Identifying the Star of Bethlehem

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Fred Wisse's background in engineering has brought rigour and method to his thinking. This, and perhaps the lasting influence of France on his native Holland, have led to his insistence on clear and distinct ideas. Amongst the many things Fred has impressed upon me, I have learned to keep in mind at least the following three points when studying a text: first, determine what needs to be explained in the text, second, eliminate superfluous hypotheses (Occam's Razor); and third, when constructing a theory to explain the text, always determine what evidence would invalidate the theory; if no evidence could invalidate the theory, then the theory does not add to knowledge (Principle of Falsification).[1]

The title of this article is purposefully misleading, like the title of one of Fred's books.[2] Although it does close with a tentative identification of the star, the article actually reviews others attempts at "identifying the star of Bethlehem." Many have tried. Most have failed due to a lack of clear and distinct ideas about the nature of the problem. This article will first ask what needs to be explained in the text. Taking what has become the traditional approach for studying the star from an astronomical viewpoint, the article will then look at the various classes of celestial candidates for the star and apply Fred's criteria to the theories supporting each class. The final and longest section will critically examine the theory of Michael Molnar, and conclude with hesitation that he may have identified the star. The modest contribution of this article, if any, consists in applying Fred's criteria to the problem.

Fred's first criterion should be applied immediately to the question, "Which heavenly body was the star of Bethlehem?" Matthew never names the star in question. Nowhere does the gospel seem to hint that the reader does or should know the identity of the star. Never does the story indicate that knowledge of the star's identity would help the reader understand the gospel or the function of this pericope in the gospel.[3] The identity of the star thus fails the test of what needs to be explained to understand the text. As such, knowledge of the star's

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identity does not form a part of New Testament exegesis as I have learned it from Fred.

Though the identity of the star of Bethlehem does not need to be explained to understand Matthew, it is a question which has fascinated readers of the gospel from early times. The story of the star of Bethlehem has had great importance in the history of Christendom quite apart from its context in the gospel of Matthew.[4] Once separated from exegesis, and their speculative nature recognized, theories on the identity of the star have a real place in scholarship.

Levels of Historicity

Fred's first criterion has been applied, and it has shown that the question of the identity of the star is not a problem of New Testament exegesis. This article will now pursue the problem of identifying the star of Bethlehem as a question of interest for the background of New Testament studies and for the history of Christianity.

To search for the star of Bethlehem, one must consider the historicity of the story as told by Matthew. Raymond Brown, in his classic work on the Birth Narratives, suggests three possible categories for the historicity of Matthew's story of the star. He says Matthew's story of the star of Bethlehem may be substantially historical (which this article will call "category one"), partially historical ("category two"), or totally a theological creation ("category three").[5]

For the purposes of reviewing theories on the identity of the star, this article will assume that the story is not totally a theological creation, that is, that it does not fall in category three. Since, as noted above, Matthew never names the star or seems to assume that the reader need know its name, it is hard to see what meaning a search for the name could have if the story is purely Matthew's theological invention. This article will thus assume that the story lies in Brown's first or second category, that is, that the story is substantially or partially historical. This is an assumption and not a result of this study. This approach can neither prove nor disprove the historicity of Matthew's story.[6] It rather assumes some historicity, and then may show which stars could or could not be consistent with an assumption of some level of historicity.

Brown's category two, which he himself calls "partial Matthean facticity" obviously covers a wider range of possibilities than his category

one, substantial historicity. For his "partial facticity," Brown suggests the following scenario:

> After the crucifixion and resurrection, as Christians came to recognize in faith what God had done in Jesus, they reflected on his birth against the background of the OT and Jewish expectations. An astronomical phenomenon had taken place sometime before his birth, and this was interpreted as the fulfillment of the star that Balaam said would rise. Perhaps some who acclaimed the birth of Mary's child were interpreted as magi in light of the stories of Balaam, and possibly of Tiridates and/or of Cyrus.[7]

When speaking of category two, this article will always assume a scenario compatible with this suggestion of Brown.

Matthew's Information about the Star

What details in the text might help identify the star?[8] The goal of this section is to draw out what the Matthean text implies about the star by which the various theories could be tested. These will form criteria for identifying the star. If a theory does not make a clear statement with regard to anything Matthew says about the star, then it probably cannot be falsified. These criteria will thus also serve to insure that any theory is making a statement which at least potentially adds to human knowledge.

If a given theory contradicts one of the criteria developed here, the theory is probably wrong. If the story of the star is assumed to be substantially historical, the criteria may be applied strictly; if the story is interpreted as category two, only partially historical, the criteria may have to be applied more loosely. In either case, but especially for category two, the study of history or literature must not be confused with mathematics or physics. In mathematics, one has to deal with rigorous proofs; in physics, one can at least hope to verify or invalidate a theory by experiment. In history and literature, like law, one must often be satisfied with the balance of probability.[9]

What does Matthew assert or imply about the star?

