

Paul de Saint Robert and his *True Meaning of a Tercet of Dante*

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Abstract. Count Paul Ballada de Saint Robert (1815–1888), man of great genius and scholar of various scientific disciplines, shows with the help of science what is the exact meaning of the verses 22.24 of the I chant of Purgatory. Many commentators on these verses of Dante's (1265–1321) masterpiece, in order to avoid the difficulties of a literal explanation and ignoring the fact that Dante knew very well astronomy, provide only an allegorical and fanciful meaning. The explanation of Saint Robert, on the contrary, is based on the astrophysical phenomenon called "precession of the equinoxes" which was well known to Dante.

Key words: Allegorical, astronomy, Chant I, Commentators, Dante, Equinoxes, masterpiece, Paul de Saint Robert, Precession, Purgatory

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Pisano R, Capecchi D, Lukešová A (eds) (2013). *Physics, Astronomy and Engineering. Critical Problems in the History of Science and Society. Proceedings of the 32nd International Congress of the Italian Society of Historians of Physics and Astronomy*. The Scientia Socialis Press, Šiauliai. ISBN: 978-609-95513-0-2

1 Purpose and Explanation of Paul de Saint Robert

The Count Paolo Ballada of Saint Robert¹ wrote a memorandum with the intention of clarifying and providing the right interpretation of the thought of Dante on one of the most controversial and debated passages of the Divine Comedy. The memorandum *The True Meaning of a Tercet of Dante* presented in June 1866 at the Academy of Sciences of Torino refers to I chant of the Purgatory, wherein the Poet refers to a well specified astronomic phenomenon:

To the right hand I turned, and fixed my mind
Upon the other pole, and saw four stars
Ne'er seen before save by the primal people²

Dante knew very well Astronomy, affirms the Count of Saint Robert and this is demonstrated by the fact that in the Divine Comedy there are numerous astronomical allusions. Without the help of the Astronomy many passages of the Divine Comedy cannot be interpreted correctly.

Even if commentators identify the four stars forming the Southern Cross as the stars to which Dante refers, this does not explain how Dante, who was born in 1265 and wrote his masterpiece at the beginning of 14th

¹ The count Paul Ballada de Saint Robert was born in Verzuolo (Cuneo) in June 1815. As very young boy, he entered the Military Academy of Turin becoming soon lieutenant of artillery, and afterwards professor of ballistic at the Military School of Turin. At 45 years he left the Army for devoting himself to the study of physical and military sciences. He was a member of the most important Academies of Sciences. His life was dedicated to technical-scientific studies: Ballistic, Artillery, Mechanic, Hypsometry, (St Robert 1872, 1873, 1874) Thermodynamic (St Robert 1865, 1870) and natural studies; Botany and Entomology. Very important were his studies of Thermodynamic (Drago 1993; Pisano 2007; Redondi 1974), he was the first in Italy to write about Sadi Carnot (St Robert 1868; Pisano 2013) his work *Principes de Thermodynamique* was utilized in the most important Universities in Europe (Pisano 2013). He had also a great passion for mountaineering and promoted the historical ascent to Monviso in 1863 (Crivellaro P 1998) with his friend Quintino Sella (1827–1884). In the same year they founded the prestigious Italian Alpine Club (CAI). He left his studies and retired in Castagnole delle Lanze (Asti) in 1878 until 1884. He died in Turin in 1888. Recently see Pisano 2013.

² Alighieri 1960, Purgatory I, v 22–24.

century, could have known a constellation that was not visible at that time from any known land, until the beginning of the sixteenth century by the first daring sailors. Owing to the lack of a satisfactory explanation, the commentators had to refer to the allegory, defining that the Poet wanted to symbolize the four Cardinal Virtues: Prudence, Justice, Fortitude, Temperance and that only by chance they correspond to the truth, by connecting the meaning of the words "save by the primal people" to the fact that they were both honored by the ancients and then almost forgotten and ignored.

According to Saint Robert, the habit of using allegory in order to explain the difficulties encountered in the Divine Comedy is contrary to the intention of the author. As a matter of fact, the poet warns us in the *Convivio* that "[...] first much always be the literal sense, because it contains the other senses, otherwise you cannot understand it and especially the allegorical one" (Alighieri 1928, Tome II, Chap I). Saint Robert then says that when Dante speaks of the "four stars ne'er seen before save by the primal people" (Alighieri 1960, Purgatory I, v24) he refers to stars actually existing and not only in the imagination, and according to the words of Dante, he literally provides the scientific meaning.

