A linguist's angle on the Star of Bethlehem

Richard Coates takes a fresh look at a long-standing enigma: what might the authors of the Biblical accounts of the Star of Bethlehem have meant?

ABSTRACT

There is no shortage of suggestions for the astronomical events that may have given rise to the *Bible*'s descriptions of the Star of Bethlehem. In this account, I consider the question from a linguist's point of view, focusing on the language used to describe phenomena in the sky around 2000 years ago. What would an astrologer have meant by "we have seen his star in the East"? And what events might have been both visible in the conditions described, and considered of significance? Scholars working in this area cluster in groups: the comet group, the planetary group, the supernova group, and so on. None has yet succeeded in delivering a fatal blow to the others' accounts. I may be in a group of one for the time being: the astrological group. I present here a type of argument that may reconcile astronomical events, astrological learning of 2000 years ago and biblical accounts.

A great deal of energy has been expended since Johann Kepler's treatise of some 400 years ago (1606) in explaining, or explaining away, the astronomical credentials of the Star of Bethlehem: whether the phenomenon was real or not and, if it was, what it was. Many of the ideas still being seriously considered on the subject have been circulating for well over 300 years and are being constantly reinvented, rediscovered, refined and recombined by new generations of biblical interpreters and astronomers. It is unlikely that any final agreement about the topic will ever be achieved, and there is no hint of the last word yet.

> **"Ye have seen his natal star."**
>
> **James Montgomery, from his hymn "Angels, from the Realms of Glory" (1816).**

As a non-astronomer, I hesitate to add to this literature, which is a collection of mistakes, intellectually respectable ingenuity and wishful thinking, and well summarized by Hughes (1979), Kidger (1999) and Moore (2001). But I think the addition is novel on two counts.

A permanent problem

First, I am not concerned with whether there is even the smallest grain of truth in the Gospel account recording the visit of the Three Wise Men, which is a permanent problem – see "An insoluble problem?" on p5.29 for a survey of the relevant literature. I shall write, for convenience, as if it really did happen, thus avoiding lots of *said to have been*s, *alleged*s and *perhaps*es. What we know, then, is that at some point in the first century of the Christian era a story arose about Jesus's early life involving a visit from Magi (the word used in the *Vulgate* [Matthew 2:1]; or *astrologers*, as the *New English Bible* fairly renders the concept). One or all of them said something that was rendered in the Latin of the *Vulgate* as "*Vidimus enim stellam ejus in oriente*": "For we have seen his star in the east." The main question for me in this article is the philological and phenomenological one of what an astrologer active around the year zero could have meant by saying "we have seen his star in the east". I make the assumption that this story has a kernel of astronomical truth; the plausibility of a particular *type* of interpretation of the story, based on star-lore, is what is to be established. No supernatural or mystical interpretations will be entertained, and no attention will be paid to any religious significance of the events. It follows that I am not going to present in detail a definitive account of what might have happened in the sky, but some *parameters* of a possible explanation emerge as a by-product of considering a new factor: ancient star-naming.

The second novelty is that my proposal stays within the bounds of ordinary cyclical astronomy. It does not even make an appeal to colourful events such as eclipses, the appearance of comets (recorded or unrecorded: Humphreys 1993, summary Kidger 1999 ch. 4), novas (Kidger 1999 ch. 10, his own view) or supernovas (within our galaxy or not: summary Kidger 1999 ch. 6, Tipler 2005), meteor processions (Moore 2001), or more fanciful stuff; it is less strained than the "Venus at its brightest" or "planetary conjunction" types of theory of the nature of the star, which has regularly popped up from year to year (e.g. Killian 2003/6). No post-Akkadian Middle Eastern astrologer could have taken the female planetary deity Venus as a harbinger of a king's birth, at least not on its own, because the planet Venus was a male deity only in the South Arabian tradition (which was not a mainstream one). And no such astrologer would have been ignorant enough to confuse Venus with anything else. The ancient astrologers actually examined the sky minutely, unlike those who write in the daily papers. The question of planetary conjunctions will be taken up again below, and its possible relevance assessed, but I want to state at the outset that I do not think we are dealing with an event which is *exclusively* defined by planetary phenomena, nor indeed by any phenomena which were abnormal – except in the looser sense of "relatively infrequent in routine astronomical cycles".

