For on that day thorns and thistle, sin, death, and decay—the things that overcame the world against its will at God's command—will all disappear, and the world around us will share in the glorious freedom from sin which God's children enjoy. For we know that even the things of nature like animals and plants, suffer in sickness and death as they await this great event.

Conclusion

In the ecology of living organisms, each species has its environmental niche space. Each niche space is bounded by a number of dimensions (some known, others not known) that define where organisms experience their life cycles. If just one niche dimension is zeroed the organism dies. Each niche space is different for each species, so are the niche dimensions; and lethal conditions can be different. But some conditions are clearly lethal. Even if a "Noah's Ark" of animals with the necessary vegetation were transported to Mars, most would survive for no more than a few minutes; and none would go through a single life cycle under the prevailing surface conditions. Even if the dimensions of an organism's niche space were known exactly and that space could be duplicated, still the probability that that organism—or any other kind of life—would arise by chance alone is zero, even under those ideal conditions. If, on the other hand, the living organism were placed in that niche, still the probability of its eventual death is 100%.

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ON THE STAR OF BETHLEHEM

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It is shown that, while a star really appeared to herald Our Lord's birth, all the proposed naturalistic explanations of the star are inadequate. Hence the star was a supernatural sign. In the course of the investigation, evidence is adduced to show that Our Lord's birth was in the year 2 B.C.

Introduction

Attempting to decisively date the birth of Christ or His crucifixion is a formidable task for any chronologist; and trying to ascertain the nature of the so-called Christmas Star is an even more formidable task for the astronomer. This paper reviews the current ideas surrounding the Star of Bethlehem and it also attempts to date the birth of the Lord Jesus Christ using a variety of evidence.

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To avoid confusion from the outset, it will be noted that all dates given in this paper will not include the mythical year zero. Many modern commmentators to the contrary, there properly should not be a zero year in a calendrical system referring to any historical event. The first year of Christ's stay on earth would, by definition, be the year A.D. 1; the year before his birth would by the same definition be the year 1 B.C. Hence there is no room for a year zero.

Naturalistic explanations for the Star of Bethlehem abound; and most of them can be summarily dismissed. In order then, to ascertain the validity of any and all naturalistic attempts at explaining the star, we need to

collect all that is actually and reliably known about the star. For that we must turn to the Bible.

The Biblical Evidence

The first mention of the star occurs, traditionally, in Numbers 24:17 where Balaam, in blessing the nation of Israel, says:

> . . . there shall come a Star out of Jacob, and a Sceptre shall rise out of Israel.

In this passage it is stated that the Star shall rise out of Jacob. When it comes to constellations, each of the twelve sons of Jacob is associated with one of the twelve signs of the zodiac. For example, on the strength of Genesis 49:8-12, Judah is associated with the constellation of Leo, the lion. Some support for such associations may be gathered from Joseph's dream as recorded in Genesis 37:9-11 and from Genesis 1:14. But there is no record, as far as the author's research has suggested, that Jacob was ever associated with any constellation whatsoever. If Genesis 37:10-11 is any indication, then Jacob is associated with the sun, not with any constellation.

Thus if we take Numbers 24:17 as referring to the Star of Bethlehem, then either the wise men saw a star ascending from the very land of Israel and placing itself in the sky, or else a part of the sun was torn loose and was observed as a star by the wise men in the east.

The only other Scriptural references to the star occur in Matthew 2 where we read in the second verse that the wise men asked Herod:

> Where is he that is born King of the Jews? For we have seen his star in the east, and we are come to worship him.

Apparently, the wise men no longer saw the star, having seen it in their native land (presumably, Babylon); for verses 9 and 10 continue with:

> When they had heard the king, they departed; and, lo, the star, which they saw in the east, went before them, till it came and stood over where the young child was.
>
> When they saw the star, they rejoiced with exceeding great joy.

Herod then interviewed the wise men and asked them when they first saw the star. As for the time of the appearance of the star, Matthew 2:16 reports that Herod slew all the children of Bethlehem:

> from two years old and under, according to the time which he had diligently enquired of the wise men.

This passage would seem to allow for a delay of as much as two years between the appearance of the star and the visit of the wise men. It seems that Jewish Talmudic tradition holds that there would be a two-year delay between the appearance of the star and the actual birth of the Messiah.[1] If this were the common belief in Herod's day, then no doubt Herod was not taking any chances by executing the children two years old or under.

Apocryphal References

In addition to the Biblical references, there are also three apocryphal references to the star. One of these appears in the blasphemous *Protevangelion* where it is reported that the wise men said unto Herod:

> We saw an extraordinary large star shining among the stars of heaven, and so out-shined all the other stars, as that they became not visible, and we knew thereby that a great king was born in Israel, and therefore we are come to worship him.[2]

A second reference is to be found in the *Epistle of Ignatius to the Ephesians* and it is like unto the first:

> A star shone in heaven beyond all the other stars, and its light was inexpressible, and its novelty struck terror into men's minds. All the rest of the stars, together with the sun and moon were the chorus to this star; but that sent out its light exceedingly above them all. And men began to be troubled to think whence this new star came so unlike to all the others. Hence all the power of magic became dissolved; and every bond of wickedness was destroyed; men's ignorance was taken away; and the old kingdom abolished; God himself appearing in the form of a man, for the renewal of eternal life.[3]

