

BOOK OF ABSTRACT

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Archaeoastronomy analysis of the Buftea-La Cârna Medieval burial ground in Romania

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keywords: Ingá Stone; archaeoastronomy; Itacoatiara; Science education.

ABSTRACT

The Buftea - *La Cârna/Mănești* site (near Bucharest) is the largest known burial ground from Medieval Wallachia (c. 1400 - c. 1600). The first research was initiated almost half a century ago by Aristide Ștefănescu. Further research was undertaken between 2020-2021, when around 1,000 burials have been investigated. Two contemporary cemeteries (II and III, c. 1400 – c. 1450), were placed about 200 m from each other, and in between another cemetery (I, c. 1520 – c. 1630), surrounding a church. The dating is provided by coins found in some of the graves. If the hiatus of about seven decades between cemeteries II and III on the one hand, and cemetery I on the other hand, can be explained by written sources, a key question still arises: why have two separate and nearby cemeteries (II and III) in use at the same time?

The grave goods are almost the same in both cemeteries. To attempt an answer, we perform an archaeoastronomy analysis using SkyscapeR using a measurement uncertainty of 0.1° . The paper will use 180 graves orientations (170 from II and 10 for III). The longitudinal azimuth axis (defined by a first point at the top of the head and a second one in between the shin legs or foot legs) of each grave was measured with a total station. The total number of graves investigated in each cemetery can only be estimated; the first excavations carried out, in 1980s, were only partially published. The altitude of the horizon was computed using heywhatsthat.com. A key difference between the orientation of the measurements for the two cemeteries is that III has a NE orientation while II covers the entire solar arc. The probability distribution function indicates a tendency to orientate graves towards the positive declinations (Spring and Summer) with 2 focus ranges for III ($3-5^\circ$, $7-9^\circ$) and 3 for II (0° , $3-10^\circ$, 15°). The Sun's $0-15^\circ$ declination interval points to a range spanning approximately 45 days after the Spring Equinox (or before the Autumn Equinox) which could indicate the interval Easter falls in.

Further investigation is required especially in relation to similar burial practices of that period and in relation to cemetery I which was built later around a new church dated $\sim 16^{\text{th}}$ century.

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Astronomical knowledge in medieval planetary diagrams

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keywords: medieval, planetary diagram, history of astronomy

ABSTRACT

Up to the 12th century only a few of the numerous antique works on planetary astronomy were available in Europe. From the 8th century A.D. onwards the knowledge contained in these works was frequently illustrated by diagrams (Eastwood and Graßhoff 2004). They range from purely schematic representations of the ordering of the planetary spheres, to diagrams that provide information about the orbital periods of the planets, about distances to each other or about astronomical or astrological properties of individual planets. Other diagrams link the planetary representations with cardinal points or TO-maps or give quantitative representations of data from the antique texts to elaborate representations of planetary positions.

Interpretation of these diagrams is sometimes complicated: Even if the position of the planets has an astronomical meaning, it still needs to be clarified whether the signs of the zodiac are to be interpreted astronomically or astrologically, whether only the sun is aligned with the signs of the zodiac or also the planets, whether the positions of the planets or the apses are drawn in the diagram, or whether the data originate from calendar calculations or actual observation. In addition, medieval astronomers often displayed different sets of data in one diagram that in later time would have been kept separate. However, a careful analysis of such diagrams in favorable cases makes even possible the determination of the date of the displayed planetary constellation. Hints for interpretation can be found above all in the texts of Pliny (Mayhoff 1906), Beda Venerabilis or Hrabanus Maurus (Migne 1844).

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Orientation of the Church dedicated to San Massimo in Marmora (Cuneo - Italy)

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keywords: astronomical alignment, cultural astronomy, orientation of churches, liturgical architecture

ABSTRACT

The orientation of Christian churches reflects the historically well-documented concepts that one should face east to pray and the architectural and liturgical principle that temples and churches should be built facing east. The church dedicated to San Massimo in Marmora in the province of Cuneo, Italy, shows a face orientation slightly misaligned from this canonical east-west direction, since the profile of the mountains shifts the position of the sun's rising and setting.

Furthermore, the presence of a fresco of Santa Lucia and 2 sundials suggest considerable attention to the determination of time by the builders and local inhabitants. We experimentally measured the alignment of the church with the sunset at the autumn equinox 2023 and the spring equinox 2024.

As these measurements must be refer to the time of the construction of the church, we considered the historical framework of the site. The parish church of San Massimo, which stands in an isolated position surrounded by the cemetery, was remodeled in the 18th century, but retains the bell tower and other elements of the medieval structure. Outside, around the side entrance, a series of frescoes dating back partly to the 14th century and partly to the 15th century can be seen. Inside are other medieval frescoes: among those from the 14th century, an Annunciation, a St. Mary Magdalene, and a haloed warrior on horseback with a crusader shield. It could be San Giorgio, after whom the church was co-titled in 1386. Also in the church, walled up in the right chapel, is a fragment of a Roman arula (1st century AD) depicting a winged Victory.

Dendrochronology was used to verify the foundation dates suggested by the frescoes, which turn out to be around 1350 AD. We then reproduced the equinoctial sunset of 1350 A.D. to determine how accurately the alignment of the church could be used to define the onset of spring and fall at the time of the construction of the house of worship.

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