

## ***Patere* and *formelle* in Medieval Venice: towards an astronomical reading**

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**Abstract.** This paper explores the possibility that *patere* and *formelle*, characteristic decorative elements of medieval Venetian architecture, may represent stars and constellations: their arrangements on the facades of religious and civil buildings would have had the purpose of favouring the traveller's geolocation, conveying simple messages such as 'You are facing north', 'You are facing east', to an audience generally accustomed to reading the sun and stars for orientation. Stars and constellations are depicted not only in the Western way, but also according to iconographies of different geographic areas, particularly from the Near and Middle East.

It was John Ruskin who started the rediscovery of the strange arrays of circular *patere* and rectangular *formelle* – the typical bas-relief ornaments on medieval Venetian buildings dating from the eleventh to fourteenth centuries).<sup>1</sup> *Patere* and *formelle* used to be considered as merely decorative or illustrating some conventional moral allegory, such as the fight between virtue and vice. They were also considered apotropaic, supposedly having the power to avert evil or bad luck.<sup>2</sup>

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<sup>1</sup> John Ruskin, *The Stones of Venice* (New York: Lovell, 1851-53); *Examples of the architecture of Venice: selected and drawn to measurement from the edifices*, (Orpington: Allen, 1887); *The Stones of Venice*, in E.T. Cook and A. Weddeburn, eds, *The Works of John Ruskin* (London and New York: Allen, Longmans, Green, & Co.), 1903-12, vols. 9-11

<sup>2</sup> Alberto Rizzi and Zygmunt Swiechowski, *Romanische Reliefs von venezianischen Fassaden: "patere e formelle"* (Wiesbaden: Steiner, 1982, pp.22–29; Alberto Rizzi, *Scultura esterna a Venezia. Corpus delle sculture erratiche all'aperto di Venezia e della sua laguna* (Venezia: Stamperia di Venezia editrice [1987]).

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The path to a new and less vague line of interpretation was opened by the discovery of astronomical contents in the main portal of St Mark's Basilica. The bas-reliefs of the lower archivolt, created about the middle of the thirteenth century, and likewise considered simple ornaments for a long time, turned out to be connected with the iconography of stars and constellations, represented not only according to Western iconography, but in relation to the astronomical lore of a vast area around the Mediterranean and of the Near and Middle East.<sup>3</sup>

Since the roundels in the underarch of this portal are based on the same repertoire and combinations of animals, hybrids, humans, and foliage which we find in the *patere* and *formelle*, St Mark's contextual evidence suggested that *patere* and *formelle* too could be investigated for possible astronomical content.<sup>4</sup>

Residing permanently in Venice, I have had the opportunity of exploring for a long time the corpus of these artifacts still located in their original contexts, observing them repeatedly at different times of the day, seasons of the year, and light conditions (with or without solar shadows).

The advantages of direct observation can hardly be underestimated in the field of archaeoastronomical research.<sup>5</sup> And in fact, during these

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<sup>3</sup> Gloria Vallese, 'Le stelle i viaggi / Un ciclo astronomico nel portale centrale della Basilica di San Marco a Venezia (Part One)', *Annuario dell'Accademia di Belle Arti di Venezia*, Vol.V (2014): pp.235–75, [https://www.academia.edu/15364489/LE\\_STELLE\\_I\\_VIAGGI\\_Un\\_ciclo\\_astronomico\\_nel\\_portale\\_centrale\\_della\\_Basilica\\_di\\_San\\_Marco\\_a\\_Venezia\\_Prima\\_parte](https://www.academia.edu/15364489/LE_STELLE_I_VIAGGI_Un_ciclo_astronomico_nel_portale_centrale_della_Basilica_di_San_Marco_a_Venezia_Prima_parte) [accessed 22 July 2023]; 'Le stelle i viaggi / Un ciclo astronomico nel portale centrale della Basilica di San Marco a Venezia (Part Two)', *Annuario dell'Accademia di Belle Arti di Venezia*, Vol. VI (2015): pp.105–26, [https://www.academia.edu/37176137/LE\\_STELLE\\_I\\_VIAGGI\\_Un\\_ciclo\\_astronomico\\_nel\\_portale\\_centrale\\_della\\_Basilica\\_di\\_San\\_Marco\\_a\\_Venezia\\_Seconda\\_parte](https://www.academia.edu/37176137/LE_STELLE_I_VIAGGI_Un_ciclo_astronomico_nel_portale_centrale_della_Basilica_di_San_Marco_a_Venezia_Seconda_parte) [accessed 22 July 2023] ; Gloria Vallese, ed., *Stelle e viaggi. Un ciclo astronomico del XIII secolo nel portale della Basilica di San Marco a Venezia/Stars and Travels. A 13th century astronomical cycle on the main portal of St. Mark's Basilica in Venice* (catalog of the exhibition held in Venice, Accademia di Belle Arti, Magazzino del Sale 3, June 18 - September 30, 2016), Crocetta del Montello: Edizioni Antiga, 2017, <http://www.stelleviaggi.org/portale> [accessed 22 July 2023].

