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ROMAN OR GAULIC: ORIENTATION AS A FOOTPRINT OF CULTURAL IDENTITY?

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ABSTRACT

The towns of *Aventicum* (Avenches, Switzerland) and *Augusta Raurica* (Augst, Switzerland) were the main Roman towns of the *Civitas Helvetiorum* in the province of *Gallia Belgica* (and later shifted to *Germania Superior*). Both were probably founded *ex-nihilo*, the first at the time of Claudius (mid first century AD), the second by Caius Munatius Plancus around 44 BC and was refounded soon after the 15 BC. The layout of both towns conforms to all Roman standards with an urban grid in orthogonal shape and with several public buildings to hail the splendor of Roman society. Also the orientation of such grid seems to conform to most Roman standards. The archaeoastronomical study of both towns is contextualised following two paths. Firstly, we consider the orientation of the layout of some other regional Roman foundations as *Vesontio* (Besançon, France), *Iulia Equestris* (Nyon, Switzerland), *Forum Claudii* (Martigny, Switzerland), and *Vindonissa* (Windisch, Switzerland).

Secondly, we realize that the sacred areas (including temples, sanctuaries and often theaters) of this two towns seem to break the general layout in both of them: these appear to bear orientations skewed several degrees with respect to the general grid. In both cases a Roman theater seems to feature some kind of relation with the temple as in other areas in the Roman Empire. Notably, the orientation of these temples share similarities to other sacred precincts in the region possibly built prior to the Roman conquest.

This duality in orientations, with a grid with an orientation different to that of some of the main public buildings may be a witness to a period when a compromise, negotiation, or resistance either implicit or explicit, took place between conquered and conquerors. Interestingly, similar cases have recently been reported in the Roman towns of *Augusta Treverorum* (present day Trier, Germany) or *Augustodum* (modern day Autun, France).

KEYWORDS: *Orientation; Archaeoastronomy; Roman Towns; Switzerland; Augusta Raurica; Aventicum.*

1. INTRODUCTION

Tilley (1996) indicates that places are centres of bodily activity, human significance and emotional attachment with significant meaning for persons, while space, being more abstract and wide, is therefore composed of places that create landscapes. In this sense, he distinguishes the architectural space as the deliberate creation of space linked with what he defines as existential space, or the space constructed by the society and its social relations. In those social relations, it is important where the social interaction takes place, and therefore place is not neutral but bears a load of value and power with it defined by such society. In this sense both space but also time form part of, and must be understood from, the social practices. For Tilley a place acquires part of its sense by moving towards it in the right direction.

Such space concept interestingly applies to where monuments are located in the landscape and how they relate to their environment, how they are observed, where are they facing to, their orientation. Once we find that the orientation and location of the monument are important in the Roman worldview, we could visualize that they could also express that movement, perhaps by their location within space. One can therefore generalize Tilley's concept by advocating that such monument must also be 'moving' towards the 'right' (socially prescribed) direction. The study of such must be the purpose of Cultural Astronomy and Archaeoastronomy as a result.

In this sense, a direction, for a monument, or for the movement to approach a place has a concrete social meaning, and therefore, we can argue that the orientation of a monument includes valuable social information.

The orientation of Roman monuments is commonly thought to relate to that of the whole Roman town, although there are cases of orientations and light effects within buildings that seem to indicate a particular use to highlight the cosmic sanction of the Imperial ruler (see e.g. Hannah, Magli 2011).

