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Kepler and the Star of Bethlehem

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Johannes Kepler (1571–1630) was a famous astronomer. But like other astronomers he had a problem to find work that would guarantee a regular income. So he was lucky to get work as “steirischer Landschaftsmathematiker” in Graz. One of his tasks was to write an annual calendar of weather forecasts and political developments on the basis of astrological facts. He correctly predicted a conflict with the Ottoman Empire, although it is not clear whether the stars or the newspapers were the cause for that. Both his horoscope for Wallenstein and his book “Warnung an die Gegner der Astrologie” are well known. Kepler believed in some aspects of astrology, the influence of the planets for example. He deduced this from his ideas about physics. He neglected other aspects of astrology, e.g. the significance of the zodiac.

In 1604 Kepler observed a new star and believed in a connection to a special and very rare planetary conjunction. After a Jupiter-Saturn-conjunction Jupiter met Mars. Kepler speculated that the star of Bethlehem might be a new star which was generated after a similar conjunction and recalculated it for 6/7 BC.

Nowadays examples of both astronomical (and astrological) interpretations of the star of Bethlehem exist. The best known is the three time conjunction of 6/7 BC. But the interpretation of Martin (1980) for 213 BC seems equally excellent. Vardaman (1989) takes the Halley comet of 12 BC to be the star of Bethlehem. Other speculations arise from two Novae in the years 5 and 4 BC, tabulated in sources from the Far East.

But historians tell us that there is no need for a real star. The text in Matthew, book 2 is a legend. What is important in regard to the understanding of the star of Bethlehem is the “sidus Julium” the comet which could be seen in the sky during Caesar’s funeral and the march of the King of Armenia Tiridates to Nero in Rome during. There was no real star over Bethlehem. All we have are interesting speculations, like those by Kepler.

Current interpretations of the star of Bethlehem

For a long time the star of Bethlehem has tempted the astronomers to ever new speculations. The belief that Jesus' birth date can be estimated with the help of a star constellation is just too alluring. Also Kepler succumbed to temptation.

What are the latest astronomical interpretations for the star of Bethlehem (a selection)?

- A comet at the year 5 BC (for example: Humphrey 1991).
- Halley's comet of the year 12 BC (Vardaman 1989).¹
- A triple conjunction of the planets Jupiter and Saturn in 6/7 BC (for example: Münter (1821) Quoten in Zdeler (1826), Gerhardt (1922), d'Ochieppo (1968)).²
- The star was more of an interpretation from a horoscope (17th April 6 BC) than a visible feature in the sky. The interpretation is based on a double lunar occultation of Jupiter³. The explicit consideration of the astrology of that time by taking special examples makes this interpretation worth reading. One learns much about the close connection ancient man had with the stars. Dworetzky & Fossey (1998) expand Molnar's (1995) thesis by a double lunar occultation of Saturn.
- A very close conjunction of Jupiter and Venus (both bright planets optically merged into one star) after a triple Regulus/Jupiter conjunction in 2/3 BC (Martin 1980).⁴

Chronology of the Bible

As criterion for choice, data from the Bible (Mathew (2, 1–16) and Luke (2, 1–4; 3, 1–3, 23)) seem suitable. But the child murder of Herod is regarded as legend among historians and theologians.⁵ Furthermore the star is the fulfillment of a prophecy from the Old Testament (Num 24, 17). Otherwise the Jewish writer Flavius Josephus (37/8–100), a despiser of Herod, who describes the latter's reign

¹I won't go into this interpretation as I find it absurd. It is based on the interpretation of an alleged "micro writings" on coins. However, these important sources are only shown in drafts and not in macro photographs. The temporal classification also seems to blow up the generally accepted frame.

²This is the most common interpretation of the star of Bethlehem, which does not necessarily say anything about its quality.

³Molnar (1995, 2000).

⁴Certainly this succession of constellations put everything else into the shade. If the simple observability of happening in the sky were decisive, it would be difficult to over-bid this interpretation.

⁵E.g. Wilckens (1983), p. 19.

in detail, would not have omitted the child murder. The tax estimation of Quirinius cannot have taken place during the lifetimes of Herod either, such estimation was only possible within the direct range of Romans' rule. Herods' realm, however, was formally independent, if only so by Roman tolerance. The tax estimation mentioned in Luke could probably be the one of AD 6 when a Roman province was established.⁶

The most important aid for the temporal classification remains king Herod. The story of the Star takes place during his lifetimes. However, it is again the Jewish historian Flavius Josephus only, who supplies us with usable information.

