

Pharaoh Tutankhamun, Queen Tawananna III and King Jian Jia saw the extremely bright Supernova 1355 BC

Göran Henriksson¹

¹(Department of Physics and Astronomy, Uppsala University, Sweden)

ABSTRACT: A Chinese oracle bone text from the 14th century BC mentioned that a guest star appeared "On a *chi-ssu* day, the seventh day of the month". On contemporary Swedish rock-carvings a solar symbol was depicted below the ecliptic, represented by six calendar ships, and close to the left elbow of Orion. The symbol for the full moon was depicted in Gemini, above the supernova, which means that the supernova appeared in November. A combination of this information means that the supernova appeared in the sky on 9 November in 1355 BC and can be identified with the supernova remnant PKS 0646+06.

In four cases it has been possible to estimate the magnitude of the supernova and these points match the linear decline of a type Ia supernova.

Independent support for this interpretation can be found in the Babylonian *Enuma Anu Enlil* (EAE) texts. Pharaoh Tutankhaten changed his name to Tutankhamun in 1355-4 BC (High Egyptian Chronology). When the Supernova appeared during daytime there was two suns in the sky and Akhenaten's monotheistic religion was disproved. Hittite Queen Tawananna III had two sun discs in her royal seal. Independently, the American Anasazi people depicted the Supernova below the left elbow of the "Warrior".

Keywords: Chinese oracle bones, light curve, Supernova, Supernova remnant, Swedish rock-carving

I. INTRODUCTION

Chinese oracle bone texts from the Shang Dynasty contain the earliest mentioning of a "guest star": "On a *chi-ssu* day, the seventh day of the month, a great new star appeared in the company of the 'Fire (Star)' (Antares)" and another oracle bone text tells us "On a *hsin-wei* day the new star dwindled." Yoke [1] writes: "The above are contained in the oracle-bones, dating from about the 14th century B.C. and have been regarded as the most ancient extant records of novae. Needham [2] mentions that the two records probably referred to the same phenomenon. It is unfortunate that no exact dates or positions of the new stars can be deduced from the above."

However, this new star can be identified on Swedish rock-carvings from the Bronze Age, 1800-500 BC, as a solar symbol placed below the ecliptic and close to the left elbow of a male figure, our constellation Orion, that lifts the highest of the six calendar ships along the ecliptic, Gemini-Taurus, above his head, Henriksson [3] and [4]. The symbol for the full moon was marked in Gemini, above the supernova, which means that the supernova appeared in November. If this information is combined with the information in the Chinese text that "On a *chi-ssu* day, the seventh day of the month", which only happens once every 59th year in November, there exists only one solution, 10th November 1355 BC in China and the 9th in Sweden, see Fig. 1.

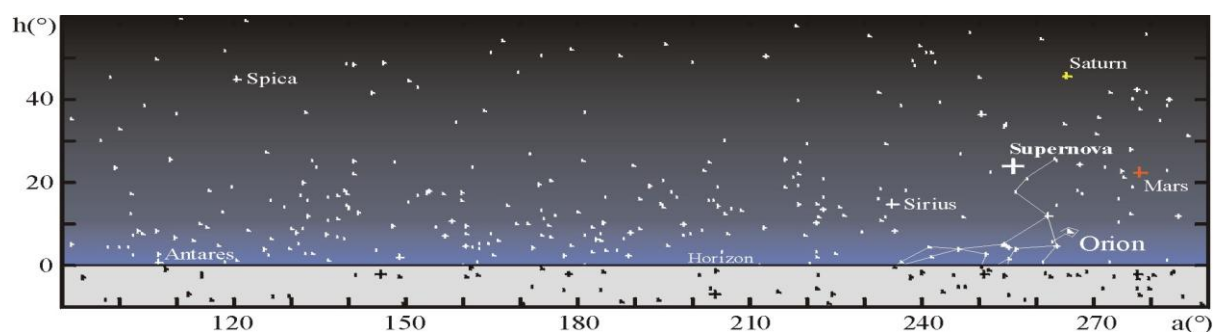


Fig. 1. The southern sky in Anyang, the Capital of China during the Shang Dynasty, when a Supernova suddenly appeared in the west, on 10/11 1355 BC, when Antares in Scorpio was rising in the east, at 04.45 local mean solar time.

The sun came closer and closer to the position of the supernova every day and on the “*hsin-wei day*” 11 May 1354 BC it set before the sun and was only possible to see during daytime, see Fig. 25. In Sweden it was visible during daytime 30 April - 6 July. This has been marked at Vitlycke, parish of Tanum, as a row of 68 cup-marks, one for every day, Fig. 26-27. Both sources are original. It has been possible to determine the magnitude and date in four cases and these points match very well with the linear decline of a supernova type Ia, Fig. 50.

II. THE OLDEST CHINESE GUEST STAR APPEARED ON A CHI-SZU DAY

According to an oracle bone text from the 14th century BC, during the Shang Dynasty, a New Great Star appeared in the sky and the king must ask the oracle, which sacrifices that were necessary. It also tells us that it was on a *chi-szu* day the 7th day of the month. The Swedish rock carvings show a supernova below the full moon in Gemini, which means that it was in November. The oracle bone text also mentions that the new Great Star appeared in the company of the "Fire Star", which in later texts corresponds to the red bright star Antares in Scorpio.

However, no traces of a supernova remnant has been found in the vicinity of Antares, but it is more likely that "in the company of" corresponds to "simultaneously with" which means that the supernova appeared in the sky at the same moment as Antares became visible at the eastern horizon in the morning of 10/11 1355 BC, at 04.45 local mean solar time in Anyang, see Fig. 1. In Sweden it was still 9/11 and the time was 22.10. The half moon could be seen about 1° above the western horizon, see Fig. 5.

The 7th day of the month corresponds to the first quarter half moon and exactly this situation has been depicted on the rock-carvings for instance at Rickeby, parish of Boglösa, province of Uppland, which supports this interpretation, see Fig. 5-9.

On many Swedish rock-carvings the supernova is depicted close to the left elbow of Orion at the position of the well-known supernova remnant PKS 0646+06, Fig. 3-4 and 33.

III. SWEDISH ROCK-CARVINGS

1. Astronomical symbols on Swedish rock-carvings

After almost 35 years of study of the Swedish rock-carvings I have been convinced that the people who made them had a genuine knowledge about important celestial phenomena and how they could be recorded in a unique way. This knowledge has been collected and transferred from one generation to the next during many hundred years. The Bronze Age society in the southern half of Sweden developed a common system of symbols that made it possible to record all important phenomena in the sky, see Fig. 2. In the eastern part of Sweden they mostly used only symbols, but in the western part they sometimes combined a symbol with a realistic drawing. The unique date for a total solar eclipse was documented by the sun's position in a calendar ship and a depiction of the planets visible in relation to the sun. The dates for Comet Encke and the Supernova were defined by the phases of the moon and their positions in relation to the calendar ships.

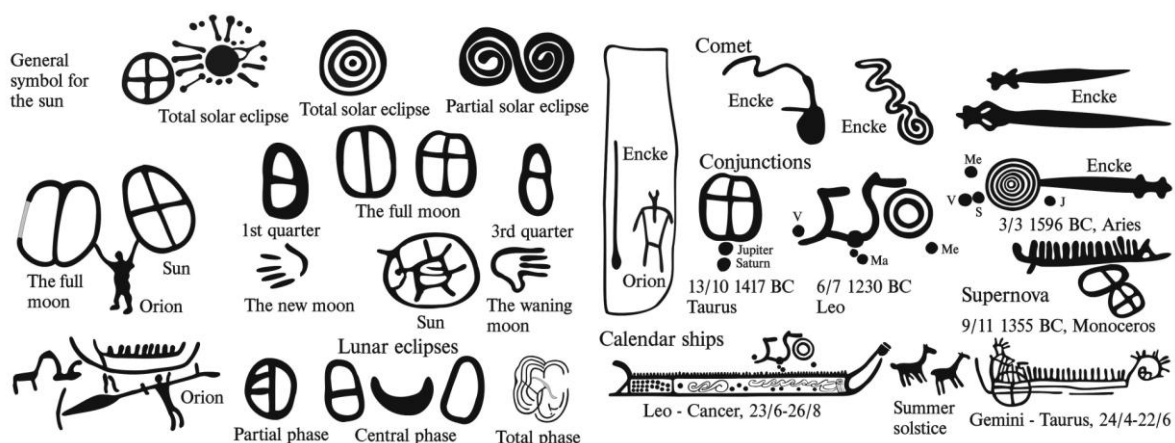


Fig. 2. Common symbols on Swedish rock-carvings, Henriksson [4]. The Nordic sky god Tyr is standing on the moon at full moon, represented by a pair of feet, and kept the moon's crescents with his left hand because the Fenris Wolf had bitten off his right hand. The man with a spear lifting a ship (Orion) is Thunaraz-Thor in the ancient Nordic tradition according to Ohlmarks [5].

2. The Supernova 1355 BC depicted at Tanum in Bohuslän

The greatest Swedish human figure is a depiction on a rock-carving at Litsleby, in the parish of Tanum, province of Bohuslän. It has been cut upon older carvings, Fig. 3. The 2.25 m high man, our Orion, and a sun wheel, the normal representation of the sun, corresponds in this case to the Supernova because its position is far below the ecliptic. The pair of feet represents the position of the full moon in Gemini, 15° to the left of the Supernova. The two great cup marks at the fore half of the spear correspond to the positions of Mars and Saturn. The male figure colored in red has gigantic size compared to the older black figures in normal size.

The evening sky in southeast on 17/11, in 1355 BC, at 21.00 local mean solar time in Tanum, was dominated by the full moon (phase 189°) and a very bright supernova at its maximum, 8 days after its outbreak, see Fig. 4.

The remnant of this stellar explosion is called PKS 0646+06 and can still be observed by modern telescopes, see Fig. 48 and 49. At the time of this dramatic event the planets Mars and Saturn were visible in Gemini, above the supernova in Monoceros, see Fig. 4.

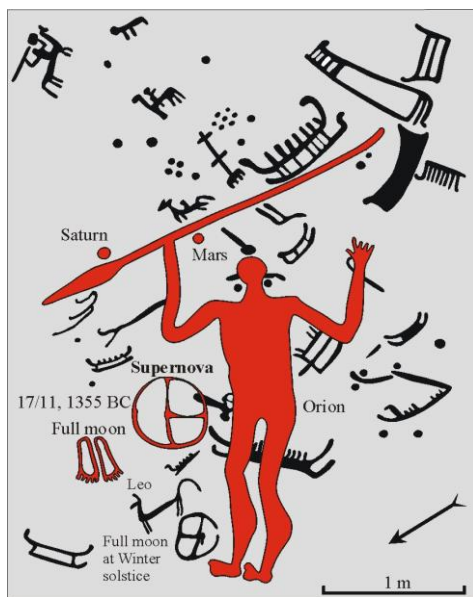


Fig. 3. A rock-carving at Litsleby, parish of Tanum. (After L. Baltzer [6] and a photo by G. Henriksson 1993.)

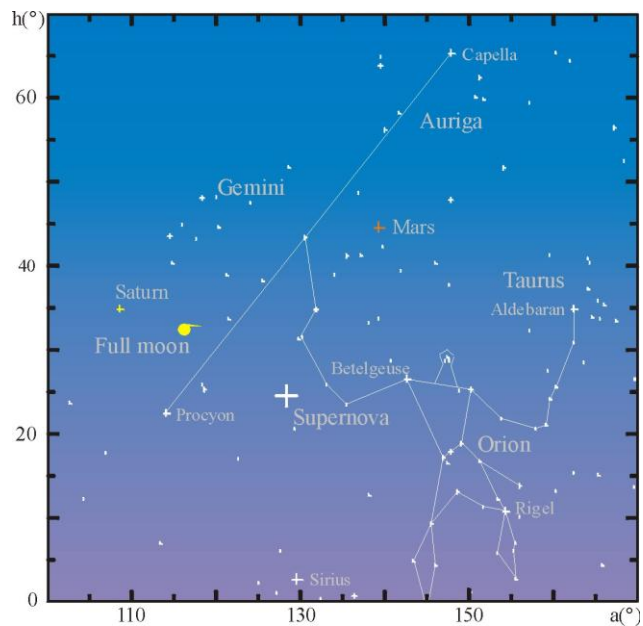


Fig. 4. The evening sky in south-east, at 21.00 local mean solar time in Tanum on 17/11, in 1355 BC. Stellar magnitudes < 4.5.