Both of these passages claim that the star was supremely bright; but if this were the case, then why is there no record of the star in any other culture? There are other cultural accounts of Joshua's long day (or night as the geographical case might be) and also of Hezekiah's sign. There is even a Roman record of the three hours of darkness which occurred while Christ hung on the cross; but this star, which is reported by these manuscripts to have exceeded the combined brightness of the moon, sun, and stars; was somehow missed by the Romans, Chinese, Mayans, Babylonians, and even by the Jews themselves. The apocryphal accounts are thus obvious fabrications, especially considering that they are found embedded in passages which proclaim that salvation is by water baptism,[4] and that ignorance is no more (see above) and that Mary was fed by angels throughout her childhood.[5]

The third apocryphal account is found in the extremely blasphemous *First Infancy Gospel:*

> And at the same time there appeared to (the wise men) an angel in the form of that star which had before been their guide in their journey; the light of which they followed till they returned into their own country.[6]

This passage is interesting only in that it mentions that the star was an angel, a consideration to which we shall turn our attention toward the end of this paper.

Thus it appears that all that is known of the Star of Bethlehem, from Scripture, is that it was a single star; that it was not particularly bright since it had not been noticed by Herod or the Rabbis; that it disappeared until the wise men saw it again en route from Jerusalem to, presumably, Bethlehem, a distance of a little more than 6 miles. Furthermore, it went ahead of them until it finally stood over the house wherein the young child was. Finally, the visit of the wise men may have been some two years after the appearance of the star, possibly, even after the birth of the Lord.

We are now ready to consider some of the naturalistic explanations which have been put forth in order to account for the star.

Some Suggested Naturalistic Explanations

The suggestion which can be quickly dismissed is that the star was actually the planet Venus which can sometimes take people by surprise by its brilliancy. It can even be seen in daylight and it is the most commonly reported "UFO" today. But if Venus had been the star, then it would have been recognized in the morning, being the morning star. Furthermore, the wise men were doubtlessly aware of its position and motion so that it is extremely unlikely that it would take them by surprise.

A second suggestion is that the star was a meteor or fireball. Such "shooting stars," which are little particles of rock or nickel-iron ranging in size from a grain of sand to many tons, are short-lived, common phenomena. They are so common, in fact, that it hardly seems likely that any fireball or bolide (exploding meteor) could have aroused the wise men to a 450-mile journey to Jerusalem. After all, most meteors last less than 10 seconds.

It has been suggested, by Joseph Ciotti,[6] that the Star of Bethlehem was an early sighting of the planet Uranus. Uranus was discovered by Sir William Herschel in 1781. It is barely below the detectability of the naked eye and it was located in the constellation of Pisces during the years about Christ's birth. But even though Pisces is made up of faint stars, it is doubtful that the slow-moving, exceedingly faint Uranus would have been detected. Even if it had been seen there is nothing inherent in its appearance that would urge the wise men toward Jerusalem.

A somewhat more feasible possibility for the star is the suggestion that it was an exploding star—a nova or supernova. Far eastern records do record two "temporary stars" around Christ's birth.[8] The first appeared some time in the second month (March 10 to April 7) of the second year of the *Ch'ien-p'ing* period (5 B.C.) near the stars of alpha and beta Capricorni. This star was observed for seventy days and there is some question as to whether or not motion was recorded for it. If it did move then it would have been, most likely, a comet. At its appearing, it would have risen 4½ hours before sunrise; hardly an early morning or "eastern" object.

The second reported sighting hails from Korea. It is rather vague insofar as its date may not have been correctly recorded.[9] This object was reported as appearing in late winter or early spring in the year 4 B.C. in the constellation of Aquila. Some have suggested that the 5 B.C. and the 4 B.C. objects may be one and the same,[10] but Morehouse[11] has suggested that the 4 B.C. object was a supernova which can now be identified with a binary pulsar, PSR 1913+16b. That pulsar has a period of 0.059 second and Morehouse's identification with the Aquila object is not at all unreasonable.[12] Yet there is nothing at all unique about either the 5 B.C. or the 4 B.C. objects that would provoke the wise men into journeying to Jerusalem.

It has also been suggested that the Star of Bethlehem was a comet. But, outside the possibility that one or both of the above objects were comets, there appears to be no record of any comet around the time of Christ's birth. Mention is sometiomes made of the 11 B.C. appearance of Halley's comet; but it is far too early. Since a bright comet may move as much as ten degrees per day, it is difficult for one either to remain visible for two years or even to lead and stop over Bethlehem in a way that was clearly discernible to the wise men. A comet as the Christmas star has one other drawback and that is the fact that comets are always viewed as unfavorable omens.

But The Star Really Appeared

The suggestion that the star was merely a legend or a fabrication on Matthew's part fails on three counts. It is claimed that Matthew concocted the star in order to fulfill the prophecy of Balaam in Numbers 24:17. But the necessity of having to concoct such an object can be questioned since it is not at all clear that Balaam's prophecy requires a literal star for its fulfillment. Yet had Matthew felt it necessary then he would have explicitly pointed to the fulfillment of the prophecy for he is certainly not slack in his use of the clause: "that it might be fulfilled which was written." The second argument against the position that Matthew made up the star is that his star was far too subdued. For truly legendary stars of the type that Matthew is purported to have invented, we need only look at the first two of the three apocryphal accounts mentioned previously in this paper.