<sup>4</sup> Vallese, 'Patere e formelle', in Gloria Vallese, ed., *Le stelle i viaggi*, 2016, pp.89–97, <http://www.stelleviaggi.org/portale> [accessed 22 July 2023].

<sup>5</sup> As underlined by Ed Krupp, HASTRO History of Astronomy e mail list 8 August 1995; Clive Ruggles, *Astronomy in Prehistoric Britain and Ireland* (New Haven,

repeated observations, I came to notice that *patere* and *formelle* having the same iconographic subject (i.e, presumably corresponding to the same stars or constellations), appeared to be oriented towards the same points on the horizon. This suggested that they were meant to depict some celestial phenomenon (i.e., the rising or setting of a star/constellation) which takes place in front of the observer, always on the same point on the horizon.. That point on the horizon, or azimuth, where the said phenomenon takes place, is known (for a given place, latitude, and epoch), so that *patere* and *formelle* can convey a message of the kind: ‘You are facing N’, ‘You are facing NW’, and so on.

To verify this hypothesis, I embarked on a renewed and extensive field exploration, this time considering, for the first time, the iconographic subjects of *patere* and *formelle* in relation to their geolocal orientation, as verified by compass (and other instruments, see below). I analysed in detail an ample number of cases, a small choice of which, complete with photos, diagrams, and maps of the sky, I published here.<sup>6</sup>

The compass gave a first general affirmative answer to the main question, namely: in front of *patere* with the same iconography, is the observer always facing the same point on the horizon? The use of the compass, on the other hand, has some limitations in this kind of research. In principle, since *patere* and *formelle* were created before the diffusion of the magnetic compass, their orientation (if they have any) would be astronomical, not magnetic. Besides, from a practical point of view, there is a certain difficulty in using a compass in a densely man-made space, due to the substantial metallic masses, visible or hidden, which often interfere with the measurements.

But the first answer obtained with a compass can subsequently be refined and integrated by means of other tools. I used Stellarium to reconstruct the sky over Venice in 1200, i.e, in the age in which the use of *patere* and *formelle*, according to the studies by Swiechowski and Rizzi

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CT, and London: Yale University Press 1999, p.41 and p.151. I am grateful to Nick Champion who drew my attention to these passages.

<sup>6</sup> Gloria Vallese, ‘*Patere* and *formelle*: towards and astronomical reading (Part One)’, *La camera dello scirocco*, Vol. V (October 2021): pp.7–16, [https://www.academia.edu/104458419/Venetian\\_patere\\_and\\_formelle\\_towards\\_an\\_astronomical\\_reading\\_Part\\_1\\_](https://www.academia.edu/104458419/Venetian_patere_and_formelle_towards_an_astronomical_reading_Part_1_) [accessed 22 July 2023]; ‘*Patere* and *formelle*: towards and astronomical reading (Part Two)’, *La camera dello scirocco*, Vol. VI (February 2022): pp.9–17, [https://www.academia.edu/104458612/Venetian\\_patere\\_and\\_formelle\\_towards\\_an\\_astronomical\\_reading\\_Part\\_2\\_](https://www.academia.edu/104458612/Venetian_patere_and_formelle_towards_an_astronomical_reading_Part_2_) [accessed 22 July 2023].

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quoted above, seems to have touched its peak; and a solar calculator (suncalc.net), to obtain charts in which the azimuth of the risings and settings of the Sun on the solstice days is superimposed on a town map.

These instruments can also compensate for the change (albeit slight) in the azimuth of the rising and setting of the celestial bodies which occurred in the approximately one thousand years that separate us from medieval Venice.

Google Maps gave me the opportunity of analysing some of the cases outside Venice, where the same iconographic repertory as that of the Venetian *patere* and *formelle* is used to describe the same orientation of the building.

Based on these observations, I now propose here that the animals, hybrids and human beings in the *patere* and *formelle* represent stars and constellations, and that their display on the façades was not a mere embellishment, but had the purpose of favouring the geolocation of the passer-by. They conveyed messages such as ‘You’re facing north’, ‘You’re facing east’, to a multicultural audience accustomed to orienting themselves by reading the sky, not only for the long travels, but also for the short displacements of everyday life. On the corners of Venetian streets, *calli* or *fondamente* (and also, and even more often, along the waterways), *patere* and *formelle* seem to have fulfilled a practical function not too dissimilar from that of road signs in today’s cities.

On the facades of manors of the great merchant-explorers of the thirteenth century (such as the Polos or the Da Mostos), on the other hand, the system was brought to a higher level of sophistication. There, *patere* and *formelle* form characteristic alignments and groupings along the facades. If read in geolocal context, these alignments can indicate the orientation of the building to the astounding accuracy of one degree, or of a few degrees (I will describe one example in detail later in this article).

This level of approximation largely exceeds what is needed for the celestial navigation of the town. I believe the purpose of alignments and groupings on the patrician houses was to display, to a discerning eye, the house owners’ navigational expertise and, furthermore, to hint to the extent and direction of their voyages, based on the astronomical lore that had been employed (see below).