Chronology of Josephus

His Jewish history gives a detailed description of the last months of the king (Antiquities, 17). A lunar eclipse and a feast of Passover are named as dating aids. Unfortunately clear bridges to well-known Roman history are missing, so that it is from the lunar eclipse only that one is able to conclude the death year of Herod. In ancient history the death year of Herode is generally given as 4 BC, but it is also said that this is based on an astronomical dating (the lunar eclipse, which Josephus mentions).

Martin (1980) examined this temporal allocation in detail in his work, and then rejects what had generally been believed. He argues (and I think he is right) that the period between the lunar eclipse 4 BC and death of Herod is too small, in order to include all events mentioned in Josephus. An alternative lunar eclipse in 1 BC appears for him to be more suitable.⁷ On the one hand the discussed period is now large enough for all actions described in Josephus to fit in, on the other hand the observation conditions for the lunar eclipse are far better in 1 BC than for a lunar eclipse in 4 BC. This new definition of Herods' death date is important for Martin (1980), because his interpretation of the Star of Bethlehem for 2/3 BC is only possible in this way.

Chronology during the times of Kepler

During Kepler's times the chronology was a popular field of work. Kepler also devotes himself to studying chronology⁸, particularly in connection with the temporal classification of the life of Jesus.

⁶Wilckens (1983), p. 210.

⁷The death date of 4 BC e.g. is defended by Barnes (1986), whereas Filmer (1966) has the same results as Martin (1980). Pratt (1990) also suggests the eclipse of AD 1.

⁸Kepler, *Gesammelte Werke V* (1953).

What was the general belief regarding this topic during Kepler's time?

It was agreed that the monk Dionysius Exiguus (unknown – AD 545) had erred when introducing the Christian era (AD 525). Most church fathers gave as birth date of Jesus 2 or 3 BC. They mostly relied on Luke (3, 1–4, 23), who says that Jesus started his activity as teacher at the age about of 30 in the 15th year of Tiberius (AD 28/29). A back calculation resulted in the date of his birth. In agreement with these data and after examination of the data of Flavius Josephus, Scaliger (1540–1609, an important publisher of ancient writing and connoisseur of ancient history) gave 1 BC as the year of Herodes' death and referred (like Martin today) to the lunar eclipse of that year.⁹

Kepler rejected the lunar eclipse on which Scaliger based his beliefs and favored the lunar eclipse of 4 BC (the historians follow him in this until this day). Kepler can only justify his new interpretation of the Star of Bethlehem by this shift of Herods' death from 1 BC to 4 BC.¹⁰

During his times, the Biblical data were not regarded as critically as they are today. Thus Kepler still argues with the child murder of king Herod. The assumption that all two-year-olds were to be killed, leads Kepler to conclude that Jesus was born two years before Herode's death – in Kepler's opinion 4 BC – that is 6 BC. Following this argumentation Kepler arrives at his thesis of the Star of Bethlehem.¹¹

Keplers "New Star"

In 1604 a nova lit up in the constellation serpent-bearer (Ophiuchus).¹² Kepler describes this event in great detail. He sees a connection between this new star and the conjunctions of the planet. Here the argumentation affects the astrology of Kepler. It rejects the astrological power from zodiac, but considers an influence of the planets on each other to be possible.¹³ This is based on his understanding of physics in the solar system. As supporter of heliocentrism he believes in a kind of force, that originates in the sun and interacts with a respective force of the planets (*Astronomia nova*, Prag, 1609, *Gesammelte Werke III*).¹⁴ The planets can also exchange their "forces" among themselves.¹⁵ This permits an influence of the pla-

⁹For Joseph Justus Scaliger see annotations in Kepler, *Gesammelte Werke V* (1953), p. 400.

¹⁰Kepler *Gesammelte Werke V* (1953), p. 402.

¹¹Kepler, *De Anno Natali Christi*, Frankfurt, 1614, *Gesammelte Werke V* (1953).

¹²Kepler, *De Stelle Nova*, Prag, 1606, *Gesammelte Werke I* (1938).

¹³Kepler, *Warnung an die Gegner der Astrologie*, Frankfurt, 1610.

¹⁴Kepler, *Warnung an die Gegner der Astrologie*, p. 75–76, Kepler, *Neue Astronomie* (1990, second edition), especially chapter 57, p. 329.

¹⁵"Planetary ghosts" are able to perceive the angle the planets have among each other and react to certain aspects. Kepler, *Warnung an die Gegner der Astrologie* p. 87. Kepler combines his teaching of aspects with the magnetic force. Kepler, *Neue Astronomie* (1990, second edition), p. 339.