The third argument against the "counterfeit" hypothesis is that the passage in Numbers does not require fulfillment by a literal star. It speaks of a Star rising out of Jacob, not out of any constellation or horizon. Furthermore, Scripture uses stars and angels interchangeably; hence the very birth of Christ would have been fulfillment enough.

Some Other Suggestions

Seiss[13] came up with another interesting suggestion for the Star of Bethlehem. He and Bullinger[14] both refer to the Arab Christian historian, Abulfaragus (1226-1286), who indicated that Zoroaster was a student of Daniel the Prophet. In the Zoroastrian bible, the *Zend Avesta*, it is written that the appearance of a new star in the constellation of Virgo would herald the birth of the Messiah.

By virtue of the fact that the word *coma*, which in Hebrew signifies "to long for" (see Psalm 63:1), is also the name of a constellation north of Virgo; both Seiss and Bullinger conclude that the constellation of Coma must be the one wherein the Star of Bethlehem appeared.[15]

Seiss' account gets confused when he reports a flare-up of a star in the constellation of Coma in the year 125 B.C. He reports that that was the very star which, becoming visible in daylight, caused Hipparchus to recognize the transiency of the stars and thus to draw up his famous star catalog. Seiss then mentions a Chinese report of a flare-up of the same star about the time of Christ's birth; but he has either confused this with the two reports already mentioned, or he had access to an accout which is now lost.[16] It is reported that Ptolemy wrote that the same star was barely visible in his day (A.D. 150). Seiss finally identifies the star as 5

Comae which he claims was the Christmas star which also passed overhead at Jerusalem and was seen by the wise men when they looked down the well.

The story of the well cannot be accurately dated. It claims that the wise men travelled by day to Jerusalem and that the star was seen when one of the wise men looked in to a well. Now it is a demonstrable fact that the stars are visible, in the day time, when seen from the bottom of a long shaft; but there are several flaws with the account that the wise men saw the star in the well. First of all, they would have had to take deliberate precautions to avoid having their heads in the way of the star's light. Secondly, the star must still be fairly bright and thirdly, they could not have seen it going ahead of them on their journey from Jerusalem. Lastly, the star's visibility in a well would not have uniquely pinpointed the place but would only have indicated the proper latitude, not the longitude.

It is easy to check on Seiss' theory that 5 Comae was the Star of Bethlehem. In order to do so, the author has written a FORTRAN computer program which calculates precession to double precision. Both Bethlehem's and Jerusalem's latitudes were precessed forward in time from 1 B.C. to A.D. 1950. The precession formulae used were those of Escobal.[17] The zenith trace was then plotted on a 1950 star chart and from that plot, a number of objects which passed more or less overhead at Bethlehem in the time of Christ were selected. Their 1950 positions were then precessed back to 1 B.C. and their zenith angles at meridian transit were reduced to miles north or south of the two latitudes of Jerusalem and Bethlehem. The results are given in Table I.

According to Table I, the object which appeared to pass closest to directly overhead at Bethlehem was Gamma Lyrae. It passes due overhead about a half a mile north of Bethlehem. Seiss' suggestion for the Christmas star, 5 Comae, was overhead almost 13.5 miles south of Bethlehem.

When it comes to possible unreported exploding stars, two planetary nebulae appear close to the zenith trace. The brightest is the Ring Nebula, M 57, in Lyra. It would have been directly overhead about 41 miles north of Bethlehem. The second planetary is an anonymous one which is not even listed in the New General Catalog. It is located in the constellation of Cygnus, its 1950 coordinates being 21 hours, 31.2 minutes in right ascension and its declination being 39 degrees 24 minutes. None of these objects appear to satisfy all the criteria which scripture accords to the Star of Bethlehem, also not Seiss' star which apparently lasted for 275 years and would thus hardly be considered special.

Table I. Objects which passed overhead near Bethlehem at the time of Christ's birth.

Name of object	Distance from Jerusalem object passed overhead.	Distance from Bethlehem object passed overhead.
γ^1 Andromedae	7.75 miles south	2.69 miles south
γ^2 Andromedae	7.60 miles south	2.55 miles south
β Perseii = Algol	23.54 miles south	18.49 miles south
ξ Leonis	14.68 miles north	19.74 miles north
5 Comae	18.47 miles south	13.42 miles south
γ Lyrae	4.53 miles north	0.53 miles north
M 57 = Ring Nebula	35.61 miles north	40.66 miles north
Anonymous Pl. N.	27.69 miles north	32.75 miles north

Most of the above interpretations for the Christmas star are rejected by the majority of Christian astronomers and laymen. In order to ascertain the validity of those which commonly are accepted, we must first combine secular history and the Bible to date the actual birth of Christ.

When Was Christ Born?

Luke 3:1 indicates that John the Baptist started his ministry in the fifteenth year of the reign of Tiberius Caesar. There is little doubt that Caesar Augustus died in A.D. 14, the date being attested to by coins and historians of that era. So the first year of Tiberius' reign dated from August 19, A.D. 14 to August 18, A.D. 15. Hence his fifteenth year was from August A.D. 28 to August A.D. 29.