The star appears at least two years before the death of Herod the Great, presumably at the time of the birth of Jesus (Matt 2:1, 7, 16).

If the story of the star is substantially historical, any theory which names a phenomenon taking place later than two years before the death of Herod the Great is invalidated. If the story is in category two, then the phenomenon described must be such that people a generation or more later could believe it took place during Herod's rule.

The star is recognized by Magi as "his star," that is, the star of the new-born king of the Jews (Matt 2:2). They saw the star at its rising (Matt 2:2). They consider worship, gold, frankincense and myrrh to be suitable gifts for the new-born (Matt 2:11). Magi seeing the star at its rising and connecting it to a newborn suggest an astrological context. Any theory naming a star or astronomical phenomenon whose astrological interpretation is contrary to the interpretation which the text or the characters within the text give it, is thus falsified. This criterion applies equally well whether the story is category one or two. The challenge of this criterion is to identify correctly the historical astrological beliefs.

Herod and all Jerusalem are shaken by the Magis' report (Matt 2:3). They obviously consider it very important. Nevertheless, they seem either not to have seen the star, or if they saw it, not to have seized its import (Matt 2:3). This needs to be explained, without unduly multiplying hypotheses. For category one, extremely spectacular phenomena should be eliminated because they are contradicted by the surprise of Herod and the people of Jerusalem. If the story is only partly historical (category two), extremely spectacular phenomena may not necessarily falsify a theory, as time might lessen memories of past celestial marvels.

The Magis' report of this star, which they link to the new-born king of the Jews, causes Herod to immediately conclude that "the Christ" has been born (Matt 2:4). The phenomenon must thus be one that people could see as fulfilling some Old Testament or Jewish tradition associated with the coming of the Messiah. This criterion is weak, however, as history has shown that people are able to prove all sorts of strange things from scripture or tradition.

Finally, the star goes before the Magi as they travel from Jerusalem to Bethlehem, and stands above the place where the child was (Matt 2:9,10). This final indication, though important for the exegesis of the gospel of Matthew, is physically impossible for a star. Thus, this final indication may have to be explained specially, or be disregarded in the search for the identity of the star. It should be noted that this moving

star makes Brown's first category ("substantially historical") very difficult (Brown presents a longer list of obstacles which also makes him lean toward his second category for the star itself[10]).

Candidates for the Star

Comets

In the last few decades astronomers and biblical scholars have searched the ancient skies for comets, novae, supernovae, meteors, using the cuneiform tablets of Babylon, the Arabic astronomical records, and the Japanese, Korean and, finest of all the records, the Chinese records. They have looked at other incidental records which might reveal strange celestial phenomena. Most recently they have used desktop computers with astronomy programs to search the ancient skies for interesting conjunctions and occultations.

The Florentine artist Giotto di Bondone, who saw the comet Halley in 1301 and another comet in 1304, put a comet above the stable in his fresco of the Adoration of the Magi in a chapel in Padua. Giotto might have been pleased to learn that the Comet Halley did in fact appear in the sky in the year 12 B.C.E. It was extensively observed in China; there it was first seen on 26 August near Canis Minor and last seen in Scorpius 56 days later; it was observed by the Romans, and was reported as marking the death of the Roman General Agrippa. The Chinese annals report other comets in 10 B.C.E. (observed in Bootes near Arcturus), in 5 B.C.E. (near Capricornus, observed for over 70 days), in 4 B.C.E. (near Altair); the next recorded comet was not until 13 C.E.[11]

The date 13 C.E. is too late for the birth of Jesus. All the other comets listed are perhaps possible for category two. For category one, the comets of 5 B.C.E. and later do not fulfill the requirement of being at least two years before the death of Herod the Great, for which 4 B.C.E. is generally accepted. Halleys and the comet of 10 B.C.E. give acceptable dates, even if a little earlier than generally estimated for Jesus's birth.

The insurmountable objection for all theories advancing a comet is the ancient astrological view of comets. According to the records, people of the time always considered comets to be harbingers of evil events, not the birth of kings. The 12 B.C.E. appearance of Halley is

recorded in the Roman annals not as having announced any royal birth, but rather the death of the General Agrippa. The Jewish general and historian Josephus considered a comet to be the messenger announcing the coming destruction of Jerusalem (Josephus, *Jewish War* 6.288–289). The great astronomer and astrologer Claudius Ptolemy, although mistaken about the place of comets (he thought they were an atmospheric phenomenon) was quite clear about their astrological significance. He always saw comets as bringing bad events or bad weather: certain types of comets produced "wars, hot weather, disturbed conditions."[12] In another place he says "Of occasional phenomena in the upper atmosphere, comets generally foretell of droughts or winds. . ."[13] A positive interpretation of a comet would have been completely out of character for the understanding of comets at the time. Thus, any theory based on comets would seem to be invalidated by the criterion of needing to be in line with the demonstrated beliefs of the time.