Let’s note, before continuing, that in origin all the reliefs on the *patere* and *formelle* were polychrome, with the figures brightly coloured and often partly gilded on a dark background, so that they were much more legible

from afar than they are today.<sup>7</sup> Additional inlays of metallic elements made the main outline readable even in the dim lights of dawn and dusk.<sup>8</sup>

Through systematic observation and comparison of urban sites, the first fragments of a long-lost vocabulary have begun to reappear. I summarize its essential lines in the following paragraph.

It appears that, in the language of the *patere* and *formelle*, the figure of a Lion does not represent the constellation of this name, but the Sun, while, in general, all the other celestial animals play, so to speak, in the part of themselves: so, for example, a ram represents *Aries*, a hare *Lepus*, and so on. Each celestial animal has its ‘house’, or ‘lair’, along the horizon (i.e., an azimuth where it rises and sets), which, for the same latitude, never changes significantly for several human generations.

The animal most frequently represented is the Sun/Lion. Let’s remember that, in the ancient so-called ‘naked-eye’ astronomy, the apparent travel of the Sun back and forth along the horizon during its annual cycle had a relevance which is barely understood today.<sup>9</sup>

Along its annual journey, the Sun/Lion ‘visits’, one after another, the ‘houses’ of different celestial animals, figuratively ‘seizing’ them as they ‘come out of their lair’ (i.e., rise), or ‘take refuge into their lair’ (i.e., set). Thus, a *patera* showing a Lion attacking a huge dog (the Greater Dog, or *Canis Major*), as in Fig. 1, can denote a precise degree of azimuth/amplitude, or, it would be more appropriate to say, a certain point around the Rose of the Winds, which, prior to the diffusion of the magnetic compass, was the main system of reference for navigation.

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<sup>7</sup> Lorenzo Lazzarini, ‘Nuovi studi tecnico-scientifici sui rilievi degli arconi della basilica marciana’, in Otto Demus, ed., *Le sculture esterne di San Marco*, (Milano: Electa, 1995), pp.228–34; Guido Tigler, *Il portale maggiore di San Marco a Venezia/Aspetti iconografici e stilistici dei rilievi duecenteschi*, (Venezia: Istituto Veneto di Scienze, Lettere ed Arti, 1995).

<sup>8</sup> Gloria Vallese, ‘Stelle di San Marco: una ricerca agli esordi’, in Gloria Vallese, ed., *Stelle & Viaggi 2/ Esplorazioni, iconografia e astronomia a Venezia nel 200* (online catalog of the exhibition held in Venice, Accademia di Belle Arti, Magazzino del Sale 3, October 28 2021-January 29, 2022), [www.http://www.stelleviaggi.org/exhibition-2021-inlays](http://www.stelleviaggi.org/exhibition-2021-inlays) [accessed 21 July 2023].

<sup>9</sup> Swiechowski, ‘Systematische motivverzeichnis: Löwe’, in Swiechowski and Rizzi, *Romanische Reliefs*, pp.227–76. Travel of the Sun: Carl H. Schier, *Globus coelestis Arabicus, qui Dresdae in regio museo mathematico asservatur* (Lipsiae: Typis Teubnerianis, 1865), p.9.

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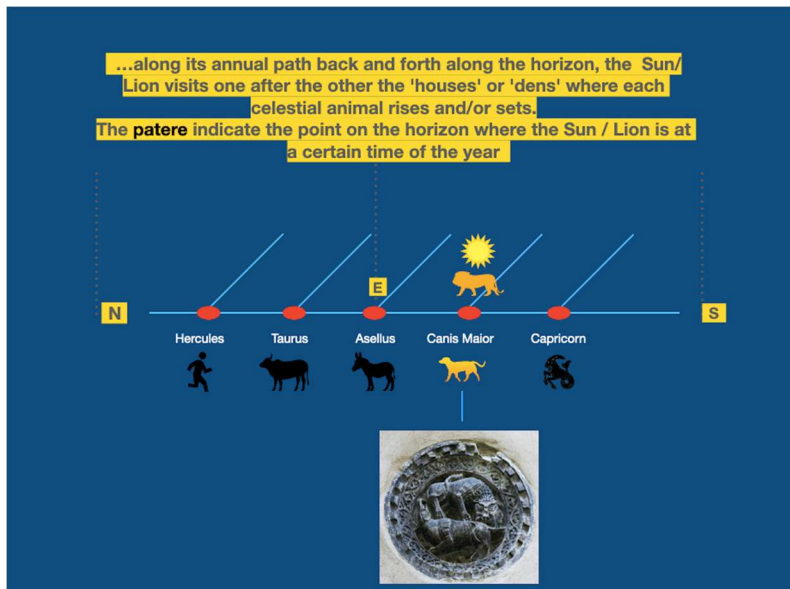


Fig. 1. Annual travel of the Sun/Lion along the horizon. *Patere*: Lion biting a dog at the back, twelfth c. Venice, 281–83 Calle Larga San Marco. Photo: Courtesy Paolo Della Corte, Venice.