> **"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."**
>
> **Werner Keller, *The Bible as History* (1863).**

Minimal facts

The "facts" to work on are minimal, and have often been repeated. In the canonical Scriptures, they appear in Matthew's Gospel alone, and I quote piecemeal from the Authorized Version (1611). The "wise men from the east" came to Jerusalem saying, "Where is he that is born king of the Jews? for

we have seen his star in the east and are come to worship him" (2:2). Herod inquired "what time the star appeared" (2:8), using for "time" something the *Vulgate* translates as the word *tempus* "epoch", not *hora* "hour of the day"; and as they left, "the star, which they saw in the east, went before them, till it came and stood over where the young child was" (2:9). "When they saw the star, they rejoiced" (2:10). And that is the last we hear of it.

The first thing to note is that in Matthew's account of the event the word *star* is never qualified in any way, and certainly not called extraordinary. That is, it is not called a specially bright star, a new star, a comet, or anything else implying a rare abnormality such as an occultation or planetary massing (Burney 1903, Hughes 1976). Others have depended on ignoring the coyness of Matthew's description, in the interests of other ideas; for example, Lundmark (1953) and Clark *et al*. (1977) (interested in novae), and Montefiore (1960) (interested in comets, following Origen *Contra Celsum* i 32).

Pretty well all "Christmas" iconography – from the sixth-century mosaic in Sant'Apollinare Nuovo, Ravenna, Italy, to modern greetings cards – has taken a different decision, and magnified the star or made it special. An account claiming a specially bright star does appear in two early non-canonical sources, the epistle of Ignatius to the Ephesians (ch. 19, in which it is said to be a novelty and whose "light was exceedingly great above all [the stars]") and the Protevangelium of James (21:2, in which there is said to have been "a very great star shining among those stars and dimming them so that the stars appeared not"). But both of these texts are generally reckoned to be of a later date than Matthew's Gospel with its non-committal wording.

"It is not called a specially bright star, a new star, a comet, or anything else implying a rare abnormality such as an occultation or planetary massing."

The normal business of astrologers was to interpret the movement of the unfixed stars against the routine cycling of the fixed ones so as to give practical guidance in such crucial matters as planting-time, the dry season, the harvest etc, as well as to perform the more exciting and dangerous (but perhaps not conceptually distinct) speculative task of looking for portents for their patrons. The professional skill they had, then, was in reading the significance of ordinary configurations of heavenly bodies. The events that assumed particular importance in such a skill, apart from solar, lunar and planetary movements (not conceptually distinct in a geocentric universe), were those of *annual* significance, i.e. those that marked the progression of the seasons. These would be the heliacal rising of certain stars (i.e. the first time they were visible before sunrise, no easy thing to determine in dusty Middle Eastern desert conditions, however limpid the zenith may be); their culmination (i.e. the moment when they reached their highest point in the southern sky) in relation to sunset or sunrise; and their heliacal setting (i.e. the last time they were visible after sunset). The heliacal rising of Sirius, for instance, once coincided with the flooding of the Nile (cf. Pannekoek 1961) and was taken to be a portent of that event. The heliacal setting of Aquarius, a notably watery constellation, was also once supposed to make the Nile rise; and the heliacal rising of the Pleiades was once a signal to begin the harvest.

These heliacal events are of course much more significant than the mere (dis)appearance of a star over the horizon, the import of which cannot be judged without knowledge of its relation in time to the divide between day and night. After all, any star that is not circumpolar vanishes or appears over the horizon once a night for a large number of consecutive nights in the year (unless, of course, they culminate close to the horizon), and the event is in itself no use at all in determining the passage of time. By contrast, heliacal events happen precisely once in every solar year.

If an astrologer were to speak of "seeing a star in the east", therefore, the most natural interpretation we could give to such a comment would be that he had observed its heliacal rising (Green 1975). Note also the translation of Matthew (2:2) in the *New English Bible* as "We have seen the rising of his star". This is now accepted by many biblical commentators, because the Greek word appearing here in the singular, *anatolē*, normally occurs in the plural form when it has the meaning "east" as opposed to "(a) rising".

