

# Archaeoastronomy in ancient Helvetia: the Theater, the Temple and the city of Aventicum (Avenches)

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## Abstract

This article presents our discovery of the astronomical orientation of the city of Aventicum, the capital of ancient Roman Helvetia, where the sacred complex formed by the Temple of the Cigognier and the Theater were oriented along the axis that links the sunset of the Summer Solstice and the sunrise of the Winter Solstice. Also the East and West doors of the city were astronomically oriented on the axis that links the sunrise of the Summer Solstice and the sunset of the Winter Solstice.

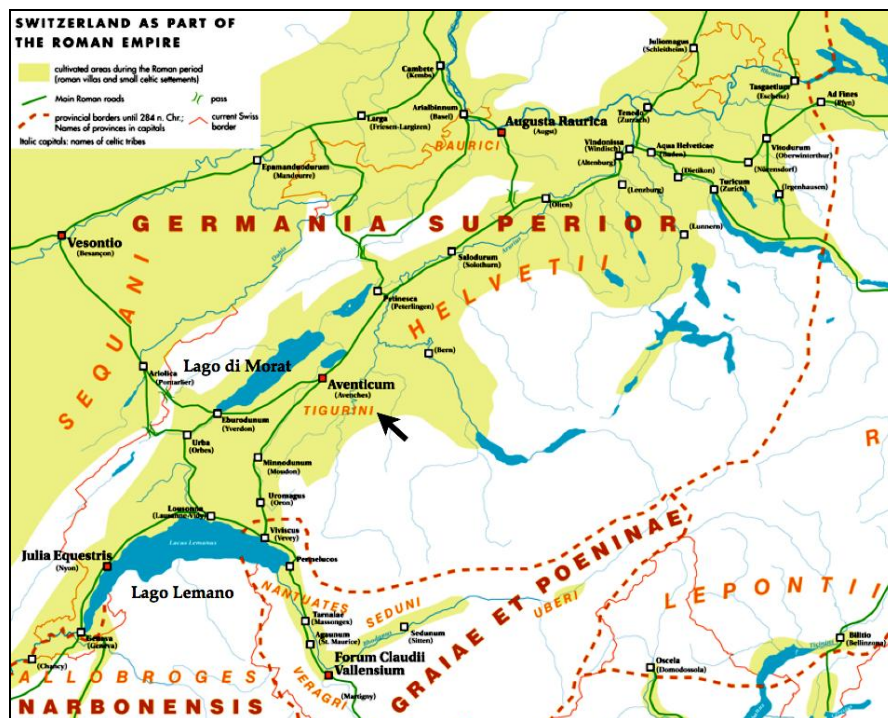
On July 13th, 2017 I had the fortune to visit two extraordinary Roman sites in Switzerland, Avenches and Vallon, together with friend Cristiano Castelletti, a great scholar as well as an excellent journalist of the Swiss-Italian Radio. This article is dedicated to his memory, because unfortunately Cristiano passed away in 2017, leaving a great void for us all.

**Keywords:** Archaeoastronomy, ancient Roman religion, Roman Calendar, Helvetia, Roman Architecture, Avenches or Aventicum, Roman Gaul.

## 1. - A brief history of Aventicum

Julius Caesar defeated the Helvetii in 58 BC at Bibracte, and the conquest of the ancient Helvetia was completed by Drusus and then by Tiberius (de Pury-Gysel,

2011, pp. 8 and 16; Castella, 2015, pp. 9-13). The construction of the city of Aventicum, also known as Forum Tiberii, began in 5-6 AD (de Pury-Gysel, 2011, p. 16). Tacitus called it the capital of the Helvetii (Tac., Hist. 1.68.6). At first it belonged to the Roman province of Gallia Lugdunensis, then to the Gallia Belgica, as its administrative center; the military one was in Vindonissa, today's Windisch, near Zurich (de Pury-Gysel 2011, pp. 9 and 12). The part of Gaul conquered by Julius Caesar was named Gallia Comata, with capital Lugdunum, today's Lyon; at the time of Augustus it was divided into the three provinces of Aquitania, Lugdunensis and Belgica (Sear 2006, p. 98). No material traces of pre-Roman settlements have been found, only burials and materials of La Tène culture, datable between the second century BC and 40 BC (de Pury-Gysel, 2011, pp. 9-12).



**Figure 1.** The Roman *Helvetia* in the *Aventicum* area: with the roads and the boundaries of the various provinces (from Wikipedia, Marco Zanoli<sup>1</sup>).

The site was chosen for its strategic location close to Lake Morat (fig. 1), connected to a fluvial and lacustrine network which reached the North Sea (de Pury-Gysel, 2011, p. 13). Fluvial and maritime transport was in fact preferred to

<sup>1</sup> [https://it.wikipedia.org/wiki/Aventicum#/media/File:Historische\\_Karte\\_CH\\_Rome\\_1.png](https://it.wikipedia.org/wiki/Aventicum#/media/File:Historische_Karte_CH_Rome_1.png) accessed on February 6th, 2019.

land transport, because it was faster, cheaper and more efficient; it is also likely that the Roman roads followed the route of pre-existing Celtic roads.

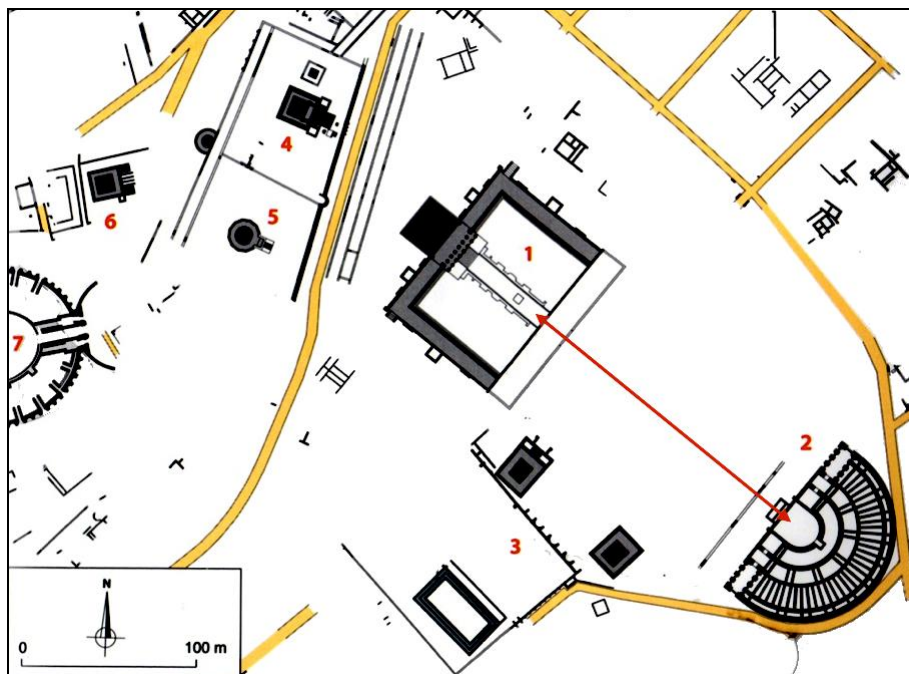
Since there are no written sources, the date of the different building phases of the city is based on the archaeological finds and in particular on dendrochronology, because the area was marshy and all the buildings rested on wooden piling. In the storerooms of the Museum of Avenches there is an incredible quantity of such wooden poles, perfectly preserved thanks to the chemical characteristics of the soil.

