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Astronomy and Mystic Simbols in the Romanesque Parish Church of Santa Maria, in Cortemilia (Cuneo, Italy)

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Abstract

Cortemilia, a town in Piedmont (Italy), is located in an area that in ancient times belonged to Ligurian tribes then conquered by the Romans. At the edge of the town is the Romanesque church of Santa Maria (Sancta Maria de Plebe) of the twelfth or thirteenth century. The magnetic and astronomical survey of church showed an orientation of its axis in the direction of the local rising of the Sun at the Equinoxes.

On a wall inside the church is a beautiful sandstone bas-relief. In its center is the Virgin Mary with a crown, sitting on a throne with the baby Jesus on her lap. The measures and overall harmony of the relief reflects the medieval mystic symbolism (the divine Trinity, the Perfection of God, the Virgin and Jesus seen as intermediaries between God and men).

In the frame surrounding the Virgin are symbols associated with the stars, among them a Sun that is going to be "swallowed up" by a sickle-shaped Moon. On manuscripts of the same period we saw that this symbol can be easily attributed to the representation of a total solar eclipse visible from the area of Cortemilia on June 3rd 1239, in the same period when the church was built. It took place more than five centuries after from the previous one: this surely increased the emotional impact of the event of the population, since at that time it was believed there was a close relationship between the total solar eclipses and the omens of divine doom. These feelings are evident also in the written descriptions of that eclipse that came down to us.

But also the position of the stars that were visible when the sun was darkened may be the basis of the interpretation of the astral symbols and of their position on the bas-relief: perhaps the anonymous sculptor wanted to 'freeze' on the stone information related to the spectacular astronomical event that he himself had witnessed.

The parish church of Santa Maria in Cortemilia and its extraordinary relief are two priceless treasures, a wonderful example of art, culture and astronomical knowledge of the Middle Ages.

Keywords: Cortemilia, Romanesque parish church, mystic and astronomical symbols in Middle Ages, medieval art, total solar eclipse of 1239.

1. Cortemilia: historical and geographical notes

Cortemilia (province of Cuneo, Italy) is located in a hilly area where is the Uzzone river, between the dioceses of Alba and Acqui Terme. This rural area was inhabited since very ancient

times, as prove finds dating back to the Palaeolithic age, and a part of a serpentine ax of the Neolithic age (III-II millennium BC). The town was probably of Roman origin, as evidenced by the discovery of some tombstones of the Republican age; the site had an important strategic location in the area between the roman towns of Alba (*Alba Pompeia*), Acqui Terme (*Aquae Statiellae*) and Vado Ligure (*Vada Sabatia*).

The etymology of the name Cortemilia is controversial. One hypothesis is a roman origin: Cohort Emilia (Cohors Æmilia), with reference to the Roman consul Marco Emilio Scaurus who conquered this territory defeating the Ligurian Statielli (or, according to other sources, the Ligurian Epanterii or Montani). Otherwise the name could be medieval: in the Theatrum Statuum Regiae Celsitudinis Sabaudiae Ducis (1682) the site is called Curtismilium ad Burmidam, from 'curtis', a name that in the late roman empire meant a large self-sufficient farm, from which originated the feudal structure.

2. The church of "Sancta Maria de Plebe".

The parish church of Santa Maria (or "Madonna della Pieve") is located in the outskirts of Cortemilia. It has a Romanesque structure, built entirely of local sandstone, and a remarkable apse with three single windows decorated with arches with bas-relief figures. The bell tower is square. The building retains fairly intact its original architectural elements, dating back to the XII-XIII centuries; alterations were made in the XVII-XVIII centuries. Near the church is another stone building, perhaps the ancient monastery.



Figure 1. The Romanesque church of Santa Maria (Sancta Maria de Plebe) in an image taken from the farm of Monte Oliveto (photo by G. Veneziano).