Personalized star

Traditionally, then, the "Christmas" magus said, "We have seen his *star* in the east" (my emphasis, RC), using a word taken as equivalent to the Greek *astēr*, which usually denotes a single star and not a constellation. What could this have meant? What is a personalized star? We get an inkling in the evidence of pre-Islamic Arabian star-lore, which can still be detected in the modern names of some stars. I am not referring to those Arabic names that are simply Arabic renderings of the positions of stars in constellations as described by Ptolemy, such as: Rigel, i.e. *al-rijl* "the foot" (of Orion) i.e. β Orionis; or Deneb, i.e. *al-dhanb* "the tail" (of the hen/swan) i.e. α Cygni; or the continental European name Calbalasad, i.e. *al-qalb al-asad* "the lion's heart" i.e. α Leonis (known in English tradition as Regulus, Latin for "little king"); or Shaula, i.e. *al-šawla* "the sting" i.e. λ Scorpii, the tail-end star of Scorpius. These are all descriptions dependent upon the figures into which Ptolemy divided the skies, following a long tradition explored by many including Roy (1984). But there is an independent Arabian, pre-Ptolemaic tradition, which Paul Kunitzsch explores in his formidable and masterly book *Die Arabischen Sternnamen in Europa* (1959) and later works (1961, 1983, 1989, 2006). Among the non-Ptolemaic star names we find some called *al-sa'd*, which may conveniently be translated "lucky star" in this context (Heuter 1986).

The most interesting for us is *al-sa'd al-malik* "the lucky star of the king", or possibly, with an alternative rendering of the unexpressed Arabic vowels, *al-sa'd al-mulk* "the lucky star of the kingdom". This is the name rarely used in English, Sadalmelik or Sadalmelek, i.e. α Aquarii. This is a modest third-magnitude star (+2.95) once judged to be the brightest in the constellation of Aquarius (β Aquarii is, under precise modern measurement, a fraction brighter) hence its α label and a possible significance greater than one would ascribe to it on a casual look today. It seems very likely to me that a first-century astrologer's words as quoted above from Matthew (2:2) would refer to a star bearing a name of such a type; and that, if the "Christmas" magus had been versed in the same tradition as is represented by the early Arabian star-names, in referring to a king's star he would actually have been referring to α Aquarii. This star has a present declination of 0° 19′ 11″ south and therefore rises very close to the east point of the horizon; it is therefore a significant star for determining direction, but would have been less so two millennia ago, when it was some 10° from the east point (Phillipps pers. comm.).

I shall pursue the possible consequences of identifying this particular star as significant, even though the precise source of its name and its significance must remain unclear. There is no clue in the name about which king it alludes to, if any. The use of the Arabic article *al-* does not require us to believe a specific king was intended. I assume that it was taken as a generic "lucky star as regards kingship" and, as will become clearer, that specific interpretations were derived from its relations with other bodies in particular time contexts.

It is possible to calculate when the heliacal rising of α Aquarii took place at Jerusalem in former times. The timing of this event was not materially different over a period of centuries. My calculations are crude, but precision about dating is not directly relevant to my main theme – the meaning of the remark in Matthew (2:2).

An insoluble problem?