Supernovae

In 1604 Kepler observed a triple conjunction of planets in the constellation Ophiuchus that appeared to give rise to a new star, a supernova in modern terminology. After these observations, Kepler came to believe the star of Bethlehem was a supernova similar to the one he had seen.[14]

Theories that the star was a supernovae fail the test of falsifiability. At the time of writing, no known Hellenistic Greek, Roman or Babylonian text gives an astrological interpretation of anything moderns can identify as a supernova.[15] It is thus impossible to say that the appearance of a supernova would be a sign of a king. No falsification is possible on the grounds of contemporary astrological beliefs.

Supernovae theories should be rejected on the criterion of time. No known ancient archives record what we would now call a supernova during or near in time to the reign of Herod the Great. For category one, a second contradiction is that a bright supernova might well have been noticed by Herod or the inhabitants of Jerusalem. Thus, supernovae theories are not only untestable with respect to astrology, they seem to be wrong on the simple grounds that no known supernova occurred at the appropriate time.

Planetary Conjunctions

It has already been noted that in 1604 Kepler observed a triple conjunction which he believed gave rise to a new star. Although he did not believe the conjunction itself to have been the star of Bethlehem, his comments raised this idea in the minds of some researchers. In 1968 Roger Sinnott published a short but influential article studying conjunctions which could explain the star of Bethlehem.[16] Since that time, conjunctions have figured as one of the most popular proposed explanations of the star.

The Babylonian cuneiform tablets have yielded one particularly interesting conjunction candidate for the star. The almanac written in 8 B.C.E. indicated that there would be a triple conjunction of the planets Jupiter and Saturn in the constellation Pisces in 7/6 B.C.E.

Based on this tablet, the Assyriologist Simo Parpola has proposed a plausible scenario for the events of Matthew's story.[17] The planets Jupiter and Saturn reached their first conjunction (about two moon diameters apart) on 27 May 7 B.C.E. Their second conjunction occurred on 6 October 7 B.C.E. which corresponds to 22 Tishri on the Babylonian calendar. Tishri was the month of Amurru ("the West") which may have given the magi the idea of going west to find the meaning of this phenomenon. They might then have travelled to Jerusalem, and then been directed to Bethlehem. If they left Babylon at the time of this second conjunction, they would have been in Jerusalem or Bethlehem in time to see Jupiter at its second stationary point on 7 November 7 B.C.E. and Saturn at its second stationary point on 20 November 7 B.C.E. This stationary point would, in Parpola's view, fit Matthew's description of the star stopping above Bethlehem. The third and final conjunction of Jupiter and Saturn occurred on 1 December 7 B.C.E. This date was about three weeks before the winter solstice when the Babylonians celebrated the good tidings of the victory of the god Nabu over the forces of darkness.

The dates of these phenomena are fine, and the explanation even seems to take into account real contemporary astrological beliefs. However, falsification of the astrological comments is not possible based on contemporary knowledge.

The same major problem of falsification arises with any theory based on Babylonian astrology. A great deal is known about Babylonian history. Babylonian astronomy, while less well known than Babylonian

history, is becoming more and more a known quantity. Babylonian astronomical texts have been published in two great collections, *Astronomical Cuneiform Texts*[18] and *Late Babylonian Astronomical Texts*.[19] The latter texts are in the process of being edited and translated. Babylonian genethliac horoscopy, however, is much less well known. Only twenty-eight horoscopes, and four birth notices, have come down to us. They have recently been conveniently collected in a single text, *Babylonian Horoscopes*,[20] which provides photographs, transliteration, critical notes and translation. Even this number, while remarkably small, gives a false idea of the amount of astrological data available from ancient Babylon. The form the ancient astrologers followed in writing these astrological tablets seems to consist of first a date, then a statement that the child was born, then the positions of the significant celestial bodies is given, then the tablet may close with a short astrological conclusion. But at least in their present condition, only tablets 2, 5, 9, 10–11 (duplicate), 16 and 27 in *Babylonian Horoscopes* have any astrological conclusions, and these are quite brief. Thus, as research stands at the moment, Babylonian astrology is simply not well enough known to provide criteria to falsify Parpola's theory.

Even if it were better known, Babylonian astrology is unlikely to be the appropriate astrology to form the basis for understanding Matthew. Matthew wrote in the Greek language. These cuneiform tablets of Babylonian astronomy or astrology were excessively esoteric, even in their own time. They were written in cuneiform. They were written in the Babylonian language, which was no longer the daily language even of the city of Babylon, let alone anywhere else. Furthermore, many of the cuneiform signs within these Babylonian language tablets were written with word signs borrowed from the long dead Sumerian language. This exceedingly archaizing system of writing would have been known only to very specially trained experts. It would certainly have been incomprehensible and probably even unknown to most people in Palestine at the time of Jesus's birth, and later almost certainly unknown to all Matthew's potential readers. Even if one assumes Matthew's story to have been completely historically accurate, the strange cuneiform script would not likely have been known to many of the inhabitants of the eastern Roman Empire. To show applicability in a case like this, one would have to prove that at least the tenets of Babylonian astrology were widely known to people in the eastern Roman Empire in the first century. By

comparison, at least the main tenets of Hellenistic astrology seem to have been very generally known in the Hellenistic world and everywhere in the Roman Empire.