Now there are only two possible dates for the crucifixion which allow for the resurrection to have occured on the first day of the week, and the years for those dates were A.D. 30 and A.D. 33. Traditionally (perhaps as with Ussher[18] who based his conclusion on a comparison of Daniel 9:27 with Matthew 26:28), Christ's ministry on earth is taken as having lasted three and a half years. This indicated that the A.D. 33 date is the correct one for the crucifixion.

In support of this conclusion, Luke 3:23 states that:

> And Jesus himself began to be about thirty years of age

at the time of his baptism by John (v.21).[19] This would then have been some time during or after the fifteenth year of Tiberius.

These considerations pinpoint the A.D. 33 crucifixion date. Jesus' ministry thus began in the fall of A.D. 29, early in the sixteenth year of Tiberius, with John having started some six months earlier, perhaps at the time of Passover or else at the time of Pentecost (Leviticus 23:21).

All this serves to date the birth of Christ as the fall or late summer of 2 B.C.; the birth of John being more specifically dateable as about the 25th of March, 2 B.C, that day being the first day of spring and one human gestation period after the first course of Abia (Luke 1:5, 8, 23).

It is interesting to compare the various dates for Christ's birth. Most modern commentators place it in 5 B.C. or earlier. Some modern ones place it as early as 7 B.C. In doing so, they run contrary to the testimony of the historians who were closest to the fact of the birth. Only Sulpitius Severus of the fourth century held for the birth of Christ being as early as 4 B.C. A second century gnostic group called the Alogi seemed to have agreed with him but, as we shall see, they appeared divided on the issue.

Irenaeus held for the birth of Christ to be either 4 B.C. or 3 B.C.

When it comes to a date of 3 B.C., we find only three adherents: Clement of Alexandria, Orisius, and Cassiodorus Senator.

The list for a date of 3 to 2 B.C. (i.e., corresponding to the Jewish year) is longest of all including: Julius

Africanus, Hippolytus of Rome, Hippolytus of Thebes (first fragment), Jerome, Origen, Photius of Constantinople, Zonares, Eusebius of Caesaria, Bar Hebraeus, Chrysostom, Basilides, Tertullian (who opted for the spring of 2 B.C. at which time Saturnius instead of Cyrenius was governor of Syria), the *Paschal Chronicle* and the *Chronicon Cyrianicum.*

Opting for a birth date of 2 B.C. are Epiphanius and the early Syrian historical treatise, the *Chronicon Edessenum.*

Dating Christ's birth as either 2 or 1 B.C. is the second fragment of Hippolytus of Thebes.

Holding out for a birth date of 1 B.C. are Dionysius Exiguus and Furius Dionysius Folocalus who was the editor of the *Chronograph* of A.D. 354.

Finally, Epiphanius reported the Alogi also held a date of A.D. 9.

The average of all these estimates yields a date of 2.52 B.C. (not counting the Alogi whose inclusion brings the average to 2.16 B.C.). This is perfectly in line with the Biblical date of 2.3 or 2.25 B.C. Thus the year of our Lord's birth can quite readily be established as 2 B.C.

Josephus, Herod's Death, and Roman Matters

Then why all the modern estimates of 4 B.C. or earlier? The answer to that question lies in the date usually affixed to the death of Herod. Josephus reported that Herod died some time after a lunar eclipse. There was a partial eclipse of the moon in the early morning hours of March 13, 4 B.C. which reached its maximum phase around 2 A.M. But there are a number of serious problems associated with identifying Herod's death with the 4 B.C. eclipse. These problems have been summarized quite well by Martin[20] who points to the total lunar eclipse of January 9-10, 1 B.C. as the one to which Josephus refers Herod's death.

If this is indeed the right eclipse, then this also enables a chronology of the governorship of Syria to be constructed which allows for Cyrenius (Luke 2:2). Quintilius Varus was governor of Syria until 4 B.C., having assumed the governorship about 7 B.C. A stone inscription found near the Anio River outside of Rome is readily identifiable as referring to Varus, who, according to the inscription, was twice governor of Syria.

Josephus reports (Antiq. *17*, 58) that Varus succeded Sentius Saturnius as Governor of Syria shortly before the death of Herod. Josephus further indicates that Saturnius was governor that previous spring. Now either this was in 7 B.C. (which means that Herod died no later than 6 B.C.) or else Josephus is referring to the second time that Varus was governor of Syria, namely, 2 B.C. Furthermore, Josephus also notes that Syria had a number of governors during the rule of Saturnius (*Antiq. 16*, 280, 285, 357, 361).

Now, as Martin has pointed out, the year 2 B.C. was also the silver jubilee of the rule of Augustus. It was a year in which there were great celebrations in Rome as the Senate conferred the title of *Pater Patriae* on Augustus Caesar. Apparently, there was a special taxation of the Roman world in commemoration of the 25th anniversary of Augustus' rule. This was the taxation referred to in Luke 2:1-5. It was a special tax, as indicated by Luke 2:1 and by the very fact that it was decreed rather than automatic. The annual taxes were more or less automatic; they required no proclamation.