3. The Supernova explosion on 9/11 in 1355 BC depicted in Sweden

According to a Chinese oracle bone text from the 14th century BC, a new Great Star appeared in the sky on the 7th day of the month, which means that it was half moon that evening. In Sweden, the half moon was situated just above the horizon and this was marked on the rock-carvings by a short line at the lunar symbol and parallel to the horizon.

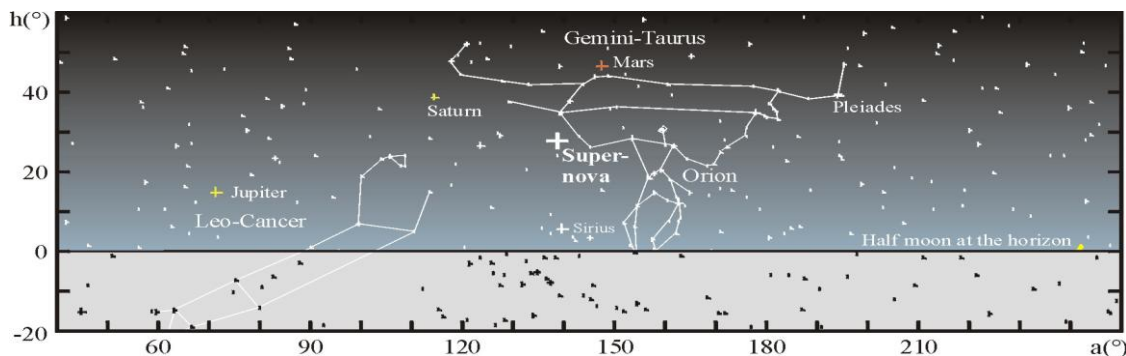


Fig. 5. The sky on 9/11 1355 BC, at 22.10 local mean solar time in Rickeby, parish of Boglösa, in Uppland. At that moment a new extremely bright star appeared above Sirius, the brightest star in the ordinary night sky. It was a supernova that one week later, at its maximum, would be about 3800 times brighter than Sirius. The half moon could be seen about 1° above the western horizon, to the right.

On some of the Swedish rock-carvings a lying left foot is depicted at the Supernova, which means that it was half moon when the Supernova exploded. The lying left foot means that the position of the half moon is not correctly depicted in the sky. From the oracle bone text we know that the Supernova appeared during the rising of Antares in Scorpio, at about 04.45 in the Chinese Capital Anyang, which fits perfectly with the time for the setting half moon at about 22.10 in Sweden, see Fig. 5.

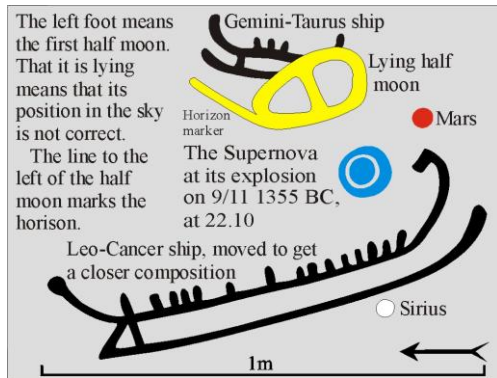


Fig. 6. The Supernova explosion on 9/11 1355 BC, at 22.10 in Rickeby, parish of Boglösa, in the province of Uppland. (After a photo by G. Henriksson 1994.)

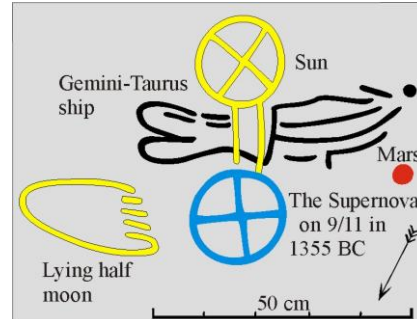


Fig. 7. The Supernova explosion depicted at Hjulatorp, parish of Berg, in the southern province of Småland. (After K. Kjellmark and O. Lidsten [7])

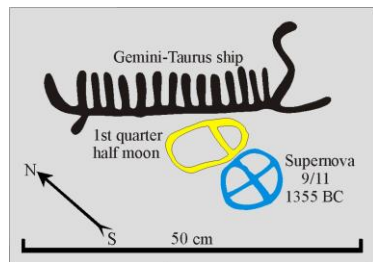


Fig. 8. The Supernova eruption at Flyhov, in the parish of Husaby, province of Västergötland. The lying left foot means that it was the half moon in the evening, but the position of the moon was not correct. (After a photo by G. Henriksson.)

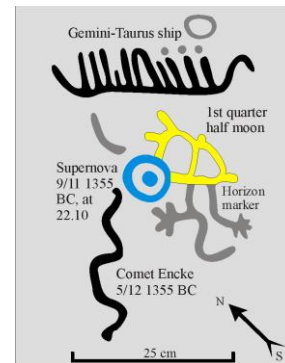


Fig. 9. The Supernova explosion depicted at Evenstorp, parish of Sundals Ryr, province of Dalmland. (After K. Rex Svensson [8])

After the unexpected and chocking appearance of the Supernova, Fig. 3-9, systematic recordings were made at full, third quarter, new and first quarter moon. The appearance of Encke's tail close to the Supernova was depicted on Fig. 9 and 15-17. Its heliacal setting was recorded in a Chinese text, Fig. 25, and its heliacal setting and rising on a Swedish rock-carving, Fig. 27.

4. The Supernova at its maximum and the full moon on 16-17/11 1355 BC

The ship above the Supernova at Rickeby corresponds to the sun's orbit through Gemini and Taurus. The position of the full moon is marked both for the evening of 16/11 and 17/11 1355 BC in Fig. 10 and 11.

The position of the Supernova corresponds to the supernova remnant PKS 0646+06 discovered by the radio astronomers.

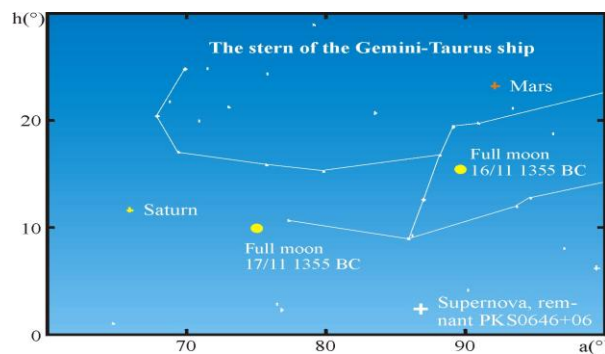


Fig. 10. The Supernova at its maximum rises above the eastern horizon at Rickeby, parish of Boglösa, province of Uppland, on 16/11 and 17/11 1355 BC, at 18.00 local mean solar time. The phases of the moon were 172.5° and 186.7° respectively. (m<4.5).

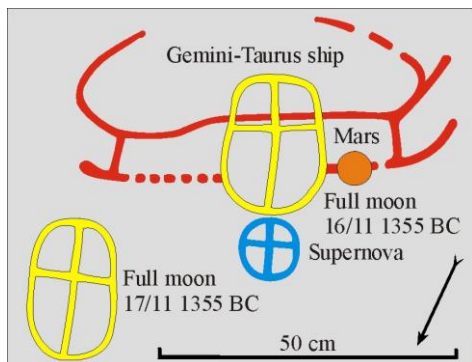


Fig. 11. Rock-carving at Rickeby, parish of Boglösa, province of Uppland. (After a photo by S. Hallgren [9])

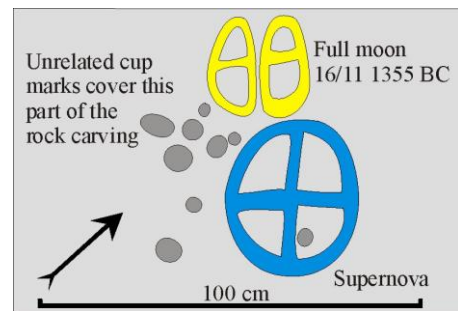


Fig. 12. The Supernova and the full moon depicted in the evening of 16/11 1355 BC, at Flyhov, parish of Husaby in the province of Västergötland. (After G. Burenhult [10])

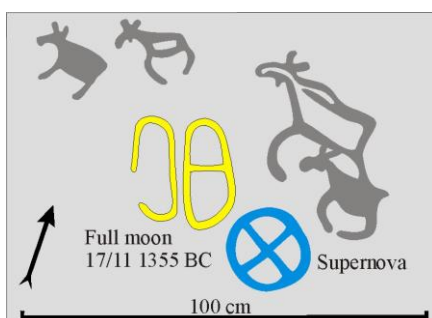


Fig. 13. The Supernova and the full moon among depictions of elks at Brådön in Nämforsen, in the northern province of Ångermanland. The position of the full moon corresponds to the morning of 17/11 1355 BC. (After G. Hallström [11])

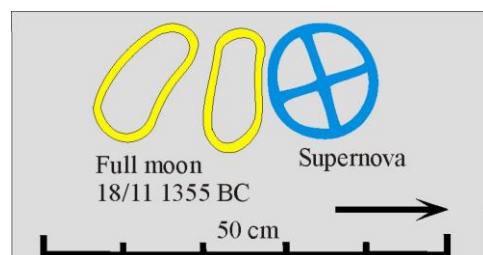


Fig. 14. This position of the Supernova and the full moon corresponds to the situation in the morning of 18/11 1355 BC. Hjulatorp, parish of Berg, in the province of Småland. (After K. Kjellmark and O. Lidsten [7])

5. SN1355 BC and Comet Encke, on 5/12 and 7/12 1355 BC

In the beginning of December 1355 BC a very important cross-correlation took place between the two extremely bright transient objects that appeared almost simultaneously in the sky, the Supernova and the tail of Comet Encke. For every night the tail of Encke came closer and closer to the Supernova from the right, passed in front of it and continued to the left, see Fig. 15-17. The head of Encke was situated below the horizon all the night and the long tail moved for every night more and more to the left.