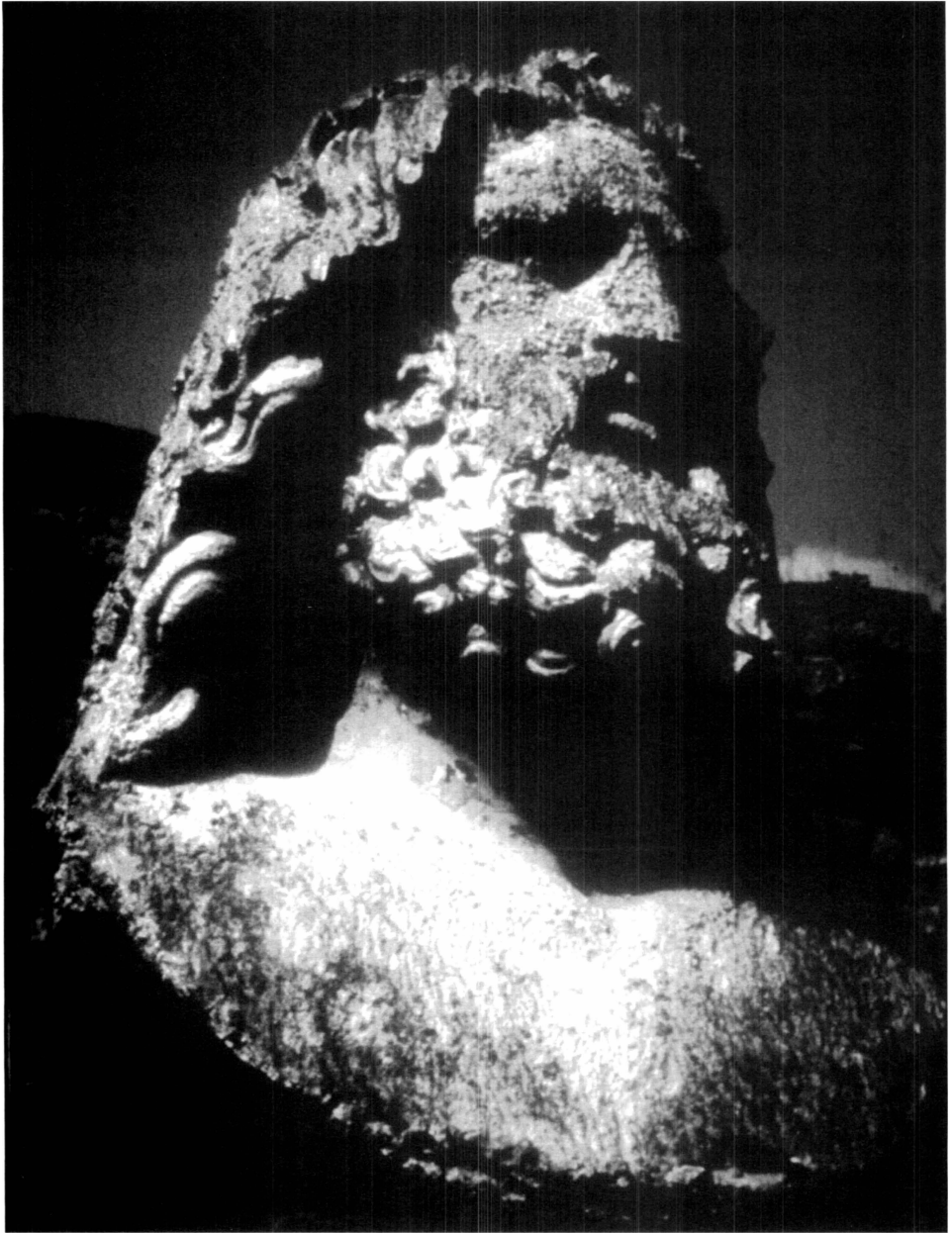


Fig. 1 The planet-god Jupiter. Pompeji, Temple of Jupiter.
The planet-god Jupiter is one of the main actors in most interpretations of the Star of Bethlehem
Photo and Copyright: Rahlf Hansen.

nets on the earth according to Kepler. In this sense an astrological force from planets is physically possible.