The Sun/Lion, however, does not need to rise or set in the same ‘house’ along the horizon to ‘grab’ another celestial animal; it can also catch its prey from a distance, just by reaching from afar with its rays. This is the case, for example, of the Sun/Lion grabbing the constellation Grus by the neck at dawn on the summer solstice. The corresponding *patere*, depicting a young Lion who performs a rather accentuated, unnatural twist to bite a walking wader at the base of the neck, is used to denote the point at the horizon in which, just a few moments after its upper culmination, the star Lambda *Gruis*, the celestial bird’s neck, is ‘caught’ and dissolved by the light of the rising Sun.<sup>10</sup>

Apart from the Sun/Lion, the vocabulary includes other celestial predators. Among the most frequently represented are the Griffin (Pegasus) and the ‘two Eagles’, Altair and Vega. According to Swiechowski’s thematic index, the *patere* featuring Griffins and Eagles are, together, about one half of the extant corpus.<sup>11</sup>

<sup>10</sup> Vallese, ‘*Patere* and *formelle* (Part One)’, pp.12–13, fig. 11-13.

<sup>11</sup> Swiechowski, ‘Systematische motivverzeichnis: Greif, Adler’, in: Swiechowski and Rizzi, *Romanische Reliefs*, pp.227–76.

Iconographically, the two celestial Eagles represent actually two phases in the hunting of the same bird; but they denote two different constellations.<sup>12</sup> The Eagle/Hawk as it plunges, closing its wings around the prey and lowering its head to deliver a lethal blow, denotes Vega/*Lyra*.<sup>13</sup> This is an Arab visualization for this constellation: the name Vega, still in use for its main star, comes from the Arab language ('*al-nasr al-wāqi*', 'The Plunging Eagle'). The Eagle/Hawk, as it flies away with the captured prey, lifting its head and opening its wings, represents Altair in the constellation *Aquila*. Here again, we have a name of Arab origin: '*al-nasr al-ta'ir*', which means 'The Rising Eagle'.<sup>14</sup>

Returning to the vocabulary of the *patere* and *formelle*, we observe that a celestial prey can be attacked at the head or at the rump, depending on whether it was surprised while it was 'coming out of its lair' (i.e., rising), or 'taking refuge into its lair' (i.e., setting). The *patera* in Fig. 1, for example, shows the Sun/Lion attacking the Greater Dog (Sirius/*Canis Major*), as it was setting.

In addition to the hunting scenes involving two celestial animals, a predator and a prey, we have a series of recurring and well-standardized attitudes for the single animal, to denote the different positions that every constellation, and the Sun/Lion itself, take in their journey across the sky, as exemplified by Fig. 2.

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<sup>12</sup> Ian Ridpath, *Vega and Altair, the flying eagles*, in *Star Tales: Revised and Expanded Edition* (Cambridge:, James Clarke & Co Ltd, 1989, <http://www.ianridpath.com/startales/vega-altair.html> [accessed 3 November 2022]. Identification of the 'Two Eagles' in St. Mark's portal and in the *patere* showing the same subject: Vallese, 'Le stelle i viaggi (Part One)', 2014, pp.237–38, fig. 4-8; 'Stelle e viaggi', 2016, pp.65–71, fig. 1-6; 'Patere e formelle (part One)', 2021, pp.8-9, fig 3-5.

<sup>13</sup> Ridpath, *Lyra*, in *Star Tales*, <http://www.ianridpath.com/startales/lyra.html> [accessed 3 November 2022].

<sup>14</sup> Ridpath, *Aquila*, in *Star Tales*, <http://www.ianridpath.com/startales/aquila.html> [accessed 3 November 2022].

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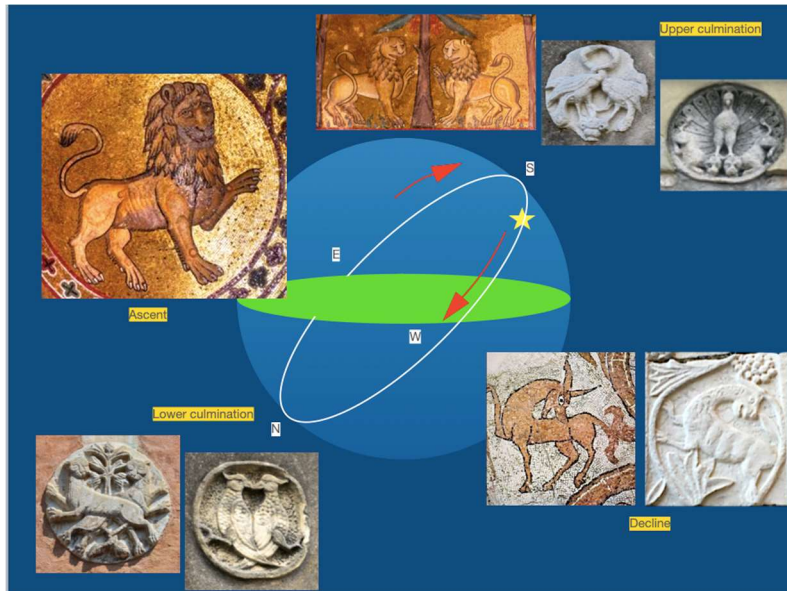