Due to the attraction of the sun and moon on the equatorial bulge of the earth, the axis of this latter, instead of remaining parallel to itself, has a slow conical motion from east to west around the axis of the ecliptic, taking about 26000 years to describe the entire cone. By changing the tilt of the earth with respect to the stars, consequently also changes the position of the horizon of each site in relation to them, other new stars become visible, whereas others become invisible. This phenomenon is called *precession of the equinoxes*, because it anticipates the equinox every year of twenty minutes and a half. In this phenomenon we find the solution of the problems of understanding the words of Dante. Because of this motion of revolution of the earth's axis forty centuries ago the Southern Cross shone in our northern sky. Dante, says Saint Robert, certainly knew this movement almost imperceptible, because it also deals with it in chapter XV of the Treaty II of the *Convivio*, which describes the movement of the starry sphere almost insensitive about one degree in one hundred years. In more recent modern times, this value was corrected to about one degree every 72 years. Dante, continues Saint Robert, certainly well knew the existence of the four stars, as they are described in the catalog (*Almagest*) of Ptolemy (100–178), where they do not form a specific constellation but are united in the *Centaurus* (Delambre 1817).

The astrological address followed by Dante in his masterpiece is undoubtedly the scientific one which is headed by Claudius Ptolemy. Moreover, Ptolemy is mentioned several times (Ceri 2000) in the *Convivio* by Dante, along with a clear understanding of his theories (Alighieri 1928, Tome II, Chap III, XIV, XV).

1.1 The Opinion of Other Scholars

Rinaldo Orengo (1895–1991) writes in his book *Dante Man of Science* (1978): “The Astronomy of Dante in the Divine Comedy and in the *Convivio*, is not whimsical or fanciful: it is exact”. Dante had the possibility to know the doctrines handed down by the *Almagest*, which was translated in 1175 from Arabic into Latin by Gerard of Cremona (1114–1187) and he also had the possibility to know the work of Alfragano (c IX), *De Aggregation Scientiae Stellarum* (Moore 1903) also mentioned in the *Convivio* (Alighieri 1928, Tome II, Chap VI).

Corrado Gizzi (1915–2012) in his book *Astronomy in the Sacred Poem* (1974) admits that the entire cosmology of the Comedy has been built by the great Poet, on the precession of the equinoxes.

Even Alexander Humboldt (1769–1859) in his *Examen Critique* (1837) and in *Cosmos* (1848), writes Saint Robert, attributes a real existence to the four stars of Dante, but explains, as many commentators, that the words “ne’er seen before save by the primal people” (Alighieri 1960, Purgatory I, v24) mean that they were only seen from Adam and Eve. At the time of Ptolemy, around the second century of the Christian era, they were still visible in the most southern parts of the Mediterranean, so it is no wonder that they were known to him and are included in its catalog. Consequently, these invisible stars in Europe at the time of Dante were visible, due to the precession of the equinoxes, to the early inhabitants of Europe, *from the primal people*.

It seems inexplicable to Saint Robert that Humbolt did not notice that the first people had to see the Southern Cross also living in the northern hemisphere. For him the first to suggest that the words “ne’er seen before save by primal people” (*Ibidem*) allude to the effect of the precession of the equinoxes, was the astronomer Joseph Johann von Littrow (1781–1840) in his book *The Wonders of the Sky* published in 1834.

Even the astronomer Ernesto Capocci (1798–1864) in his *Cosmographic Illustrations of the Divine Comedy* published in 1856 also admits the same

explanation and confirms that Dante could be very well aware of the existence of the four stars because he knew the catalog of Ptolemy.

1.2 Astronomer Zanotti Bianco on St Robert's Work

Astronomer Zanotti Bianco Ottavio (1852–1932) in his *Astrology and Astronomy* (1905) writes: There is no shortage in these verses of the commentaries: maybe there are too much of them. Commentators have worked using their imagination, as usual, copying each other serious errors, ignoring as well the serious work of astronomers and the warnings of Dante himself. Two Italians astronomically employed these tercets, and their names are completely ignored, as their work by *dantologi*. I want to talk about Ernesto Capocci and Count Paolo Ballada de Saint Robert. The first is a Neapolitan astronomer, who in 1856 published a book entitled *Cosmographic Illustrations of the Divine Comedy*. The second is a distinguished mathematician who cultivated science not for earning a living but for pure love. He left lasting traces in various branches of knowledge, he published a work entitled *The true meaning of a tercet of Dante*. In both works there is the correct explanation of verses 22–24 of chant I of Purgatory.

Saint Robert in stating that the “four stars ne’er seen before save by primal people” (Alighieri 1960, Purgatory I, v24) actually exist and are those of the Southern Cross, also asserts that Dante could have known those stars because he had studied and meditated about the Treaty of Ptolemy, although they were long ago disappeared from the horizon of any place in Italy due to the precession of the equinoxes. But the explanation of Saint Robert was totally ignored, as well as that of Littrow and Ernesto Capocci.