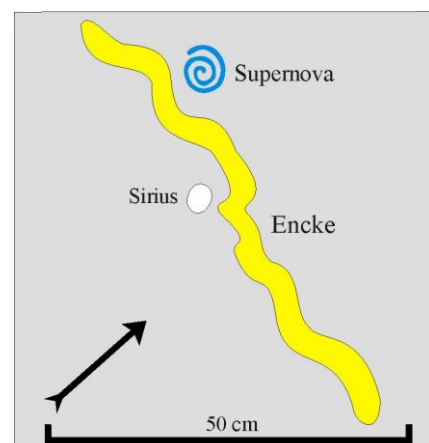
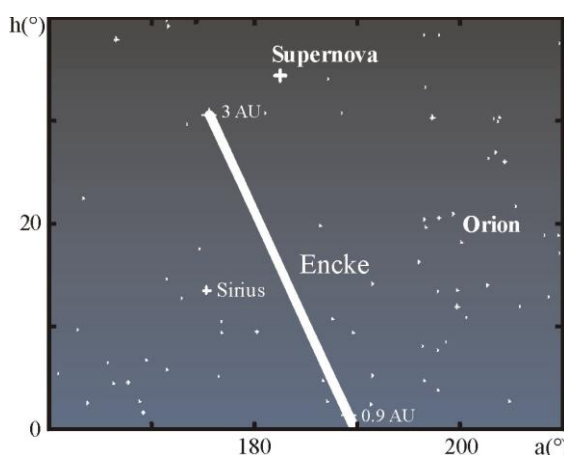


Fig. 15. Left. The tail of Comet Encke was visible between the Supernova and Sirius on 5/12 1355 BC, at 23.00 local mean solar time at Ekenberg. The head of Encke was below the horizon all the night. The length of the tail has been marked as 3 AU to match the depiction and the time-shift $\Delta T = -2.0$ days. Stellar magnitudes < 4.5 . Right. Detail of a rock-carving at Ekenberg in Norrköping. (After Burenhult [10])

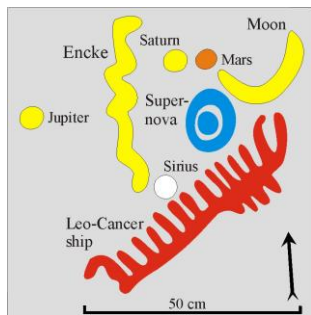


Fig. 16. The Supernova and Comet Encke on a rock-carving at Flyhov. The position of the tail of Encke corresponds to the situation on 7/12 1355 BC at 20.00. The moon was depicted at phase 65° and not with a symbol. (After Burenhult [10])

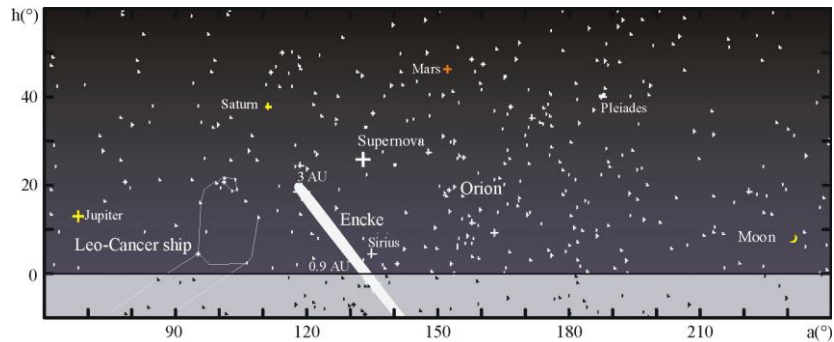


Fig. 17. The southern sky, with the tail of Comet Encke and the Supernova, and the low moon to the right, on 7/12 1355 BC, at 20.00 in Flyhov, parish of Husaby, province of Västergötland. Encke's time-shift $\Delta T = -2.0$ days gives the mean anomaly 3.57° , distance to the sun 0.452 AU, distance to earth 0.563 AU and magnitude of the nucleus -5.82 . The phase of the moon was 65.06° and the length of the tail in the figure corresponds to 3 AU. Stellar magnitudes < 4.5 .

6. The Supernova and the first quarter half moon on 6-7/2 1354 BC

A unique situation took place at Oppeby in Nyköping when the star Lambda Geminorum or HR2763, was occultated by the moon, between 19.20-20.10, on 7/2 1354 BC. The half moon was situated just above the Supernova, Mars was visible above Orion and the Pleiades was setting. The star to the right of the moon, HR2763, had just been occulted by the moon. see Fig. 18-22.

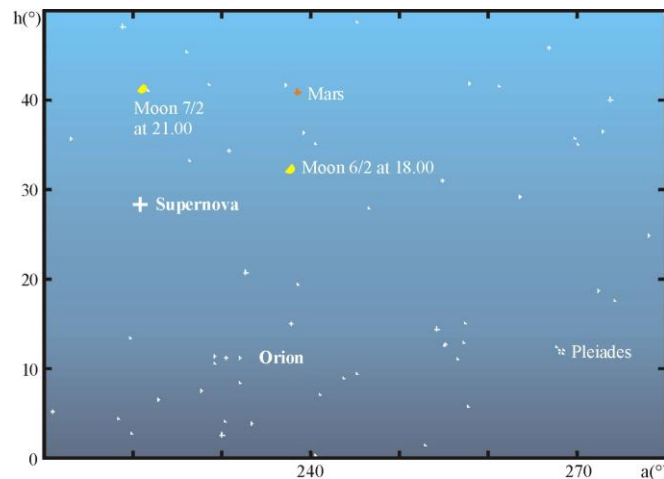


Fig. 18. The western sky on 7/2 1354 BC, at 21.00 local mean solar time at Oppeby in Nyköping. (Lunar phase 88.4° on 6/2 and 103.1° on 7/2. Stellar magnitudes < 4.0 .)

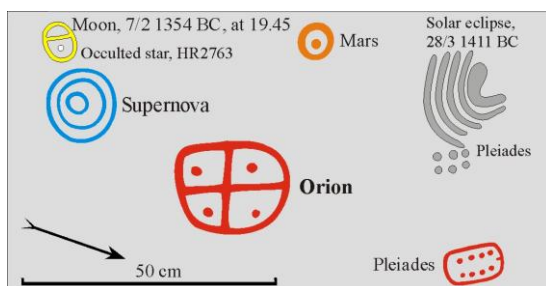


Fig. 19. A rock-carving at Oppeby in Nyköping, shows the half moon above the Supernova on 7/2 1354 BC. The brightest stars in Orion and the Pleiades have been surrounded by a frame. (After a photo by G. Henriksson 1986.)

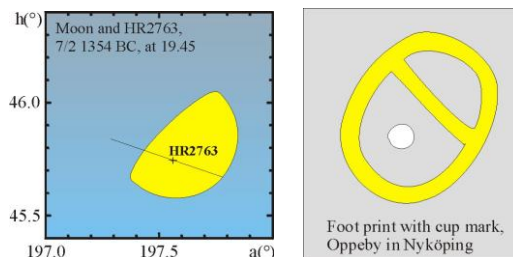


Fig. 20. Occultation of the star HR2763, magnitude 3.58, by the moon, on 7/2 in 1354 BC. The star's position behind the moon at 19.45, corresponds to the position of the cup mark within the foot print at Oppeby. At 20.10 the star re-appeared at the lower right limb of the moon. The time can be determined as 19.45 because the cup mark within the lunar symbol corresponds to the star HR2763, that at that moment was situated behind the half moon.



Fig. 21. The half moon above the Supernova on 6/2 1354 BC, at Himmelstalund, in Norrköping. (After A. Nordén [12])

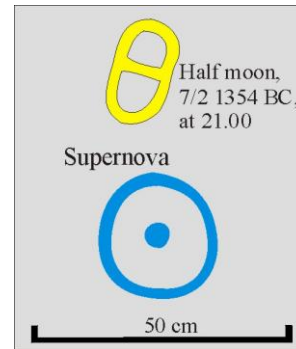


Fig. 22. The half moon above the Supernova on 7/2 1354 BC at Möckleryd, province of Blekinge. (After G. Burenhult [10])

7. The Supernova and the new moon on 31/3 1354 BC

The rock-carvers preferred to make their recordings at new, first quarter, full and third quarter moons. If something remarkable happened in between this phases they made a realistic drawing of the moon, see Figure 16. All images depicted uniquely the important celestial phenomenon that was seen in the sky. The Supernova and the new moon can be seen in Fig. 23-24.

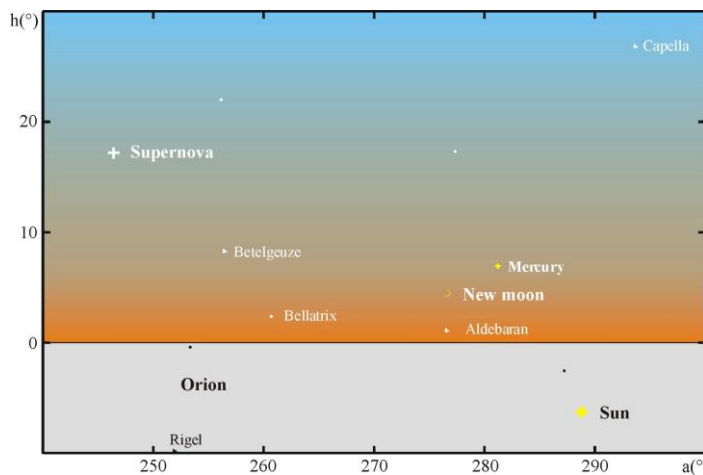


Fig. 23. The western sky at Oppeby, in Nyköping, on 31/3 1354 BC, at 19.20 local mean solar time. The light from the still bright Supernova dominated the evening sky, but also the crescent of the new moon and Mercury were clearly visible together with the brightest stars. The phase of the moon was 16.59° and the stellar magnitudes < 2.0.

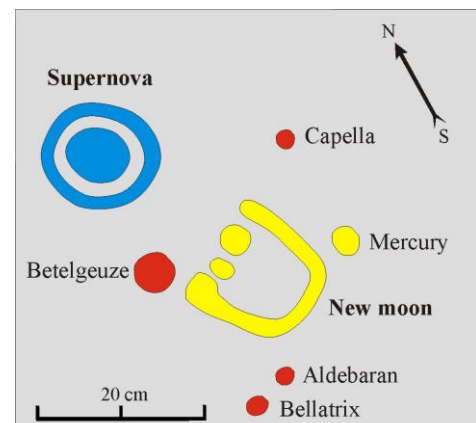


Fig. 24. The Supernova and the crescent of the new moon depicted at Oppeby, on 31/3 1354 BC. (After a photo by G. Henriksson 1986.)

8. The Supernova challenges the Sun in China

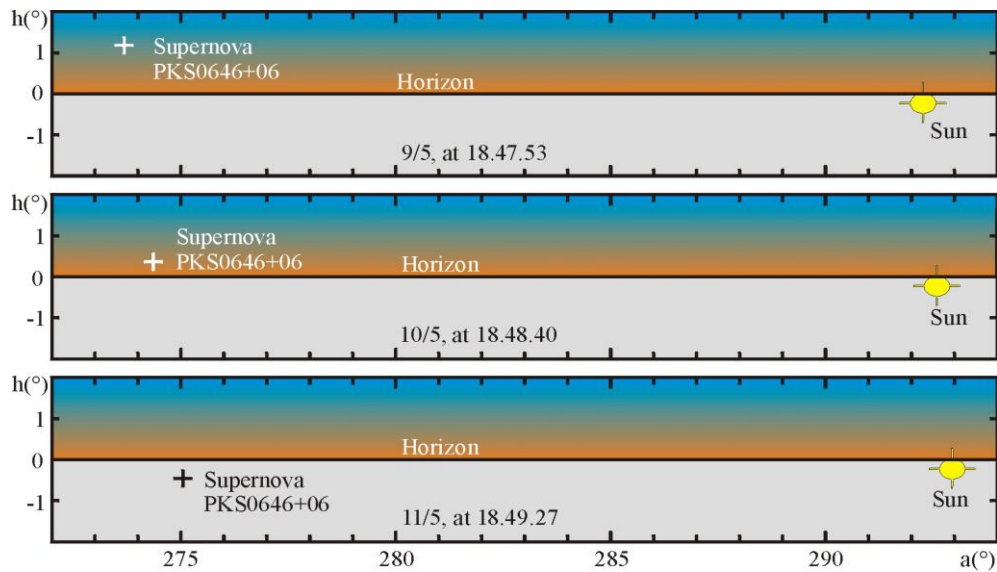


Fig. 25. The setting of the Supernova together with the sun, on 9-11 May 1354 BC, in Anyang. According to one of the two oracle bone texts the new star became fainter on a *hsin-wei* day. The names of the days in the Chinese calendar repeats every 60th day. On the 11th of May 1354 BC, that was a *hsin-wei* day, the Supernova was for the first time setting before the sun. Beginning with this day and during the following two months, the Supernova was only above the horizon during daytime and became much more difficult to see.

The last king of the Shang Dynasty, King Zhou, was defeated in a battle in 1060 BC according to my dating of the bright appearance of Comet Encke on 22 June in 1060 BC, just before the Battle of Muye (Henriksson [13] and [14]). After that battle he committed suicide. Therefore, the Shang Dynasty ended in 1060 and not in 1046 BC that was earlier accepted. Therefore, all years in the list of rule of the Chinese kings should be shifted backwards by 14 years.