The first building phase of the city dates back to 6-7 AD, while its road grid is of the Tiberian period: it is angled 45° from the east-west axis, and had a series of regular insulae (probably 36 or 42 in number), with a Forum, a sacred area, a Basilica and a Curia, and a nearby thermal building (de Pury-Gysel, 2011, pp. 9, 13, 16, 27; Castella, 2015, pp. 9-13). A series of statues portraying members of Julio-Claudian imperial family proves the presence of the Imperial cult in the city: Agrippina major portrayed as Fortune, the Divus Augustus, Claudia Livilla and Drusus minor, whom Tiberius originally designated as his successor. It is thought that the statues were made after the *Senatus Consultum* of 19 AD, passed after the death of Germanicus, which ordered the erection of monuments in honor of the deceased members of the dynasty, who were granted the Imperial cult (de Pury-Gysel, 2011, p. 27).

The year 69 AD – with the dispute between Galba, Otho and Vitellius for the succession to emperor Nero – was a critical moment in the history of Aventicum, because it sided with Galba, while the Roman army of the Rhine (Legio XXI Rapax of Vindonissa) sided with Vitellius. After the Roman victory of Bözberg, the whole area was sacked and the small settlements and the villages were razed to the ground. Aventicum avoided the destruction offering its surrender, and after that some of the members of the ruling class of the city remained celts, an example of local aristocracy associated with the imperial power (Castella, 2015, pp. 9-13).

Emperor Vespasian (69-79 AD) was a great benefactor of the city, perhaps because his father lived there together with his nephew and future emperor Titus; Suetonius refers that Flavius Sabinus – the father of Vespasian – had been a banker

in Aventicum (Castella, 2015, p. 31). In 71-72 AD Aventicum became Colonia Pia Flavia Constans Emerita Helvetiorum Foederata, and under Domitian it passed to the province of Germania Superior (de Pury-Gysel, 2011, pp. 16 and 39-40; Castella, 2015, pp. 9-13). In that period great public works were started: first of all the city walls were built, with 73 watch towers and a moat. Then a new thermal plant was built near the Forum, and an ambitious building project was set up: the construction of the new sacred complex formed by the Temple of the Cigognier and the Theater, the construction of the temple of Grange de Dîmes and of the palace (or temple?) called Derriere la Tour, and finally the construction of the great Amphitheater (de Pury-Gysel, 2011, p. 38; Castella, 2015, p. 47). All these buildings were completed during the reign of Trajan. In the hadrianic period a navigable waterway was dug, to connect the city to the Lake of Morat. Several private houses were enriched with new thermal plants and luxury decoration, evidence of the prosperity of the city (fig. 2).



**Figure 2.** Plan of the sacred area of *Aventicum*. The Temple of Cigognier (1) and the Theater (2) are aligned along the same axis. The Temple-Theater complex suggests that sacred processions and representations took place there. Not far away is the Amphitheater (7) and the temples of Grange des Dîmes (5) and Derrière La Tour (6) (Castella, 2015, fig. 60).

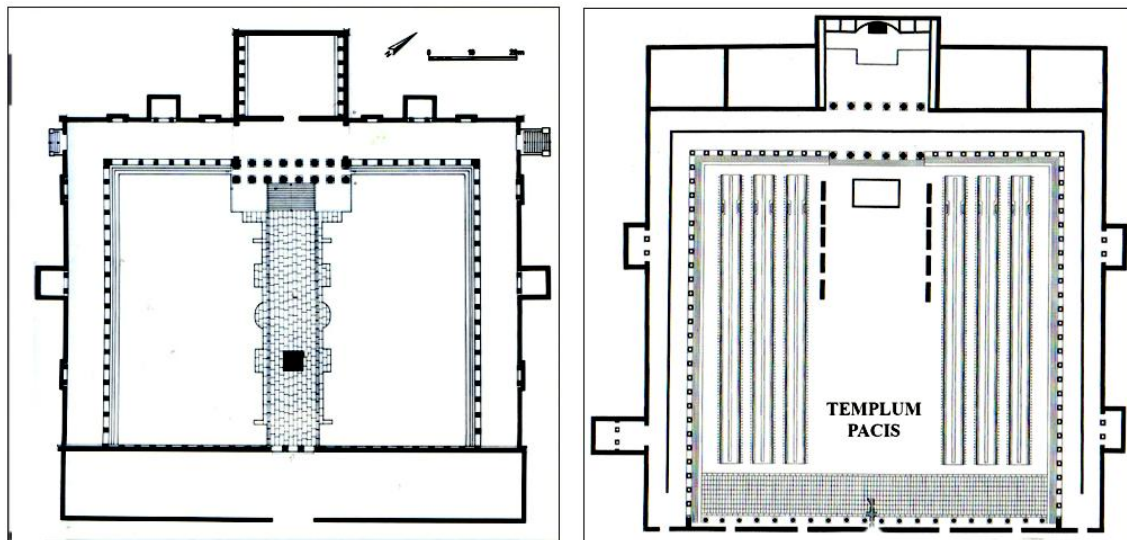
Unfortunately the decadence of Aventicum began in 275 AD, with the sacking of the Alamanni; in the VI century AD the city was definitively abandoned. The new medieval town was built higher up on the hill located west of the ancient Roman city, since a town on a hill is better defensible; and probably because the lowland area had once again become marshy due to the lack of adequate maintenance of the Roman water and sewage system.