Roman towns are characterized by the presence of an orthogonal urban grid, although such orthogonality is often broken when new parts of the city had to be rebuilt or when local topography imposed a twist to accommodate to it (Romano 2003). In spite of this, Roman towns generally present a net of perpendicular streets, a town grid, with the *Cardo Maximo* and *Decumanus Maximo* being the principal ones. According to the prescriptions of the Roman land surveyors (*agrimensores*; see Campbell 2000) these axes should be directed, at least symbolically, towards the cardinal directions (Frontinus, *de limitibus*: 8.30–33, 10.27–28; Hyginus (2) *constitutio*: 134.6–14; Campbell 2000). Despite the prescriptions by the *agrimensores* them-

selves and by Vitruvius, indicating several methods to obtain the correct symbolic orientation, astronomy seems to have played a significant role in the orientation of Roman towns. In fact, Frontinus (*de limitibus*: 10.29–31; Campbell 2000) criticizes that 'many [land surveyors] have followed the variable rising and setting of the sun...'. Thus, in several instances we must expect that the orientation of the towns relates to sunrise or sunset. However, also Hyginus and Frontinus agree with Vitruvius that the theoretical way to obtain the directions for the main streets is by finding the cardinal directions.

In view of the above notices, if the layout of a new Roman town was obtained by observing the sunrise on a given day, its orientation could provide a handle on the foundation date. This approach was used by early researchers such as Hans Stohler for *Augusta Raurica* (Stohler 1939) or Audin (1949) for Lyon. Le Gall (1975) dismissed such approach indicating that it was quite naïf and prone to include many important errors. However, recent works have challenged Le Gall's view and in the last decade there has been mounting efforts to elucidate if the orientation of Roman towns could be a valuable source of information to the Roman historian.

In this sense, Rodríguez-Antón (2017) studied the orientation of 76 Roman towns in the Iberian Peninsula, finding that the orientation of such group of towns is not randomly distributed, but it does not follow the cardinal directions either. Contrary, there seem to be some concentrations towards particularly significant dates. Something similar was previously found for Italy and other parts of the Empire (see González-García, Magli 2015 for a recent review). González-García et al. (2018) investigate the orientation of 64 towns founded at the time of Augustus finding an even clearer indication that the orientation of these towns tends to concentrate towards orientations related to the Winter Solstice and the Equinox (both dates are important for Augustus biography and ideology; Zanker 1988; Barton 1995).

In parallel, several studies in Gaul have hinted to the possibility that the orientations there had a possible link with the local pre-Roman culture, attested in orientations towards arguably Celtic dates (see García Quintela, González-García 2014; 2016). Something similar has been recalled for *Carthago Nova* in Southern Spain, where the authors indicate that the Romans re-interpreted the previous Punic layout into the orientation of the new Roman town and its temples (González-García et al. 2015).

It is in this context where we present here an extension of these studies to the western part of Switzerland, where the towns of *Aventicum* (present day Avenches), *Iulia Equestris* (Nyon) and *Augusta Raurica* (Augst) were the main Roman towns of the *Civitas*

Helvetiorum in the province of *Gallia Belgica* (and later shifted to *Germania Superior*). We have also considered the Gallo-Roman temples of these sites and we have included the temples at the site of Petinesca (Studen) as a comparison. Finally, some other measurements of Roman sites in the region complete our sample. The idea behind this study is testing if the orientation is a handle on cultural footprint, and so if Roman towns do show Roman orientations while the temples present more pre-Roman links.

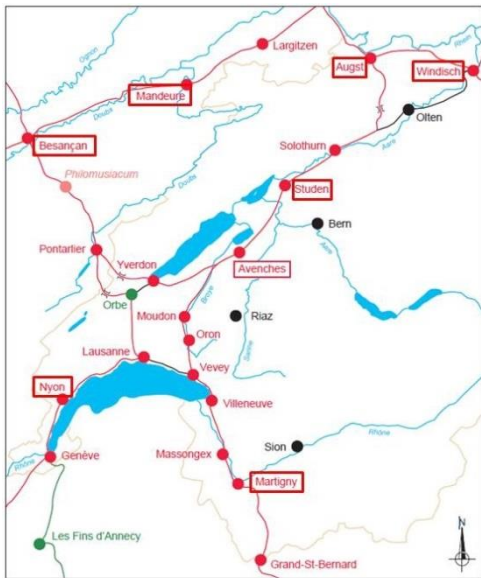


Figure 1. Red squares indicate the sites measured and mentioned in the text, adapted from Pury-Gysel (2015).