Indications are, then, that Caesar Augustus proclaimed a special, unscheduled tax as part of his silver jubilee (February 2 B.C. to February 1 B.C.) and that Joseph went to Bethlehem to pay said tax toward the onset of the rainy season (at the last possible moment, in other words) thus finding no room at the inn.

It is common to identify the taxing mentioned by Luke with one of the censuses. The last Roman census before the birth of Christ occurred in 8 B.C. The next census did not occur until A.D. 14. The censuses were scheduled to occur every 20 years with updates every five years. The update nearest the birth of Christ was thus in 3 B.C. These, like annual taxes, were more or less automatic, requiring no proclamation.

Armenian sources, as well as Josephus, report that in 3 B.C. the census also entailed an oath of fidelity to Caesar. But the oath was to be administered at the temples, not in the home towns of the participants. Hence this oath of allegiance could not have been the taxation referred to by Luke.

Now Luke 2:2 reports that:

> this taxing was first made when Cyrenius was governor of Syria,

indicating that Cyrenius was sole governor of Syria, not a co-regent. Josephus reports that Saturnius was governor in the spring of 2 B.C. and that Varus replaced him in the autumn of 2 B.C. But it seems likely that both of these regents would be in Rome for the summer festivities, thus leaving room for Cyrenius to be governor of Syria from the early summer of 2 B.C. until the early fall of 2 B.C.

The indications are that Jesus was born late August or early September of 2 B.C, the new moon before the new year being the 29th of August that year. Had he been born the 29th, then 40 days later his presentation in the temple would have fallen on the Day of Atonement. Five days later would have been the Feast of Tabernacles when all Jewish males were legally required to be in Jerusalem. Luke 2:39 reports that after this, they returned to Nazareth.

There are two things to notice about the coming of the wise men. First of all, at no point in Scripture does it say that they saw the child in Bethlehem. They asked for the birthplace and that was identified as Bethlehem, but Scripture does not say that the star led them to Bethlehem. The star could have led them to Nazareth. Secondly, it is clear that when the wise men saw him, Jesus was no longer an infant but was a child and he was no longer in a manger but was in a house. It is thus not at all inconceivable that the wise men came late in 2 B.C. and happened upon Joseph and Mary in Bethlehem. These might have been there visiting family and friends at the Feast of the Dedication (Hanukah) in December. This would then date the flight into Egypt in late December and Joseph, Mary, and Jesus would then not have stayed in Egypt any longer than about 40 days; for Herod would have died January 38 of 1 B.C.

If then, the birthdate of Christ can be established as 2 B.C., what of the usual Christian interpretations of the Star of Bethlehem? The most popular of these accounts is the 7 B.C. triple conjunction of Jupiter and Saturn. A

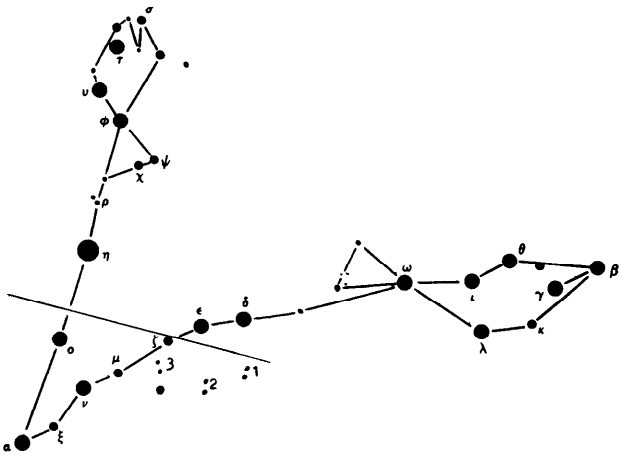

Figure 1. The constellation of Pisces showing the relative positions of Jupiter and Saturn during their triple conjunction of 7 B.C. The position labelled 1 marks the location of the two planets on May 27, 2 indicates their position on October 5, and 3 shows the December 1 location. In each case Jupiter is the northern point and Saturn is the southern point.

tremendous amount of mythology has been constructed around the account since Kepler wrote about it in the sixteenth century. The scenario of the 7 B.C. conjunction is as follows:

The Theory of Conjunction

On May 27 of 7 B.C., Jupiter and Saturn approached each other and came as close as 0.99 degree from each other. This distance is about twice the apparent diameter of the moon which is about 0.5 degree. They then proceeded further apart only to reverse direction, approaching each other again until a separation of 0.98 degree occurred on October 5. The final conjunction occurred December 1 of 7 B.C. when there were 1.05 degrees separating them.

One of the mythological embellishments which have become affixed to the triple conjunction has to do with the Day of Atonement. The Day of Atonement fell on October 3 in the year 7 B.C. Hence a number of writers have dated the central conjunction as happening on that day. But Tuckerman's tables[21] indicate that the conjunction occurred two days after the Day of Atonement on October 5. The 30th of September is also sometimes erroneously given as the date of the second conjunction.

A second myth that is often repeated about the triple conjunction of 7 B.C. is that the two planets fused into one brilliant star. In actual fact, they never came any closer to each other than about two apparent lunar diameters; hardly noteworthy at all. Furthermore, an even closer triple conjunction of Jupiter and Saturn occurred some 59 years earlier. It, too, was in the constellation of Pisces and would have been an even more spectacular and significant herald of Christ's birth. But no wise men are reported as having showed up in Jerusalem at that time.

