but with the opposite conclusion. This position is found with religious skeptics who use the conflict as an example of why such beliefs are doubtful. The fourth is what we have come to see among nineteenth-century rationalist theologians and modern scientists and could be categorized as integration.

However, it would not be correct to say that modern astronomers have successfully integrated the sciences with the Gospel. This is because their arguments are made in spite of the consensus of historians and theologians that the events depicted in Matthew are primarily legend. The integration also requires significant reworking of the Gospel passages that most authorities reject. As such, these astronomers have taken a position of conflict with experts in the appropriate field for investigating the historicity, composition, and meaning of these tales. The lack of engagement with the specialists in these matters is at odds with a rigorous, scientific approach: engaging with all the evidence both for and against ones position. The large number of theories and lack of consensus also show a severe problem with this approach. As such, the integration of astronomy and the Star engenders a conflict with historical analysis. This leaves other, perhaps emotive reasons for believing the tale.<sup>9</sup> A century ago Schweitzer saw these labors as disingenuous and considered such efforts a scholarly mask concealing modern superstitions ([1913] 2001, 465), and today these labors continue to justify believing religious tales.

The defense of the Star's reality would better fit with apologetics and evangelism, which can be seen by the use of Star scholarship. A century ago Francis William Upham (1873, 306) used his work on the Star in the promotion of the Christian faith against atheism, and modern efforts against "New Atheists" also cite Star research (cf. Poole 2009, 43). Ernest Martin's work is clearly evangelical in nature, as well as other researchers; in particular, Fredrick Larson, a student of the influential apologist Francis Schaeffer, has a popular website and film (produced by Stephen McEveety of Mel Gibson's *The Passion of the Christ*) promoting Martin's hypothesis for the purposes of evangelism. Likewise, astronomer Craig Chester (1993) uses Martin's hypothesis in the politically conservative magazine *Imprimis*. Costantino Sigismondi (1998; 2002), an astrophysicist with Vatican ties, applies natural theories of the Star in light of Catholic theology, as did Gustav Teres (2002) of the Vatican Observatory. For cosmologist Frank Tipler (2007, 140–53), the physically explained Star is evidence of traditional Christianity. The BioLogos Foundation, started by the evangelical and former head of the Human Genome Project Francis Collins and partly funded by the Templeton Foundation, also uses the Star to show the historical reality of the Bible and reconciliation between

science and religion (Giberson and Collins 2011, 108). Physicist Colin Humphreys (1991), a member of the Faraday Institute for Science and Religion and the Templeton Foundation, also tries to explain biblical marvels as physical events, including Exodus miracles and the Star. Another physicist and evangelical, Robert Newman (2001), who elsewhere defends biblical miracles (Geivett and Habermas 1997, 214–25), applies Martin’s thesis along with a supernatural Star for the purpose of promoting the faith, which an unnatural event alone cannot do: “The apologetic value of this sequence of [natural] events . . . is enormous.”

Newman’s testimony in particular shows why this paradigm exists. A miraculous Star is easy to dismiss for readers who treat such extraordinary stories with skepticism unless they are already believed, but a natural phenomenon becomes credible rather than fictitious, making these efforts useful in apologetics (cf. McGrath 1990, 34f. Strobel 1998, 50; Cabal 2007, 1405; Thong and Fu 2009, 310–7). Much the opposite is found in non-Christian works: compare the freethinker Isaac Asimov (1976, 183–94) who entertained various speculations regarding the Star because they were interesting what-if scenarios, but he still rejected historicity (cf. Carl Sagan quoted in Brown 1975; Gardner 2001, 40–48). The literature is bereft of skeptics using a naturalized Star to explain miracles away; only the converse is true.