A satisfactory answer to the question of what was the Star of Bethlehem may be impossible, as admitted, in effect, by Hughes (1976), and as claimed by Cullen (1979). For recent and not so recent accounts of the various astronomical theories of the Star, see also Lundmark (1953; on the essential background to which see Lundmark 1938), Morrison Planetarium (1954), Montefiore (1960, 1962), Finegan (1964), Clark *et al.* (1977), Armstrong (1978), Seymour and Seymour (1978), Arnheim (1984), Sinnott (1986), Doig (1990), Martin (1996), Crudele (2002) and Tipler (2005). There are many other partisan writings for particular theories, and there are surveys in Hughes (1979), Kidger (1999) and Moore (2001). Paffenroth (1993) can also be read as a full catalogue of theories about the Star, but that is not the author's intention. For a completely metaphorical interpretation of the Star, compare the prophecy in Numbers (24:17); a common expression for a messiah in the *Midrash*, according to Abramsky (1971) was *bar koxba* "son of a/the star", with reference to the prediction in the Book of Numbers. It was applied, punningly, in the case of Shimon bar Koseva, the leader of the revolt of 132–5 AD against Rome; he is known to history simply as Bar Koxba. (I write *x* for the Hebrew voiceless velar fricative consonant.) The same common messianic ideas are likely, it seems to me, to be responsible for the association of a star with the birth of Jesus, now considered as a messiah; cf. Green (1975), Arnheim (1971). There was also the common astrological teaching that a new star appeared at every birth (*Encyclopaedia Biblica* **3** 3351), and that is presumably why Jesus was assumed by popular lore to have had a bigger and better one than everybody else's.

It may well be that it is idle, in the light of this, to construct an astronomical argument about the reality of the Star of Bethlehem; but, as I say in the main text, my purpose is not primarily to discuss the reality of the event. Rather, I want to explore what kind of astronomical reasoning would make the characters' utterances in the *Bible* story meaningful; i.e. how the Gospel might be understood by those with appropriate astronomical knowledge at or near the time of its writing. For the idea that the Star is completely mythical, see further Bultmann (1963) and the excellent piece by Cullen (1979); and note the silence of Renan (1863) on the topic.

On the present calendar, the heliacal rising turns out to be in mid-February. α Aquarii, with a right ascension of 22′05″, rises around 04:00 UT on 21 March. Stars of the third magnitude are visible in the dawn when the Sun is still approximately 18° below the horizon, i.e. about 70 minutes before sunrise. If α Aquarii had truly been bright enough at this period to justify its α label more decisively, it would of course have first become visible in the dawn earlier than this. We cannot say with precision how much brighter or how much earlier, which militates against discovering which body (see below) may have been in what relation with it when the event occurred. Sunrise at the latitude of Jerusalem (32°N) is about 06:00 on the same day, so that the last heliacal risings of third-magnitude stars occurred around 04:45. The Earth's axis describes an ellipse in space in a period of about 26 000 years, causing the vernal equinox or "first day of spring" to appear to move anticlockwise around the zodiac, i.e. to make it arrive "earlier" as seen against the year calculated on the Sun's apparent movement. The effect of this axial motion, the *precession of the equinoxes*, means we must allow 28 days for precession over 2000 years; heliacal risings are delayed by this amount, as seen against solar time. The Western calendar was advanced by between 10 and 12 days (depending on the prevailing Christian rite in various areas) between 1582 and 1917. The cumulative effect of these distortions is to place the heliacal rising of α Aquarii, 2000 years ago, in what would be very early February on the Julian calendar and early mid-February from the modern perspective of the Gregorian calendar.

We have no real clue about the time of the year at which Jesus was born, and the guesses that appear in the literature are based on ill-founded reasoning of various kinds. As David Hughes reminds me, the three most popular criteria are: shepherds being in the fields; the inns of Bethlehem being full; and the supposed birthdate of John the Baptist. It was many years after Jesus's life that the Christian churches began to celebrate his birth as a festival distinct from the Epiphany (cf. Usener 1911). In fact the church fathers seem to have been pretty unimpressed by birthdays even as secular festivals – Origen points out that in the *Bible* only unsavoury characters such as Pharaoh (Genesis 40:20) and Herod (Matthew 14:6, Mark 6:21) have them (Pimlott 1978). Birth in Christ, i.e. christening, was for the greater part of the Christian era an event more worthy of being recorded than physical birth. It is extremely likely that a decision was made to consecrate 25 December as the feast of Jesus's birthday when Christianity replaced Mithraism as the official religion of the Roman Empire in the 320s AD, for this day was the Mithraic chief holy day, the feast of the Unconquered Sun. A fusion of the two traditions, or a hijacking of the Mithraic one, seems clear in the light of St Ambrose's repeated equation (in the *Hexameron* and other writings) of the Sun with Jesus and in the light of his reference to Christmas as the "day of our new Sun", quoting, as others did, Malachi (4:2). There was also a Mithraic belief that the Sun was a gate through which the soul could ascend; a tale that it is not hard to Christianize (Chadwick 1953). There may also have been memories or traditions of the time of the birth from a very early date (cf. Clement of Alexandria's *Stromata* I xxi 145).