2. MEASUREMENTS OF GALLO-ROMAN TEMPLES AND ROMAN TOWNS IN SWITZERLAND

The territory between the Alps and the Jura were settled by La Tène culture several centuries prior to the Roman conquest. It was mostly populated by Gallic tribes (notably the *Helvetii* but also including the *Rauraci* and *Allobroges*). The territory was incorporated to the Roman realm by Caesar after the defeat of the *Helvetii* at the Battle of Bibracte in 58 BC. An important step towards the final incorporation of the territory was the foundation of several Roman towns, like *Colonia Iulia Equestris* (Nyon) in Caesar's or Octavianus times as the city name states, but the first known Roman urban grid dates from the end of the reign of Augustus beginning of Tiberius (Brunetti, Henny 2012; Frei-Stolba 2004), or *Augusta Raurica* (Augst; Hufschmid 2011) by Lucius Munatius Plancus around 43 BC, but the actually known urban layout is the one of the re-foundation soon after 15 BC. Augustus finally completed the conquest of the Alps securing the communication through the alpine valleys (see e.g. Ducrey 2006 for a recent review), when *Aventicum* is founded as Roman colony after

AD 71–72, but a Roman town grid existed since the end of 1st Century BC, and become the capital of the *Civitas Helvetiorum* (de Pury-Gysel 2011).

Little is left to be considered from Pre-Roman times from an archaeoastronomical perspective. However, the hypothesis of some degree of mixture between Roman veterans and local Gallic elites (shown by texts as Strabo 4.1.11 on Vienne, personal names of Eudens as Caius Iulius Eporedirix or Caius Iulius Vercondaridubnus, or mixed city names as *Augustodunum*, *Augustonemeton*, *Augustoritum* etc.; Hamilton & Falconer 1903) indicates the possibility that both Roman and perhaps Celtic footprints could be found in architectonic elements from the time. More specifically, we want to explore the possibility that the orientation of Roman towns and sanctuaries could be linked to Roman or Gallic principles.

To test this idea, we performed in-situ measurements at several Roman towns and Gallo-Roman temples in the area (Figure 1). These were done with a Suunto professional compass with a clinometer that allows for $\frac{1}{4}^\circ$ readings in azimuth and $\frac{1}{2}^\circ$ readings in altitude. Evidently such reading is not the final error in azimuth as this is heavily dependent on the preservation of the remains measured. To minimize this, we have performed a number of measurements at each site. Finally, we estimate that the error in declination is nearly $\frac{3}{4}^\circ$. This error is used later to compute the curvigram of Roman towns in Gallia. It must be stressed that such error might translate in a 1 day error close to the equinox but in several days of uncertainty in the case of orientations close to the solstices.

We have complemented our measurements in the area with bibliographic data. Data for several sanctuaries and temples in *Augusta Raurica* were kindly provided by Melanie Sticker–Jantscheff. Also, data for Nyon, *Iulia Equestris* (Brunetti, Henny 2012), Martigny, *Octodurus* or *Forum Claudii*, (Wiblé 2004) and Windisch, *Vindonissa* (Trumm 2015) were obtained through satellite images complemented by orthophotographic measurements. We estimate that the errors here are larger and the data are treated accordingly.

Table 1 presents our measurements for the Roman towns. It is interesting that out of our five towns considered here *Aventicum* (Figure 2) and *Augusta Raurica* (Figure 3) do present orientations that could be related to the solstices, with dates close to winter solstice in the case of *Aventicum* and summer solstice for *Raurica*. The other three present varying orientations with apparently no systematics. However, it is interesting to note that all three, *Iulia Equestris*, *Forum Claudii* and *Vindonissa* present orientations that could be related to sunrise or sunset at alleged Celtic dates, although *Vindonissa* is rather doubtful. It is

interesting in this sense the case of *Forum Claudii* where the southern end of the *Cardo* would be facing the nearby Alps and therefore, as it is the case in Aosta (Bertarione & Magli 2015), it would be facing

sunrise, in this case close to the beginning of February, which could be related to the setting sun in line with the *Decumanus* on dates very close to that one.