Thanks to an inscription "Ecclesia Sanctae Mariae de Plebe satis antiqua et ex anno suae erectionis ibi MCC notato conicere licet", scholar Giuseppe Luigi Martina dates the foundation of the church around the year 1200. During the restorations of 1942 a marble slab was found, with

the inscription "ANNI D[omi]NI M[il]L[esim]O CC", which means "Anno Domini (Year of the Lord) one thousand two hundred" [1]. The inner walls of the church have no plaster, and were built using stones coming from the river, while the vault is made with bricks. Above the entrance is a loggia with three arches and two columns. The altar is set in the center of the semicircular apse, in whose walls open three small windows (monofore): the central one is in axial position. On the left wall is a marvelous sandstone bas-relief – dating back to the same years of the foundation of the church – which depicts the Virgin Mary with the baby Jesus.



Figure 2. Detail of the apse with the three small windows (monofore) (photo by G. Veneziano).



Figure 3. The square bell tower (photo by G. Veneziano).



Figure 4. The marble slab found during the restoration of 1942 and walled on the capital to the left of the altar. On it is possible to read: ANNI - DNI - M L O CC, readable as: "ANNI D(omi)NI M(il)L(esim)O CC" ("Year of the Lord one thousand two hundred") (photo by G. Veneziano).



Figure 5. Interior of the church seen from the altar (photo by G. Veneziano).

3. Astronomical orientation of the church of Santa Maria

The parish church of S. Maria is located outside of the town center. It is built *at the foot* of a hill (called Monte Oliveto), and not *on top* of it, as it is customary for religious buildings. This suggests that in ancient times this site had been linked to some pagan local cult. Not far away from here, in fact, in 1774 were found two inscriptions, one of which is dedicated to the goddess Diana, whose symbols were linked to the world of woods and forests. Under the present altar there was a base with traces of burning, perhaps an altar used for sacrifices to the Goddess [2, p. 7].

Thanks to the courtesy of mr. Francesco Caffa, head of the Department of Culture of the municipality of Cortemilia, on September 4th, 2010, I made a first survey in the church together with colleagues Piero Barale (SAIt, Italian Astronomical Society) and Giuseppe Brunod (CeSMAP, Study Centre of the Archaeological Museum of Pinerolo, Turin).

The geographical coordinates of the church, measured with GPS and confirmed by Google Earth, are the following:

Latitude: 44°34′57.60″ North; Longitude: 08°11′49.92″ East; Height above sea level: 260 m.

The axis of the nave has a magnetic *azimuth* of 104°37′ and an astronomical *azimuth* of 106° (later confirmed by measurements made on satellite images).



Figure 6. Satellite view of the location of the parish church of Santa Maria (the map data: Google Earth).

The church, therefore, is not built along the classic equinoctial line: since the building was built near a hill, it was assumed that the *azimuth* could match that of the rising sun at the equinoxes *seen locally*. This hypothesis was confirmed during autumn equinox of 2011. On September 22nd, the first ray of sun struck the roof of the church at 8:38, (daylight savings time - 6:38 UTC) when the Sun had an *azimuth of* 103°44′ and a height of 14°; therefore its azimuth is a little more than 2° to the left, compared to the axis of the church.

A few minutes later, at 8:44 (6:44 UTC), the Sun was visible from the entrance of the church, completely above the local horizon of Monte Oliveto (azimuth 104°51′, height 15°) and its light illuminated the roof of the church. At 8.50 (6:50 UTC), when the Sun had an azimuth of 106°21′ (the same of the axis of the church) and a height of 16°, the light was able to filter out from the roof of a building on the slopes of Monte Oliveto and to *illuminate the apse*.

It is difficult to estimate the exact impact of sunlight on the church, because over the centuries Monte Oliveto was modified by human activities, with terracing and buildings, which changed its profile: therefore the moment when the Sun is rising behind Monte Oliveto has changed. This can justify the difference of 2° in the rising of the Sun; originally the church was oriented towards the point where the Sun is *rising locally* on the Equinox.



Figure 7. September 22nd, 2011, (in correspondece with the autumnal equinox) at 8:38. First light of the Sun rising behind Monte Oliveto (photo by G. Veneziano).



