A short discussion on the orientation of the town planning of the Oppidum of Ubii also known as Ara Ubiorum

A short discussion on the orientation of the town planning of the Oppidum of Ubii also known as Ara Ubiorum

Amelia Carolina Sparavigna

Politecnico di Torino

Abstract: Here we discuss the town planning of the Oppidum Ubiorum, also known as Ara Ubiorum, today the city of Cologne in Germany. It has been told that the main east-west axis of the Oppidum was aligned along the sunrise azimuth on Augustus' birthday. We will analyse the orientation of this axis in the framework of the Julian calendar. A possible year of foundation/inauguration is proposed consequently. The orientation according to the natural features of the site of this Roman town along the Rhine is also given and stressed. The features of the site were fundamental in determining the plan of Ara Ubiorum.

Keywords: Archaeoastronomy

Turin, 28 August 2019. DOI: 10.5281/zenodo.3380556

The Ara Ubiorum, the Altar of the Ubii, was a Roman sanctuary in the Oppidum of the Ubii, today Cologne. Like the Ara Trium Galliarum, set up by Drusus at Lugdunum in 12 BC, the Ara Ubiorum was the site of a concilium provinciae, the political and religious center for the planned province of Germania Magna [1]. The priests who serviced the altar were eminent Germans[1] [2,3]. The same name, Ara Ubiorum, was also used for the Oppidum, from the foundation under Augustus to AD 50. Then, the name Colonia Claudia Ara Agrippinensium was used from AD 50 onwards [4,5]. According to [6], it was in 9 BC that the Oppidum received the altar for the observance of the Imperial cult of Rome and Augustus.

The town of the Ubii had its rectilinear planning of the streets based on the Roman surveyor's grid, known as limitatio. In [4], in the framework of an archaeo-astronomical analysis, the orientation of this planning is proposed as determined by the direction of the sunrise on Augustus' birthday. The link to the emperor's birthday is also mentioned in [6]. The limitatio "orientated the east-west axis by the rise of the sun on the birthday of Emperor Augustus (September 26) while the north-south streets pointed towards Rome" [6]. In [7], it is told the same: the east-west axis was "nach dem Sonnenaufgang am Geburtstag des Kaisers Augustus (23. September) orientiert; die Nord-Süd-Achse lag in der Richtung auf Rom." For what concerns the north-south axis of the town, the cardo, we have to consider it as a symbolic orientation where noon was representing Rome. For the east-west axis, the decumanus, Joachim von Elbe, author of [6] and [7], was probably referring to a literature on the ancient town-planning which was including the book written by Francis John Haverfield in 1913. In this book we find told that, sometimes, the decumanus was oriented "where the sun rises above the horizon on the dawn of some day important in the history of the town" [8]. Haverfield is referring to the work of Eduard Walter Barthel [9] and the Roman town of Timgad [10]. This town is supposed having its decumanus aligned along the sunrise azimuth on emperor Trajan's birthday.

---

1 Tacitus in the Annales, I.57, reports that in AD 9, the Cherusci prince Segimundus was serving at the altar. After the defeat of Varus in the Battle of the Teutoburg Forest, Segimundus fled over the Rhine to Germany. It seems that Rome was merciful, "he was graciously received and sent with an escort to the Gallic bank of the Rhine."

The fact that different dates of Augustus' birthday are given in [6] and in [7] is interesting and deserves a discussion. As we will see, one is the date in the historical calendar, the other is a Julian proleptic date. Usually we find the historical date, September 23, as the birthday of Octavian Augustus. When Octavian was born, the dates were given by the Republican Roman calendar, a lunisolar calendar, which was quite irregular. When the calendar was reformed by Julius Caesar, the length of the months changed. Octavian decided to maintain his birthday on the same day: the old date (a.d. VIII Kal. Oct.) turned into the new (a.d. IX Kal. Oct.), that is the 23th day of September.

In any case, if we want to make an archaeo-astronomical analysis, in particular an analysis which is referring to a possible alignment of the decumanus along the sunrise azimuth on a specific day stated by a historical date, we have to consider the following fact. The events in the astronomical calculations are given by a Julian date, that is, by a date in a Julian Proleptic calendar, which can be different from the historical one. Actually, this is the case of Augustus' birthday. Given in the historical Julian calendar of the period that we are considering, it is different from the date in the Julian Proleptic calendar. The difference is due to the fact that for many years the Julian calendar was not properly applied by the Roman priests, who traditionally were ruling the time in Rome. Therefore, for many years, the Roman year was different from the solar year of a few days. In 9 BC, that year given in [6], the historical dates given by the Roman calendar were different of three or four days from those of the Julian Proleptic calendar [11,12].

Here a table that we can use for the conversion, to have the astronomical date from the historical one. This is the table that we can find in the discussion [13], Henry Browne, The Nundines, and early times of the Julian Calendar, 1857.