This means that we now can determine which one of the kings who was mentioned on the two oracle bones from the Shang Dynasty and performed sacrifices to the New Bright Star. After correction by 14 years we realize that it was He Dan Jia (also called Jian Jia), who ruled (1363 BC – 1354 BC). His years of rule were earlier dated as (1349 BC – 1340 BC).

The bright supernova appeared on 10 November 1355 BC when the first sacrifice took place. The second sacrifice took place on 11 May 1354 BC. After that date the supernova was only visible during daytime for about two months. This may mean that Jian Jia, responsible for the sacrifices, lost his authority and may have been sacrificed or committed suicide during the following months when the Supernova was visible together with sun during daytime. This corresponds very well with his last year 1354 BC, according to the corrected list of years of reign for the Chinese kings.

9. The Supernova challenges the Sun in Sweden

Between 30/4 and 5/7 1354 BC the Supernova was only visible above the horizon together with the sun, but on 6/7 the Supernova was rising before the sun for the first time, its heliacal rising. This has obviously been considered as a struggle for power in the sky, which has been depicted vividly on the central part of the very large rock-carving at Vitlycke in Tanum, see Fig. 26 and 27.

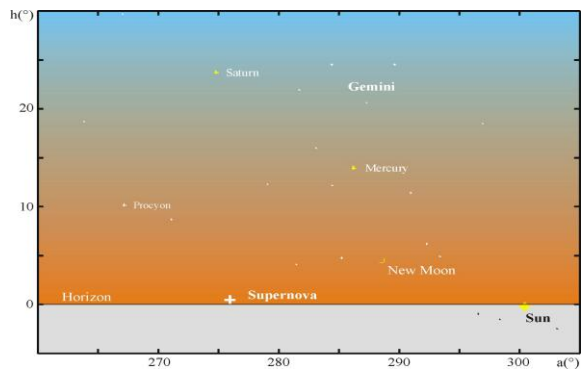
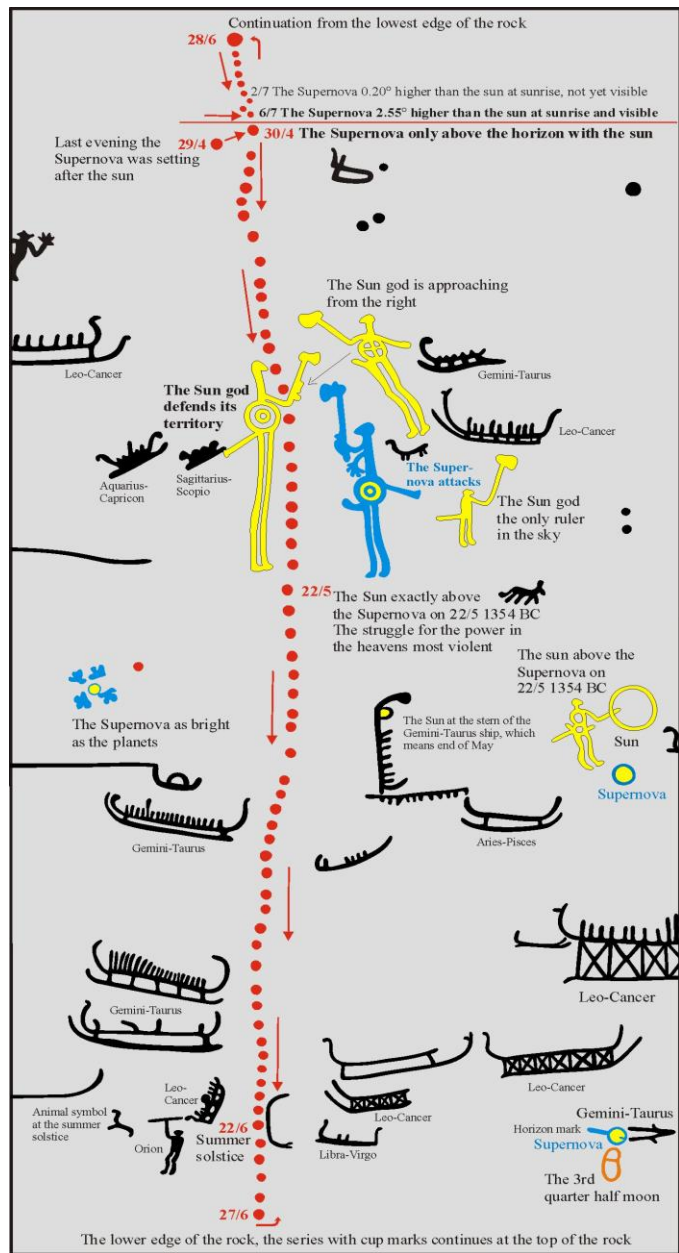


Fig. 26. When the last rays of the sun disappeared on 29/4 1354 BC the Supernova was still 0.47° above the horizon at Vitlycke, parish of Tanum, province of Bohuslän. It was setting at 19.40.50, its heliacal setting. The next evening the Supernova disappeared below the horizon at 19.41.10, but the sun was at that moment still 0.70 solar radius above the horizon.

Fig. 27. The great rock-carving at Vitlycke, parish of Tanum. The struggle between the old sun and the new sun, the Supernova, lasted for 68 days and one cup-mark (red) was made every day along a vertical line. The cup mark of 27/6 was made at the lowest edge of the rock and the next one, on 28/6, was made at its top and the series continued with smaller cup-marks until the heliacal rising on 6/7. (After L. Baltzer [1])



10. The Supernova equally bright as Venus on 21/7 1354 BC

The night when the Supernova had the same magnitude as Venus can be seen in Fig. 28-29.

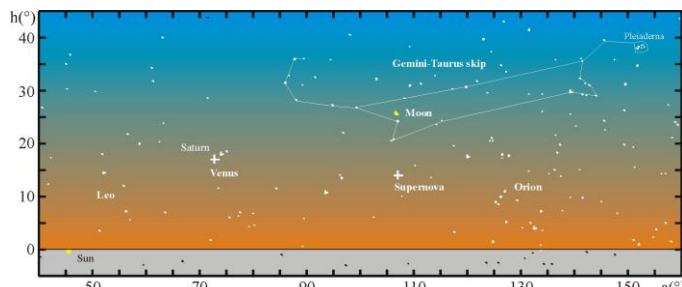


Fig. 28. Venus and the Supernova equally bright below the Gemini-Taurus ship on 21/7 1354 BC. The upper limb of the sun was visible on the horizon at 03.21.24 local mean solar time at Gamleby. The moon, with phase 294.9°, was situated exactly above the Supernova two days after the third quarter half moon. Stellar magnitudes < 4.5.

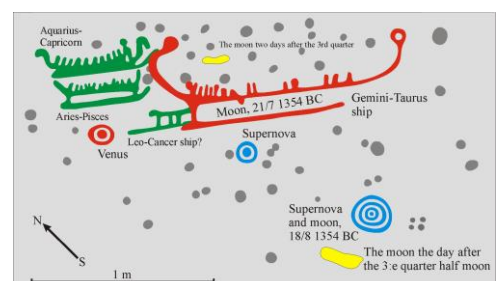


Fig. 29. Rock-carvings at Hammar, parish of Gamleby, in the province of Småland. (After Burenhult [10])

11. The Supernova and the third quarter half moon on 17-18/8 1354 BC

The Supernova and its relation to the third quarter half moon can be seen in Fig. 30-32.

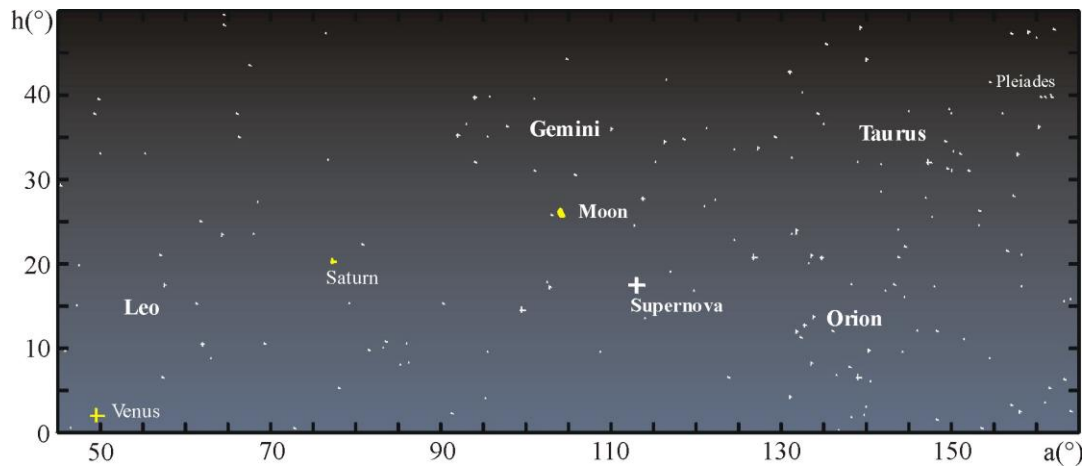


Fig. 30. The eastern sky at Hammar, parish of Gamleby, province of Småland, on 18/8 1354 BC, at 02.00 local mean solar time. Venus is rising and the Supernova is below the third quarter half moon, phase = 276.44°. Stellar magnitudes < 4.5.

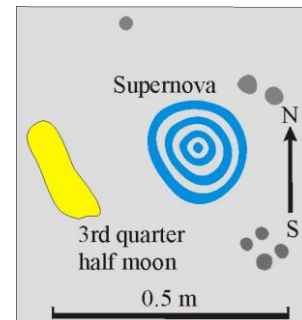
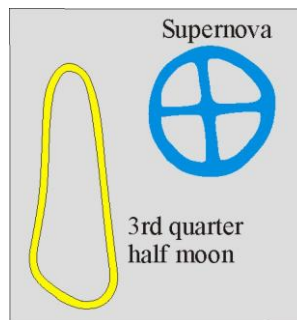
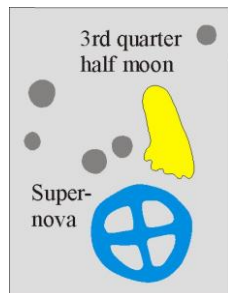
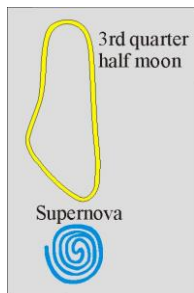


Fig. 31. The Supernova on 17/8 1354 BC. Left: Leonardsberg, in Norrköping. (After A. Nordén [12]). Right: Flyhov, parish of Husaby, province of Västergötland. (After Burenhult [10]).

Fig. 32. The Supernova on 18/8 1354 BC. Left: Himmelstalund, in Norrköping. (After Nordén [12]). Right: Hammar, in Gamleby. (After Burenhult [10]).

12. The Supernova equally bright as Mars and Saturn on 28/1 1353 BC

The so far latest rock-carving identified as a depiction of the Supernova was made on 28/1 in 1353 BC. It can today be found in front of the main building of the former Swedish Air Force base F 13 in Norrköping, close to Ekenberg. Unfortunately the original rock was blown up when F 13 was built, but fortunately this undamaged fragment was found and placed in front of the main building. The rock-carving existed during 3300 years but F 13 was abandoned already after 40 years.