Figure 8. September 22nd, 2011, at 8:44 the Sun has an azimuth of 104°51′ and illuminates the roof of the church (photo by G. Veneziano).



Figure 9. September 22nd, 2011, at 8:50 (local time). The Sun has the same azimuth of the axis of the church (photo by G. Veneziano).

4. The bas-relief of the church: a journey between astronomy and medieval mystic

Inside the church, on the left wall, is a beautiful sandstone bas-relief. The Virgin Mary, is in the center sitting on a throne, with a crown on her head and the baby Jesus on her lap. Jesus' face is consumed by time, while his mother's is intact. On either side of the Virgin and Child are an angel and a saint. Near the border of the relief are two men, probably two monks, fewer than two towers. Above the Virgin is an arched vault, on which are depicted various symbols of the early medieval Christian mysticism: a twelve-pointed star, the Sun, the Moon, and floral motifs. On top of the arch is a triangle, inside which is the Divine hand of God.



Figure 10. The bas-relief with the Virgin and Child surrounded by various characters and astral symbols, with on top the right hand of God in the act of blessing (photo by G. Veneziano).

Excluding the towers with the monks on either side of the bas-relief, the other characters are set inside a complex geometric figure, on top if which is an equilateral triangle with the right hand of God. Here we find a double symbol: the blessing hand indicates the number three; the equilateral triangle – with three equal sides and three equal angles – symbolizes the Catholic doctrine of the Trinity and also the perfection of God, whose qualities (wisdom, power, justice and love) are in perfect balance. This triangle is widening below to form a larger triangle in which are inserted the figures of the Virgin and Child, and of angels and saints. At the two sides of the lower corners are the two monks, and two towers which probably are bell towers. Symbolically, we have on top the Divine perfection that is descending from above, which regulates the perfect and immutable laws of the Universe and the cycles of Nature. And in the lower part we have the imperfection of human beings (the two monks) who – despite their efforts – would never reach divine status if not with the intercession of the Virgin Mary and Jesus Christ who – as mediators – have an intermediate position.



Figure 11. Processing showing the geometric development of the bas-relief. The presence of God is inscribed in an equilateral triangle (yellow), the Vitgin and Child in a larger triangle (red). The two monks fall outside of this geometric pattern (photo and image processing by G. Veneziano).

The symbols engraved on the frame that surrounds the Virgin are related to the Stars. On the right side are two twelve-pointed stars, representing most likely the Sun. The twelve points (or rays) could hint to the twelve months of the year, or to the hours of the day. According to many authors, the number twelve symbolizes the end of a complete cycle. Its symbolic repetition (as is the bas-relief, that has *two* twelve-pointed stars) means that it "embodies a dynamic totality, that is able to grow. If the year has in effect twelve months, the time is unlimited" [3, p. 302].

Therefore the two twelve-pointed stars could symbolize eternity. The number twelve also has a very important esoteric meaning: it is also the symbol of the "initiation rites that allow the individual to move from the profane to the sacred level" [3, p. 302].

Symbolically it is linked to the idea of physical or mystical initiation rites that the beginner must overcome in order to transform and pass to a higher status. In this case is symbolized the difficult inner transformation that is necessary to a *phisical* human being (such as the two monks outside of the two ideal triangles) to become a *spiritual* human being, and thus enter into the eternity of the Kingdom of God.

On the left is a circular symbol divided in four segments with eight scrolls (similar to a flower) and the Sun (always with twelve rays) together with the lunar crescent. The circular symbol has

different meanings: the flower embodies the grace of Nature and the renewal of the vegetal world; it is often used in painted decoration of vases. It is divided in four parts, and the number four represents the Earth and the real world, something solid and tangible. Four is also the number of the Seasons, of the Elements, of the Cardinal points, and of the division of sacred space (the *templum*) made by ancient priests, the *augures*. Four is also the number of the name of God, the sacred *tetragrammaton* YHVH, frequently translated as *YeHoVaH* or *YaHVèH*. [3, p. 695].