From (historical)	1 Jan. 45	to 28 Feb. of same year	add 1.
From	29 Feb. 42†	to 28 Feb. 41	add 1.
From	29 Feb. 40†	to 28 Feb. 34†	add 1.
From	29 Feb. 34†	to 28 Feb. 33	add 2.
From	28 Feb. 33	to 28 Feb. 31†	add 1.
From	29 Feb. 31†	to 27 Feb. 29	add 2.
From	28 Feb. 29	to 28 Feb. 28†	add 1.
From	29 Feb. 28†	to 28 Feb. 22†	add 2.
From	29 Feb. 22†	to 28 Feb. 21	add 3.
From	1 Mar. 21	to 28 Feb. 19†	add 2.
From	29 Feb. 19†	to 28 Feb. 17	add 3.
From	1 Mar. 17	to 28 Feb. 16†	add 2.
From	29 Feb. 16†	to 28 Feb. 10†	add 3.
From	29 Feb. 10†	to 28 Feb. 9	add 4.
From	1 Mar. 9	to 28 Feb. 5	add 3.
From	1 Mar. 5	to 28 Feb. 1	add 2.
From	1 Mar. 1	to 28 Feb. A.D. 4	add 1.

The years marked † are the actual, the others the proleptic bissextiles.

In [13] it is told that, for example, the battle of Actium was fought, according to Dio Cassius, on the 2nd September U.C. 723 = B. C. 31. The corresponding proleptic Julian date is 4 Sept.; "on the usual view (Ideler's), 3 Sept." Ideler is Christian Ludwig Ideler (1766–1846), German chronologist and astronomer [14].

So the historical date of September 23 was corresponding to the following dates in the proleptic calendar, according to [13]:

From 1 Mar. 17 to 28 Feb. 16 add 2. It was 25 September.
From 29 Feb. 16 to 28 Feb. 10 add 3. It was 26 September.
From 29 Feb. 10 to 28 Feb. 9 add 4. It was 27 September.
From 1 Mar. 9 to 28 Feb. 5 add 3. It was 26 September,
From 1 Mar. 5 to 28 Feb. 1 add 2. It was 25 September.
From 1 Mar. 1 to 28 Feb. A.D. 4 add 1. It was 24 September.

As previously told, September 26, the date that we find in [7], is a proleptic Julian date, probably deduced according to Ideler's view.

In [4], a recent survey is reported of the monuments of Ara Ubiourm. The survey is giving a direction of the decumanus of 90 and a half degrees. Neglecting atmospheric refraction and the natural horizon, let us assume a sunrise azimuth comprised between 90 and 91 degrees. Let us use software CalSKY for astronomical analysis. We can see that, at Cologne, this azimuth was on the dates shown in the following tables.

27 Sep 10BC	Rise : 6h15.5m	Set : 18h19.7m	Transit: 12h18m07s
	az= 89.8°	az=269.9°	Altitude=38.5° Vir
28 Sep 10BC	Rise : 6h17.2m	Set : 18h17.5m	Transit: 12h17m50s
	az= 90.5°	az=269.2°	Altitude=38.0° Vir
29 Sep 10BC	Rise : 6h18.9m	Set : 18h15.2m	Transit: 12h17m33s
	az= 91.1°	az=268.6°	Altitude=37.6° Vir

27 Sep 9BC	Rise : 6h16.8m	Set : 18h18.0m	Transit: 12h17m54s
	az= 90.3°	az=269.4°	Altitude=38.1° Vir
28 Sep 9BC	Rise : 6h18.5m	Set : 18h15.8m	Transit: 12h17m37s
	az= 90.9°	az=268.7°	Altitude=37.7° Vir

27 Sep 8BC	Rise : 6h16.4m	Set : 18h18.6m	Transit: 12h17m58s
	az= 90.1°	az=269.5°	Altitude=38.2° Vir
28 Sep 8BC	Rise : 6h18.1m	Set : 18h16.3m	Transit: 12h17m41s
	az= 90.8°	az=268.9°	Altitude=37.8° Vir

So in 10, 9 and 8 BC, it was September 27 or 28, that the sun raised along the direction of the decumanus. Let us consider 27 September (from Calsky) and use again the table in [13] to have the historical date.

From 1 Mar. 17 to 28 Feb. 16, minus 2. It was 25 September.
From 29 Feb. 16 to 28 Feb. 10, minus 3. It was 24 September.
From 29 Feb. 10 to 28 Feb. 9, minus 4. It was 23 September.
From 1 Mar. 9 to 28 Feb. 5, minus 3. It was 24 September,
From 1 Mar. 5 to 28 Feb. 1, minus 2. It was 25 September.
From 1 Mar. 1 to 28 Feb. A.D. 4, minus 1. It was 26 September.

So the best agreement between the azimuth of the decumanus and the direction of sunrise on Augustus' birthday, neglecting any role of atmospheric refraction and of natural horizon, happened in year 10 BC. Was 10 BC the year of the foundation or inauguration of the town? That is, is it enough finding a coincidence - of sunrise and decumanus azimuths - to date a Roman colony?