A third myth asociated with the 7 B.C. conjunction is the story that it was Kepler who first associated the conjunction with the birth of Christ. Actually, the Annals of the Abbey of Worcester, in reporting on the 0.17 degree approach between Jupiter and Saturn during their triple conjunction in Pisces in 1285, noted that such an event had not happened since the birth of Christ.[22] All in all, then, it seems very unlikely that the triple conjunction of Jupiter with Saturn in 7 B.C. was any portent to the Lord Jesus Christ's birth.

Martin[23] claims that the star referred to by the wise men was none other than the planet Jupiter. But if that were so, then there would be negative significance in addressing Herod with the words: "We have seen his star in the east" (Matthew 2:2) since such an event occurs regularly as clockwork every 13 months. Martin thus claims Jupiter as the Star of Bethlehem, but others[24] have, by the same type of argument, selected Saturn.

Planetary Configurations at that Time

Yet there were a number of significant and unusual planetary configurations in the years 3 to 2 B.C. Sequentially, they start with a conjunction of Jupiter with Venus on the 12th of August, 3 B.C. At that time the planets came within 0.23 degree of each other, about half of the apparent angular diameter of the moon. That conjunction was followed by another on the first of September of that year when Venus and Mercury approached each other to within 0.36 degree.

On the 14th of September of 3 B.C. Jupiter had the first of a triple conjunction with the star Regulus, the brightest star in the lion. At that time it passed about 0.63 degree from the star. The following 17th of February, the second of the triple conjunctions took place. This time the separation of the two objects was 1.19 degrees. The last of the triple conjunction occurred on May 9 of 2 B.C. when the star and the planet were 1.06 degrees apart.

The following month, on June 17, 2 B.C., Jupiter again came into conjunction with Venus. This time the conjunction was truly spectacular as the two brightest objects in the sky outside of the sun and the moon merged together into what, to most human eyes, appeared as one object. At their closest, they were only 0.05 degree apart.

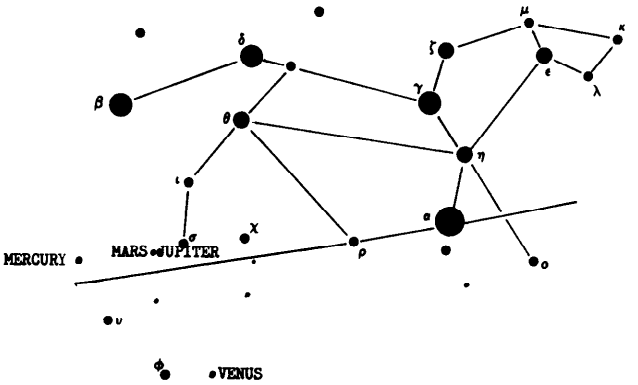

Figure 2. The constellation of Leo showing the positions of the planets in that constellation on August 29, 2 B.C. Here, as in Figure 1, the ecliptic is shown as a straight line which does not connect two stars.

Finally, on the 27th of August of 2 B.C., Mars and Jupiter passed within 0.14 degree of each other. At that time all the major planets, except for Saturn, were in the constellation of Leo, being massed within 10 degrees of each other.

Spectacular and intriguing though such conjunctions may be, yet they cannot possibly be the Star of Bethlehem. Matthew plainly recorded that there was one star, not a group of stars. Hence all speculations which involve planetary configurations must be ruled out from the start. Besides, had the star been a planet, then Matthew could have used that word instead of "star," for our very word "planet" comes from the Greek word which Matthew would have used (Compare Jude 13). This does not mean that the above planetary configurations did not possibly have significance, for the very purpose of their creation was that they be for signs (Genesis 1:14). All it means is that the Star of Bethlehem itself could not have been a planet or a planetary configuration.

Thus it appears that the most spectacular planetary configurations all occurred in the year preceding the historic date of Christ's birth.

What, Then, Was The Star?

But what of the star? The wise men originally saw it in the eastern sky, in the light of dawn, as the Authorized Version clearly states in Matthew 2:25:[25]

> For we have seen his star in the east, and are come to worship him.

Then there is the requirement of Matthew 2:9 that the star definitely moved and stood still:

> and, lo, the star, which they saw in the east, went before them, till it came and stood over where the young child was.

Thus the star moved and stood still. Not only that, but the star had to be close enough to the wise men in order to be able to lead them, to go "before them." Strictly speaking, there is no natural phenomenon known which can do this unless it be ball lightning. But ball lightning is too transient a phenomenon to have led the wise men for very long. It is certainly not a star.

That leaves us with only one alternative. The Star of Bethlehem was a miracle; an angel. Angels are often referred to as stars in the Scriptures. One such reference is Revelation 1:20 where we read:

> The seven stars are the angels of the seven churches.

Other references could be cited.[26] This resolves all difficulties about the nature and the behavior of the star since angels can move and stay still. Perhaps the angel first appeared in the constellation of Virgo, while the sun was yet in that constellation, even as the *Zend Avesta* required. If so, then it would have appeared about the first day of autumn in 4 B.C., some two years before the actual birth of Jesus as the Talmud indicated.