5. An Eclipse carved on stone?

The other series of symbols certainly is the most interesting. We see the Sun with twelve rays and the Moon sickle-shaped. Their position is remarkable, because the two stars are not shown *one next to the other*, but virtually *con-penetrating*: it seems that the Sun is going to be incorporated – sort of 'swallowed' – into the Lunar disk. In ancient and medieval symbolism, the Sun and the Moon have always been *counterposed*. They were shown as separate and distinct, on the opposite sides of images or paintings, or at least *next* to one another. The images of the Sun and Moon on the Cortemilia bas-relief look as if their motion had been stopped in a plastic pose, as if to indicate a peculiar astronomical event. Which one? Most likely a total solar eclipse.



Figure 12. Detail of the symbols engraved on the frame that surrounds the head of the Virgin (photo by G. Veneziano).

Our relief is remarkably similar to an illustration of the German scientist and humanist Hartmann Schedel (1440-1514), in his *Nuremberg Chronicle* (also known as *Die Schedelsche Weltchronik* or with the original Latin title *Liber Chronicarum*), published in 1493 in Nuremberg. In the book Schedel reports about astronomical phenomena such as eclipses and comets, as well about mysterious events and supernatural wonders. In Chapter LXXVI is the representation of one of those astronomical events: a solar eclipse.



Figure 13. Left: detail from Hartmann Schedel's *Nuremberg Chronicle* (1493). Right: detail of the frame of the Cortemilia bas-relief (photo by G. Veneziano).

It may be that the anonymous sculptor of the bas-relief wanted to represent a total solar eclipse among the astral symbols? And if it is so, which one? Thanks to the ephemeris program *Five Millennium Canon of Solar Eclipses* developed for NASA, it was possible to have a list of the solar eclipses visible from this site from the seventh to the fifteenth century – thus including the year of foundation of the church of Cortemilia, 1200 – spanning a period of 900 years.

During this long period of time, in the site of the church were visible 349 partial eclipses of the Sun, 4 annular eclipses and only 3 total eclipses. Obviously, a partial eclipse of the Sun is a relatively frequent phenomenon. Annular and total ones are much rarer, and totals eclipses have a great emotional impact. Taking into consideration only annular and total eclipses we obtained the data shown in the table 1:

Total and annular eclipses visible from Cortemilia Latitude: 44°34′57″ N - Longitude: 08°11′49″ E - Height: 260 m					
Date	Туре	Totality	Height of	Azimuth of	Duration
	(T – A)	(hh/mm)	Sun	Sun	(mm/ss)
		local time	(°)	(°)	
12 April 655	Т	07.58	23	100	00.27
05 October 693	Т	07.30	9	108	01.59
08 December 698	А	11.55	22	173	08.53
09 January 753	А	12.43	24	181	09.59
18 August 863	А	06.34	10	82	02.19
03 June 1239	Т	13.21	66	213	02.09
23 March 1270	А	06.42	5	89	01.08

Table 1. Total and annular eclipses in Cortemilia from VII to XIII century:T - Total Eclipse, A - Annular Eclipse

In the period of time when the church was built (around 1200 AD) there has been only one total solar eclipse, on June 3rd, 1239. Moreover, the table shows that the previous eclipse (an *annular* eclipse) occurred in year 863, nearly 376 years before. The previous *total* eclipse had been on October 5th, 693. This means that when the eclipse occurred in Cortemilia on June 3rd 1239, a total eclipse of sun had not occurred there since 546 years. This phenomenon has a great emotional impact, so we can imagine how it was felt after nearly five and a half centuries of absence. Not even the most detailed stories of their ancestors would have prepared the inhabitansts of Cortemilia for that prodigious sight! In medieval times there was a close relationship between eclipses and negative prophecies, especially around year 1000 when these phenomena were perceived with feelings of absolute terror, because of the superstitious fear of the arrival of the end of the world. Those fears were supported by the meaning that the Holy Scriptures gave to solar eclipses as signs of future cataclysms and flagella, as a manifest sign of disfavor and of divine wrath (see for example Amos 8: 9, 10 and Revelation [Apocalypse] 6: 12-14).