Conjunction and Nova

Kepler's observation of a conjunction followed by a supernova together may be the grandfather of a recent theory by Mark Kidger which starts from this triple conjunction of 7/6 B.C.E. and adds a nova to suggest a novel explanation of the star of Bethlehem.[21]

First, according to Kidger, the Magi observed in Persia (most likely) the triple conjunction of 7 B.C.E. in the constellation Pisces, which he believes is the constellation of the Jews. Then in February there was a massing of the planets Jupiter, Saturn and Mars in the constellation Pisces. His theory then speaks of pairings of the Moon and Jupiter and Mars and Saturn, and of two occultations of Jupiter. Following David H. Clark's work,[22] he adds to this a nova in 5 B.C.E. This nova he claims to have been recorded by the Chinese and perhaps the Koreans.[23] Most fascinating of all, the nova (if such it was) was situated such that it would have at first appeared in the east at dawn, but then two months later (the time to travel to Jerusalem and consult Herod) it would have appeared at dawn in the south, the direction from Jerusalem to Bethlehem.[24]

In a final, very tentative suggestion, Kidger theorizes that the nova may have been DO Aquilae, because it is a variable star near the position the Chinese recorded for what he claims to be the nova of 5 B.C., and is listed as a nova or nova-like star in the *General Catalogue of Variable Stars*. This would make the star of Bethlehem a known star which could flare up again some day.

Kidger's theory is invalidated if Matthew's story is fully historical (category one), since the final phenomenon occurs too late. The date is acceptable for a category two interpretation of Matthew.

Kidger's real problem lies elsewhere. His theory has a critical problem with respect to astrology. His suggestion is in many ways the cleverest to date. It makes use of several categories of phenomena, shows how astute observers' interest could be raised and to successively higher levels, culminating in the striking phenomenon of a new star. But he fails to demonstrate that the earlier phenomena would have had the effect on magi assumed by the text of Matthew.

His final identification of the star as a nova poses many problems. The Chinese records actually use a term normally meaning "comet" for the phenomenon he identifies as a nova. If it actually was a comet, it falls under the objections raised above for all comets. Clark whom he follows makes a good but by no means airtight argument that the Chinese records actually imply a nova, and then needs special pleading to make the Korean records confirm the nova. If Kidger is correct in taking it as a nova, in so doing, he has painted himself into another astrological corner: neither the very skimpy Babylonian astrological records, nor the ample Hellenistic records, tell us how a nova was interpreted by magi. Thus his theory falls in the category of those theories which cannot be falsified.

Heliacal Rising of Jupiter and Its Occultation by the Moon

Michael Molnar has recently expounded an innovative theory. With the simplicity characteristic of truly great ideas, he argues that any interpretation of Matthew's story of the star must start from the point of view of first century astrologers. He thus dismisses comets, supernova and other phenomena which impress moderns, but are either not recorded by or are not auspicious according to ancient astrologers. He further argues that Hellenistic astrology is the appropriate form of astrology for the time and place of Matthew.

Molnar identifies the royal planet Jupiter rising half an hour before the sun in the constellation Aries on 17 April 6 B.C.E. as the Star of Bethlehem. This event was very portentous according to the criteria of Hellenistic astrologers. Jupiter's rising was close enough to the sun to enhance its strength, yet just far enough from the sun that Jupiter not lose power by being "burned." About half an hour after noon (Jerusalem time) of the same day the moon occulted Jupiter, another highly auspicious event. The beneficent planets were auspiciously placed to support this event, the malefic ones placed to obviate their influences.[25] Horoscopes cast for this day, Molnar contends, surpass even that of Julius Caesar.

These Jovian events fit the bill rather well for the Matthean story.[26] Their presence marks the birth of a king or divine person according to the astrological tenets of the time, and would likely have created a sensation amongst astrologers—yet, Jupiter rising half an hour before the sun would certainly not have been a bright event, and

its midday occultation would have been completely invisible. But this would not have dampened the enthusiasm of the astrologers of that day. By the Hellenistic times, mathematics had advanced to the point that magi could calculate the movements of the sun, moon, and planets and predict with great accuracy their movements along the ecliptic. Hellenistic mathematics could calculate that Jupiter would rise shortly before the sun. It could also calculate that Jupiter and the moon would be in conjunction on the same day, but it would not have been able to predict whether or not the conjunction would be an actual occultation.[27] Magi could also have predicted the positions of the other planets by mathematics. Only to distinguish between a conjunction and a true occulation would observations have been needed. Thus the Magi would have to a large extent observed these obscure events not with their physical eyes, but rather with the eyes of their mathematics.

