

The Ottoman Sundials In Aiello del Friuli

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Aiello del Friuli - 2200 inhabitants - 13 km² .

Aiello del Friuli is a small town in northern Italy (about 120 km - 75mi - from Venice) where local dialists have built more than 80 sundials, about 20 of which are collected in a large square called "Courtyard of the Sundials". For this reason the town is also called "the sundials town".

Since 2001, every year on a Sunday in late May, they have held an event called "The Sundial's Feast" during which, in addition to various attractions, a competition is held between four sundials built during the year. The sundials described below were designed by Gianni Ferrari and drawn by Renato Devetak in 2010.

Introduction

The Islamic sundials that we built in the Courtyard of the Sundials in Aiello del Friuli, finished in March of 2010, are typical Ottoman sundials: their look is inspired by some sundials of the XVII-XVIII centuries, present in Cairo or on the walls of some Mosques in Istanbul, with the necessary changes to adapt them to the place and to the declination of the wall on which they were painted.

Since in that epoch, both in Turkey and in the Muslim countries, equal hours were already in force and clocks were already common on buildings and towers, the sundials were not used to read the time of the day, but were built only to give the instants of the beginning of the periods in which the prayers of the Islamic religion should be recited: instants that cannot be given by mechanical clocks.

Almost all the sundials in this epoch are vertical, drawn on the walls of palaces or Mosques, in such position to be easily viewed by those who passed in the city streets.

The three new sundials that we have built are, to our knowledge, the first vertical Ottoman sundials, with only the lines of the Islamic prayers, that have been built in Europe for many centuries and also in the world in the last 100-150 years.

In April 2010 one has been realized in Bremen (Germany) by Reinhold Kriegler and, finally, another, very great, is nearing completion in Reggio Emilia (Northern Italy) by the Italian dialist Renzo Righi. A horizontal dial of this type, a copy of one in Topkapi (Istanbul), has been realized in 2009 in St. Louis (Missouri) by Roger Bailey.

Our dials are all calculated for the Latitude of 45° 52' 21" N, for a vertical plane with a declination of 56° 33.6' W and are contained in rectangles with dimensions of 1250x1120 mm (about 50x44").

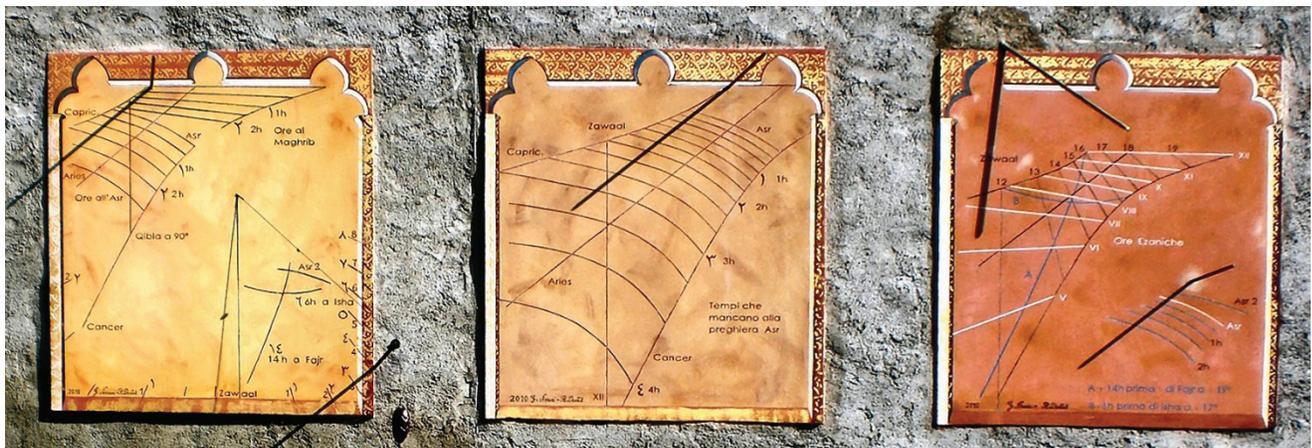


Fig.1 - The three sundials in Aiello del Friuli

RIGHT SUNDIAL

The dial is similar to that present on the southwest wall of the New Mosque (Yeni Cami) in Istanbul, directly engraved on the stones of the wall and with dimensions of around 280x320 cm (110x126”).