Table 1. Measurements of Roman town grids. The first column presents the Roman name, the second its present name. Third and fifth columns give the azimuth towards east and west respectively. For Augst and Matigny it is also included the measurements for the *Cardo*. Columns fourth and sixth give the corresponding altitudes of the horizon in those directions. Columns seventh and eighth give the geocentric declinations and finally the last two columns present the possible astronomical targets. SS stands for summer solstice, WS for winter solstice, MNL stands for Major Northern Lunastice while MSL stands for Major Southern Lunastice.

Roman Town	Present Name	A(e)	h(e)	A(w)	h(w)	δ (e)	δ (w)	Dates(e)	Dates(w)
<i>Iulia Equestris</i>	Nyon	108½	2¼	288½	5¼	-11.5	16.5	18Feb/24Oct	7May/6Aug
<i>Forum Claudii</i>	Martigny	50½	2¾	230½	9¼	28.1	-18.7	MNL	26Jan/16 Nov
		140½	17¾			-16.8		2Feb/9Nov	
<i>Aventicum</i>	Avenches	128	3	308	2	-22.7	26.25	5Jan/8Dec	
<i>Augusta</i>	Augst	54½	1¾	234½	2½	24.2	-21.3	SS	14Jan/28Nov
<i>Raurica</i>		144½	3¼	324½	2¾	-30.8	35.5	MSL?	---
<i>Vindonissa</i>	Windisch	73	3¾	253	2¾	14	-9.5	24Apr/15Au	24Feb/18Oct
<i>Besontio</i>	Besançon	133½	b(7)			-23		g WS	

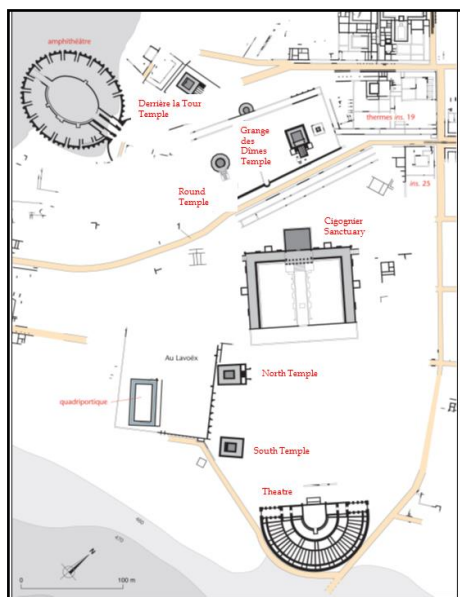


Figure 2. Temples area in Aventicum. Note the Sanctuary plus Theater combination. This is a common arrangement in the area, appearing also at *Augusta Raurica* and *Epomanduodurum* (Mandeure, France).

Table 2 includes the data for the 35 sacred structures measured at four sites, *Aventicum*, *Augusta Raurica Epomanduodurum* (Mandeure, France) and *Petinesca*. This last site, near the present population of Studen is located on a forested hill near the river where several Roman structures have been identified at the sanctuary of Gumpboden (Tschumi 1953; see figure 3a). It includes the rests of several buildings and *cellae* excavated in the early twentieth century and recently restored. We could measure there seven temples and two *cellae* and a building com-

monly thought as service building. Both *Aventicum* and *Augusta Raurica* present several sacred areas, with the remains of several temples that are at odds in orientation with respect to the general layout of the Roman town. We have included those temples in Table 2. For *Aventicum* we measured the Forum temple, the temple *Derrière la Tour*, the temple of the *Grange des Dîmes* and the *Temple du Cigognier* and associated structures (Pury-Gysel 2015; Figure 2). Finally, for *Augusta Raurica* we could measure the main Temple and its associated theatre, the Forum Temple and the Temple of Apollo (see Figure 3b and c). Several other structures also identified as Gallo-Roman temples (Hufschmid 2008) were measured through the accurate topographic maps and compared with the data kindly provided by Melanie Sticker-Jantscheff. These are included in Table 2.