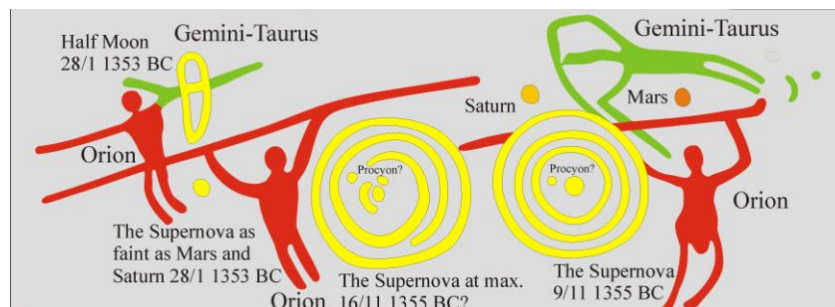


Fig. 33. The brightness evolution of the Supernova from its discovery and maximum brightness on 9/11 and 16/11 1355 BC respectively and its faintest known phase on 28/1 1353 BC. These depictions can be found within the Air Force base F 13, close to Ekenberg in Norrköping. To the left we can see the Supernova as an ordinary cup-mark at the elbow of Orion and below the first quarter Half Moon. This cup-mark has the same size as Mars and Saturn to the right. (After A. Nordén [15])

IV. Independent supporting evidences for the Supernova 1355 BC

All human societies have realized the importance of the sun for their survival. Therefore, total solar eclipses have caused severe problems for the religious leaders. But what happened if an extremely bright star suddenly appeared in the night sky, and sometimes was visible even during daytime? The limited time it was visible during daytime it may have been considered as a new sun god that challenged the old sun god. This situation has been discussed in section III.9, concerning the depictions of the Supernova 1355 BC in Sweden, see Fig. 27.

1. The Supernova in the Mesopotamian oracle texts Enuma Anu Enlil

It is important that the interpretation of the depictions of the Supernova 1355 BC on Swedish rock-carvings and in the Chinese oracle bone inscriptions can be independently supported by other sources. One of the oldest collections of astronomical texts is the Babylonian Enuma Anu Enlil (EAE) that contains solar and planetary omens back to at least 2500 BC. From these texts I have earlier identified three total solar eclipses, (Henriksson [16] and [17]).

Among the solar eclipses in the solar omen tablets 23(24) – 29(30) there also appeared omens concerning that was described as luminous surface objects, for simplicity translated as “disks”. I believe that among these disk objects we can find comets and supernovas. I think that they roughly corresponds to “guest stars” in the Chinese chronicles. When I looked in EAE for any description that could correspond to the Supernova 1355 BC I found a promising situation when a flaming disk appeared in the night sky. This can be found on tablet 24(25) in “Solar omens” translated by Wilfred H. van Soldt [18].

On page 28, III line 25 we can read: “If a disk (rises) during the middle watch of the night¹ and a flame² lights up in the middle: there will be ... for the country, city will become hostile to city, family to family (and) brother to brother, a mother will lock her door against her daughter, variant: destruction of all cities.” (¹ in another text this time of night is explained as noon. ² That is “fire”. The explanation is unintelligible to the translator.) The noon of the day is midday and the noon of the night is midnight.

In Fig. 1 we can see the situation when a supernova suddenly appeared on 10/11 1355 BC at 04.45 local mean solar time in Anyang. This moment corresponds to 9/11 1355 BC at 00.06 local mean solar time in Babylon which means that it in fact was midnight in Babylon!

This seems to be a good description by an eyewitness to the sudden appearance of the Supernova in Babylon at the same moment that it was discovered at the court in China and King Jian Jia asked the oracle about the appropriate sacrifice needed, mentioned on the first of the oracle bone texts discussed above. The Babylonian eyewitness described the light from the supernova as “a flame lights up in the middle”. The Supernova was about 3800 times brighter than the brightest normal star in the night sky, Sirius, and its light was not stable because of seeing disturbances caused by the atmosphere. Compare with Fig. 47, below.

Most of the texts are too fragmentary and it is impossible to get useful information from them. However, on line III 24 we can read: “If a disk rises during the middle watch of the night and stays: the king will change his path for his own country, variant: the king will not change his path for (his own) country, variant: a battle will take place in the country, fourth variant: the king of ... will fall, the gods will distance themselves² from the country, variant: will throw (the country) into confusion, the king will rebel against his own offspring (M: the king will flee to a country which is not his own) fifth variant: the king [...], the dynasty *will be defeated*³. (² suggestion E. Reimer, ³ Or: “... will defeat the dynasty.”).

The interesting new information is that the disk *stays*. The observer has realized that the disk is not moving as a planet, but follows the daily motion of the nearby stars. It means that it is not a comet but a fixed new bright object in the sky – a supernova.

We can also recognize the situation described 7 days later, on 16 November 1355 BC, in the text III, line 11: “If a disk [...] stands next to the moon, and Kabta¹ stands in front of it: a messenger will die at his master’s order, variant: (one who is) an influential person at his master(’s court), a messenger, will die.” (¹ the conclusion at the end of this note is that “... the identification with Mars should be considered.”) This situation is illustrated in Fig. 10-14 from Sweden and to the left in Fig. 34 from Babylon, see below. On 16 November 1355 BC the Supernova reached its maximum brightness with magnitude –10.4, see Fig. 50, below.

On line III 31 we can read: “If a normal disk is present and one disk stands to the left: *from* the throne *of* your relief troops the king of Amuru will rebel, variant: he will take the throne.” The normal disk is the solar disk and this means that another disk was visible to the left of the solar disk. This situation is shown in Fig. 25 and 26. On the 11th of May 1354 BC, that was an *hsin-wei* day in China, the Supernova was for the first time setting before the sun, its heliacal setting, see Fig. 25. After that the Sun and the Supernova were seen together above the horizon at daytime. In Sweden the Supernova was visible above the horizon together with the sun during 68 days between 30/4 and 5/7 in 1354 BC, see Fig. 26 and 27. The situation described on line III 31 was true in Babylon from the middle of May to the middle of July 1354 BC.

On line III 33-38 we have situations with two disks that are rising and the disks correspond to the Supernova and Comet Encke. This unique situation can be dated and is described on line III, 36: "If two disks rise and Venus stands in the middle: the subjects will kill the king in a struggle, variant: the king will be killed (M: will die)". At first I thought that this situation never could happen because the supernova and the sun was situated at opposite sides in the sky and Venus was only visible within about 45° from the sun and Encke was always seen close to the sun when it was brightest. In fact, this unique situation happened only 16-21 November 1355 BC, see Fig. 34. In Sweden, depictions were made with Encke, Venus and the setting sun on 16 and 21 November 1355 BC, Henriksson [14].

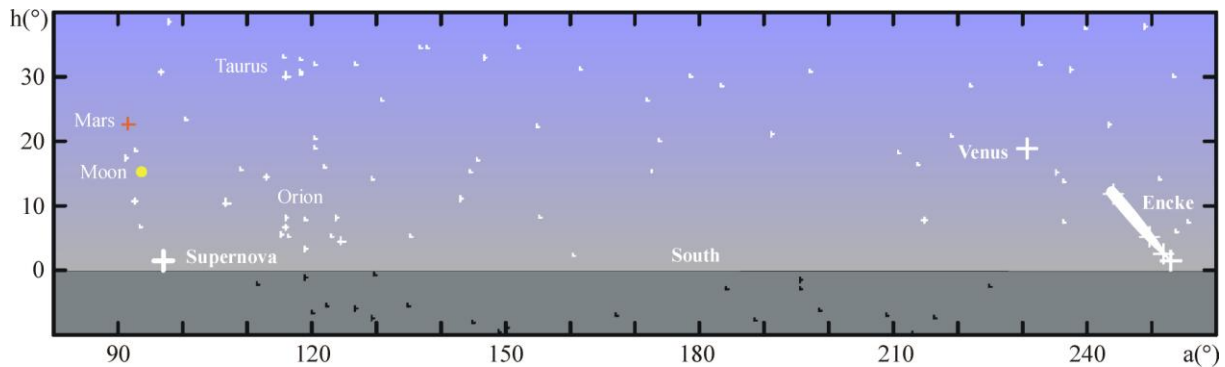


Fig. 34. The evening sky in Babylon on 16 November in 1355 BC at 18.05 local mean solar time. This evening was remarkable because a bright supernova was rising in the east and a bright comet was setting in the west. This situation fits quite well with an omen in EAE described on Tablet 24(25) line III, 36: "If two disks rise and Venus stands in the middle: the subjects will kill the king in a struggle, variant: the king will be killed (M: will die)". This was probably the first time when Comet Encke became visible in the evening sky and therefore was said to rise. This was ten days before the perihelion passage of Encke and its nucleus was visible during at most five evenings more.

The full moon and Mars were visible above the Supernova in the east. This is a very unique situation that never was repeated. Magnitude of the Supernova = -10.4, the mean anomaly of Encke 357.27°, distance to the sun = 0.403 AU, distance to the earth = 1.198 AU, $V = -4.5$, estimated length of the tail = 0.5 AU and stellar magnitudes < 4.0. The sun was 12.6° below the horizon at this moment.

However, in the beginning of December 1355 BC, after the perihelion passage of Encke, it was possible to see Enckes tail very close to the Supernova on 5 and 7 December 1355 BC, see Fig. 9 and 15-17. But at that time Venus was not visible. The last depiction of the Supernova and Encke was made 22 January 1354 BC, see Fig. 47, below.

Complementary descriptions of the Supernova can be found on Tablet 25(26). In line I, 2 we can read: "If a 'sun' comes out in the night and lasts until the morning: Enlil [...] the rumor of [...]; if Erra speaks the people of the land will be diminished (in number), the entire country will not [...] rain. In line I, 3 we can read: "If a 'sun' comes out in the night and stays: the king will become despised, variant: he will rejoice, variant: he will become worried."⁴ (Cf. tablet 24(25) III 19.) Another reference to tablet 24(25) can be found on line I, 9: "If a 'sun' rises during the middle watch ... [...] brother will become hostile to brother, a mother will lock her door against her daughter, [...]."⁶ (Cf. tablet 24(25) III 25). In the first 14 lines of tablet 25(26) 'sun' is equivalent to the Supernova and the Hittite queen Tawananna III introduced a second small sun above the normal sun in her winged sun seal, see Fig. 36.

The 28 first lines of tablet 24(25) III begin with omens mainly depending on the Supernova. The lines 28a-31 tell us about a situation with the Supernova visible together with the sun. On line 32 we have the Supernova and a dust storm, but on lines 33-38 we have two disks, the supernova and Comet Encke. Finally, on lines 39-44 we have unrealistic speculations about what will happen if 3, 4, 5, 6, and 7 disks will appear of in the sky.

From these 38 first lines on tablet 24(25) and the 14 first lines of tablet 25(26) we can draw the conclusion that the prognosis from the appearance of Supernova 1355 BC included future hostilities between nations, the fall of dynasties, the king must abandon his country and that the gods will distance themselves from the country and problems within peoples families. These scenarios fit very well with what happened during the time when the Hittite King Šuppiluliuma I (1380-1345 BC) attacked Syria and the Kingdom of Mitanni to the north of Babylonia.

According to Trevor Bryce [19], Chapter 7: "In what is commonly referred to as the Second Syrian War, or Hurrian War, Suppiluliuma launched a series of military operations, over a period of some six years,¹¹⁰ which resulted in the final subjugation of Mitanni and the consolidation of Hittite control over Syrian territory north

of Damascus.

Akhenaten had died some ten years before this war, and with the abandonment of his capital Amarna within three to four years of his death, the Amarna archive came to an end. Thus we lose one of our chief sources of information on developments in Syria. Unfortunately the section of the Deeds covering the period after Akhenaten's death is too fragmentary for any significant information to be gained from it. We do know, however, that by the year immediately preceding the Second Syrian War Suppiluliuma was back in Anatolia, engaged in further operations in the Kaska region.¹¹¹ Military operations in Syria were left in the hands of deputies, notably his son Telipinu.”

“Deeds”, shortened DS below, is “The Deeds of Suppiluliuma as told by his Son, Mursili II”, translated by Güterbock [20]. Akhenaten died in 1363 BC according to the high Egyptian Chronology (Henriksson [21]): “During the first years after the death of Akhenaten his queen Nefertiti was still very powerful. Smenkhkare, who probably was a son of Akhenaten, became the new pharaoh. He ruled during four years, probably together with Nefertiti, under her second name Neferneferuaten. After the death of the young ruler an even younger boy became Pharaoh in Egypt, under the name Tutankhaten.” Today we know that Akhenaten was the father of Tutankhaten who after the appearance of the Supernova 1355 BC changed his name to Tutankhamun (1358-1348 BC), see the next chapter. The capital at Amarna (Akhetaten) was abandoned at the same time as Tutankhaten changed his name to Tutankhamun and the Amarna archive came to an end.