As for the Epiphany: the astrologers need not, probably could not, have arrived instantly on Jesus's birth or even the traditional 12 days afterwards. They would have seen the sign in their homeland, commonly supposed to have been Persia (for instance Filson 1960 and Green 1975). There are, of course, competing theories of where the astrologers came from, two popular ones involving northern Syria and Mesopotamia. Hughes (1976) directs attention to Babylonia, using a deft hop in his argument from Sippar as the place where the cuneiform tablet predicting the triple conjunction of 7 BC was found to Sippar as the probable starting-place for the pilgrimage of the Magi.

Uncertain season

If they had arrived in Bethlehem with the birth-yell still resounding, Herod would certainly not have needed to protect his position by murdering little boys up to the advanced age of two. Herod took pains to find out from the astrologers (Matthew 2:8) exactly when, in terms of past months *(tempus)*, not hours *(horae)*, the star "had appeared". In short, there is no consistent evidence in the *Bible* on which to base any assumption about the season of Jesus's birth. There is also nothing beyond the actual words "his star", taken to refer to the "star of the king", to support or contradict the possibility, implied by my suggestion that α Aquarii's heliacal rising is relevant, that the astrologers were interested in an event of February (by the modern calendar). Lastly, of course, Matthew does not say that the "appearance" of the star, in whatever aspect was relevant, was simultaneous with Jesus's birth, but that would have been a legitimate inference for a contemporary astrologer to make (cf. Sachs 1952, Oppenheim 1964, Hawkes 1973), and it is what everyone usually takes for granted. The idea depends on

the magical notion that a star was, or could be, the *fravashi* (Old Persian, roughly "counterpart") of an earthly entity. It became common astrological teaching that a new star appeared at every birth (*Encyclopaedia Biblica* 3 3351), and that is presumably why Jesus was assumed by popular lore to have had a bigger and better one than everybody else's. In chapter 28 of *De Stella Nova*..., Kepler cites the proverbial expression "*nova stella, novus rex*", a more elitist version of the theory of a new star at every birth, and one which was common coinage in the wake of the appearance of the supernova in Ophiuchus in 1604 (Caspar 1959, Kepler *Collected Works* I 322). Kepler sent a copy of his treatise to James I of England "*quia Stellae novae consideratio Regum propria sit*" ("because thinking about a/the new Star is fitting for Kings"; from the covering letter – notice the pun in *consideratio* on *sidus sideris* "star", as well). These traditions are also alluded to in *The Golden Bough* (Frazer 1911). (After much agonizing, Kepler arrived at his own astrological interpretation of the conjunction and star, and set it out in a letter to Herwart von Hohenburg [1607].)

"How long would astrologers have taken to come from Persia, if that is where they came from?"

But from that it follows that time elapsed between the star's appearance and the astrologers' visit. Just how long it could have been is a highly speculative matter. How long to come from Persia, if that is where they came from? It is about 1000 miles as the crow flies from, say, Persepolis or Isfahan to Jerusalem. But camels cannot fly – the reputed pace of a laden camel is 2 mph, not exactly life in the fast lane. Pritchard (1863) says the journey would have taken seven months, while Hughes (1976) believes the trip would have taken four months to prepare and execute. At 25 miles a day, and under the best possible assumptions, the journey would have taken about 40 days, but the best possible assumptions are certainly unrealistic. The train is unlikely to have moved in a straight line, and could rather have followed the arc of the Fertile Crescent, for example. Rest days are not allowed for, whether they were religious holidays, enforced halts from bandit or other military activity, labour troubles, bad weather, resting in a literal sense, or whatever. (For an entertaining account of Middle Eastern travelling conditions, see under "Caravan" in the 1909 edition of *Encyclopaedia Britannica*.) The two caravan seasons are from spring into early summer, and autumn. Speculation on why the Magi skipped the first caravan season after the appearance of the star is not likely to get us very far. But during the period from March to May α Aquarii would have been visible only at dead of night, i.e. not during travelling hours. It is also unhelpful to try to reconcile this account with the shepherds' visit to the baby in the stable, apparently before his circumcision eight days after his birth, because this is in Luke's Gospel, which has few points of contact with Matthew's nativity account. Nothing speaks against the arrival of the astrologers at a much later that traditional period in Jesus's first year of life (cf. Finegan 1964 and see below.)