3. DISCUSSION

According to Laurence et al. (2011) when considering the ancient Roman urban grid one should consider that there was possibly no a priori plan, but a grid where the city was growing with time. In this sense, when new buildings, especially public buildings, are incorporated they do so to create an impression on the spectator. This is interesting as provides a possible explanation for the different orientation between temples and sacred precincts and the general urban grid. Interestingly, we should not expect a clear trend in the new buildings as we do seem to find in our results presented here.

It is interesting to note that while the layout of the Roman towns considered here seems to be rather canonical, with the alleged orthogonal grid and pub-

lic spaces (see for instance the case of *Augusta Raurica* in Figure 3c), their orientations vary greatly (Figure 4a). While *Augusta Raurica*, *Vesontio* and *Aventicum* do present solstitial alignments, there are no equinoctial orientations. Our sample is admittedly sparse to draw general conclusions, but if we perform a comparison with the general rule discovered so far in Gallia (Figure 4b), we find that we should expect at least two towns with equinoctial orientations in our sample. Instead, we find that the orientation of *Forum Claudii*, *Iulia Equestris* and *Vindonisa* could arguably be related with Celtic start of season feasts (see Table 1 and Fig. 4a).

The picture seems rather more complicated when we consider the temples, where we have a much

larger sample. All temples seem to be facing the eastern part of the horizon, according with Roman and Celtic standards, with two very prominent concentrations. The first one would be for azimuths close to 72° while the other would be for orientations close to WS sunrise. It should be noted that the first is not clearly related to any Celtic festivity (but it is necessary to recognize the lacunae of our knowledge as there were certainly a lot of feasts not necessarily related to the sun extremes or the mid-season dates, see Lajoie 2009), but it rather seems more closely related to the sunrise on dates at or near April 21st, the date when it was celebrated the mythical foundation of Rome (see e.g. Scullard 1981).

Table 2. Measurements in Roman and Gallo-Roman temples, sanctuaries and related public buildings. Columns are as in Table 1, the only difference is in column two that present the structure measured. T stands for temple. WS for winter solstice and SS for summer solstice. MNL stands for major northern lunastice, and MSL for major southern lunastice. A b in the column of the horizon heights indicates that it was blocked.

Site	Structure	A(e)	h(e)	A(w)	h(w)	δ(e)	δ(w)	Dates(e)	Dates(w)
Epamanduodurm	Theater			264½	1½		-3		13Mar/1Oct
	Temple	95	4			-0.6		19Mar/25Sep	
Aventicum	Forum Temple	128	3			-23		WS	
	T. Gr. Dimes	112	2½			-13.1		14Feb/28Oct	
	Theater			306	2		25.1		
	T. Cigognier	126¼	4			-20.8		16Jan/26Nov	
	T. D. de la Tour	73¾	1¾			12.1		22Apr/21Aug	
	Round T.	111¾	2½			-13		14Feb/28Oct	
	North T.	37¾	0¾			33			
Petinesca	South T.	44¾	0½			29		MNL	
	Temple 1	74	¾			11.1		19Abr/24Aug	
	Temple 2	77¼	½			8.7		12Apr/15Sep	
	Temple 3	90	¼			-0.13		20Mar/23Sep	
	Temple 4	77¾	½			8.1		11Apr/25Sep	
	Temple 5	62¼	0			18		12May/1Aug	
	Temple 6	78½	¼			7.6		9Apr/3Sep	
	Temple 7	70½	¼			13		24Apr/18Aug	
	Temple 8	71½	½			12.6		23Apr/20Aug	
	Temple 9	74½	¾			10.8		18Apr/25Aug	
	SW Gate	57¾	0	237¾	b	20.9		25May/19Jul	
	N Gate	127½	1½			-23.7		WS	
	S gate	124¾	1			-22.4		WS	
	Aug.Raurica	SE Building	137¼	1¾	47¼	1¾	-28.7	28.7	MSL
Temple		73½	1½			12.5		23Apr/20Aug	
Theatre				252½	2		-10.4		21Feb/20Oct
Forum T.		54½	1¾			24.2		SS	
t1		81	1½			6.9		7 Apr/5 Sep	
T1		74	1½			11.6		20Apr/23Aug	
T2		61	1½			20.0		20May/23Jul	
t3		66	1½			16.8		7 May/6 Aug	
T4		66	1½			16.8		7 May/6 Aug	
T5		73	1½			12.3		22Apr/21Aug	
T6		63	1½			18.8		15May/29Jul	
T. Apollo		74¾	(5)	245¾	1¾	13.1	-9.2	25Apr/18Aug	25Feb/17Oct
Anfitheatre		125½	3	305½	1¼	-20.9	23.9	16Jan/26Nov	SS
Sichelen 1		111	3			-11.9		17Feb/25Oct	
Sichelen 2	123	5			-17.6		30Jan/12Nov		
Sichelen 3	74½	2¼			11.8		21Apr/22Aug		