In 1604 there was a rare conjunction between Jupiter and Saturn. For the first time since 800 years it happened under a fiery sign (see at the bottom). Subsequently Mars stepped in. After this dance of planets the new star could be seen in the sky not far away. When the Nova lighted up Mars and Jupiter were still in a position close to each other and together with Saturn and the Nova formed a triangle. A fiery triangle at the sky within a fiery sign! Kepler speculated that there was a correlation between the conjunction of the planets and the Nova.¹⁶

Keplers interpretation of the Star of Bethlehem

Kepler could reckon back that in 6/7 BC a Jupiter-Saturn conjunction had taken place. In addition he calculated that after this conjunction Mars came along. We have a similar sequence, as the one Kepler had observed in 1603/4. He postulated that the similarity in the planetary meeting should have the same circumstances. Kepler assumed that also in 6 BC a new star lit up, like in 1604 “his” nova. This new and bright star, a concomitant of the same planetary conjunction as in 1604, was to be the Star of Bethlehem. These astronomical back trackings, paired with his astrological interpretation, encouraged him in his chronological classification of the birth of Jesus.¹⁷

Genealogical tree of Keplers thesis of the Star of Bethlehem

- In the 9th century the astronomer and astrologer Masha'allah (unknown – AD 885) offered the Jupiter-Saturn-conjunction as a possible Star of Bethlehem.¹⁸
- The Annals of Worcester Priory for the year 1285 presented the same conjunction as Star of Bethlehem.
- Kepler¹⁹ described a correlation between the conjunction Jupiter-Saturn-Mars and “his” nova. A similar sequence 6/7 BC may also be the Star of Bethlehem.
- Bishop Münter (1821) suggested that only the conjunction of Jupiter and Saturn was the Star of Bethlehem.²⁰ Ideler (1826) wrote in his “Handbuch der mathe-

¹⁶Kepler, Gesammelte Werke V (1953), p. 403.

¹⁷Kepler, Gesammelte Werke V (1953), p. 405.

¹⁸Gerhardt (1922), p. 59.

¹⁹Kepler, Gesammelte Werke V (1953), p. 404.

²⁰Ideler (1826), p. 405–406.

matischen und technischen Chronologie” that Kepler held the same thought as Münter did. As his “Handbuch” was read more widely than Kepler’s papers, this belief became common.²¹

- O. Gerhardt (1922) repeated the thesis from Ideler 1826 (= Münter).
- F. d’Ochhieppo (1968) held the same thesis and writes a sort of “script” for planetarium shows.

We have seen that the interpretation is already very old and in the courses of time has gone through various modifications. The most important element in Kepler is that the Jupiter-Saturn-conjunction had just moved into a fiery sign.²² Kepler found out that some 1600 years before “his” conjunction, the first one (in the 200 year cycle) in the fiery sign archer (sagittarius), there was a similar conjunction, which for the first time took place in the fiery ram (aries). The conjunction of 6/7 BC took place (for the last time in the 200 year cycle) in the watery sign fishes (pisces). But the Jupiter-Mars-conjunction following the Jupiter-Saturn-conjunction took place in the fiery sign ram (aries). This last “fiery conjunction” was very important for Kepler. Later the importance of the “elemental quality” of the sign was replaced by the fact that the conjunction Jupiter-Saturn was located in the fishes (pisces).²³ In analogy the astrological interpretation changed. But in any case Kepler’s authority lasts until today. Furthermore you can see how flexible any astrological interpretation is. It is astonishing that astronomers, who will normally point out the arbitrariness of astrological interpretations, give exactly those astrological interpretations as proof for their own respective thesis.

Discussion of Kepler’s “Star of Bethlehem”

Nowadays we know that Kepler’s assumption that there might be a connection between the constellation of the planets and his new star is wrong. However, in the

²¹Ideler describes Kepler’s thesis correctly (p. 401). Then he quotes Schubert’s “mixed theses” (Petersburg, 1823) saying that Bishop Münter was the first to claim that the planet conjunction was nothing but the star of Bethlehem (p. 406). Ideler presents his own evaluations on p. 408, i.e. that one does not require an unusual star in the proximity of the conjunction. The claim of Burke-Gaffney (1937, p. 425) that Ideler passes Münter’s thesis off for Kepler’s, is not correct.

²²Every 20 years the conjunctions repeat themselves, but shifted by eight signs and three degrees in the zodiac. After 200 years the conjunctions have thus wandered through 80 signs plus 30 degrees (= a further sign). The zodiac is divided into four groups, and three signs following the classical elements. The first (the ram, aries) is considered a fiery sign, as is the 5th (lion, leo) and the 9th (archer, sagittarius). This means that a shift by 8 signs leads into a sign of the same quality. Only after 200 years do the remaining 3 degrees of shifts add themselves to a further sign, so that the conjunction changes into a new “quality”. After 800 years the conjunction occurs in a sign of the same sort (e.g. fiery).