Molnar holds that this stupendous astrological event was also noted and used by the Romans. According to Molnar, this event would have been understood as announcing the birth of a king in the territory of Herod the Great. Linked with the Jewish longing for deliverance from the rule of Rome, this would have been interpreted by many around Judea (and perhaps by many in Judea who did not observe the biblical injunctions against astrology) as the sign of the birth of the Messiah. It may have been linked to the prophecy of Balaam that "a star shall come out of Jacob" (Num 24:17). Rome, of course, could not accept this interpretation. Molnar thus argues that the Romans turned this sign to their own propagandistic ends. Molnar holds that certain Antiochene coins (including one he purchased and which inspired his investigations) represent the portent of 17 April 6 B.C.E. The portent was reinterpreted, however, so that by these coins Rome claimed that the stars had decreed not the birth of the Jewish Messiah but rather the Roman hegemony over Judea and the designation of Antioch as the head city of the domain of Aries.[28] Thus, he believes that these coins are witness to the fact that the event and its astrological significance were very much noticed, but turned against Judaea and used for Roman propaganda.[29]

Molnar argues that an accurate account of the movements of Jupiter lies behind Matthew's story, but that the final redactor was a layman and did not fully understand the technical terminology. The rising referred to in the text is Jupiter's rising just before the Sun,

the heliacal rising on 17 April 6 B.C.E. The star "went ahead" would be a layman's misunderstanding of the ancient technical term for retrograde motion (what we now call retrograde motion was considered forward motion by the ancient astrologers). And of course a planet does not stop over a particular house. Stopping here means the end of Jupiter's retrograde movement against the background of the stars. On this basis, Molnar proposes that the astrological account standing behind Matthew's report of the star leading them to Bethlehem and standing over the house read as follows, ". . . and behold the planet which they had seen at its heliacal rising went retrograde and became stationary above in the sky (which showed) where the child was."[30] For the ancient astrologers, Jupiter did not stop over the manger, but rather it was stationary in the sign Aries, showing that the king was born in Judea.

Critique of Molnar's Work

The first test of a theory is that its proposed phenomenon must take place at least two years before the death of Herod for category one, or within the reign of Herod for category two. Molnar seems to believe that his work, if correct, shows that Matthew's story of the star is substantially historical, that is, should be situated in category one. His date in the spring of 6 B.C.E. is approximately two years before the death of Herod, and thus at the limit if the story is strictly historical. The two years mentioned in the story seems to be an approximate enough number that a matter of a few months would not seem to pose a problem. His theory is thus both falsifiable, and when tested does fall barely within the limits imposed by the text. A date which is acceptable for category one is necessarily acceptable for category two.

Although possible for category one, Molnar's theory puts the star so close to the two year limit that it fits better with category two. Many years after the event, astrologers, and astrologically astute people might well remember or have access to records of this very portentous event. If converted to Christianity they might well conclude that this star's indication of the birth of a very great king or god must refer to the birth of their Lord. The date is certainly approximately correct; they would not likely have known the exact date of Jesus's birth any better than we do.

Detailed statements about the Babylonian astrological interpretation of celestial phenomena are very difficult if not impossible to falsify. They are unfalsifiable simply because the evidence is very scanty, as has been pointed out. All theories positing a Babylonian interpretation of the star face this problem. Molnar, however, interprets the star against the background of Hellenistic astrology. For Hellenistic astrology there are many sources, including the book-length *Tetrabiblos* of Ptolemy, which remained the main reference work for astrology up to early modern times. In contrast to statements about Babylonian interpretation, statements about Hellenistic astrological interpretation of celestial phenomena are in principle falsifiable. Molnar's statements about Jupiter's heliacal rising and occultation by the moon may thus be tested by reference to Hellenistic astrology. This article will examine three aspects: the nature of astrology, the significance of Aries, and the complexity of astrology.

The basic nature of Hellenistic astrology provides a criterion which challenges Molnar's theory. For Molnar's theory to work as an explanation of Matthew's story of the star, understood as historical, the Jovian events must predict the birth of a great king or god. But, taking his inspiration from the Church Fathers, the great nineteenth century expert Bouché-Leclercq points out that in Hellenistic astrology stars do not announce births but rather predict the destiny of children who are born under them.[31] Thus Molnar's theory is falsifiable at this point, and his very sources do in fact seem to falsify his theory.

Several ways can be found, however, to get around this apparent falsification of Molnar's theory. First, one may accept this understanding of astrology and hold that the story of Jesus's birth deliberately shows that Jesus at his birth overturns astrology: instead of being determined by the stars, he is served by the stars, whom he robs of their power. This is in fact the line taken by many Church Fathers, starting with Ignatius of Antioch who wrote only a short time after Matthew.[32] Or secondly, one may argue with Brown and many others that at least in writers of less stature than Ptolemy the stars had a role of announcing particularly important people.[33] Note also that the problem is less acute for the story read as category two, partially historical. A generation or more later, believers in Jesus as Lord knew of the tremendous sign of 6 B.C.E. and applied it to their Lord. Applied long after the fact, the distinction between the star predicting, the star

announcing, the star determining, or the star reflecting might be less critically felt.