Fig. 2. Travel of the Sun and of the constellations across the sky. From left, clockwise: Lion marching; Couple of lions face-to face, mosaics, 12<sup>th</sup> c., Palermo, Palace of the Normans, Hall of King Roger II. Photos: Shutterstock.com. *Two cranes entwining their neck, standing on the top of a Ionic capital*, Venetian *patera*, 2101 Fondamenta della Tana, 12<sup>th</sup>-13<sup>th</sup> c.; *Peacock displaying its train*, Venetian *patera*, 13<sup>th</sup> c., 2479/A Fondamenta delle Procuratie. Photos: Courtesy Pino Usicco, Venice. *Dog biting its own back*: Brindisi, Cathedral, floor mosaic, 12<sup>th</sup> c.; Venice, detail of archivolt, Calle della Crea, 12<sup>th</sup> c. (?). Photos: own work. *Two eagles back to back*, Venetian *patera*, 2488 Fondamenta dei Cereri, 12<sup>th</sup>-13<sup>th</sup> c. Photo: Courtesy Pino Usicco, Venice. *Two lions back to back*, Venetian *patera*, Church of San Giacomo dell'Orio, 12<sup>th</sup> c. Photo: Courtesy Paolo Della Corte, Venice.

In the next paragraph, I resume what I have gathered through my observations and comparative work.<sup>15</sup>

An ascending constellation is represented by the animal in profile, walking (with a front paw raised), and with a general countenance of boldness and happiness. When it crosses the Meridian at its upper culmination (which denotes 'cardinal point south'), the figure is doubled and represented in a mirror-like posture, face-to-face, as if pivoting around a central point like a banderole; or, it can be represented as a single

<sup>15</sup> See above, note 14.



exemplar, frontal. Here, at the upper culmination, the general countenance of the animal is of happiness, fulfilment, and triumph: so, if it is a peacock, it will be displaying its train; if it is a crane, the couple will be represented entwining their necks, as when performing their wedding dance.

In the opposite situation, the lower culmination (which denotes ‘cardinal point north’), we have again a symmetrical double figure, but this time the couple will be represented back to back, with their head/s turned back.

In decline, the constellation will be represented again walking, with a front paw raised, but this time with its head turned back (as if looking behind at its past, better fortunes, so to speak), and biting its own back (or tail, or wing), in unhappiness and frustration.

The postures are chosen from the collocation of the celestial objects in particular moments of the year (the equinoxes and solstices), at some key moments of the day: midday, twilight, midnight, and dawn. So, for example, the Eagle with closed wings (i.e., *Vega/Lyra*) ‘pivots’ (i.e., culminates) at midnight/north at the time of the winter solstice; the Crane (i.e., *Al Dhanab/Grus*), ‘pivots’ at south at dawn, at the time of the summer solstice.<sup>16</sup>

With this array of attitudes, and combination of different animals, all the points around the Rose of the Winds were indicated in conventional form. Let us now take a walk in an urban context in Venice to show how the system worked. As an example, I chose an itinerary in the Santa Croce district, because it presents many of the cases described above, highlighting their interaction in real space. Each step described below was verified using a compass, and then checked and refined using other tools, as explained above.

Suppose that we (as observers) are walking in Venice along *Fondamenta dei Cereri*, and about to turn the corner onto *Fondamenta della Cazziola*.<sup>17</sup>

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<sup>16</sup>Analytic description, photos, and schemes, in: Vallese, ‘*Patere and formelle (Part Two)*’, pp.12–16, fig. 11-18.

<sup>17</sup> Google map: 2488 *Fondamenta dei Cereri*, <https://2gis.it/padova/geo/9289309886822462>.

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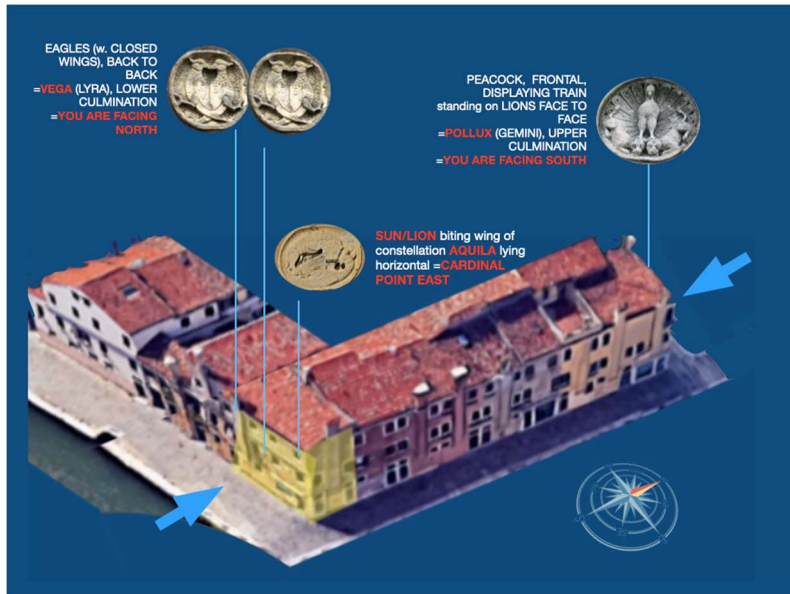


Fig. 3. Venice, *patere* and *formelle* along *Fondamenta dei Cereri* (left), *Fondamenta della Cazziola* (middle), and *Fondamenta delle Procuratie* (right). *Patere*: as in Fig. 2, plus *Lion biting the wing of a downed eagle*, Venetian *patera*, 2488 *Fondamenta dei Cereri*, 12<sup>th</sup>–13<sup>th</sup> c. Photos: Courtesy Pino Usicco, Venice; Venice satellite view: Google Maps. Imagery ©2022CNES, Airbus Maxar Technologies/Map data ©2022 Google. Graphic element (compass): Shutterstock.com. Graphic composition: own work.