In fact, the foundation of a colony and its inauguration were a complex process [15]. As told in [15], "Roman colonies traditionally commemorated a definite day of the year of their founding. This day was in effect the "birthday" of the colony." The question considered in [15] is: "what action in the long sequence of actions necessary for the legal and practical founding of a colony did such a birthday commemorate and celebrate?". Then, a detailed discussion is given in

[15]. Let us stress: a colony was the result of a *long sequence of actions*.

In the case of Cologne, it is possible that its “dies natalis”,the birthday, was the same of the Roman emperor. However, a question remains open, and it is the following: was the direction of the decumanus determined by an orientation along the sunrise azimuth on a specific day of the foundation, or was the direction planned before and the town inaugurated on the day of Augustus’ birthday, to enhance the role of his cult in the town? It is true that the direction of the decumanus was that of sunrise on Augustus’ birthday, but it was also the direction of the east-west axis, that is, the direction of the sunrise on equinoxes. Therefore, at any time of year, it was easy to determine the direction of the town, without the necessity of a direct observation of the sunrise on equinoxes.

In [4] the authors conclude that Ara Ubiorum was “the consequence of a planned intention to coincide the orthogonal urban layout” with dawn on Augustus’ birthday, to symbolically stress the role of the place. It is true that symbols were important for the Romans, but, first of all it was important the strategic position of the Oppidum. As told in [16], Cologne was born “where the Rhine emerges from the narrow river valley into the plain.” Moreover, as we can see by a map in [4], the town was on the bank of a secondary channel of the river, that is, in front of it a river island existed. It means that it was the most suitable place to cross the river and have a fluvial port too. Actually, the place had the best natural features to create a town which could become a Roman “gateway to the Rhine” [17][2]. As a consequence, the east-west orientation of the Oppidum of the Ubii was mainly constrained by the nature of the place and by the opportunity to control the Rhine as frontier and waterway. Augustus’ birthday was important, but only in the framework of a remarkable strategic position.

References

[1] Werner Eck: Köln in römischer Zeit. Geschichte einer Stadt im Rahmen des Imperium Romanum. Köln 2004, ISBN 3-7743-0357-6.

[2] https://en.wikipedia.org/wiki/Ara_Ubiorum

[3] Werner Eck, Augusto e la Germania: come nasce una provincia. Available at https://storicamente.org/eck_augusto_germania

[4] Espinosa, D. E., González-García, A. C., & Quintela, M. V. G. (2016). ON THE ORIENTATION OF TWO ROMAN TOWNS IN THE RHINE AREA. Mediterranean Archaeology and Archaeometry, 16(4), 233-240.

[5] Bechert, T. (2013) Ara Ubiorum. Zum Namen des frühkaiserzeitlichen Köln und zum Standort des Kaiseral-tars. Carnuntum Jahrbuch 2012, 9-16.

[6] Joachim von Elbe, The Romans in Cologne and Lower Germany: a guide to Roman sites and museums. U. Preis, 1995.

[7] Joachim von Elbe, Die Römer in Deutschland: Ausgrabungen, Frundstätten, Museen, RV, Reise- u. Verkehrsverl., 1977.

[8] F. Haverfield (1913), Ancient Town-Planning, Oxford, Clarendon.

[9] Barthel, W. (1911). Römische Limitation in der Provinz Africa, 1911, Carl Georgi Verlag, Bonn.

[10] Sparavigna, Amelia Carolina, Archaeoastronomical Analysis of the Roman Colonia Marciana Ulpia Traiana Thamugadi (Timgad), Founded at the Sunrise of

2 The Roman Cologne was home to a port, a natural harbour basin that was about 60-70m wide and about 1km long.

Trajan’s Birthday (May 1, 2019). SSRN Electronic Journal. Available at SSRN: https://ssrn.com/abstract=3327833 or http://dx.doi.org/10.2139/ssrn.3327833

[11] Sparavigna, Amelia Carolina, The First Calends of the Julian Calendar (May 16, 2019). SSRN Electronic Journal. Available at SSRN: https://ssrn.com/abstract=3389310 or http://dx.doi.org/10.2139/ssrn.3389310

[12] Leandro Polverini (2016). Augusto e il controllo del tempo. Studi su Augusto. In occasione del XX centenario della morte, p. 95 – 114. Available at https://www.academia.edu/29210185/Augusto_e_il_controllo_del_tempo

[13] Henry Browne, The Nundines, and early times of the Julian Calendar. THE JOURNAL OF CLASSICAL AND SACRED PHILOLOGY, VOL. III., Cambridge, 1857.

[14] See https://en.wikipedia.org/wiki/Julian_calendar 28/08/2019 and references threin.

[15] Eckstein, A. M. (1979). The Foundation Day of Roman" Coloniae". California Studies in Classical Antiquity, 12, 85-97.

[16] http://www.museenkoeln.de/archaeologische-zone/default.asp?s=4303

[17] https://www.world-archaeology.com/features/cologne-roman-gateway-to-the-rhine/