The claim that Aries is the constellation which determines or reflects events in Judea is falsifiable. Of all the classical writers Molnar can cite, only Ptolemy explicitly supports this association. Furthermore, Molnar never mentions in his defence of his theory that Ptolemy has Aries reign over not only the area around Judea, but also over the northeastern part of the known world, Britain and Germany.[34] His theory is thus not falsified, but the support is rather weak.

Having seen that Aries does rule over Judea (and northwestern Europe) at least according to Ptolemy, it is useful to see which category of historicity this best supports. If Matthew's story is essentially historical, one would have to imagine the Magi choosing to go to Jerusalem on the basis of the star being located in the constellation Aries. One would have to explain why the Magi choose the Middle East rather than Britain or Germany to search for the king. One could perhaps simply argue that they chose Jerusalem because it was handy, to avoid the rigours of a long trip to Britain or Germany.

On the other hand, this problem disappears if Matthew's story falls in category two, partly historical. A generation later, Christians who knew of a portentous event in Aries would naturally conclude that it must refer to the birth of their Lord. Since they already knew him to be born in Judea they could simply note that Aries rules over Judea, and ignore (as does Molnar) that it also rules over territories far to the northwest. Thus, Molnar's theory is stronger if Matthew's story is to be situated in category two, contrary to what Molnar himself holds.

In applying the principle of falsification one could ask what piece of evidence from Matthew or from Hellenistic astrology would show that Jupiter, in the phenomena presented by Molnar, is not the star of Bethlehem. Here Molnar is on good ground. Here the large Hellenistic and Latin corpus insures that Molnar's thesis is falsifiable, unlike the Babylonian hypotheses. And, many of the traditional competing suggestions, such as comets, have been eliminated as inappropriate according to Hellenistic astrology. Molnar has presented a strong case that the heliacal rising and occultation of Jupiter is an event which astrologers would have in fact associated with the birth of a great king.

Molnar has shown good reason to believe that the event he describes is consistent with Hellenistic astrology. It seems possible,

however, that other events during the years in which Jesus may have been born could also have been very portentous. Ptolemy himself stresses that it is not the position of a given star or planet that causes a certain effect, but rather the combination of the many different influences of the seven luminaries, the zodiacal constellations, and even the major fixed stars, which produce the overall effect. Given the uncertainty in our knowledge of the exact day of Jesus's birth, a period of at least one thousand days must be considered. Given a thousand days of twenty-four hours, with seven luminaries, twelve zodiacal constellations, and a significant number of important stars, the number of possible combinations is astronomical in every sense of the term. Molnar may have found just the right event, but how many other events in that time period might also have had a royal or divine interpretation?

As has been noted, Molnar advances support for his chosen event from numismatics. He argues that a series of coins represent the Jovian event of 6 B.C., and have been turned by the Romans into Roman propaganda in favour of their rule. This thesis is far from proven.

Finally, to give more support to the claim that Molnar has identified the celestial event behind the star of Bethlehem story, it would be helpful to find some other early Christian writing that seems to have understood the story of the star of Bethlehem in a way similar to what Molnar proposes. Unfortunately, there is a distinct lack of support for Molnar's thesis in the early church literature. Ignatius in his letter to the Ephesians speaks of the star associated with the Lord as a new star, brighter than all the others, around which the sun, moon and constellations gathered. The *Protevangelium of James,* in one manuscript, speaks of "an indescribably greater star" which dimmed the other stars "so that they no longer shone."[35] These early church writings assume that the star of Bethlehem was a new star, very bright and special in itself, not just in its astrological configuration. Molnar argues that the story about the star should be interpreted against the background of Hellenistic astrology, yet many writers who lived in that Hellenistic society steeped in astrology have missed this background. This does not, however, disprove Molnar's idea. These early Christian writers, while no doubt in general aware of astrology, do not claim to be well informed on its technical details. Matthew as well may have been totally ignorant of astrology in any technical way. One could then argue that the story of the star may have started as a

technically correct report of the phenomena around Jupiter on 17 April 6 B.C., but that this was very quickly garbled. Matthew would have transmitted only this garbled account. It remains troubling, though, that the other early writers on the star story have so quickly made it a new and fantastic star so far removed from normal astrological understanding.

Drawing this review of Molnar's work to a close, some negative conclusions must be noted, but its immense positive contribution must be stressed.