## **2. - The astronomical orientation of the Temple/Theater complex**

As mentioned above, at the end of the first century AD a new monumental complex was built in the south-eastern part of the city, consisting of the Temple of the Cigognier and the Theater. One of the authors of this article, Marina De Franceschini, visited the archaeological area with Cristiano Castelletti and Marie-France Meylan Krause – director of the small but beautiful Museum of Avenches, located in a medieval tower built with stones coming from the amphitheater and other Roman buildings. They explained that the two buildings were aligned along the same axis, and that ritual processions were probably going from one to the other. Marina De Franceschini recalled that often the sanctuaries of Isis were located near a theater which was the point of arrival of the processions, and sacred ritual representations in honor of the goddess were performed there (Beaurin, 2013, pp. 34-35 and 76). Then she wondered if the two buildings of Avenches were astronomically oriented (fig. 2).

### **2.1 - The Temple of the Cigognier**

Its plan is very similar to that of the *Templum Pacis* at Rome, built by Vespasian to celebrate the return of peace after the turbulent years of the succession of Nero. (fig. 3). For this reason it is generally believed that the project was designed during the reign of Vespasian, but that the construction began during the reign of Titus and ended under Domitian or Trajan, since the wooden poles of the foundations date back to 98 AD (Bögli, 2001, pp. 21-29; de Pury-Gysel, 2012, p. 259; Castella, 2015, p. 58).



**Figure 3.** Plan of the Temple of Cigognier compared to the *Templum Pacis*<sup>2</sup> of Rome, built by the Emperor Vespasian (from Bögli, 2001, fig. 22).

The building had a large squared courtyard surrounded by a portico, in the center of which stood the monumental façade of the Temple, preceded by a paved walkway (fig. 4).



**Figure 4.** Reconstruction of the Temple of Cigognier with the large portico and paved walkway. The star indicates the position of the only surviving column (Castella, 2015, fig. 77).

<sup>2</sup> <http://marcograzozzi.blogspot.com/2014/07/templum-pacis.html>

Today only one corner column of the pediment remains, on top of which once nested the storks (cigognes in French), hence the name “Cigognier“ (fig. 5).



**Figure 5.** Temple of Cigognier, aerial view: the star indicates the only remaining column, with part of the podium and in front of the paved walkway in axis with the Theater (Castella, 2015, fig. 26).

We do not know the name of the gods to whom the temple was dedicated, and there is no evidence (sculptures or other finds) to identify them. Only an inscription with dedication to a local deity very important for the Helvetii – Mars Caturix – has been found; but scholars believe that the temple was not dedicated to him but to the Imperial cult, as was also hypothesized for the Templum Pacis of Rome (Bögli, 2001, p. 29; de Pury-Gysel, 2012, p. 265). In Gaul several theaters were connected to sanctuaries dedicated to the Imperial cult, as at Nîmes, Arles and St. Remy; they were built for ceremonies and rituals which were quite different from those of Italy or of the Gallia Narbonensis (Sear, 2006, pp. 98, 96).

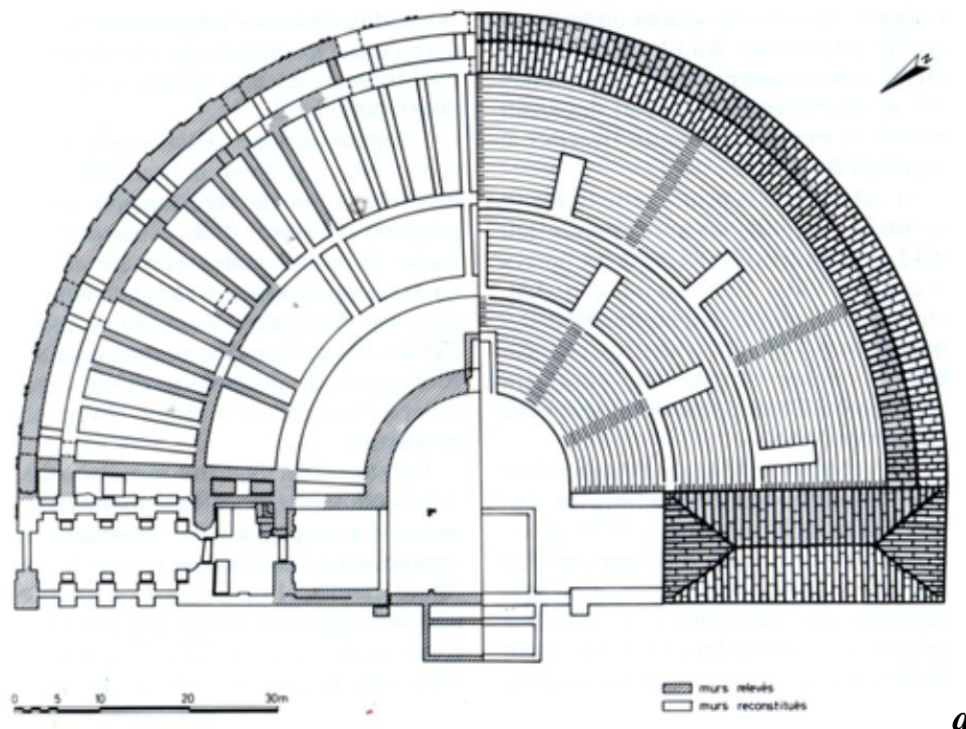
## 2.2 - The Theater

Built together with the Temple of the Cigognier, it was almost completely destroyed because its stones were stolen and re-used as a building material until the end of the nineteenth century (fig. 6). The steps of the cavea were almost

completely removed, but part of the orchestra is still in place, and at its center there is a small shrine (Sear, 2006, pp. 216-217).

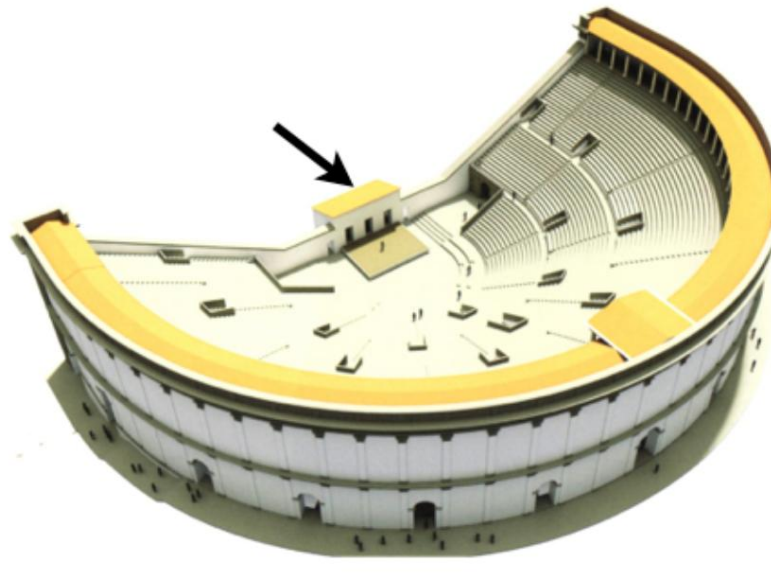


**Figure 6.** View of the theater with the cavea, the orchestra and the scaena frons. In the background the only standing column of the Temple of Cignol, indicated by the asterisk<sup>3</sup>.