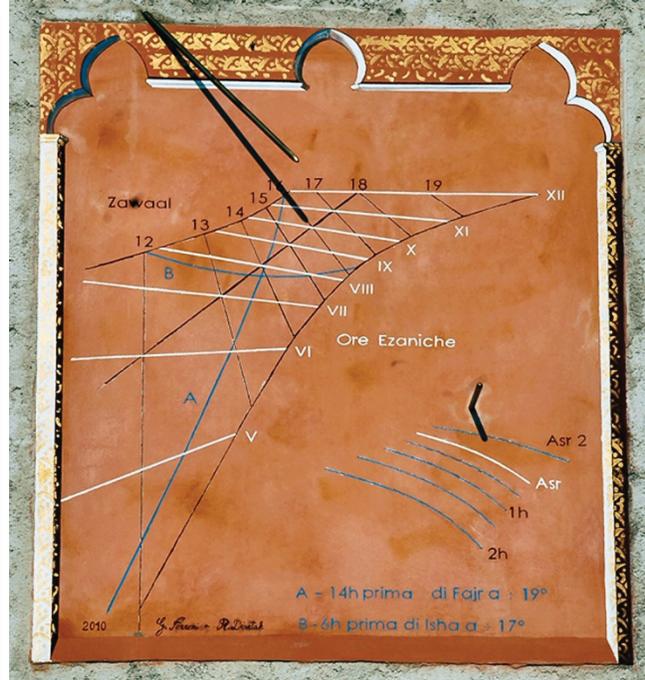
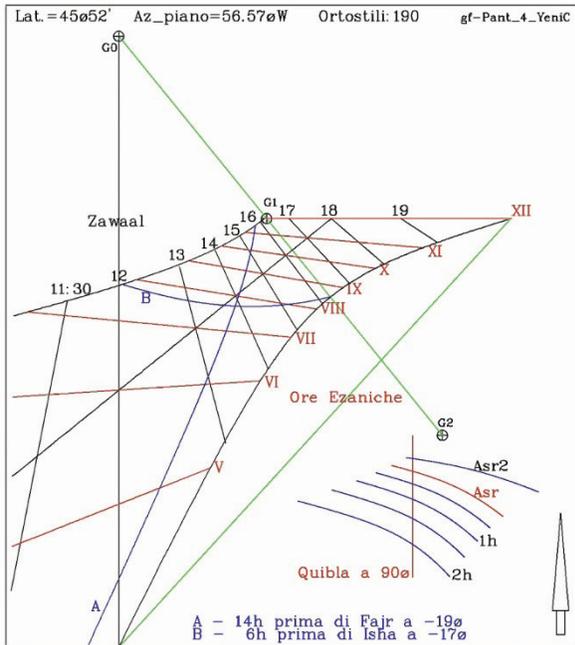


Fig.2a,2b - The dial of the New Mosque in Istanbul and the modern reconstruction.

Fig.3 - The sundial in Aiello

Today there is still present a strong long gnomon, about 40cm long, but there is no trace of the polar style placed on the extension of the meridian line that delimits the curves on the left: in the reconstruction this limit has not been respected.

The original sundial has:

- the lines of the hours of solar time every 20 minutes, traced inside the solstitial lines;
- the lines of the hours that remain until sunset (Italic hours), also marked every 20 minutes (until the diagonal line);
- the meridian line;
- the daily lines of the beginning of the zodiacal signs, identified above by "strips" with the names or the symbols of the signs;
- the lines of the first and of the second Asr;
- a line that points out the instants when there remains 60° of hour angle, that is 4 hours, until the evening prayer Isha;
- a line that points out the instants when there remains 210°, that is 14 hours, until the dawn prayer Fajr.

In the reconstruction, to make the lines most visible, the intervals were adjusted to a value of 1 hour, the daily lines of the zodiacal signs are not traced, the lines of the Ezanic hours (Turkish Italic) are limited to the zone between the solstices and the lines of Asr are brought outside with a second gnomon placed in G2.

Since the lines of the Ezanic hours give the time to the sunset prayer Maghrib and the meridian line gives the instant of the Zuhr prayer, this sundial contains lines related to all the five Islamic prayers.

In this clock the center G0 of the solar time dial is placed in such a way to allow the polar style "to lean itself" to the summit of the gnomon in G1: in this way G0, G1 and G2 are aligned with the substilar line.

CENTRAL SUNDIAL

The dial is similar to that engraved on a wall of S. Sofia Mosque in Istanbul. It includes only the noon hour line and 13 lines that give times to the afternoon prayer Asr.