Figure 3. (a) Two of the Gallo-Roman temples at Petinesca (Studen). (b) The main temple at Augusta Raurica and the remains of two smaller buildings interpreted as Gallo-Roman temples. (c) Note the regularity of the Roman lay out of Augusta Raurica, and the skewed orientation of the main temple plus theatre complex (near centre top) and the Apollo temple (left).

These results do seem to point to an apparent paradox: while towns are clearly Roman, their orientations do not seem to follow what the rule apparently dictates. However, temples, with a clear Gallo-Roman flavour in shape and possibly in deities (Hufshmid 2011) could be facing areas of the horizon more closely related with Rome than expected. Sticker-Jatscheff (2017) argues that the orientation of these temples in Augusta Raurica could relate to the setting of the Pleiades, possibly personified in the name of a hill in the vicinity (Planche des Belles Filles) where these stars could be seen a few degrees above the horizon. She indicates that such orientations could therefore comply with Celtic cosmic beliefs. Although this is a suggestive proposal, the basis to propose a Celtic star cult is rather scarce for the moment and should therefore be taken with caution.

Given the results found at other Roman sites both in Gallia, Hispania and Germania mentioned above, it could be safely argued that Romans did engage in different stages of negotiation with the local elites, where the local cults were somehow incorporated on how the sacred directions were considered. In this sense it is worth mentioning a statement by *Agennius Urbinius* indicating that “provincial governors normally receive no more important exhortation in their instructions than that those places which

are sacred should be safeguarded” (*Urbinius, de controversiis agrorum* 18–20).

In previous works we have argued that apart from the equinoctial (or cardinal) orientation; also, the Winter Solstice would be a characteristic orientation for Roman towns. The fact that several towns showed orientations towards Celtic mid-season feasts, especially in areas with a Celtic population substratum, seems to point in these directions of a compromise with or between the local populations. Particularly in the sample discussed here it is interesting that the three sites with the status of *Colonia*, namely *Augusta Raurica*, *Vesontio* and *Aventicum* have orientations related with the solstices, and are closer to the Roman standard, while those with a different status (either *municipium* or Roman camps) had the different orientations.

It is also interesting that the temples in general do show a subtle link with Roman orientations, through the connection with the rising on the day of the foundation of Rome. These temples are clearly a local adaptation of the Roman architecture with real sacred areas often including a theatre (Hufshmid 2011). Perhaps the builders, possibly local noblemen connected with the pre-Roman elites, wanted to express at the same time their status as Roman citizens without forgetting their Celtic roots. Interestingly a

similar case could be found at *Augusta Treverorum* (Espinosa-Espinosa et al 2016).