2 Paul de Saint Robert's Scientific Proof

Saint Robert in the conclusion of his memory consolidates the astronomical theories contained in the tercet of Dante with a clear graphical representation, obviously supported by mathematical calculations. The following table is taken from his memorandum; Saint Robert shows the results of his calculations for the declination and adding the complement of the latitude of 45° obtain the height of α Southern Cross and Sirius on the horizon related to a point located at 45° North

latitude (Central Europe), in the period between 13,000 years before Christian era, and 13,000 years after Christian era.

Table 1 Declination and height on the horizon³

Years	Southern Cross α A	Sirius A	Southern Cross α B	Sirius B
– 13000	– 42° 49'	– 61° 39'	+ 2° 11'	– 16° 39'
– 11000	– 35° 9'	– 62° 7'	+ 9° 51'	– 17° 7'
– 9000	– 30° 31'	– 54° 52'	+ 14° 29'	– 9° 52'
– 7000	– 29° 29'	– 44° 12'	+ 15° 31'	+ 0° 48'
– 5000	– 32° 9'	– 33° 24'	+ 12° 51'	+ 11° 36'
– 3000	– 38° 12'	– 24° 17'	+ 6° 48'	+ 20° 43'
– 1000	– 46° 59'	– 18° 13'	– 1° 59'	+ 26° 47'
Christian era	– 52° 7'	– 16° 37'	– 7° 7'	+ 28° 23'
+ 1000	– 57° 2'	– 16° 5'	– 12° 2'	+ 28° 55'
+ 3000	– 68° 6'	– 18° 16'	– 23° 6'	+ 26° 44'
+ 5000	– 75° 58'	– 24° 22'	– 30° 58'	+ 20° 38'
+ 7000	– 72° 38'	– 33° 30'	– 27° 38'	+ 11° 30'
+ 9000	– 62° 26'	– 44° 20'	– 17° 26'	+ 0° 40'
+ 11000	– 51° 33'	– 54° 58'	– 6° 33'	– 9° 58'
+ 13000	– 41° 47'	– 62° 10'	+ 3° 13'	– 17° 10'

Legenda: A = Declination; B = Height on the horizon.

³ Adapted: Saint Robert 1865–1866, I, pp 598–601.

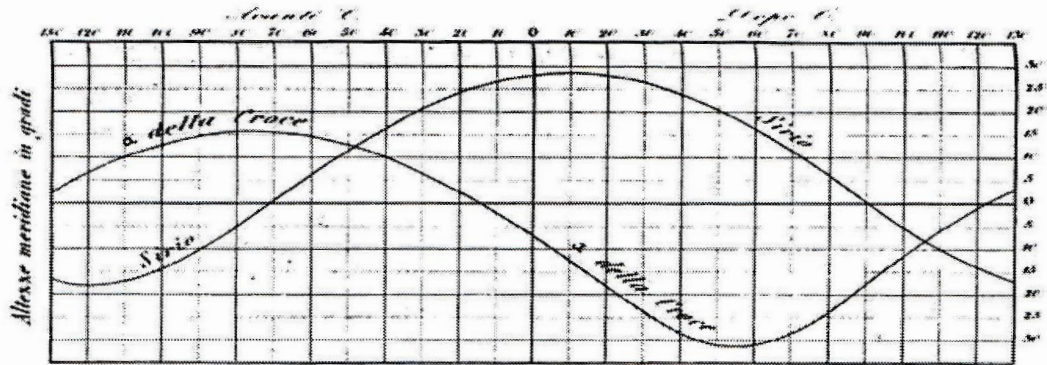


Fig. 1 The position over the centuries of the two stars for 45° north latitude ⁴

From the graph of Saint Robert, it can be inferred that α of the Southern Cross began to be invisible from the “primal people” at a latitude of 45° (Central Europe) 1410 years before the Christian era. It will make itself visible again in the year 12293, and will remain so for 12,062 years before returning invisible for other 13,703 years. The same goes for the star Sirius which nowadays is one of the most beautiful stars in our sky: it will become invisible in the year 9118 and will not reappear on the horizon until after other 9,505 years, thus remaining visible over the centuries for 16,260 years and invisible for 9,505 years.

3 Conclusion

Even today, the verse “ne’er seen before by the primal people” (Alighieri 1960, Purgatory I, v24) is the subject of conflicting discussion and argument among scholars of Dante, but we think that tying the proven and documented knowledge of Dante in the field of astronomy to the mathematical and scientific proof of Saint Robert, there is no reason to interpret in a different way the words of Dante.

⁴ *Ibidem*.

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