Approaching the turn, if we look up at the corner building (the yellow one in Fig. 3), we see, high on the chimney, a *patera* showing in mirror couple the ‘Eagle with the closed wings’ (*Vega/Lyra*), back to back, with its head/s turned back. As seen above, this means lower culmination-midnight-north; so, this *patera* says to the onlooker: ‘You are facing north’. After a few paces, if we turn again to look at the facade, we find an identical exemplar of this *patera*, telling us once more: ‘You are facing north’. So, if, while moving parallel to the facade, at one point we turn to look at it and we are facing north, and after a few paces, we look again at it and we are still facing north, this means that we have been walking along the Equinoctial line; and therefore from east to west, or vice versa. Which of the two?

Reaching the corner, and about to turn left (and in this particular example, once here we can only turn left, because there is water in every other direction!), we look up, and we find another *patera*, telling us: ‘This

side is east, and you are about to turn north'.<sup>18</sup> How? This *patera* shows the Sun/Lion biting the wing of a horizontal, or downed, Eagle. This scene can be seen at east on the mornings of the winter solstice: the first rays of the dawning Sun find ('grab') the stars in the wing of Altair/*Aquila* (the 'Eagle with the open wings') still visible and shining, as it is rising there in its characteristic horizontal posture.

In a few moments, the increasing light of the Sun will make the constellation disappear altogether, and so, figuratively speaking, the Sun/Lion will have 'devoured' the bird, as it was 'coming out of its den'. In the real sky, all this happens on the east cardinal point, and with the head of the Eagle pointing north. Thus this *patera* tells us: 'You are facing east, and north is that way'.

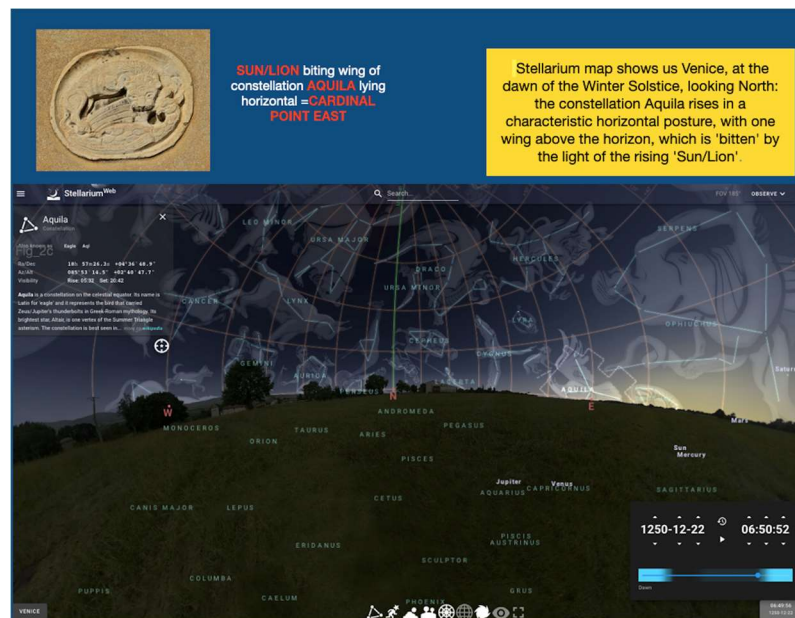


Fig. 4. Venice, rising of the Sun and of the constellation Aquila on 1250/12/22. Map: Stellarium.org; Venetian *patera*, Lion biting the wing of a downed eagle, as in Fig. 3.

Just after having turned the corner, if we look up at the wall, we find a *formella* and a *patera* which, by their representations, and because of how they are aligned on the wall, tell us: 'You are facing west', and 'North is at

<sup>18</sup> The light iron bridge leading to the right is a later addition.

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your right'; the limitations of space prevent us to enter in further detail here.<sup>19</sup>

If we continue along this way (Fondamenta dei Cereri), then turn left at the first corner, and again we turn to face the wall, we find a new *patera*, telling us 'You are facing south'.<sup>20</sup> How? This *patera* shows a frontal single peacock, displaying its train. This represents the upper culmination of Pollux in the constellation of *Gemini* the Twins; it means 'cardinal point south' and therefore: 'You are facing south'. For good measure, the *patera* shows Pollux/Peacock standing on the heads of the two Lions face-to-face. This detail means, as we have seen, 'upper culmination of the Sun', underlining the message 'midday-south' given by the frontal peacock.