<sup>3</sup> using <https://www.tdg.ch/suisse/cure-jouvence-thetre-romain/story/23431296>





**Figure 7.** Theater, with the lowered scaena frons (asterisk) which allowed the view towards the Temple of Cigognier: *a* – plan, *b* – reconstruction (Castella, 2015, fig. 90, 92).

Sitting in the cavea it was possible to see the façade of the Temple of the Cigognier, because the scaena frons was not multi-storey – as usually was in ancient theaters – and had a reduced height and a central opening to allow the view of the Temple (Sear, 2006, p. 217) (fig. 7).

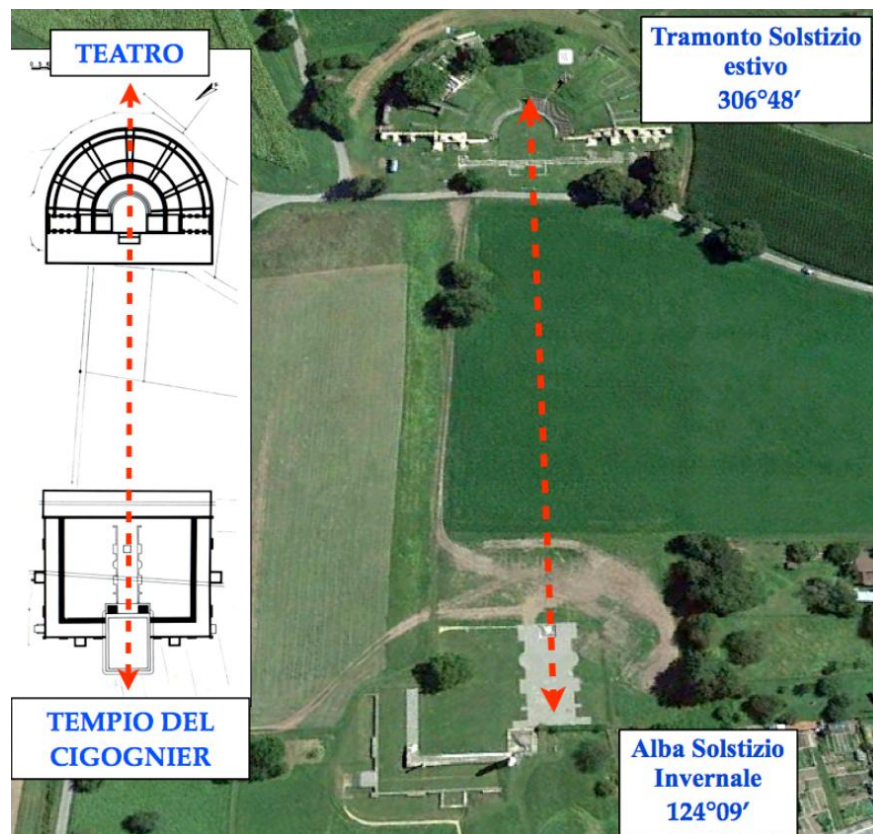
### 2.3 - The astronomical orientation of the complex and its symbolic meaning

The axis that links the Temple of the Cigognier with the Theater is oriented to  $124^\circ$ , measured with the compass, corrected according to the magnetic declination of the day or the survey (July 7th, 2017) which in Avenches was  $+2^\circ 0'$  East (data from noaa.gov website).

This value ( $124^\circ$ ) is close to the azimuth of the sun ( $122^\circ$ ) at sunrise of Summer Solstice at the latitude of Rome ( $41^\circ 54' 39''$ N, while in Avenches is  $46^\circ 52' 48''$ N). Other measurements made with Google Earth confirmed the data, with a  $124^\circ/306^\circ$  orientation perfectly matching the azimuth of the sunrise of the Winter Solstice ( $124^\circ 24'$ ) and of the sunset of the Summer Solstice ( $306^\circ 48'$ ), as calculated by Giuseppe Veneziano (fig. 8).

AVENCHES	Azimuth of the Sun	Azimuth of Temple and Theater complex
SUNRISE Winter Solstice	124°09' (124,15°)	124°
SUNSET Summer Solstice	305°35' (305,58°)	304°
		Azimuth of the East and West Gates
SUNRISE Summer Solstice	54°25' (54,42°)	53°
SUNSET Winter Solstice	235°51' (235,85°)	233°

**Figure 8.** Table with the azimuth of the sun in the days of the Solstices compared to the orientation of the buildings in *Aventicum*: Temple of Cigognier, Theater, East and West Gates (Calculations and table by Giuseppe Veneziano).



**Figure 9.** Astronomical orientation and azimuth of the Temple-Theater complex of Aventicum (from Bögli, 2001, fig. 4 and satellite picture photo from Google Earth).

This means that at the sunrise of the Winter Solstice (about December 21st) an observer standing in the courtyard of the Temple of Cigognier could watch the sun rise behind the Theater. While six months later, at the Summer Solstice (about June 21st), the spectators sitting in the cavea of the Theater could see the sun set behind the Temple; this was possible because – as we said before – the scaena frons was very low and allowed the view towards the Temple (fig. 7; fig. 9).

Since we do not know to which divinity the Temple of the Cigognier was dedicated, there is no evidence for a better understanding of the symbolic and religious meaning of its orientation. However, orientations towards the Solstices are obviously connected with the solar symbology, which in turn is linked to the Imperial cult, since the sun was the symbol of divinity and immortality of the Emperor, who after death was portrayed as Sol Invictus. Starting from Augustus, the Imperial cult was spreaded in all new Roman provinces in Europe, as a unifying religious element common to all new Roman cities, especially in the provincial capitals; it facilitated the social ascent and the integration of provincial aristocracies and other social groups such as freedmen into the “Roman way of life” (Garriguet Mata 2017, pp. 271-272).