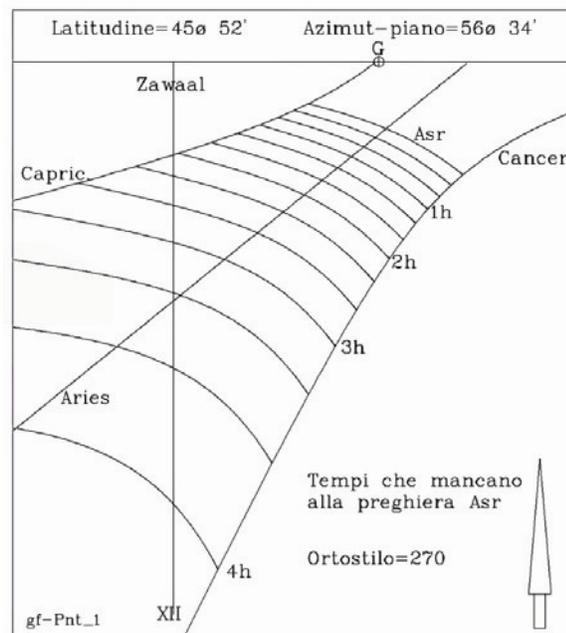


Fig.4a, 4b - The sundial of S. Sofia Mosque in Istanbul and the modern reconstruction

On the dial we see:

- above, the gnomon, perpendicular to the wall, placed in the point G and 290mm long (in the original dial this style is today deformed and folded);
- at left of the gnomon, the vertical line that crosses the whole panel is the noon line, called Zawaal.
- 13 lines almost parallel: the upper one indicates the beginning of the period when Asr prayer must be recited, while the others show how much time must pass to arrive at this moment. In the drawing lines are shown every 20 minutes (in the original sundial the lines are not individualized by time in minutes but by degrees of hour angle, a line every 5°).
- The hyperbolas of the solstices.
- The equinoctial line. In the original dial we read also the words "Aries" and "Libra."

The original clock is supposed to have been built in the 10th century from Egira, i.e. the sixteenth century, and restored at the time of the sultan Abdülmecid I (1823-1861).

LEFT SUNDIAL

The third clock is the reconstruction of a gnomonic complex engraved on a stone plate that was originally on the wall facing West of the Al Hakim Mosque in Cairo and that is now preserved in the Cairo Islamic Museum.