The immediate objection to this ideas is that, since the heliacal rising of α Aquarii is an annual event, there is no powerful reason to expect astrologers to get excited about some particular recurrence. Obviously such a routine happening could only gain extra significance by being different from usual; the only way in which it could be different from usual is by a rare geometrical relation to the "unfixed stars", i.e. the Moon or planets. Let us therefore readmit the possibility that such a relation is relevant, but restrictively only one involving a fixed star and (at least) one planet, and in no sense admitting that anything other than a particular fixed star is the star in question. Philology suggests that α Aquarii may be the best candidate, but readers are reminded that my intention is to press the credentials of a *type* of argument, and it is conceivable that a better candidate may be identified in the long run.

Conjunctions

Astrologers, then as now, offer interpretations of such relations (or *aspects*) as *conjunction* ("[near-]identity of celestial longitude"), and *trine* ("separation by 120° longitude, i.e. 8 hours of right ascension"), and so on, and invest them with significance for the microcosm, the human counterpart of the macrocosm or wider universe. Leaving aside the stellar background for a moment to focus on what is known or has been claimed about the planets at the crucial time, it is well known that there were three close approaches of Jupiter and Saturn in Pisces in 7 BC (a so-called triple conjunction; Pritchard 1856, 1863, and numerous further writers through till Hughes 1976, 1979, and Kiefer undated, summary in Kidger 1999, Doig 1990); they were 1° apart on 29 May (modern Gregorian calendar) of that year, and two further close approaches took place late in the year. Some commentators have taken the planetary event(s) of 7 BC actually to *be* the Star of Bethlehem, leading them to the deduction that Jesus was born in that year. (One interpretation of some historical information on the career of the Roman official Cyrenius [or Quirinius] mentioned by Luke [2:2], points roughly in the same direction, as does the fact that Herod ["the Great"], the would-be persecutor of Jesus, died in 4 BC.) These planets would separately have been in Aquarius something over a year previously. It is also known that Mars entered the general region of the approach in the following year (Morrison Planetarium 1954), creating a triple *planetary massing*. Stockwell (1892a,b) preferred to concentrate on an approach of Jupiter and Venus said to have occurred in Pisces in 6 BC, and Sinnott (1968, 1986) on one of two similar ones in 3 or 2 BC in Cancer and Leo respectively (first calculated on the basis of the Tuckerman tables [1962] and recalculated using the Bretagnon-Simon revision [1986], thus also Martin [1980], and similarly Killian [2006], who identifies an alignment of Mercury, Mars and Jupiter in Leo in August of 2 BC).

Each of these planetary events has been mentioned in connection with the Star of Bethlehem, and different authorities disagree spectacularly on just how prominent each is likely to have been to the naked eye. Kepler (1606) was the first to suggest that the event of 7 BC (perhaps in association with some extraordinary supernova like that observed in 1604 in Ophiuchus) actually *was* the Star of Bethlehem. He was inspired further by his recollection of rabbi Abrabanel's prophecy of the arrival of the Messiah, given at the "great conjunction" of Jupiter and Saturn in 1463 (Benecke 1900); and Suslyga had then recently put forward the view that western chronology was four years out, placing Jesus's birth at 4 BC. Ideler (1826) elaborated upon this argument, and the most recent reviews and qualifications of this theory known to me are those of Hughes (1976) and Kidger (1999). Sinnott (1986) claims particular relevance for his conjunction on the grounds that it took place adjacent to α Leonis, i.e. Regulus "the little king", which is a significantly named star (and similarly, but without the claim about Regulus, Killian 2006). Unfortunately for him, it appears certain that the name Regulus is the name of the star itself, as early as Ptolemy in its Greek translation-equivalent *basilískos*, and not therefore of a person or class of person to be associated with that star. The array of more or less prominent astronomical events around the period 3 BC to 1 AD is set out by Mosley (1987).