**Figure 10.** Gold bust of Emperor Marcus Aurelius found in *Aventicum*<sup>4</sup>.

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<sup>4</sup> <http://www.delafee.com/History+of+Gold/> (accessed on 10.01.2019)

The beautiful gold bust of emperor Marcus Aurelius found at Avenches (fig. 10) seems to confirm this hypothesis, because gold is a solar and divine symbol. And the discovery of two different groups of statues portraying members of the Imperial families, proves the presence of the Imperial cult in the city (de Pury-Gysel, 2011, p. 27). One of the statues represents Agrippina major as Fortuna, an iconography that links her to the feast of Fors Fortuna, which was celebrated by the Romans during the days of the Summer Solstice and had a symbolic meaning linked to the Seasons and the Time, such as the Saturnalia, which were celebrated on Winter Solstice (De Franceschini, Veneziano, 2011, pp. 160-168).

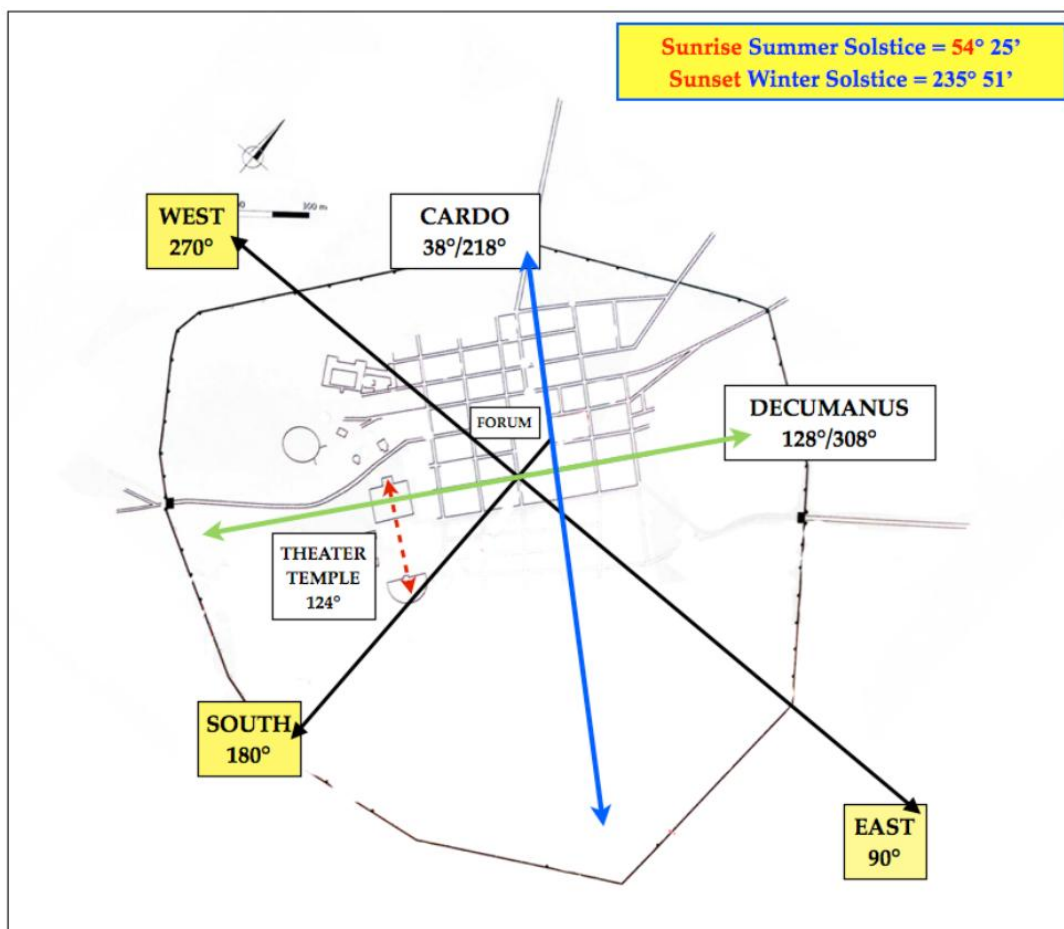
A local deity can also be linked to the sun: it is the god Belenus (or Belanus), a proto-celtic deity of light, sun and fire, who was called the "resplendent god", because of his healing powers associated to the light of the sun. In Roman times the god Belenus was identified with Apollo, as happened for example in the Roman sanctuary of Sainte Sabine (in Burgundy), where Apollo was associated with Belenus, and numerous ex-voto thanked the god for healing.

The festival of Belenus was celebrated on May 1st, when large bonfires were lit on to 'encourage the heat of the sun' which promoted the crop growth, and protected livestock from disease. Several buildings dedicated to that same deity were found in England: they were oriented precisely towards the dawn of May 1st. An Internet website says that there were celebrations in honor of the god Belenus also during the Summer Solstice, but no other data confirming this information is provided.

### **3. - The astronomical orientation of the city of Aventicum**

As already mentioned, the Roman city of Aventicum had several building phases, which began in the Augustan and Tiberian age with the construction of the road grid and of the Forum; the city walls date back to the Flavian period, while the Temple of the Cigognier, the Theater, the Amphitheater and the new thermal plants were designed in that same period, but were completed during the reign of Domitian or Trajan (de Pury-Gysel, 2011, pp. 17, 25-27 and 38).