References

[1]Montefiore, H.W. 1960. *Novem Testamentum*, II. E. J. Brill, Leiden, p. 211.

[2]Protevangelion 15:7 in The Lost Books of the Bible and the Forgotten Books of Eden. Collins-World, 1977, p. 35.

[3]Epistle of Ignatius to the Ephesians 4:11-13. *Ibid.*, p. 171.

[4]*Ibid.*, verse 9: that through (Christ's) passion he might purify water to the washing away of sin.

[5]Protevangelion 8:2. *Ibid.*, p. 28.

[6]The First Gospel of the Infancy of Jesus Christ 3:3. *Ibid.*, p. 40.

[7]Bunton, G. W. 1977. The Star of Bethlehem. Bernice P. Bishop Museum Press, Honolulu, pp. 7 & 10.

[8]Clark, D. H., J. H. Parkinson and F. R. Stephenson. 1977. An astronomical re-appraisal of the Star of Bethlehem—a nova in 5 B.C. *Quarterly Journal of the Royal Astronomical Society.* 18(4):443-449.

[9]*Ibid.*, p. 445.

[10]*Ibid.*, p. 445.

[11]Morehouse, A. J. 1978. The Christmas Star as a supernova in Aquila. *Journal of the Royal Astronomical Society of Canada.* 72(2):65-68.

[12]Morehouse interpolates the Aquila supernova as having occurred between those associated with the Crab nebula and the Vela pulsars. The latter has been associated with an apparent supernova reported in an ancient Sumerian tablet, reputedly 6,000 years old. The Crab Nebula pulsar has a period of 0.033 second; PSR 1913+16b has a period of 0.059 second and the Vela pulsar has a period of 0.089 second. If we assume that the three pulsars are similar and correctly identified with their supernovae, and if we assume that t_o is the initial period and r is its slow-down rate, then we can date the Sumerian tablet. We find that for 1978:

for the Crab Nebulae $t_o + 924\ r = 0.033$
for the Aquila object $t_o + 1981r = 0.059$
for the Vela pulsar $t_o + t\ r = 0.089$.

Solving for t we find that the tablet may actually be as recent as 1200 B.C.

[13]Seiss, J. A. 1882. The Gospel in the stars. E. Claxton and Co., Philadelphia. Reprinted in 1972 by Kregel Publications, Grand Rapids. Pp. 28-29 and 161-162.

[14]Bullinger, E. W., 1893. The witness of the stars. London. Reprinted in 1976 by Kregel Publications, Grand Rapids. Pp. 34-40.

[15]Both Bullinger and Seiss depict Coma as a baby boy standing on the lap of a maiden. Seiss claims that the picture is found on the Egyptian Dendera constellation chart and, indeed, it is so depicted. But on the Dendera chart the figure is to the south of both Leo and Virgo, not to the east of Leo and to the north of Virgo as Seiss and Bullinger both depict it. Furthermore, Bullinger claims that the Dendera dates from about 2,000 B.C. (p. 36), but my own examination of the chart reveals that the Scorpio-Sagittarius region is closest to the horizon of the chart. This indicates that the chart is roughly 1500 years old; certainly not much more than 2,000 years old. This is consistent with the fact that the chart was found in a building dating from the Ptolemaic era (circa second century B.C.). It was probably not an original fixture in the building when the latter was erected but was probably added long after the building was new. For a copy of Bossi's 1820 drawing of the Dendera and for more information see: Allen, D. A. 1977. An astronomer's impressions of ancient Egypt. *Sky and Telescope.* 54(1):15-19.

[16]However, there is a pulsar, CP 1133, only 6 degrees west of Coma in the constellation of Leo; but it is west of Denebola which clearly places it in Leo; and it was not at all overhead in Israel in the time of Christ.

[17]Escobal, P.R. 1968. Methods of astrodynamics. John Wiley and Sons, New York. Pp. 277-280.

[18]Ussher, James. 1658. The Annals of the World. E. Tyler, London. p. 820.

[19]Critics have often claimed that the Greek does not say that Jesus "began to be about" 30 years old but that, instead, the Greek actually says that Jesus was about 30 years old "when he began his ministry." In actual fact, however, no Greek manuscript has the words "his ministry" in it at all, it being purely a fabrication of the imaginations of the critics. To set the record straight, the Greek literally reads: "Himself Jesus began were-ing about thirty years being son . . . ". If the middle-voiced "began" is separated from "to be" (or "were-ing") then the text should not be interpreted as "began his ministry", which words do not occur in the Greek, but, instead, the text would then be translated as "Jesus, himself was about 30 years old, began being the son . . . ", which is clearly a nonsensical reading. Hence the correct translation of the Greek, as is attested to by all Reformation translations, is "And Jesus himself began to be about thirty years of age, being (as was supposed) the son . . . ".

[20]Martin, E. L. 1978. The Birth of Christ Recalculated! Foundation for Biblical Research, Pasadena. Chapter 2. Beware of some of Martin's most recent revisions which have thus far only been published in his newsletter. For example, he holds for a coincidence with the

14 September 3 B.C. conjunction of Jupiter and Regulus with the new moon. The new moon was actually on the 9th of September, not the 14th. The dates of new moon for 3 B.C. for the months of August and September are August 10 (23:12 Jerusalem time) and September 9 (13:09). For 2 B.C. they are August 29 (19:28) and September 28 (10:21).