But it seems to me implausible that any configuration involving two or more planets would give rise *on its own* to the use of a word translatable as "star". No such configurations are both exact and unexpected enough to give a convincing impression of the single heavenly body implied by the word *star*, despite Ideler's invocation of observers with poor eyesight. Matthew uses the word *astēr*, i.e. a star, not a configuration of stars *(astron)*, but it is presumed by Burney in *Encyclopaedia Biblica*, without justification, that the reference may be to one key body in a conjunction. Redpath (1909), in Hastings' *Dictionary of the Bible*, asserted that, in popular parlance, *astēr* could

be used to refer to any celestial object or grouping of them. Instead, we should consider that the portent observed by the Magi was a geometrical relation between a heliacally rising star, perhaps α Aquarii and one of the planets – or perhaps several, but there is no need to insist on a mass event. A relation between α Aquarii and any single planet would have been an interpretable sign, and the interpretation would have depended on the astrological characteristics of the planet in question.

Of course, a conjunction of any fixed star and any particular planet will occur at least once in each completed orbit of that planet (more often when the view from Earth's orbit appears to make it, after conjunction, reverse and then resume its old direction). Such a conjunction therefore happens at least once in 687 days with Mars, at least once every 11.9 years with Jupiter, and so on. So, whichever conjunction is focused on, the question arises: why this recurrence and not another one in the cycle involving the same bodies? Perhaps the safest answer is that the interpretation of any relationship took place in a nexus of non-astronomical facts. You can't have an astrological portent involving the Jews unless you have the earthly knowledge that there are Jews. So my suggestion is that our astrological relationship was interpreted against a background of worldly events including a particular upsurge of messianic expectation among Jews, such as happened from time to time. One can imagine the Magi knowing of expectation of this kind and waiting for the sign that would confirm that the exact time had come. And of course, being astronomically competent, they would have been able to predict the timing of the astronomical event once they had convinced themselves which heavenly bodies were relevant. This is an area that demands the attention of a scholar with rigorous knowledge of the astrology of the period: if Pisces were a constellation of particular significance for Jews, for example, then some astronomical occurrence in that constellation signifying the appearance of a new king would have the timeliness and relevance implied in the biblical accounts.

Expectation

Note, again, that this account is offered as a *type* of argument, and should not be interpreted as suggesting that the events in Matthew's Gospel must have taken place in 7 BC or any other of the years proposed so far. Similar accounts could in principle be constructed on the basis of any angular relation between an astrologically significant star and any planet with appropriate astrological credentials. Those involving planetary approaches in subsequent years are simply among those that might be considered. It is worth restating, though, that an angular relation such as conjunction (near-identity of celestial longitude) is one that could have existed periodically between any unfixed heavenly body and a fixed one, with no requirement that either body should be visually spectacular nor that they should be particularly close. The significance would have lain in the observers' beliefs about the participant bodies and the interpretation of their relation against knowledge of current geopolitics and religious thought, not in their prominence in the sky alone.

Now what could the account in Matthew (2:9) apparently involving the movement of the star mean? Humphreys (1993) discusses issues of interpretation of this passage. We do not know how long after the sighting in the east the visit to Herod in Jerusalem took place, but we can infer that when the astrologers arrived there the star in question was, come nightfall, culminating in the southern quarter of the sky, because Bethlehem is 8 km slightly west of south from Jerusalem, and that they "followed" it by taking the Bethlehem road. This is the limit of rationalization; we cannot tell precisely what is intended by the claim that it "came and stood over where the young child was" because we know nothing about the location or orientation of the relevant house, apart from what is said by later traditions. Arnheim's (1984) commentary on this passage, involving the star as an "usher", depends on an excessively literal-minded interpretation of Matthew. But it would not be foolish to interpret it as meaning that, as they journeyed one evening for maybe 1 or 2 hours from Jerusalem to Bethlehem, the star made its predictable westward movement until it was in the south (and thus close to culmination) as they reached the town. When due south, of course, it would appear to stop its apparent upward movement and begin to move down to the west.