In Medieval Venice, the constellation *Gemini* is represented according to different traditions, but the most frequent is this, the 'Two Peacocks', which is an Arab Bedouin visualization (not the Arab literary, or 'learned', one, which adopts the Greek tradition of the two human beings). Incidentally, Gemini as the 'two Peacocks' is one of the few Arab folkloric iconographies for which we have some written documentation, which is otherwise understandably scarce.<sup>21</sup>

This language of the *patere* and *formelle* as geolocation devices is remarkable not only in itself, but also because it is not exclusive to Venice. There are identical examples in a vast area centred on the Mediterranean sea: in the Norman-Islamic Sicily of King Roger II, in Egypt, in the Middle

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<sup>19</sup> Analytic description, photos, schemes, and charts, in Vallese, 'Patere and formelle (Part Two)', pp.11-12, fig. 5-7.

<sup>20</sup> 2479A Fondamenta Procuratie.

<sup>21</sup> Not mentioned by Ridpath, the Arab folkloric tradition of 'Two Peacocks' for the constellation Gemini was registered, without any quoted source, by Richard H. Allen, *Star Names: Their Lore and Meaning* (New York: Dover Publications, 1963 [1899]), p.222. ([https://penelope.uchicago.edu/Thayer/E/Gazetteer/Topics/astronomy/\\_Texts/secondary/ALLSTA/Gemini\\*.html](https://penelope.uchicago.edu/Thayer/E/Gazetteer/Topics/astronomy/_Texts/secondary/ALLSTA/Gemini*.html)). 'Gemini, Duo Pavones' appears in an invaluable list of Arab equivalents for Western constellations, reported by Joseph Scaliger in his philological edition of Manilius, *M. Manilii Astronomicon. Libri quinque, cum commentariis et castigationibus Josephi Scaligeri...* (Argentorato: Bokenhoffer, 1555), p.440. A slightly modified version of the same list appears in the monumental (and apparently very influential in the following two centuries) multilingual dictionary by the Lutheran bishop Matthias Martini: *Lexikon Philologicum, praecipue etymologicum et sacrum: in quo latinae et a latinis auctoribus usurpatae tum purae tum barbarae voces ex originibus declarantur, comparatione linguarum* (Francofurti ad Moenum: Thomae M. Goetzenii, 1655), 'Heniochus', *sub vocem*.

East, in Turkey, in Armenia, and Georgia – in short, at the head-points of the commercial routes towards the East and North Eastern Europe, in which Venice was most interested in the Late Middle Ages.

In that epoch, Venice was governed by an oligarchy of long-distance merchant explorers and they chose for their town this multicultural and inclusive language of the stars related to the travels.<sup>22</sup> This not only for their ‘road signs’, meant for the visitors of the international emporium that they wanted the town to be,; but also for their main monument, St Mark’s Basilica, and for the facades of their own private dwellings, on which we find alignments and other regular geometrical displays of *patere* and *formelle*, which are, in fact, rather extraordinary astronomical devices.

How does an alignment of *patere* work? In a way, it is very simple and obvious. We must imagine a giant Rose of the Winds, extending to the horizon, with the facade of the house ideally sitting in its middle, as in Fig 5.

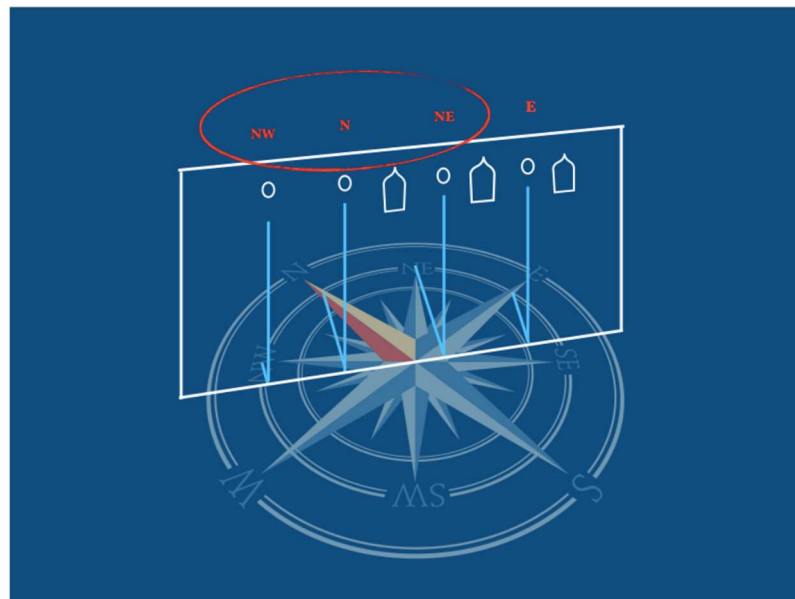


Fig. 5. Scheme: alignments of *patere* on Venetian buildings and Rose of the Winds. Graphic element (compass): Shutterstock.com. Graphic composition: own work.

<sup>22</sup> Vallese, ‘Che cos’è un portale?’, in Gloria Vallese, ed., *Le stelle i viaggi*, exhibition catalog 2016, pp.55–56, <http://www.stelleviaggi.org/portale> [accessed 22 July 2023].