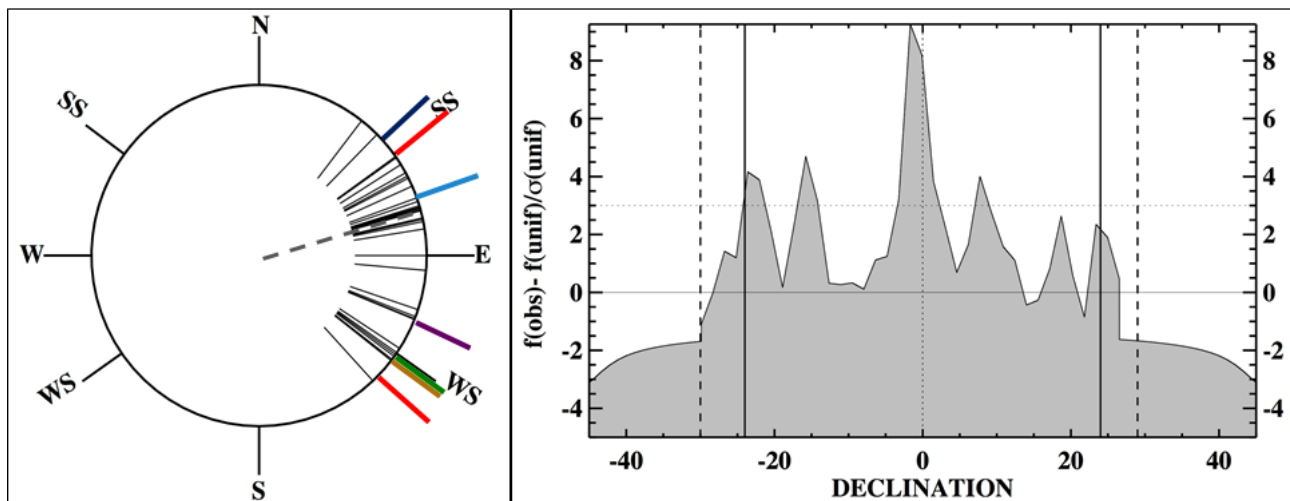


Figure 4. (a) Orientation diagram for the measurements given in Tables 1 and 2. The solid colour strokes outside the circle are the orientation of the Roman urban layouts, dark blue for Forum Claudii, red for Augusta Raurica (the two strokes provide the *Cardo* and *Decumanus*), light blue for Vindonissa, purple for Iulia Equestris, green for Aventicum, and gold for Besontio. The short solid lines inside the circle are the orientation of the temples. Short dark strokes at the outside indicate the cardinal directions and the extreme positions of the sun for a zero altitude horizon and at 47° of latitude. The dashed stroke gives the orientation for sunrise at April 21st. (b) Declination curvigram for the measured Roman towns in Gallia so far.

In this sense the different orientations in Roman and Gallo-Roman sacred buildings may be a witness to a period when a compromise, negotiation, or resistance either implicit or explicit, took place between conquered and conquerors (Hingley 2005: 30–46). Interestingly, similar cases have recently been reported in the Roman towns of *Augusta Treverorum* (present day Trier, Germany, Espinosa-Espinosa et al 2016) or *Augustodum* (modern day Autun, France, García Quintela, González-García 2016). In this sense, and as argued in the introduction, if we admit that buildings relate the space with the movement through their orientation we may conclude that their orientation is not left at the mercy of randomness

and therefore it has a social meaning. In this context, we argue that such meaning appears as a compromise between the old Gallic customs and the new Roman influence. Evidently, even if we propose that orientation has a cultural meaning, in no way such is completely directed or rigidly imposed but subject to the changes and tensions of the moments of social change and contact.

Finally, it is therefore useful to consider the orientation of both temples and town grids as they include information that may help the historian by providing new data to consider together with other historical, epigraphic and archaeological sources.

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