

Written on stone: Engraved European medieval solar eclipses

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Abstract. In the context of the European Middle Ages as the period roughly covering from the 5th to the 15th centuries, the astronomical records are rarer found in scientific treatises. At least, not until the 15th century. A few surprising examples in which the observations were recorded in a particularly original way on stone are found. In this poster we will shortly review the only four cases in which this occurred in Europe.

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1. Introduction

One of the greatest natural spectacles that can be seen throughout a human life are solar eclipses, especially those in which the star is totally or largely hidden. In times when science was not developed and the only explanation for these phenomena was the will of the gods, these events were often viewed as omens of good or bad fortune, reinforcements of recent decisions, or ominous signs of future happenings. For this reason, numerous records of solar eclipses are found throughout history, from the first and second millennium B.C., up to the present day.

Over the years there have been numerous authors who have studied and compiled records of ancient total and annular solar eclipses (see, for example, [Stephenson F.R. \(1997\)](#)). This has provided a large number of publications that have proven useful for research both from the historical and astronomical point of view. Most of the observations come from the Far East, especially China and Japan. In this case, the observer is usually a professional astronomer who provides relevant data other than the date, such as the duration of the eclipse, the precise place of the observation, the time and even the magnitude.

A smaller number of observations come from European sources, although in these cases, and at least until the middle of the fifteenth century, the records do not usually come from professionals, but are found in narrative sources mixed with historical facts to which they usually provide some kind of reinforcement. The causes of this shortage are very numerous, highlighting the cultural ones, with the generalized loss of knowledge of classical culture that only survived in very limited areas, and the historical vicissitudes that were experienced in these centuries, including the Arab occupation of southwestern Europe and the border tensions both in the East and the West, the fragmentation of the European territory first in two and later in multiple kingdoms and the constant wars between them. Thus, we find in Europe many accounts of solar eclipses but most of them



Figure 1. Engraved fragment found in the ruins of St Nicholas church in Soria (Spain).
CVRAT(us) EST SOL(is) ER(a) MCXXLX(xvii) (in the strip at the bottom).



Figure 2. Inscription B from the portal of the market square of Sos del Rey Católico. It was found upside down due to the successive reconstructions of the portal.

are found in written chronicles, almanacs and diaries. It comes as a surprise the finding of a few of these register engraved on stone. In fact, to our knowledge, only four stone engravings have been found in Europe, three of them corresponding to the well-known AD1239 eclipse and the other to the one in AD1354.

2. Total Eclipse of June 3, 1239

It is very unusual to find records of European eclipses engraved in rock from medieval times. until recently, the only well-known case is the one from Marola recorded by Stephenson for the A.D.1239 solar eclipse (Stephenson F.R. (2008)). But for this eclipse two more records were found in Soria (Spain) recently. See Figure 1 and (Martínez *et al.* 2016). for a further description.

3. Hybrid Solar Eclipse of September 17, 1354

For the AD1354 eclipse a much more remarkable inscription was found in an ashlar stone of the portal of the market square of Sos del Rey Católico (Zaragoza, Spain). In fact, not one but two engravings were found in two different stones. The so called Inscription A states “Anno domini MCCC XXXIX” and possibly relates to the date of construction of the arch. Inscription B (see Figure 2) was hard to read. It is longer and more crudely engraved and the space between the letters and the size of the engraving are irregular. The emblem of Aragon is clearly visible below on the right of the image. The engraving states: Anno domini MCCC: L: IIII XVII die septembris: hora prima: Obscura uit sol. The translation will be: In the first hour (hora prima) of September 17 of the year of Our Lord Jesus Christ, 1354, the sun was darkened. The maximum of the eclipse occurred

around 9 in the morning. The “hora prima” was a canonical hour that corresponded to the first hour after sunrise, which that day occurred around 8 in the morning.

References

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