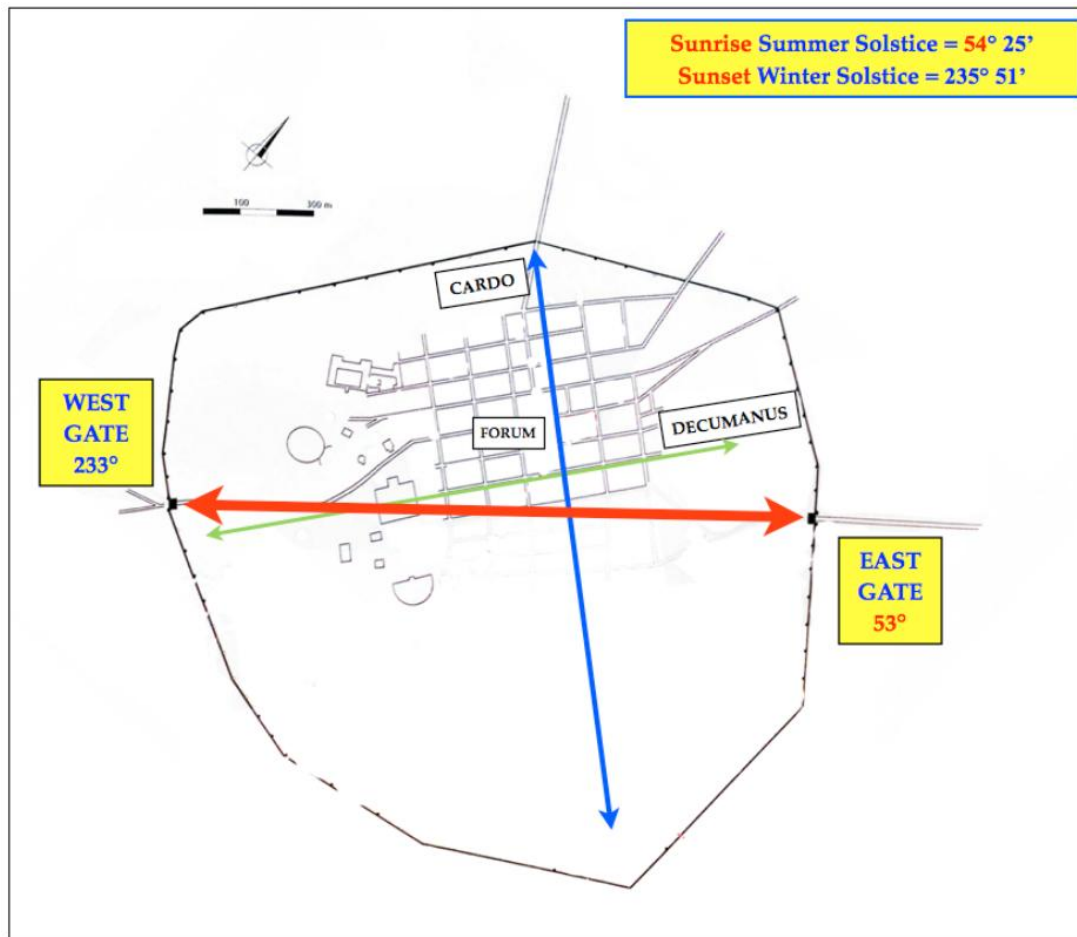
After discovering that the Temple-Theater complex was astronomically oriented, we wondered if also the city was oriented. Therefore we calculated the azimuths of its road grid and compared them with those of the sun in the days of the two Solstices (fig. 8). The calculations of Giuseppe Veneziano proved that the road axes of the Tiberian road grid were not astronomically oriented. The vertical axis (Cardo) is in fact oriented  $38^{\circ}/218^{\circ}$  while the horizontal axis (Decumanus) is oriented  $128^{\circ}/308^{\circ}$ , values that are quite different from those of the Solstices: at dawn of the Summer Solstice the sun has in fact an azimuth of  $54^{\circ}21'$ , and at sunset of the winter Solstice  $235^{\circ}51'$  (fig. 11).



**Figure 11.** *Aventicum*: map of the city with the road grid built during the Tiberian period and relative orientations of the Cardo and Decumanus (Elaboration of map from de Pury Geysel 2011, fig. 22).

However, the city walls (which had at least four gates) were built later than the road grid, in the Flavian period. We noticed that the road axis connecting the East and West gates is located south of the road grid, and had a completely different

orientation:  $53^\circ/233^\circ$ . Its azimuths are quite close to those of the sunrise of the Summer Solstice ( $54^\circ 25'$ ) and the sunset of the Winter Solstice ( $235^\circ 51'$ ) (fig. 12).



**Figure 12.** The road axis that joins the East and West Gates of *Aventicum* has a different orientation from that of the urban grid, which was older. The azimuths are close to those of the sunrise of the Summer Solstice and of the sunset of the Winter Solstice (Elaboration of map from de Pury Geysel 2011, fig. 22).

Similarly, recent study by Gonzales-Garcia states only in general terms that the orientation of *Aventicum* «could be related to the Solstices, with dates closer to Winter Solstice» (Gonzales, Garcia, 2018, pp. 405 and 408).

The East gate of *Aventicum* was excavated and studied better than the West one: its elevation is largely preserved and it has a circular space within the wall (similar to that of the city Gate of the harbor of Frejus in France – de Pury-Gysel, 2011, p. 38). Also the West gate of *Aventicum* has been identified, but it is hidden and surrounded by modern buildings.

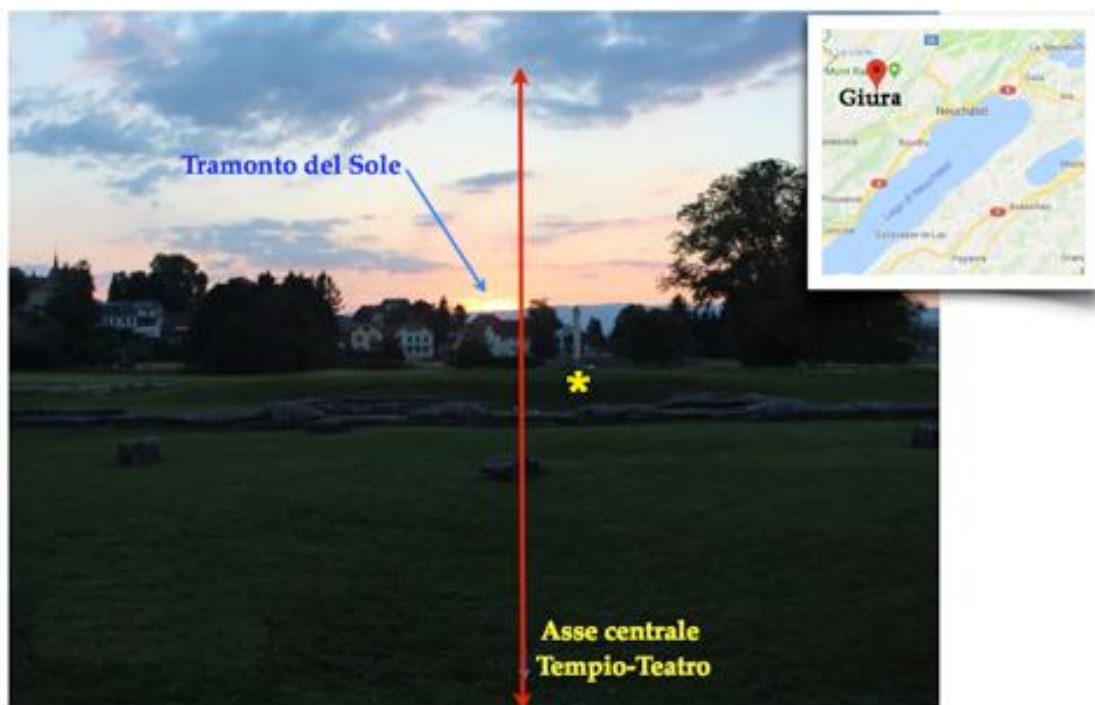
#### 4. - On-site data verification on the Summer Solstice

On the days of the Summer Solstice (20-21 June 2018) we checked our archaeoastronomical hypotheses on-site, to answer the following questions:

**A** - Was the Temple/Theater complex oriented towards the sunset of the Summer Solstice?

**B** - Was the East gate of the city oriented towards the sunrise of the Summer Solstice?

**A** - At sunset of the Summer Solstice (June 20th, 2018, 9:23 pm) sitting in the center of the cavea of the Theater we saw that the sun did not set in correspondence with the central axis of the Temple of the Cigognier (as we had thought), because the Jura mountains hide the horizon and the sun sets ahead of time, and more on the left. (fig. 13).