Trevor Bryce continues the Hittite history: “But the Hittite prince Telipinu, if he had already been installed as viceroy in Aleppo, was well placed to meet any fresh challenge from across the Euphrates—which may indeed have been one of the main reasons for his appointment. He now moved swiftly to deal with the situation. Leading an expedition against the enemy forces, he subdued the countries of Arziya and Carchemish—though not the city of Carchemish—and established a winter camp in the town of Murmuriga.¹¹⁴

But at this point he was summoned from the region for a meeting with his father, leaving behind a Hittite garrison of 600 troops¹¹⁵ and chariotry under the command of Lupakki. The situation in Syria remained unstable. The city of Carchemish had yet to be taken, and Mitannian troops invaded the Euphrates region and laid siege to the Hittite garrison at Murmuriga.

The meeting between Suppiluliuma and his son took place in Uda in the Lower Land, where Suppiluliuma was celebrating religious festivals. The chief purpose of the meeting was probably to provide the king with first-hand information on the current military situation in Syria, particularly in the region of Carchemish, to assess whether his own return was warranted.¹¹⁶”

I do not share Trevor Bryce’s conclusions in his last sentence. In my opinion the main reason for prince Telipinu’s sudden journey to take part in this religious festival was the unexpected appearance of the extremely bright Supernova on 9 November 1355 BC. Suppiluliuma had ordered prince Telipinu to leave the newly established winter camp in the town of Murmuriga to take part in extra ordinary celebrations of religious ceremonies in Uda in order to save the country from any harm caused by neglecting the new sun – the *Supernova*. Prince Telipinu’s participation in this festival must have been extremely important because it should have been very risky if the highest military leader abandoned the Hittite garrison in Murmuriga as Mitannian troops invaded the Euphrates region and laid siege at that city. **The main purpose of that meeting should have been to perform religious rituals that were demanded by the new sun god - the Supernova.**

The city of Aleppo was also mentioned in the Supernova texts on EAE tablet 24(25).

Trevor Bryce continues: “... At the same time the Egyptian pharaoh, now Tutankhamun, sensing a weakening of the Hittites' grasp on the subject territories they had taken from Egypt, and seeking to regain some of Egypt's prestige and influence in the region, launched an attack on Kadesh.¹¹⁷

... As soon as the winter had passed, Suppiluliuma began his march into Syria.”

This happened during the spring and summer of 1354 BC.

Trevor Bryce continues: “... This allegedly unprovoked act of aggression had infuriated Suppiluliuma. Now that Egypt's Mitannian ally was close to total collapse, retaliatory action could be taken. A detachment of troops was dispatched under the command of Lupakki and Tarhunta-zalma for a tit-for-tat attack against the Egyptian subject state Amka. As Suppiluliuma was later to say to the Egyptian envoy Hani:

I myself was [] friendly, but you, you suddenly did me evil. You came(?) and attacked the man of Kadesh whom I had taken away (?) from the king of the Land of Hurri.¹¹⁸ When I heard this, I became angry, and I sent forth my own troops and chariots and the lords. So they came and attacked your territory, the Land of Amka. (DS p. 97, frag. 28 E3 iv 1-8, after Güterbock)¹¹⁹

But was this sufficient to satisfy the Hittite king's wrath? The Egyptians might well have feared that once the destruction of Mitanni was complete, the full force of Hittite military might would be turned their way.”

Trevor Bryce continues: “... As Suppiluliuma prepared for his final onslaught on Carchemish, he received word that a messenger had arrived from Egypt, with an urgent letter from the Egyptian queen. With some surprise, he listened as the letter was read to him. It began with a simple statement. ‘My husband is dead.’ Then

followed an extraordinary request. Surprise turned quickly to amazement as the Hittite king realized the full implications of what the queen was asking of him. 'Such a thing has never happened to me in my whole life!', he exclaimed. He hastily convened a council of his nobles, seeking their reaction and advice. Could the queen be trusted? Was she attempting to deceive them? A decision was made to send the royal chamberlain Hattusa-ziti to Egypt. The king's instructions to him were clear: 'Go and bring me back the truth!'

The queen's request as recorded in the *Deeds* was baldly stated: 'I have no son. But they say that you have many sons. If you would give me one of your sons, he would become my husband. I will never take a servant of mine and make him my husband!' (DS p. 94, frag. 28 A iii 11-15).

The pharaoh whose sudden death had led to this request is called Niphururiya (Nibhururiya) in the *Deeds*. This is a precise rendering in cuneiform of Tutankhamun's prenomen Nebkheperure.¹²¹ Although a number of scholars have attempted to equate the pharaoh in question with Akhenaten,¹²² the case for Tutankhamun remains by far the stronger one.¹²³

This letter must have arrived to Suppiluliuma in the spring of 1348 BC if this was the last year of Tutankhamun. He must have died in January/February because his funeral took place in the middle of March to the middle of April. This can be determined from the flowers that were put on his golden death mask in the innermost coffin (Krauss [22]). The embalming took about 70 days.

The general opinion among the Egyptologists is that Tutankhamun ruled for nine years and this may indicate that he died already in 1349 BC. This year for Tutankhamun's death fits better with the six year long military campaigns in Syria by Suppiluliuma beginning during the summer of 1355 BC and ending during the summer of 1349 BC, four years before his own death in 1345 BC.

Tutankhamun's widow was queen Ankhesenamun. During the summer of 1349 BC, Suppiluliuma turned his attention back to the siege of Carchemish. When the city finally fell, Suppiluliuma installed his son Piyassili, who now adopted the Hurrian throne-name Sharri-Kushuh, as viceroy in the Land of Carchemish. From the omen texts EAE tablet 24(25) we can understand that the king of Amurru had great problems to defend his throne against aggression from the neighbouring kingdoms and Aleppo was conquered. During the rule of Akhenaten, Amurru was a vassal kingdom protected by the Egyptian army. However, during the rule of Tutankhamun the Egyptian capacity was too low to defend Amurru against the threat from the military campaigns by the Hittite armies in the surrounding states in Syria.

2. Pharaoh Tutankhaten and Tutankhamun in Egypt

In the High Egyptian chronology Pharaoh Tutankhaten changed his name to Tutankhamun in 1355-4 BC Henriksson [21]. There has not been any good answer to the question why he suddenly changed his name during his fourth year. The reason may have been that when the Supernova appeared in the sky on 9 November 1355 BC it was so bright that it may have been considered as a new sun, see Fig. 27. During the spring of 1354 BC it was visible together with the sun during daytime. If there were two suns in the sky, Tutankhaten's father Akhenaten's monotheistic belief in the solar disc could have been considered as disproved.

Tutankhamun was only eight years old when he became pharaoh. The inscription on his coffin tells us that he died when he was 18 years old. The general opinion among Egyptologists is that he ruled Egypt for nine years. During his fourth year he changed his name from Tutankhaten to Tutankhamun and during the winter of that year he left Akhetaten and moved to Thebes. The young ruler was under hard pressure to abandon his father's new religion with its Aten cult and return to the old Amun cult. Early in the reign of the boy ruler, the old Amun cult was re-established and a great number of statues and inscriptions, damaged during the rule of Akhenaten, were restored.

According to the High Egyptian chronology, the first year of Tutankhamun was 1358 BC and his fourth year was 1355 BC. He died in January in his ninth year, which means that his year of death was 1348 BC in our calendar beginning with 1 January. If we add the correction of 25 years to the years of rule for Tutankhamun (1333-1323 BC), according to the Low chronology (Baines and Málek [23]), we get the corrected years of rule for Tutankhamun (1358-1348 BC).

The Supernova 1355 BC was probably the brightest supernova during the last 4000 years and at its maximum it was 250 times brighter than the brightest planet Venus. It is remarkable that the Supernova is not mentioned in any Egyptian texts. When it suddenly appeared it was situated on the opposite side of the sky compared to the sun and may have been interpreted as an anti-sun. During the winter 1355-1354 BC there were two suns in the sky and this may have been an obvious reason to abandon a monotheistic religion based on the adoration of a single sun.

This scenario explains reasonably well the sudden decision of the young Egyptian pharaoh to change his name from Tutankhaten to Tutankhamun, perhaps already in November 1355 BC, and to evacuate the city of the sun's disk, Akhetaten, during the winter months of that year. This interpretation agrees exactly with the years of rule for Tutankhamun in the High chronology (1358-1348 BC). Tutankhamun and his Queen Anchesenamun had

written letters to the King Šuppiluliuma. The name of Tutankhamun was written as a description of his royal cartouch.

3. The winged sun disk on the royal seals of the Hittite Kingdom

The Supernova 1355 BC appeared in the sky at the end of rule of the Hittite Great King Šuppiluliuma I (1380-1345 BC). During the New Hittite Period the Hittite kings used royal seals with a winged sun disk above the other royal symbols and cuneiform inscriptions. Therefore, I hoped to find winged “double sun disks” after the appearance of Supernova 1355 BC.

According to the doctoral thesis by Stephen Paul Lumsden [24], the winged disk became a standard component of the “cartouche” of the Great Kings of Hatti in the fourteenth century BC. “As such it formed part of the very pictographic and emblematic way the king’s name and titles were depicted in Luwian Hieroglyphs.” The title, by which the Hittite king was addressed, meant “My Sun” or “My Majesty”. The standard depiction of the sun god, Istanu, had a winged sun disk atop his head. The winged disk was also used as a solar or sky symbol. The winged sun disk first appears in Syrian art, along with other Egyptian motifs, during the eighteenth century BC. The winged disk is placed high in the field above different scenes. The winged disk may also have entered the Anatolian iconography during the eighteenth century BC, but the solar imagery has a much longer history there. The winged sun disk appears in Egypt already in the third millennium BC. “In Egyptian iconography this symbol represented the sky and the sun god, Horus, and seems also to have had a close association with the pharaoh.”

The ordinary winged seal of King Šuppiluliuma I can be seen in Fig. 35. In fact, there exist no published royal seals with *winged double suns* older than the seal of Queen Tawananna III, the third and last queen of King Šuppiluliuma I, see Fig. 36. This seal has number 219 in the book by Thomas Beran (1967). According to my translation of his German text he writes: “Uppermost, in the middle of the field, the winged sun with two disks ...”. The cuneiform text tells us that this is: “The seal of Tawananna, The Great Queen, the daughter of the King of Babylon.” Queen Tawananna III survived King Šuppiluliuma I, who died in 1345 BC. The seal with “the winged sun with two disks” was still used when Tawananna ruled together with King Mušili II (1345-1315 BC), the son of King Šuppiluliuma I and his second Queen Henti.



Fig. 35. Three seals of King Šuppiluliuma I and his first queen Daduhepa. It has an ordinary winged sun with one disk. Nr. 165-167 in Beran [25].

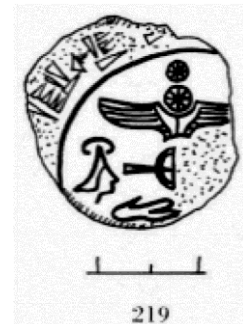


Fig. 36. The seal of Queen Tawananna III, the third and last queen of Šuppiluliuma I. The first winged sun with two disks. Nr. 219 in Beran [25].

All the succeeding kings, Muwatalli II (1315-1290 BC), Mušili III (1290-1280 BC), Hattušili III (1280-1250) and Tuthaliah IV (1250-1230), had winged suns with two disks.

The Hittite queen had a very important role because she was the highest religious leader in the country and was responsible for the relations with the gods. Her title was Tawananna. The name of the first queen of Šuppiluliuma was Daduhepa. She was Šuppiluliuma’s mother and the wife of his father Tudhaliya. She must therefore have outlived her husband and retained her status as queen after his death, in the normal Tawananna tradition. After her death Šuppiluliuma’s first known wife, Henti, became queen with the title Tawananna and became the highest religious leader. Henti was certainly the mother of all Šuppiluliuma’s five sons. The oldest, Arnuwanda, was the crown prince, but he died during his first year as king and Šuppiluliuma’s youngest son, Mursili, became the King of Hatti as Mursili II.