Several important objections may be raised against his theory. Molnar applies it to the story read as fully historical. However, at many points it fits far better with the story read as only partly historical. He has chosen a very auspicious phenomenon; might there not have been other equally auspicious phenomena in the appropriate period? He has not dealt with the problem of how Hellenistic astrology could be used to predict or announce a birth, rather than determining the destiny of those born under a given sign. It is troubling that no ancient author has identified Jupiter as the star.

On the positive side, Molnar's theory names a phenomenon which occurred at an appropriate time. His theory also easily explains why the phenomenon was well known to experts but totally unnoticed by Herod and the people of Jerusalem. His theory must add suppositions to explain how the star could go before the magi and stand over the house, but all theories which posit full or partial historicity must do the same.

The greatest positive contribution of Molnar's theory has to do with astrology. Unlike many theories depending upon modern ideas of what the star might have been, or upon limited knowledge of Babylonian astrology, Molnar's proposed background of Hellenistic astrology makes statements which can be falsified. And as he claims, the event of 17 April 6 B.C.E. does appear to produce a royal horoscope according to the beliefs of the time.

Molnar has identified an astrological event which could lie behind the story of the star of Bethlehem. The event's historicity cannot be questioned, as any modern desktop computer can verify. The event was extremely auspicious, as is fully demonstrated by Hellenistic astrological texts. The birth of Jesus certainly took place within a few years of this event, and possibly very close to the time of this event. While this in no way proves that magi at the time would have sought

the birth of the King of the Jews in Jerusalem, it certainly provides a plausible basis for Christians after the fact to find astrological confirmation of the cosmic significance of the birth of Jesus.

The Identity of the Star of Bethlehem

Fred Wisse's criteria, as I have come to understand them, have been applied to this problem. So, is Jupiter the star of Bethlehem? Historical inquiry many never have enough information to give a final answer. Fred's natural skepticism, and mine, prevent me from saying "yes." But it is the best candidate we've seen in a long time.

Notes

1. In his seminal article on falsification, Antony Flew states his position: "If there is nothing which a putative assertion denies then there is nothing which it asserts either: and so it is not really an assertion" (Flew, Hare, and Mitchell 1998, 4:105).

2. Wisse 1988.

3. Note that Matthew is well capable of hinting to the reader that certain background knowledge is helpful: ". . . let the reader understand" (Matt 24:15).

4. For a fascinating history of the interpretation and use of this text see Trexler 1997.

5. Brown 1993, 612.

6. Note Brown's comment: ". . . I do *not know* how factual or historical is Matt's story of the magi, the star, and Herod's slaughter of the children; and given the state of the evidence, *neither does anyone else, whether biblical scholar or astronomer.*" (Brown 1993, 613).

7. Brown 1993, 613. It should be noted that the idea is not original to Brown; it may be found, for instance in Clark, Parkinson, and Stephenson 1977, 18:443–49): 448 (Published in the same year as the first edition of Brown's book).

8. The criteria proposed here might be compared to the list of criteria used by Kidger 1999, 248.

9. In his introduction to Flew's essay in the falsification debate, Stewart comments: ". . . for the question raised by Flew is about the cumulative weight of evidence . . . the weight of evidence, to use a lawyer's term, is an important consideration" (Stewart 1998, 4:101).

10. Brown 1993,188–89.

11. Information from Yeomans 1991, 367.

12. Ptolemy 1940, 193.

13. Ptolemy 1940, 217.

14. In one of his short stories, Arthur C. Clarke makes the star of Bethlehem the supernova which produced the Phoenix Nebula (Clarke 1987:175–83).

15. Of Babylonian texts ". . . the texts which have been studied contain no reference to novae or supernovae" (Clark and Stephenson 1977, 14) on the authority of Abraham Sachs (Brown University), editor of the most extensive collection of Babylonian astronomical texts, Pinches and Strassmaier 1955.

16. Sinnott 1968, 36:384–86.

17. Parpola 2001, 17: 16-23, 52, 54.

18. Neugebauer 1955.

19. Pinches and Strassmaier 1955, which is edited by Abraham Sachs.

20. Rochberg 1998.

21. Kidger 1999.

22. Clark, Parkinson, and Stephenson 1977, 18:443–49.

23. Kidger finds in the Chinese records of 5 B.C.E. an object which he argues was a nova: it appeared in mid-March 5 B.C.E. probably near the star Theta Aquilae (R.A. 20h00m, Dec. -03 degrees), was visible for about 2.5 months (this object is identified by Yeomans as a comet [Yeomans 1991, 367]). This is confirmed by Korean records, if one may correct a Korean record which notes a similar phenomenon but (by bad transcription according to Kidger) one year earlier (Yeomans also identifies the Korean object as a comet, but puts a question mark after its date (Yeomans 1991, 367). This alleged nova is the object which Kidger identifies as the star of Bethlehem (Kidger 1999, chapter 9).