"The significance would have lain in the observers' beliefs about the participant bodies and the interpretation of their relation against knowledge of current geopolitics and religious thought, not in their prominence in the sky alone."

For what it is worth, α Aquarii culminates, at the Earth latitude of Jerusalem (32°N), at an altitude of roughly 57°30′N in the early evening in autumn; corrected by 10° for the shift in declination over 2000 years, this gives about 47°30′N, i.e. conveniently visible without giving a crick in the neck or getting lost in dust or haze on the horizon. This, with calendrical corrections, would take place around July–September (Gregorian calendar), i.e. 5–8 months after Jesus's birth, if the account given above were to be considered realistically. Twilight ends in Jerusalem about 20.20 local time in mid-July, and α Aquarii culminates at about midnight; by late September, twilight ends about 19.20, and α Aquarii culminates about 20.20. With foreknowledge of the star's position gathered in previous days, a mid-to-late-evening arrival in Bethlehem in mid-to-late summer is clearly achievable (and perhaps just within the autumn caravan season). This is a date much more appropriate to explain Herod's reaction of indiscriminately killing boys up to the age of two than a date when the baby Jesus was only a fortnight or so old.

A new story

The bare bones of a rational account consistent with the *Bible* story are as follows, then. Astrologers versed in the Persian (and what became the pre-Islamic Arabic) tradition saw a propitious star. Perhaps this was α Aquarii, if any import can be read into the traditional Arabic name westernized as Sadalmelik. It was in a significant geometrical relation with one or more of the unfixed heavenly bodies at its heliacal rising, from which they inferred, in the context of beliefs currently in circulation, that a significant birth had occurred. It is possible to establish with what planets α Aquarii was in conjunction (or some other relation) over a range of years from about 7 BC onwards and it might therefore be possible to narrow down the relevant ones in the light of the astrological characteristics imputed to them by the ancients, leading to a possible narrowing down of the range of possible birth-dates. Using other information not intelligible to us in the light of modern astronomy (but see Keller 1963, Hughes 1976), the astrologers worked out where the event should take place: Palestine. They went there. The relevant star was culminating, some time later, in the south as they travelled south from Jerusalem, with expectations influenced by Jewish lore, specifically by the fact that the prophet Micah (Micah 5:2), and arguably Isaiah (Isaiah 60:3), had foretold such a birth in Bethlehem (Matthew 2:5).

This account is provided as an attempt at explaining how the story could be interpreted without its mythical overlay. It is obvious enough that it has acquired a mythical overlay, intended to point up the exceptional significance of Jesus (cf. conveniently Warner 1976); and the resemblance of parts of it (e.g. the shepherds' visitation; cf. Dieterich 1902, Cumont 1956) to certain aspects of the Mithraic nativity myth is striking and suggests borrowing. But any such myth gains in credibility or acceptability if the events in it can be interpreted as having a familiar kind of factual underpinning,

and this is what I have tried to provide without recourse to mistaken identities, abnormal stellar behaviour, astronomical events of extremely rare types, "radical catastrophist cosmology" involving the solar system being turned upside-down (*à la* Velikovsky 1950), or astronomical near-miss events. Whether the visit of the Magi really took place is beside my point. For what it is worth, I believe that Arnheim's account (1984) is essentially right, despite the occasional minor critical aside on his work here. I have just tried to show that the implied astronomy need not be farfetched, as I think all previous accounts are, and it certainly need not be a fabrication by early writers on the basis of a later cometary visit, as supposed by Jenkins (2004).

My account differs from previous ones in that it is astronomically normal and attached to a known tradition of star-naming, and that a particular star is specified, though my main point is to suggest and exemplify a kind of argumentation (involving heliacal events and stellar onomastics as well as astrologically significant angular relations) not previously employed on this question, rather than to insist on the involvement of a particular star. Others of the details have been suggested by others before me.

The point of the quote at the beginning of the article from the familiar Christmas carol – "Ye have seen his natal star" – is that if my account corresponded in any way with reality, the line would be valid for all of us, if we have bothered to look. ●

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