However, Queen Henti’s fate is a mystery. It may be referred to in a fragmentary text from the reign of Šuppiluliuma’s son Mursili II, which mentions in consecutive lines the king’s father and a banishment of his mother Henti to the land of Ahhiyawa. Even if the right hand part of the text is missing it provides an explanation for what happened to Henti. Despite the fact that she was the mother of all Šuppiluliuma’s five sons it has

generally been assumed that the reason why she was banished by her husband has been the prospects of an important strategic marriage alliance with the ruling dynasty of Babylon.

When Mursili II became king in 1345 BC he was in his early twenties, which means that his mother Henti was still the queen around 1365 BC. The Babylonian King Burna-Buriash II had written a cuneiform letter (EA 9, British Museum) to Pharaoh Tutankhamun, 1358-1348 BC, and the widow of Tutankhamun, Queen Anchesenamun, had written letters to King Šuppiluliuma. This shows that the marriage between Šuppiluliuma and the Babylonian princess took place during the second half of his reign.

The year of marriage between King Šuppiluliuma I and the Babylonian princess, named Malignal, may have coincided with the appearance of the Supernova 1355 BC. According to the chronological scheme by Freu [26], the marriage alliance should be dated late in Suppiluliuma's reign, to ca 1331 in the Low Chronology. This year corresponds to 1355 BC if we add 24 years to correct this year to the High Hittite Chronology. This year for the alliance marriage with Babylon is much later than earlier was assumed according to Trevor Bryce [19], note 23, in Chapter 7. This assumption is not valid anymore.

I suggest that the real reason why Queen Henti was banished by King Šuppiluliuma I was the sudden and completely unexpected appearance of the Supernova on 9 November 1355 BC. The highest religious leader of Hatti, Queen Henti, may have been considered as personally responsible for the appearance of the Supernova and had no power to stop it.

King Šuppiluliuma now needed a new queen to restore good relations with the gods. If he married one of the princesses of Burna-Buriash II, he could also improve his relation to the Kingdom of Babylon. He married princess Malignal and she adopted the title Tawananna as her personal name and became Queen Tawananna III, the third queen of Šuppiluliuma I.

Tawananna III had seen the Supernova 1355 BC and depicted it on her seal, see Fig. 36.

4. The Supernova on Late Minoan seals from Crete?

No depictions of Supernova 1355 BC have so far been found in collections of Kassite seals from the 14th century BC. However, several examples can be found in *Corpus of Minoan and Mycenaean Seals*, volume: II,3 (1964-1974), Fig. 37-40 [27].

I interpret the hovering woman in the middle of Fig. 37 and 38 as a celestial goddess corresponding to the brightest stars in our constellation Orion.



Fig. 37. This gold seal was found in chamber Tomb1 at Nekropole Isopata, Knossos, Temenus. Three women on a field with flowers adoring a woman hovering above the ground in the middle. The tomb is dated to Late Minoan IIIA1, but the stylistic dating is Late Minoan I -II.

Length: 2.25 cm and width: 1.6 cm. Archaeological Museum in Heraklion. (CMS-II,3-051-1.) [27].



Fig. 38. This gold seal was found in Heraklion. Two beautifully dressed women standing on a field with flowers and trees with mature pomegranate indicating autumn. In the middle a woman hovering above the ground. The stylistic dating is Late Minoan I.

Now at the Archaeological Museum in Heraklion. (CMS-II,3-326-1.) [27].

There existed different ways to interpret the stars in our constellation Orion. The Middle Minoan's saw the Sacred Double Axe, Fig. 41 and 42, the Late Minoan's saw a Goddess, Fig. 37 and 40. During the Proto Geometric Period they saw the hunter Orion, Fig. 43 and 44.



Fig. 39. A celestial woman, our Orion, with a great star, Supernova 1355 BC, below her right elbow? Her skirt has the same triangular shape as the women in Fig. 36 and 37. Finding spot: Knossos Temenus, excavation site: Flur Ellinika. Stylistic dating: Late Minoan I. Material: soft stone. Length: 1.4 cm, width: 1.35 cm and thickness: 0.6 cm. Now at the Archaeological Museum in Heraklion, no.: HMS 1546. (CMS-no.: II,3 171) [27].

Mirror image of the sky.



Fig. 40. A celestial woman, our Orion, with a great star, Supernova 1355 BC, below her right elbow? Her skirt has the same triangular shape as the women in Fig. 36 and 37. Finding spot: Ierapetra. Stylistic dating: Late Minoan I. Material: soft stone. Length: 1.5 cm, width: 1.4 cm and thickness: 0.65 cm. Now at the Archaeological Museum in Heraklion no.: HMS 732. (CMS-no.: II,3 304) [27].

Mirror image of the sky.



Fig. 41. A double axe on the southern wall in the Corridor of the House Tablets at Knossos. After a photo by M. Blomberg 1996.

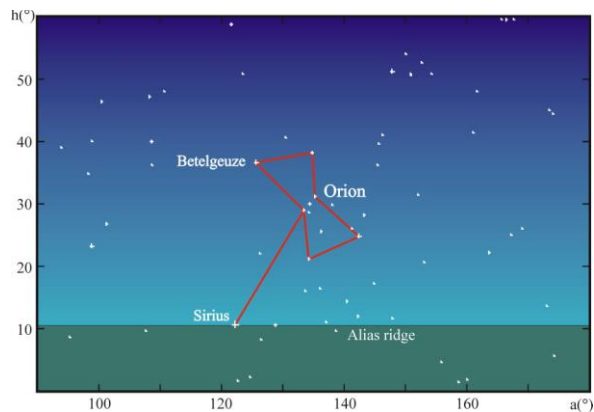


Fig. 42. The double axe, formed from the bright stars of the constellation Orion together with Sirius rising above the Ailias ridge on 21 September, 2000 BC, at 23.40 local mean solar time in Knossos. Orion dominated the Southern night sky during the autumn.



Fig. 43. The supernova and Orion on a vessel found in Siteia. Proto Geometric Period (1050-900 BC). Now at the Archaeological Museum in Heraklion. From a High 8 video frame by G. Henriksson 1994.

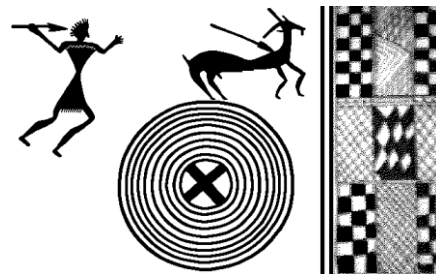


Fig. 44. The supernova and Orion on the opposite side of the vessel from Siteia in Fig. 43, This motive may have survived as an ancient legend. The cross at the centre of the concentric circles may indicate that it was a bright star, not the sun. After a photo by G. Henriksson 1994.

5. North American rock-carvings

Thousands of years before the arrival of the Europeans, native Americans occupied the western hemisphere throughout North and South America. Thousands of rock-carvings are important evidences left by the prehistoric inhabitants in the Four Corners area in parts of Arizona, Utah, New Mexico and Colorado. Rock art is a link to lost cultures whether these designs were a form of religious or astronomical symbolism or depictions of important events in the sky. The first humans living in this area was a big game hunting people called the *Paleo-Indians*. Several thousand years later a culture called the *Archaic* appeared. The more well known *Anasazi* culture, who lived south of Moab in the Four Corners area, cultivated corn, beans and squash. They also harvested wild resources, such as pinion nuts, grasses, bighorn sheep and deer.



Fig. 45. These rock-carving depictions of the Supernova 1355 BC are located near McKee Springs in Dinosaur National Monument, in Utah, USA on vertical rock faces. The “Warrior” figures, corresponding to our constellation Orion, have got a solar symbol below the left elbow at the position of the Supernova. With permission from Randy Langstraat.

The Anasazi people had independently recognized the same warrior-like constellation as the Swedish rock-carvers, see Fig. 3-4 and 33 and have made a very similar representation of the Supernova 1355 BC, Fig. 45.

V ASTROPHYSICAL FACTS ABOUT SUPERNOVA 1355 BC

1. The position of the Supernova 1355 BC

The only precise determination of the position of the Supernova can be found on a rock-carving at Himmelstalund in Norrköping. The big blue cup-mark in Fig. 46 corresponds to the Supernova and the big yellow cross corresponds to the position of the supernova remnant PKS 0646+06. The position of the Supernova cup-mark differs only with 0.6° in R.A. and 1.2° in declination.

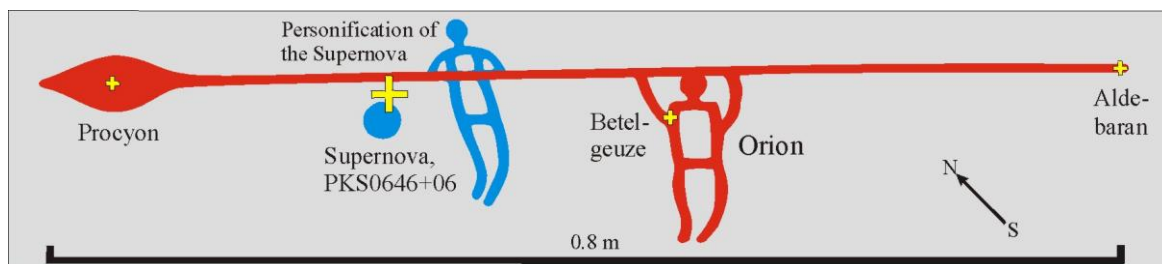


Fig. 46. Orion is lifting a long spear. His left shoulder corresponds to the bright star Betelgeuze. The spear’s pointer and its rear end is defined by the bright stars Procyon in Canis Minor and Aldebaran in Taurus respectively. The exact positions for the Supernova and the stars have been marked as yellow crosses. (After A. Nordén [12])

2. Naturalistic depiction of the Supernova 1355 BC

Normally the Supernova was depicted on the rock-carvings as a mini-sun but in one known case, at Högsbyn, there exist a naturalistic depiction of the Supernova 1355 BC. It was depicted as a bright star, by a great cup-mark with radial emanating rays carved in the bedrock, see Fig. 47.

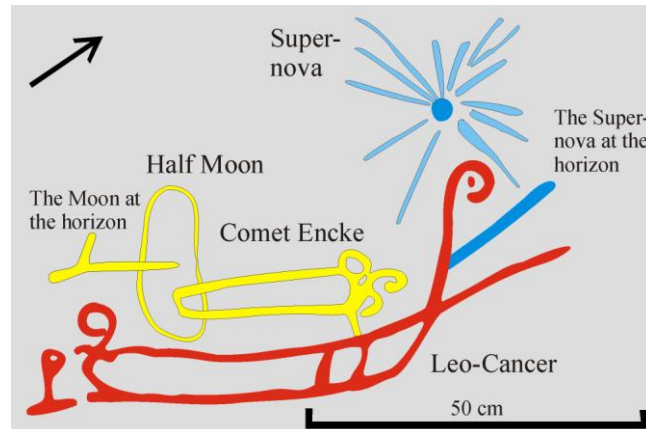


Fig. 47. The southern sky at Högsbyn, parish of Tisselskog, province of Dalsland, on 22/1 in 1354 BC, at 01.30 local mean solar time. This rock-carving has lines made with different technique. All lines are cut in the ordinary way, except the “rays” emanating from the dark blue cup-mark, corresponding to the Supernova. The rays are very thin, carved lines. Without these thin rays it had been difficult to interpret this rock-carving. This the last rock-carving with the Supernova depicted together with Comet Encke. (After K. Rex Svensson [8])

3. Supernova remnant PKS 0646+06

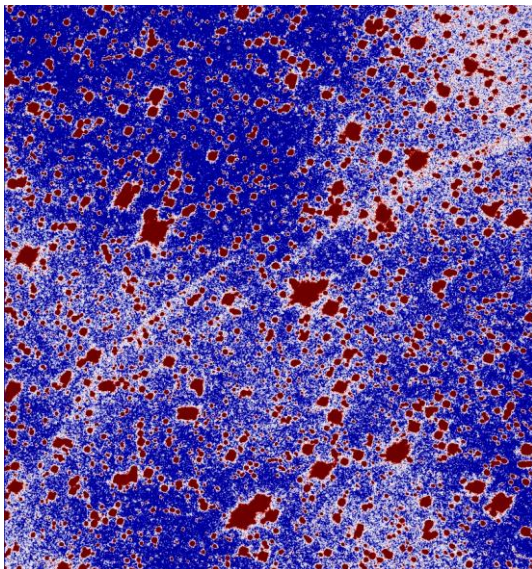


Fig. 48. The north-western part of the Supernova remnant PKS 0646+06 on a colour enhanced image from 8 February 2005, taken by O. Karlsson and G. Henriksson with the 1.00 m Westerlund telescope at the Observatory in Uppsala. Exposed 60 minutes with a red filter. The white filaments are the red H- α and [NII] emission.