[21]Tuckerman, Bryant. 1962. Planetary, Lunar and Solar positions—601 B.C. to A.D. 1. *Mem. of the Am. Philosophical Soc.* 56. American Philosophical Society, Philadelphia.

[22]Luand, H. R., ed. 1869. *Ann. Monastici*, IV. London. P. 447.

[23]Martin, E L. 1978. *Op. cit.* also see Martin, 1976. The celestial pageantry dating Christ's birth. *Christianity Today*. December 3, pp. 16-22.

[24]Hughes, D. W. 1977. Matters arising. *Nature*. 268(5620):565.

[25]Bible critics often make much of the Greek *en te anatole* here, indicating thereby that this is a technical term meaning heliacal rising. They then claim that the translators of the Authorized Bible could not have known this. Yet, despite their implications to the contrary, the singular form, *anatole*, is used another time in Scripture. It appears in Luke 1:78 where it is translated as "dayspring" and where "heliacal rising" would be utter nonsense. Examination of the A.V. indicates that the criticism is groundless for the phrase "in the east" must of necessity refer to the prior noun, the star, rather than the subject of the sentence which is "we". Hence the star was seen in the eastern sky, which can only be the morning sky. I have been unable to trace the *en te anatole* criticism back any further than Keller's book, originally written in German, which was translated into English by William Neil in 1956 under the title of The Bible as History (Wm. Morrow and Co., N.Y.). P. 350. Keller's original criticism was directed against all German translations but Neil applied the criticism to the English Bible without checking on the veracity of the application. The German Bibles use *Morgenland* which literally means "morning-country". But even in the German Bible the phrase is placed so as to describe the star, not the location from which it was observed. The latter is the case for all Reformation translations so that the criticism is spurious.

[26]Num 24:17; Jg 5:20; Jb 38:7; Ps 104:4; Dn 12:[3]: He 1:7; 2Pe 1:19; Jude 13: Re 2:28; 9:1; 12:24.

(Editor's note). The following additional references may be of interest. Bouw, Gerardus D., 1980. A note on the upcoming triple conjunction of Jupiter and Saturn. *Creation Research Society Quarterly* 17(2):138-189. Comments of some planetary configurations occuring now. Maier, Paul L., 1968. Sejanus, Pilate, and the date of the Crucifixion. *Church History* (1):3-13, gives an argument, from Roman history, for 33 A.D. as the year of the Crucifixion. And Filmer, W.E., 1966 The chronology of the reign of Herod the Great. *The Journal of Theological Studies* XVII (2):283-298, re-investigates the question of the date of Herod's death.

ASA GRAY AND THEISTIC EVOLUTION

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In this article are discussed the scientific evidence which prompted Asa Gray to try to persuade Charles Darwin to adopt theistic evolution, and Darwin's reasons for rejecting theistic in favor of atheistic evolution. In their arguments, both men appealed to the fossil record. Besides their interpretations of that record, the one by Georges Cuvier is mentioned; and it is noted that yet others are possible. So various alternative interpretations of the record are considered, to see which one best fits the facts.

Proponents of theistic evolution should realize that their point of view, for good reason, was never seriously considered by the founders of evolution theory—except for Asa Gray. Theistic evolution, if not originated, was at least avidly promoted by the Harvard professor of botany, Asa Gray. Theistic evolution or the design principle (evidence of intelligent design in nature) attempts to include theism while not excluding evolution. it is an attempt to incorporate both *a priori* systems.

In a private letter, Gray explains his position as follows: "Since atheistic doctrines of evolution are prevailing and likely to prevail, more or less, among scientific men, I have thought it important and have taken considerable pain to show that they may be held theistically."[1] And in an anonymously written article, Gray explains his position similarly: "It would not be dealing fairly by our readers, and, especially, it would be unmindful of the apologetic value of natural theology, were we to look at this theory from any other point of view, than the twofold one of science and theology."[2]

Gray was not without influence, and he used it to try to persuade Darwin to adopt theistic evolution. Briefly stated, his argument for design goes like this: Did Darwin mean to exclude theism entirely? Gray had been comforting Americans by pointing out how Darwin recognized Divine purpose, citing, for example, the three quotations that Darwin had posted in the front of the *Origin*—two from theologians and one from Bacon—which emphasized "Divine power," "intelligent agent," and "book of God's word."[3]

If Darwin does not mean to exclude theism, why not assume that the Creator directed the evolutionary process? Gray described his concept of theistic evolution metaphorically as "streams flowing over a sloping plain (here the counterpart of natural selection) may have worn their actual channels as they flowed; yet their particular course may have been assigned; and where we see them forming definite and useful lines of variation, after a manner unaccountable in the laws of gravitation and dynamics, we should believe that the distribution was designed."[4] John Dewey, one of the founders of the progressive education movement, aptly described Gray's theistic evolution as "design on the installment plan. If we conceive the 'streams of variations' to be itself intended, we may suppose that each successive variation was designed from the first to be selected."[5]

Needless to say, as the textbooks will verify, Gray's "design on the installment plan" was rejected by Darwin. In a private letter, Darwin informs Gray of the re-

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