²³Kepler has noticed this, but didn’t handle it as astrologically important.

discussed span of time there were indeed two new stars, though not in the year 6 BC but rather in 4 BC and 5 BC. Sources from the Far East describe them²⁴, but it is not clear, whether one source had a mistake concerning the date. In that case we would have had one new star only, that of the year 5 BC. There is a description of movement for this object, so it must be a comet. As the term “new star” is used both for novae and comets in these sources and as no movement is described for the object of 4 BC, it is unclear what kind of object is concerned.²⁵

The question of Kepler’s motivation to search for the Star of Bethlehem is interesting.

Chronology was a popular field for scholars as I mentioned before, the same holds for Kepler. The temporal classification of the Bible into profane historical chronology was particularly discussed. Because the calendar had just been restructured by Pope Gregor (1582) – still rejected by the Protestant countries – this sphere of activity, however, was religiously charged. Only considering this background leads to a proper understanding of some controversies. Also Scaliger and Kepler were religiously motivated and – if only for reasons of faith – could not accept the point of view of the contrahent without contradicting him. Perhaps Kepler’s resistance to the known chronology as advanced by Scaliger originated here.

Was the interpretation of the Star of Bethlehem, as stated by Kepler, only good enough to state astrological arguments against Scaliger, arguments he wasn’t capable to counter? Or was Kepler truly convinced that an observation like the one of his “new star” could also have guided the Magi, so that he structured chronology accordingly? Perhaps both reasons came together and Kepler saw in them a mutual confirmation for its argumentation.

The Star of Bethlehem from the Viewpoint of the Historians

Today theologians and historians take the Star of Bethlehem to be a legend.²⁶ It has important theological functions, which are however independent of its historicity.²⁷

For the Star of Bethlehem the Julian Star is an important motivation. This latter is a comet of the year 44 BC. It rose during the funeral the young Octavian (adoptive son of Caesar) had arranged in honours of Caesar.²⁸ He propagated the star as a heavenly sign saying that the Gods approved of Caesar’s deeds and also were

²⁴Yoke (1962).

²⁵Gerhardt (1922), p. 100–103.

²⁶E.g. Lut (2002), p. 162–163.

²⁷Luz (2002), p. 163.

²⁸Ramsay and Licht (1997).

in favor of him, Octavian, the adopted son.²⁹ The later Augustus was considered to be guarantor of the Roman peace and was accordingly admired. A similar sign could not be missing in the case of Christ.

A direct model is the march of the Armenian king Tiridates to the Roman emperor Nero in AD 66.³⁰ Tiridates praises Nero as his God. Meanwhile Halley's comet is in the sky. An eastern king subjects himself to the western king of the world, accompanied by a heavenly sign. This caused wide attention.³¹ Also the evangelists, writing a few years later, might have had knowledge of it.

The motive of the persecuted and saved royal child, in part connected to astral signs, was also very popular.³²

The latest story of a similar admiration including a heavenly sign is known from the cult of Mithras, which has a lot of common with Christianity. This might be an adoption of the motive or of the whole story line of the legend.³³

This explanation for the Star of Bethlehem, however is only slowly accepted. On the one hand the Kepler's authority works up to our time. Even if his postulated "new star" is no longer valid as an interpretation, and "only" the conjunction of the planets is. But books, as the one by Ochieppo (*Der Stern der Weisen*, 1977), supply a nice inspiration for lectures at the Planetarium, and continue to popularize the legend. Maybe now as in the days past the reasons are again religious ones, who knows...

And astronomers of the Planetarium gratefully take up this story. To tell of a historian's opinion in a Planetarium, seems like the destruction of a beautiful myth, and no one wants to burden visitors with such a thing.³⁴

Acknowledgement

I would like to thank Anja Zeidler for translation and Christine Rink for inspiration and valuable discussions.

²⁹The comet was worshipped in a temple (Plinius, 23/4–79, *Naturalis Historiae* 2, XXII end) and molded on coins (pictures see in Bleicken (1998), p. 78 and 79).

³⁰Heus (1976), p. 333, Luz (2002), p. 161–162, Strobel (1987), p. 1084–1087, Dieterich (1902), p. 9–14.

³¹Cf. impressive report by Cassions Dio, *Römische Geschichte* V, *Epitome* Buch 63, Zürich 1987.

³²Luz (2002), p. 156.

³³Wiedengren (1965), p. 207–214 gives sources and Rudolf, p. 20 uses this thesis to claim that here we have a model for the star legend.

³⁴Already in 1923 Meyer (p. 59) polemicised against astronomers: "One of this pseudo-science's oddest errors – returning inerradicably but having such magic attraction for amateurs – are those ever new attempts to find astronomical evidence for this wandering star and transfer him into a constellation of planets".

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