6. Obscuratus est Sol 1: the total eclipse of 1239 in historical records

The eclipse of June 3rd, 1239 was certainly remarkable for its extension. The path of totality across central and northern Italy affected important cities such as Genoa, Bologna, Florence, Pisa, Ancona and Perugia. The inhabitants of other cities such as Turin, Milan, Venice and Rome, which were immediately outside of this range, saw the eclipse as partial. The large amount of historical records left proves that it was an event of extraordinary resonance, considering that at that time most people were illiterate and that only a few individuals – mostly clergy, notaries, writers, scholars and merchants – were able to read and write. Hereafter we focus only on descriptions coming from the areas where the *total* eclipse was visible.



Figure 14. Distance covered by the shadow of the Sun during the total eclipse of June 3rd, 1239 on the italian peninsula (the map data: Google Maps). The two blue lines represent the extreme zones of the band of totality, outside of which the eclipse is only partial. Cortemilia it is

¹ The Sun is Obscured.

located within this band. The red line represents the area of the centrality of the phenomenon, where there is the maximum duration of totality.

A direct witness is Franciscan friar Salimbene de Adam (or Salimbene of Parma) in his *Chronica* (Chronicle), published in 1288, few decades after the event. The eclipse is mentioned several times: he wrote "... and the sun was darkened, as I saw with my own eyes, on Friday, June 3rd, 1239, at the ninth hour". [4, p. 60]. A second description is more detailed: "It happened an eclipse of the Sun, where the sun was darkened in such an horrible and terrible way; and the stars appeared, as I saw with my own eyes, I friar Salimbene of Parma, while I was in the city of Lucca, which is a city in Tuscany, and I was already in the Order of Friars Minor for a year ... until the day when the Sun was darkened, a Friday, the ninth hour, on June, the third day" [4, p. 240].

The town of Lucca was located in the center of the path of totality, in the area where the event was lasting for a longer time. Salimbene de Adam reports that the eclipse occurred at the ninth hour (ie at around 15 local time, since at that time the hours were counted starting from sunrise). According to modern calculations, the totality occurred shortly after 13 hours local time, that is to say at the end of the seventh hour. The conclusion of the whole phenomenon, that is the end of the phase when the Moon leaves the last edge of the solar disk - occurred around 14:30 local time. Therefor most likely the time reported by the monk could easily relate to the end of the entire phenomenon that to the end of the phase of totality.

The florentine merchant and writer Giovanni Villani (1276-1348) in Book VI of his work *Nuova Cronica* (New Chronicle), about the history of Florence, reports about the eclipse of year 1239, probably relying on people who witnessed the event: "The Sun became completely dark on the ninth hour, and remained obscured for several hours, and the day became night, the stars were visible. Therefore many people ignorant of the course of the Sun and other planets marveled very much".

A stone inscription set in the façade of the parish church of Santa Giulia Monchio, in the municipality of Montefiorino (on the Apennines of Modena) reports about that same eclipse and reads (translated from late antique Latin): "In the year of the Lord 1239, on Friday, the third day of June, [month] just started, the sun was obscured ... between the sixth hour and the ninth hour". [5]. It gives an indication of the time of the day when the phenomenon occurred: between the sixth hour (about) and the ninth, that is between the late morning and early afternoon.

This eclipse is the oldest chronological reference in the biography of the Dominican Jacopo de' Fazio or Jacopo da Varazze (or Jacopo da Varagine). He saw the phenomenon when he was a young boy, and described vividly in his *Chronica civitatis Ianuensis* (Chronicles of the city of Genoa): "In the year of the Lord MCCXXXIX there was a great eclipse of the Sun, and there is no memory before of another so large and so dark for such a long time. The stars appeared in the sky, in the same way they appear at night when the sky is clear. We too, being in our child years as youngsters, saw those stars shining in the sky" [6].