**Figure 13.** *Aventicum*, Summer Solstice of June 20th, 2018, seen from the cavea of the Theater. At 9:19 pm the sun does not set behind the axis of the Temple of Cigognier, because on the horizon the Jura mountains (box) hide the view and make it set before, more to the left. The yellow asterisk shows the only remaining column of the Temple (elaboration of photo by Marina De Franceschini, June 20th, 2018).

Further calculations made by Mario Codebò proved that the difference between the azimuth of the sunset in the first century AD and that of today – due to the decreasing in the declination of the sun – is 24', so at that time the sun was setting a little bit more to the right than today.

The photo taken on June 20th, 2018 at 9:18 pm (ie at 7:18 pm of Greenwich) gives a height of + 0°48'12" and an azimuth of 304° 32'09.06". Therefore the height of the Jura mountains in front is about 48'. On June 21st, 2018 (Summer Solstice) the sun set with a height of + 0°48'15" and an azimuth of 304°32'10.33". In the first century AD the sun had a slightly different position: on June 24th, 69 AD it set with a height of + 0°48'11" and an azimuth of 304° 57'01.30"; on June 24th, 98 AD it set with a height of + 0°48'14" and an azimuth of 304°56'09". So the difference between the azimuth of the sunset today and in the first century AD is about 24', while the height of 48' remains the same.

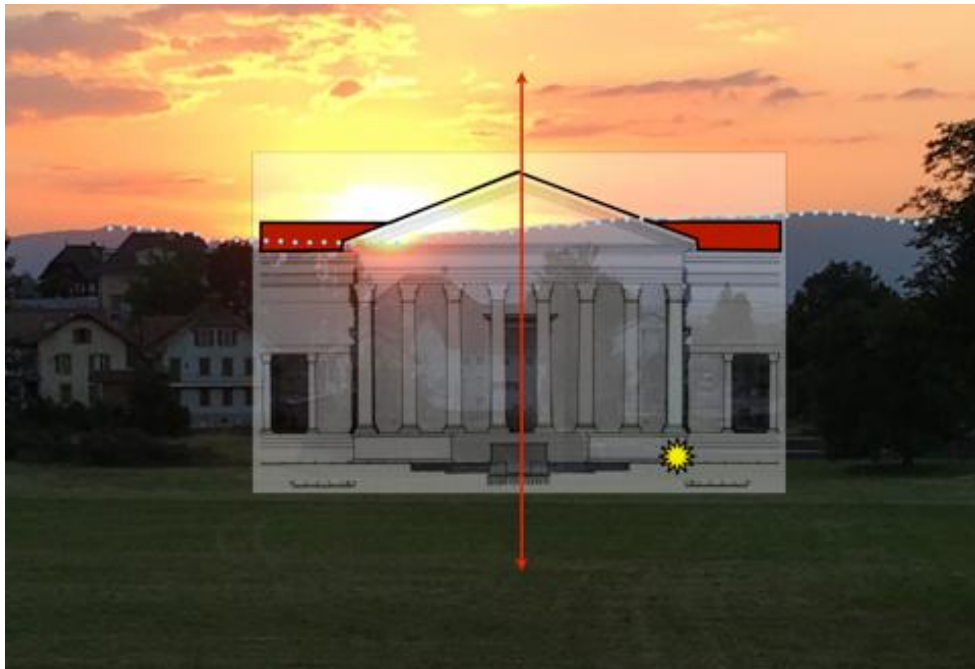
But even considering this correction, the sun would not set behind the central axis, so it seemed that the astronomical orientation was not confirmed by on-site observations.

These on-site observations, however, are related to the present state of the monument, which is razed to the ground; things change a lot if we reconstruct what was visible in Roman times. Giuseppe Veneziano rightly thought that – when it was still standing – the Temple of the Cigognier could be higher than the Jura mountains. With a photomontage we superimposed the silhouette of the pediment of the Temple to the only column still standing in the corner of the pediment, which is fully preserved with the capital. In this way we reconstructed the overall dimensions and appearance of the Temple in antiquity, including the roof of the portico which surrounded the large courtyard (fig. 4).

Thanks to the photomontage (fig. 14) we discovered that in the days of the Summer Solstice the sun actually set behind the Temple of the Cigognier, but in a different position, which again did not coincide with the axial and central one as we had imagined. The sun was instead setting behind the left side of the pediment, where it joined with the roof of the porch. The decision to build the Temple so that



the sun was setting in that point solved the problem of the Jura mountains hiding the horizon also at that time, and obtained the luminous phenomenon they wanted to see.



**Figure 14.** Reconstructive photomontage of the Temple of the Cigognier at the sunset of the Summer Solstice. The sun sets behind the pediment where it joins with the roof of the porch. The dots indicate the skyline with the Jura mountains, which prevented the sun from setting behind the central axis of the Temple. The yellow asterisk shows the position of the only column of the building still standing, to which we have superimposed the reconstruction of the façade of the Temple (photo and elaboration of Marina De Franceschini, June 20th, 2018).

**B -** At dawn of the Summer Solstice (June 21, 2018, at 5:21) we chose as an observation point one of the small towers on the side of the East gate, to avoid a large tree obstructing the view below (fig. 15). Unfortunately at 5:21 am the haze and the clouds were hiding the sun, that was visible only at 5:55 am. Giuseppe Veneziano's calculations – based on the position, time and date of the photography – confirmed that the East gate was astronomically oriented towards the sunrise of the Summer Solstice, as we had hypothesized (fig. 16).



**Figure 15.** The East Gate of the city walls of *Aventicum* in its present state (photo by Marina De Franceschini, June 20th, 2018).