24. Kidger 1999, 254–66.

25. The full set of auspicious positions for 17 April 6 B.C.E. is as follows: The Sun was in Aries, its sign of exaltation. The three rulers of Trine I (the trine of Aries, Leo and Sagittarius) are the Sun, Jupiter and Saturn. All three of these were in Aries on that day. The Sun's rising was preceded by that of both Jupiter and Saturn making them its attendants or spear-bearers. Mars and Mercury rose after the Moon, making them its attendants. "Above all the gathering of the Sun, the Moon, Jupiter, and Saturn in Aries on April 17 gives regal conditions more portentous than those in Hadrian's or Augustus Caesar's horoscope" (Molnar 1999, 99). Jupiter, having just emerged from the Sun's arc of combustion, was at heliacal rising in the morning and occulted by

the Moon at about 12:40 PM, both of which greatly augmented the powers of this royal planet. The conditions were made even better by the presence of the beneficent planet Venus in the trine of which it was co-ruler. If the maleficent planets Mars or Saturn had been in quartile or opposition to the Sun or Moon, they would have undermined this good horoscope. But, both these dangerous planets were well placed, as we have just noted, with Saturn in attendance to the Sun and Mars to the Moon.

26. Following this day with a planetarium program is fascinating. Anyone who does so should remember two things. First, the calendar has no zero year, whereas these programs do; therefore to see 17 April 6 B.C., the program must be set to 17 April -5. Second, the zodiacal constellation boundaries will not be accurate. Based on his own work and that of Neugebauer, Molnar believes that the Hellenistic astrologers at the time of Jesus's birth cast horoscopes with the vernal equinox in Aries between three and five degrees from the border with Pisces (Molnar 1999, 128). So, to determine the extent of the ancient Aries, and thus what planets were in it, several steps are needed. The planetarium programs precession routine should be set so that it displays epoch 0.0, and the vernal equinox (the point where the ecliptic crosses the celestial equator in spring) should be located. From the intersection of the celestial equator and the ecliptic, count four degrees west along the ecliptic and set the Aries-Pisces border there; then count twenty-six degrees east along the ecliptic and set the Aries-Taurus border there. Any body near the ecliptic between these two borders should thus have been in the ancient astrologers' sign of Aries. (About a century and a half after Jesus's birth, Ptolemy set the Aries-Pisces border at the vernal equinox and defined the zodiacal constellations as twelve units of thirty degrees along the ecliptic starting from that point. Ptolemy's definition has continued in use in astrology to this very day.).

27. That is, astrologers would have known that Jupiter and the Moon were at the same degree on the ecliptic, but could not have predicted whether one passed above, in front of, or below, the other (Molnar 1999, 106–7).

28. Molnar 1999, 120–21.

29. Molnar also argues that the coins may have been the basis for Luke's Christmas story. He argues that the early Christians of Antioch would have understood the scene on these coins as depicting the Star of Bethlehem. Since Luke wrote his gospel long after the event, he might well have confused the actual date of Jesus's birth with the date of the coins issued under Quirinius quite some years later. A Christian ignorant of astrology—or opposed to it—might have reinterpreted Aries, the ram on these Antiochene coins, as a sheep, and the portentous planet as representative of God's heavenly host. Thus the pagan coin may have suggested to early Christians that Jesus's birth was announced by the heavenly host and recognized by shepherds in the fields

with their sheep. Such a story might have eventually been taken by the evangelist Luke and incorporated into his birth narrative (Molnar 1999, 121–22).

30. Molnar 1999, 96.

31. "L'horoscope astrologique sert à prédire la destinée des enfants qui naissent, et non pas à annoncer les naissances" (Bouché-Leclercq 1899, 613).

32. Ignatius *Ephesians*, 19.

33. Against this Brown cites Pliny, in favour he cites Cicero and Suetonius (Brown 1993, 170).

34. Ptolemy *Tetrabiblos* 2.3 in its entirety deals with the "familiarities" between given countries and signs. "The remaining parts of the quarter, situated about the centre of the inhabited world, Idumaea, Coele Syria, Judaea, Phoenicia, Chaldaea, Orchinia, and Arabia Felix, which are situated toward the northwest of the whole quarter, have additional familiarity with the northwestern triangle, Aries, Leo, and Sagittarius, and furthermore, have as co-rulers Jupiter, Mars and Mercury." (Ptolemy 1940, 143). This accords well with Molnar's thesis. However, Ptolemy has a system of correspondences by which the northwest of the whole inhabited world is governed by the same signs as is the northwest of the centre of the inhabited world (as the northeast of the whole world is governed by the same signs as the northeast of the centre of the inhabited world, etc). Thus in the résumé at the end of the section, Ptolemy lists: "Aries: Britain, Gaul, Germania, Bastarnia; in the centre, Coele Syria, Palestine, Idumaea, Judaea" (Ptolemy 1940, 157).

35. See Hennecke 1963, 1:386. This work is not to be dated before 150 according to (Hennecke 1963, 1:370). The section quoted is absent in the oldest manuscript (Papyrus Bodmer V, 3rd century on palaeographical grounds).

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