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towards an astronomical reading

The points of the Rose (generally the points in front of the observer), are projected onto the façade in form of *patere* and/or *formelle*, generating the alignment. From the order in which we find the points, we can deduce how the façade is rotated with respect to the Rose of the Winds. If, for example, we find north at our extreme left and south at our extreme right, we understand that this façade is perfectly aligned north to south. But if instead, for example, NNW precedes N in the alignment, then the façade is slightly rotated with respect to the main N-S axis, and, from our own knowledge of the Rose of the Winds, we can also predict exactly how many degrees it is actually rotated.

Let's take, as an example, an alignment on the façade of one of the Polo houses in Corte Seconda del Milion.<sup>23</sup> Among the original alignments still extant in Venice, this one stands out for its particularly shrewd conception and elegant minimalism. It consists of only five *patere*, equidistant, and differing between themselves only by tiny details; so that, by telling us less, it compels us to put in more in terms of our own knowledge and skills in navigational matters. On medieval Venetian facades, even on very important houses and churches, it is usual to see arrangements of *patere* from different periods and different styles, as it was a common practice to salvage and reuse them in new buildings. In this particular alignment, however, all the *patere* appear to be by the same sculptor. They are likely from the twelfth century, carefully re-distributed within the design of a more recent Gothic polyphora.

The reading of this, as of any other alignment, begins from the two extremes, which can give a first general idea of how the facade is oriented. But, this time, the *patere* that the alignment shows at its extremes are identical! Or, rather, they were presumably identical, before the right-hand one went slightly damaged, as we see it now. Both show our friend the frontal peacock displaying its train, i.e., the culminating Pollux, but this time he does not sit on the two Lions face to face, or back to back, which would have given us an immediate idea of which *patere* means midday/south, and which midnight/north. And so, for now, that has to wait.

But we know for certain that, since these are two culminations, the line between them must be a longitude line (in fact, it is the Meridian), and so, facing it, we must be facing either west, or east. Which of the two? The

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<sup>23</sup> 5845 Corte Seconda del Milion, 12<sup>th</sup>–14<sup>th</sup> century. About this building: Rizzi, *Scultura esterna*, p.318–19; Giulio Lorenzetti, *Venezia e il suo estuario* (Trieste: Edizioni Lint, 1974 [1956]), p.358. About the reuse of *patere*: Rizzi, *Scultura esterna*, pp.26–27.

second *patera* from the left tells us ‘You are facing west’, as it shows a double figure of Pegasus, the celestial Griffin, back-to-back in symmetrical disposition, with its head turned back (therefore, in decline), touching the middle axis of the *patera* with the tip of its wing.

Pegasus/Griffin is represented transiting (or ‘pivoting’, in the *patere* and *formelle* language) the vertical of the cardinal points in four very well-recognizable postures; this one is its posture for west.

In the Polo alignment, west does not appear to the observer right in the middle between north and south, but slightly displaced on the left. At this point he knows that, facing the building, he will not be facing ~~not~~ exactly west, but somewhere between west and north. If this observer is a common passer-by, now he knows that, taking that passage under the Polo house which he sees just in front of him, he will be walking northwesterly, which is all he needs to know to go on navigating the town.

If, instead, our observer is an expert navigator, he may be willing to complete the reading of the alignment, testing his ability against the Polo family’s puzzle, and, in the process, coming to learn more of their skills in navigational matters. In this case, he will proceed to read also the two remaining *patere*. These appear almost identical at first glance, though, in fact, they differ in some tiny details. For example, in the rightmost one, one Lion is represented in front and the other in profile; and the acanthus leaf on which the Lions stand, here is shown in front, on the other *patera* in reverse. Having noted these differences, and understood their meaning, the expert observer is now ready to try the Polo family’s riddle. If put in words, it could run as follows: given that the distance between the west cardinal point and the summer solstice setting of the Sun (in projection on the facade, see Fig. 6), is the same as the distance between the summer solstice setting and east (in projection), how many degrees is the angle between north and the façade?





navigation of the city, and to showcase the astronomical knowledge of its main families and the extent of their travels.

This opens up an entirely new perspective, not only on these unique artifacts in themselves, but also on the oligarchy of long-distance merchant-explorers who ruled Venice in the late Middle Ages. Their choice of a multicultural and inclusive language for their town, based on the unifying motive of the stars related to travels and to the celestial navigation, is profoundly original and unparalleled in their times.

Since the system appears to be based on an essentially oral tradition, and the written sources relating to it are very limited or non-existent, at present some of the iconographies (as in the case of Griffin/Pegasus) do not have the support of any written source, and are sustained only by the coherent results of a certain number of analysed cases. Therefore, it appears desirable to expand this exploration as much as possible in future, possibly making it systematic, i.e., extending it to all the sites in town that appear to be preserved in their original state. The same can be said for the equivalents in other areas of the Mediterranean and of the Near and Middle East. The sites analysed so far, with the help of Google Maps, are enough to ascertain that the method was not limited to Venice. Also in this case, it would be desirable to build up a substantial corpus of analysed examples, to further and invigorate the recognition of this surprising, long-forgotten language.