**Figure 16.** East Gate of *Aventicum* at sunrise of the Summer Solstice, June 21st, 2018. The sun rises later, at 5:55 am, due to the clouds; but the azimuth calculation confirmed that the Gate was oriented towards the sunrise of the Summer Solstice (photo by Marina De Franceschini, June 21st, 2018).

## 5. Conclusions

Our study shows how important it is to verify the hypotheses of archaeo-astronomical orientation on the spot and in the set date, because compass and Google Earth are not always reliable without proper corrections.

A - In the case of the Temple/Theater complex, our hypothesis was that in the days of Summer Solstice the spectators sitting in the Theater would see the sun set behind the top corner of the pediment of Temple of the Cigognier, aligned on the same axis which connected Temple and Theater.

On site observation to test this data were made during the days of Summer Solstice in June 2018, sitting in the Theater at its center. They showed that the sun could not set behind the central axis connecting Temple and Theater because the Jura mountains made it disappear earlier, more on the left (as shown in fig. 13).

Therefore we reconstructed the silhouette of the Temple with a photomontage, and considered two different data: the first is the decreasing in the declination of the sun from 98 AD to today, which is 24'. The second is the date and the time when the picture was taken (fig. 13). So we made new calculations and discovered that when the Temple was still standing the sun was actually setting behind the Temple on Summer Solstice, but it was not setting in alignment with the central axis as we had expected: it disappeared behind the left side of its pediment, where the roof of the portico was attached (fig. 14). In this way the 'natural' obstacle of the mountains was 'bypassed' still obtaining the required light phenomenon: the sun setting behind the temple.

Thanks to the photomontage we understood that the luminous phenomenon could be observed also by the "VIP" spectators of the Theater, the high ranking members of local or Roman Celtic elites, who were sitting in the first and lower rows of the cavea: the pediment of the Temple was high enough to be visible behind the scaena frons of reduced height, as reconstructed by the archaeologists (see above fig. 7).

B - About the orientation of the city gates, our hypothesis was that in the days of Summer Solstice the Sun was rising in axis with the East gate, but the calculations

made by Giuseppe Veneziano showed that there was a difference of  $1^{\circ}25'$  between the azimuth of the East gate ( $53^{\circ}$ ) and of the sunrise ( $54^{\circ}25'$ ).

Our observation of the spot and data coming from the time and date of the picture (fig. 16) proved that the Sun was illuminating along their axis the ancient Roman road and the East gate which were both about 6 meters wide. Therefore the width of the Gate was compensating the difference of about  $1^{\circ}$ , and our hypothesis was correct.

It is of great importance to visualize the light phenomena from a well-defined observation point, which must be an artificial structure built in ancient times, a building or even a rocky platform re-worked by men. It is so easy to find the 'right spot' from which the sun can be seen rising or setting in the desired position: but if that spot is not an ancient observation point, the photographic image alone (even if of great effect) can't be considered scientific evidence.

In the city of Aventicum the Romans planned a double astronomical orientation, corresponding to the two astronomical couplets of the Solstices: the Winter sunrise and the Summer sunset for the Temple/Theater complex; and vice versa, the Summer sunrise and the Winter sunset for the East and West gates of the city.

The astronomical orientation of megalithic structures existed already in prehistoric times, and served to know and accurately calculate the seasonal cycles for agricultural purposes. The two Solstices were the key-dates most frequently chosen for the orientation, since it was quite easy to identify the precise sunrise or sunset points, beyond which the sun never went. In the case of the Equinoxes, since the sun quickly moved its points of sunrise and sunset on the horizon, it was more difficult to grasp the two equinoctial moments with the simple observation, and to identify the east and west points with precision.

The solstitial orientation soon assumed a 'sacred and symbolic' character, linked to the dualism between Light & Darkness or between Life & Death, which corresponded to the apparent death of Nature in winter and to its maximum blooming in the summer. The luminous phenomena created by the buildings oriented towards the Solstices were a 'sacred signal' (hierophany) sent by the gods,

who manifested themselves with the Light. This ‘sign’ was used to measure Time and to verify the accuracy of the Calendar, and only after that checking it was possible to set the dates of the ritual ceremonies, which had to be celebrated in the right day and at the right time to be favorably accepted by the gods, in order to propitiate a good harvest and to avert the famines.

The Imperial cult was linked to the Sun and therefore to the Solstices, as confirmed by the discovery in Aventicum of the statue of Agrippina major portrayed as Fortuna, mentioned above: the ancient goddess Fors Fortuna was honored in the days of the Summer Solstice. The luminous phenomena that occurred in the Temple of the Cigognier on that same date seem to confirm the hypothesis that the Temple/Theater complex was dedicated to the Imperial cult, which was the unifying religious element of the new Roman Provinces in early imperial times.

In the case of Gaul – and in general of the Celtic area – it is known that the Roman deities gradually flanked and overlapped the ancient local ones: for example, the Celtic god Belenus was identified with Apollo. In this way the two worlds and the two cultures coexisted after the Roman conquest: their cults and religious symbols coincided in part, but not entirely. In fact, according to Horne «while the cult may have accepted a new Roman name for its divinity, fully utilizing the positive aspects of Roman material culture, the practices of worship during the Roman period could differ very little, compared to the period prior to the Roman conquest» (Horne, 1986, p. 23). Therefore under the Roman rule only the religious form changed – the outer appearance of the cult – but not its inner substance, as seems to prove the construction of temples that Horne called Romano-Celtic. On the outside they had a Roman form with a monumental façade, but inside they preserved the substance of the Celtic temple structure (Horne, 1986, pp. 20-22). Gonzales-Garcia wrote that «the local cults were somehow incorporated and the sacred directions were considered», and that «the different orientation in Roman and Gallo-roman sacred buildings may be a witness to a

period when a compromise, negotiation or resistance took place between conquered and conquerors» (Gonzales, Garcia, 2018, pp. 408-409).

Aventicum proves that the Romans built astronomically oriented cities and buildings also in the provinces, spreading in the Empire a very ancient (and secret) wisdom that in Italy was inherited from the Etruscan world, as proves for example the Tomba Ildebranda at Sovana (Grosseto, Italy), oriented towards the sunrise and the sunset of the Winter Solstice (De Franceschini, Veneziano, 2011, pp. 191-193). We can not exclude that the city was also a meeting point between orientations related to Roman cults and other ones related to ancient Celtic deities and their constellations, as evidenced by the recent study<sup>5</sup> by Giuseppe Veneziano and Piero Barale on the orientation of Augusta Taurinorum (Turin, Italy).

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