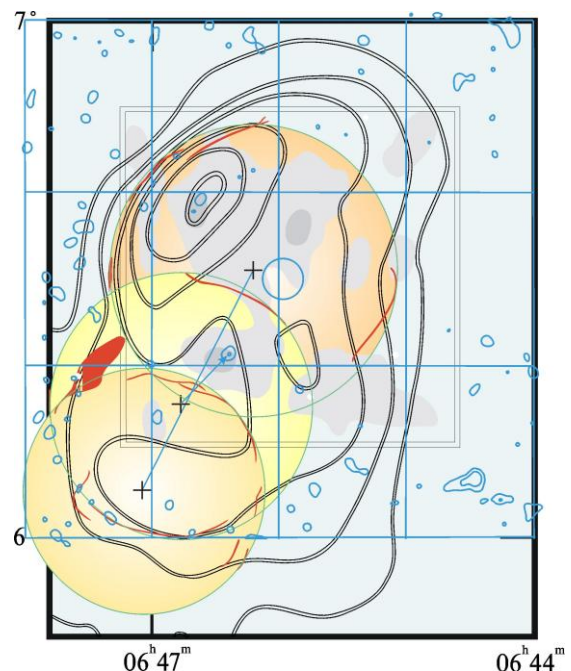


Fig. 49. Supernova remnant PKS 0646+06. The epoch for the coordinates is 1950.0. Data collected by G. Henriksson in 1995.

In Fig. 48 we can see a photo with false colours taken with the 1.00 m Westerlund telescope at the Astronomical Observatory in Uppsala, on 8 February in 2005, by O. Karlsson and G. Henriksson.

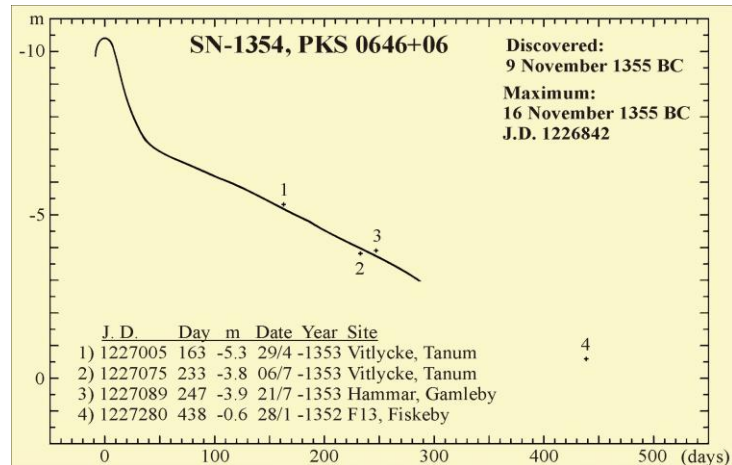
The Supernova remnant PKS 0646+06, observed at different wavelengths, is presented in Fig. 49. The double lines in Fig. 49 represent radio contours at 2700 MHz with 4.4' resolution (Graham et al. [28]). The red lines and areas correspond to H- α and [NII] emission observed by Davies and Meaburn [29]. The X-ray map,

with 80" resolution, shown as the gray areas was detected by the Imaging Proportional Counter onboard the Einstein Observatory, Leahy [30].

4. The Light curve for the type Ia Supernova 1355 BC

The Supernova from 1355 BC can be identified as the supernova remnant PKS 0646+06, discovered by radio telescopes. It can be classified as a type Ia supernova from the shape of its light curve, Leibundgut and Pinto [31], see Fig. 50.

Fig. 50. The apparent magnitudes (m) for the supernova SN-1354 (+) and a standard light curve for a supernova of type Ia. The magnitudes are estimated from the Swedish rock-carvings from the Bronze Age (1800-500 BC).



VI. DISCUSSIONS AND SUMMARY

The supernova 1355 BC is the third class of the celestial objects that I have identified on the Swedish rock-carvings. The first class is identified total solar eclipses that made it possible to make a very precise determination of the secular lunar acceleration. Deviations from the gravitational theory by Isaac Newton was discovered and could be used to confirm Einstein's precession of the geodesic and the theory of Massive Gravity and to determine the mass of the Graviton (Henriksson [17]).

The second class is identification of observations of Comet Encke (Henriksson [14]). There exist cross-correlations between Encke and total solar eclipses Henriksson ([3] and [4]) and between the Supernova and Encke, see Fig. 9 and 15-17. Astrophysical observations and models, see Fig. 46-50, can verify the physical existence of the Supernova 1355 BC.

It is very important that there exist independent support for this interpretation of the Chinese texts and the Swedish rock-carvings. They can be found in the Babylonian Enuma Anu Enlil (EAE) texts. The celestial objects called "discs" can be identified as the Supernova and Comet Encke. These interpretations can be verified by a direct comparison between the situations described in the EAE texts on Tablet 24(25) and 25(26) [18] and the situations depicted on the Swedish rock-carvings.

According to the High Egyptian Chronology, Pharaoh Tutankhaten changed his name to Tutankhamun in 1355 BC, Henriksson [21]. The reason may have been that when the Supernova appeared in daytime there were two suns in the sky simultaneously, which disproved his father Akhenaten's monotheistic belief in the solar disc, Aten.

Šuppiliuma I was king in the Hittite Kingdom when the Supernova suddenly appeared in the sky in 1355 BC. His Queen Henti, responsible for the celestial cult, was banished that year and Šuppiliuma I married a Babylonian princess that became Queen Tawananna III. She was the first to introduce a winged sun with two disks representing the Sun and the Supernova in her royal seal.

REFERENCES

- [1] Ho Peng Yoke, Ancient and Mediaeval Observations of Comets and Novae in Chinese Sources, *Vistas in Astronomy* 5, 127, 1962.
- [2] J. Needham, *Science and Civilisation in China*, Vol. III. Cambridge University Press. 1959.
- [3] G. Henriksson, Prehistoric constellations on Swedish Rock-carvings. *Actes de la V^{ème} conference de la SEAC, Gdańsk, 5-8 septembre 1997 (Światowit supplement series H: Anthropology, 2)*, ed. A. Le Beuf & M. Ziolkowski, Warsaw, 1999, 155-173.
- [4] G. Henriksson, Solar eclipses, supernova and Encke's comet on Swedish rock Carvings. *Proceedings of the Fifth Oxford International Conference on Archaeoastronomy, Santa Fe, August 1996*, ed. Fountain, J. W. & Sinclair, R. M., Carolina Academic Press, Durham, North Carolina, 2005.
- [5] Å. Ohlmarks, *Vårt Nordiska Arv*. Stureförlaget AB Stockholm, 1979.
- [6] L. Baltzer, *Glyphes des rochers du Bohuslän*, Gothenburg, 1881.
- [7] K. Kjellmark and O. Lindsten, *Nyupptäckta hållristningar vid Hjulatorp i Bergs socken, Kronobergslän, Fornvännen*, 1909.

- [8] K. Rex Svensson, *Hällristningar i Älvsborgs län*, Uddevalla, 1982.
- [9] S. Hallgren, in *The rock-carvings in Uppland, Sweden*, by Einar Kjellen. Lund 1976.
- [10] G. Burenhult, *The Rock Carvings of Göotaland*, "Acta Archaeologica Lundensia", series in 4, nr 8, Lund, 1973.
- [11] G. Hallström, *Monumental Art of Northern Sweden from the Stone Age*, Stockholm, 1960.
- [12] A. Nordén, *Östergötlands Bronsålder*, Linköping, 1926.
- [13] G. Henriksson, King David's Altar in Jerusalem Dated by the Bright Appearance of Comet Encke in 964 BC. *Annals of Archaeology* Volume 1, Issue 1, 2018, pp. 30-37.
- [14] G. Henriksson, Aristotle, King David, King Zhou and Pharaoh Thutmose III have seen Comet Encke. *Mediterranean Archaeology and Archaeometry*, Vol. 20, No 1, 2020, pp. 29-43. DOI: 10.5281/zenodo.3605658
- [15] A. Nordén, in *Hällbilder* by Pehr Hasselroth, Liber Stockholm, 1984.
- [16] G. Henriksson, A new Chronology of the Old Babylonian Kingdom and Ur I-III based on identification of solar and lunar eclipses. *Proceedings of the SEAC 2002 Conference* in Tartu, 2006.
- [17] G. Henriksson, The acceleration of the Moon and the Universe – the Mass of the Graviton. *Advances in Astrophysics*, Vol. 2, no. 3, August 2017. <https://dx.doi.org/10.22606/adapt.2017.23004>.
- [18] W. H. van Soldt, *Solar Omens of Enuma Anu Enlil: Tablets 23 (24) - 29 (30)*. Istanbul, 1995.
- [19] T. Bryce, *The Kingdom of the Hittites*, Oxford University Press, 2005.
- [20] H. G. Güterbock, The Deeds of Suppiluliuma as told by his Son, Mursili II. *JCS* 10: 41-68, 75-98, 101-30, 1956.
- [21] G. Henriksson, Chronology for the Egyptian Pharaohs of the Amarna period and the Israeli leaders Moses and Joshua by correlation with eight solar eclipses. *Proceedings of SEAC 2004 Conference in Kecskemet. BAR* **1647**, 133-148, 2007.
- [22] R. Krauss, Nochmals die Bestattungszeit Tutanchamuns und ein Exkurs über das Problem der Perseareife¹. *Studien zur Altägyptischen Kultur*, 1996, Bd. 23, pp. 227-254. Published by: Helmut Buske Verlag GmbH.
- [23] J. Baines and J. Málek, *Atlas of Ancient Egypt*, Andromeda, Oxford, 1992.
- [24] S. P. Lumsden, *Symbols of power: Hittite royal iconography in seals*, University of California, Berkeley, 1990.
- [25] T. Beran, *Die Hettitische Glyptik von Bogazköy, Teil I*. Verlag Gebr. Mann, Berlin, 1967.
- [26] Feu, J. (2002), 'La chronologie du règne de Suppiluliuma: essai de mise au point', *Fs Popko*, 87-107.
- [27] Corpus der minoischen und mykenischen Siegel (CMS). (1964-1974). Supervised by D. Panagiotopoulos and M. Anastasiadou at the Institute of Classical Archaeology, Heidelberg University. Can be accessed on its website <http://arachne.uni-koeln.de/drupal/?q=en/node/196>.
- [28] D. A. Graham, C. G. T. Haslam, C. J. Salter and W. E. Wilson, A Continuum Study in the Constellation of Monoceros. *Astronomy and Astrophysics* 109, 145-154, 1982.
- [29] R. D. Davies and J. Meaburn, A New Optical Supernova Remnant, *Astronomy and Astrophysics*, 69, 443-444, 1978.
- [30] D. A. Leahy, Detection of X-ray emission from the supernova remnant PKS 0646+06. *Astronomy and Astrophysics* 156, 191-193, 1986.
- [31] B. Leibundgut and P. A. Pinto, A distance-independent calibration of the luminosity of type Ia supernovae and the Hubble constant. *The Astrophysical Journal*, 401, 49-59, 1992 December 10.