This analysis indicates that Barbour’s categories can break down when scholars attempt to incorporate their scientific abilities with their religious beliefs yet do not fully embrace scientific, rational methodology when it does harm to such integration. The overall history of the Star’s interpretation is largely conflict and independence, while integrations are either partial or not long lasting. As the subject matter is still popular, there will, almost certainly, continue to be efforts to find the Star as a real object in the heavens above rather than a literary symbol in the pages below.

## NOTES

I wish to thank Matt Goldish, Daniel Hobbins, and Christopher Otter for help with early drafts of this paper. I was also helped by the anonymous reviewers from *Isis*. Nonetheless, any and all errors are my own. I must also thank David Hughes for his help in detailing his involvement in Star scholarship and his support in my endeavors into the subject matter.

1. Often there is confusion regarding the definition of great, greater, and greatest conjunctions. North (1980, 186) says that great conjunction are simple conjunctions of Jupiter and Saturn, greater conjunctions when the great conjunction first takes place in a new triplexity, and the greatest when a great conjunction first takes place in the Fiery trine.

2. Using Freitag (1979), van Gent’s online bibliography, and adsabs.harvard.edu, the number of popular magazine publications about the Star are 1901–1910: 2; 1911–1920: 2; 1921–1930: 5; 1931–1940: 14; 1941–1950: 11. These numbers do not include pamphlets from planetariums. More than the first decade of *The Sky* (later *Sky & Telescope* in 1941) included an essay each year on the Star (1936 through 1947).

3. Discussion in the 1873 issues of *Astronomy and Astrophysics* was the last time an academic journal would consider the subject at length until Hughes in *Nature* and the responses it would produce. A mere paragraph on the subject appears in *The Observatory* (1909, 104) and a small

response a year later. According to Hughes in an e-mail correspondence, his paper in *Nature* came about serendipitously, starting with a one-page collection of ideas for his extramural students and then a conversation with the editors of *Nature* at a party.

4. Novae and supernovae were distinguished after 1885, and these objects were understood to be not new stars but changes in older ones come 1918. Concerning this history, see Lankford (1997, 363–4).

5. Most of these constellations related to Palestine can be found in the various astrological geographies of antiquity (i.e., Ptolemy, Manilius, Dorotheus of Sidon, Hephaistio; see next note). Various secondary sources only add possibilities. Hagar (1918) relates almost the entire zodiac, Orion, and other bright stars to Christ's birth. Coma Bernices was argued by Papke (1995, 47–55, 104), and Andromeda by Tipler (2005).

6. For an example of diversity, Ptolemy (*Tetrabiblos* 73–74) says that the constellation Aries is representative of numerous lands, including Palestine, but Manilius (*Astronomica* 4.620–7, 797–8) in the early first century assigns this region to Aquarius under the name of Phoenicia (*contra* Molnar 1999, 47), Dorotheus assigns Gemini, and other sources are even more contradictory. See Gundel and Schott (1936, 312). On pre-Christian Babylonian horoscopic astrology, see Rochberg (1998).

7. See the review of Molnar (1999) by Birdsall (2002). Similar blunders exist in Teres (2002, 20f.), including that the tense of the verb  $\pi\rho\omicron\delta\acute{\alpha}\gamma\omega$  in Matt 2:9 was the aorist imperfect, a nonexistent, impossible tense. Kidger's only use of Greek (1999, 289) has the wrong case after a preposition (the nominative rather than dative) and invents a definite article when changing from singular to plural. Often Star scholars do not consult the Greek at all, (cf. Humphreys 1991; Martin 1991; CPS 1977).

8. It should be noted that astrology lost not because it was unscientific or wrong but because its conclusions were theologically untenable—determinism was the problem, and the same conflict would have happened in the past if reductionist neuroscience was sent back in time.

9. In e-mail conversation, Hughes expresses an anxiety in figuring what is truthful in Matthew and what is not because of the slippery slope it creates. Perhaps a similar understanding exists among other Star researchers: if this story is fictitious, then what can be left for faith with certainty? It is worth noting that Hughes has become more skeptical of the Nativity story.

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