The most accurate description of this eclipse is by Ristoro (or Restoro) of Arezzo, in his work *Della composizione del mondo colle sue cascioni* (Composition of the world with its causes), published in 1282. Some of this information will lead back to the Cortemilia bas-relief. "In the sixth hour of the day, when the Sun was twenty degrees in Gemini, with clear weather, the air began to turn yellow and the Sun was covered step by step and the whole body of the Sun was obscured, and it became night; and we saw Mercury near the Sun, and all the stars were visible, which were above the horizon ... and saw the Sun being covered for the space that a man could cover with 250 steps, and the air and the earth began to cool; and [the Sun] begun to be covered

and discovered on the west side". In Arezzo, very close to the centrality of the phenomenon, the totality lasted 5 minutes and 45 seconds. Ristoro, however, is definitely wrong in identifying the planet close to the Sun: it was not Mercury but Venus, which was about 1° West of the Sun, while Mercury (close to its maximum elongation) was always about 20° West of the Sun. Another planet, Saturn, was visible at about 25° East of the Sun, exactly on the opposite side of Mercury. In accordance with Ristoro d'Arezzo, the Sun eclipse was near the constellation of Gemini.

When the Sun was completely obscured, it was possible to see a very impressive scene: besides the three aforementioned planets, the Sun in eclipse was surrounded by the most remarkable constellations of winter sky: Aldebaran and the Pleiades in the constellation of Taurus, Betelgeuse and Bellatrix in Orion, the bright Sirius in Canis Major and the stars Castor and Pollux in Gemini.

Cortemilia was located not far from the upper area of the eclipse, which was total but had a slightly shorter duration of totality, 2 minutes and 9 seconds. According to scholar Gemma Rosa Levi-Donati, the large number of reports about the eclipse proves that "the phenomenon could be remembered for years by those who had been able to see it, so that the story passed down from fathers to sons and nephews, and became tradition". Even a century later, a notary in Foligno, Bonaventura di Mastro Benvenuto, in his work *Fulginatis Fragmenta Historiae* (Fragments of History of Foligno), among the historical information for the year 1239 reported: "Obscuratus est sol per totam orbem" (The Sun was obscured on the whole Earth) [5].

7. Conclusions. A "message" encrypted on the stone?

The position of the stars visible in the sky when the sun was darkened could be the starting point of the interpretation of the astral symbols on the Cortemilia bas-relief. In the left part of the frame that surrounds the face of the Virgin we have two symbols: one is a sickle-shaped Moon inside which is a Star with twelve points. This can be explained as symbolizing the Sun in eclipse. As a support to this hypothesis, we discovered that a few years after the construction of the church of Santa Maria there actually was a total solar eclipse, whose impact was sunning, since it was more than half a millennium that a total solar eclipse had not been observed at Cortemilia.

Now we have another question: what are the two twelve-pointed stars on the right side of the frame surrounding the head of the Virgin? There are two possible explanations.

1) *They may represent the planet Venus*, which during the Eclipse of June 3rd, 1239, appeared to the right of the Sun in eclipse, very close to it (as highlighted in relief): the anonymous sculptor wanted to show its dual aspect of "morning star" and "evening star".

2) They may be a time indicator. The two stars engraved in bas-relief on the right side of the face of the Virgin, both have twelve points, as well as the star (the Sun) that is is going to be "swallowed up" by the Moon. According to this last analogy, all three twelve-pointed stars represent the Sun. The one on the left is the Sun at the time of the eclipse. The two on the right could represent the Sun in two precise moments of day, such sunrise and sunset. It may be that the sculptor engraved two Suns in order to show that the eclipse took place in a moment set in between the rising of the Sun and its sunset that is by midday.

Beyond the interpretation of these last two symbols and their meaning, it is important to point out that the parish church of Santa Maria in Cortemilia and its extraordinary bas-relief are two priceless treasures, a wonderful representation of art, culture and astronomical knowledge in one of the most controversial periods of our past history.

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