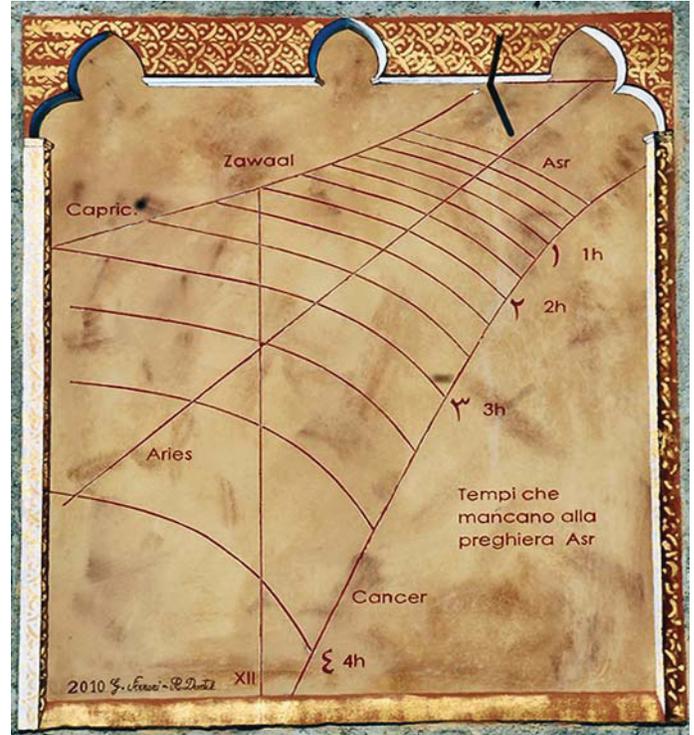


Fig.5 - The sundial in Aiello

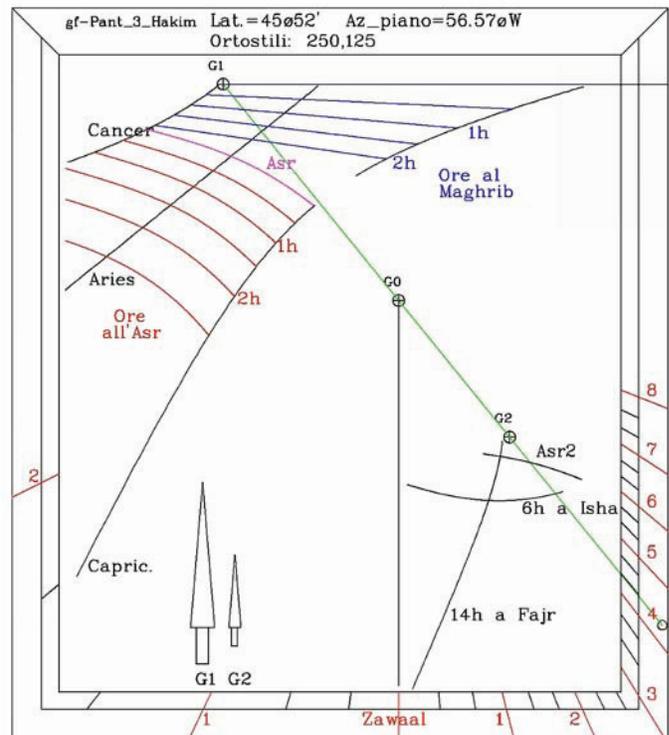


Fig.6a, 6b - The sundial of the Al Hakim Mosque in Cairo and the modern reconstruction

The instrument consists of three separate dials in "Ottoman" style.

Today in the original the engravings are difficult to see and partly almost invisible. The instrument, built by Al Hakir Muhammed in the year 1040H (1630-31), is very similar to two other sundials, one in the Islamic Museum and the other in the Anderson Museum, both in Cairo.

There are three different shadowing elements: a polar style from the central point G0, an orthostyle in the top left (point G1) and a second orthostyle, of the same length as the first one, placed in the point G2, in the right inferior quadrant of the plate.

The first dial G0

The first clock marks the local solar time.

The polar style, originally almost certainly a metallic rod, was leaning against the gnomon G2 and then it was on the substylar line.

The graduations every 60 and 20 minutes are indicated on the U-shaped frame surrounding the instruments. Due to the declination of the plane, the hours are shown from 2 hours before noon (modern 10 am) to 8 hours later.

On the noon line is the word "Zawaal": this line also coincides with the meridian line of the dial with gnomon in G2.

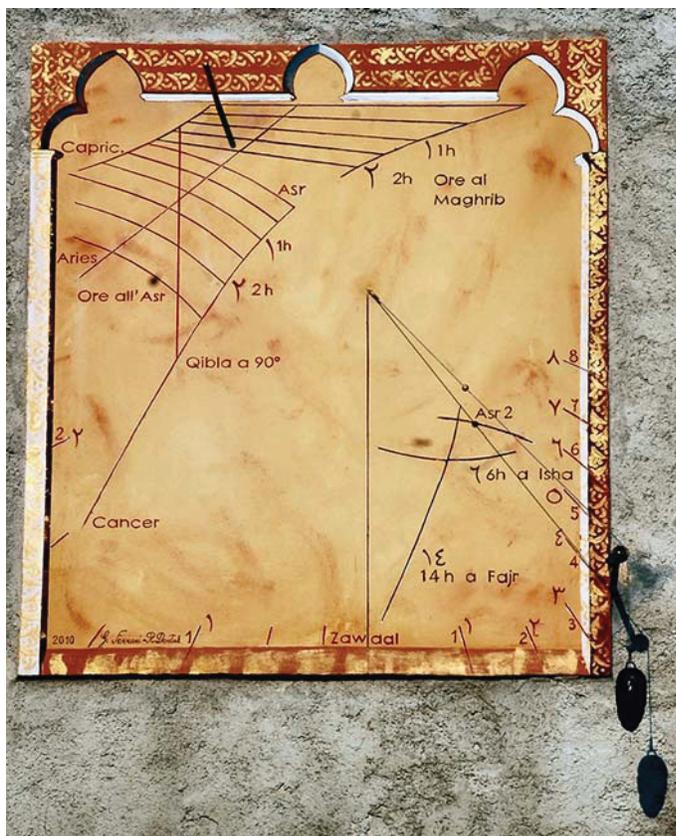


Fig.7 - The sundial in Aiello

The second dial G1

The shadow of the extremity of the gnomon in G1 had a quadruple function: it served to indicate the time remaining until the Asr prayer, the exact instant of it, the time remaining until sunset, i.e. to the Maghrib prayer, and the Qibla, i.e. the direction of Mecca.

When the end of the shadow hits the vertical line Qibla, if the observer looks towards the Sun, then Mecca is located exactly on his left.

Near to the curve of Asr there are 5 other curves (8 in the original dial) almost parallel: they give some instants before the Asr prayer, from 1h to 2h 30m, with intervals of 30m.

On the zone of the dial right of the gnomon G1, in the original plate the lines of the hours to sunset (Italic hours lines) can be barely glimpsed: also they had intervals marked at 20m (30m in the reconstruction), from 2 hours before sunset.

The third dial G2

In the third clock we find only three curves:

- the curve of the second Asr (when the period devoted to this prayer ends).

- The curve indicating 6 hours remain before the end of evening twilight (Isha prayer); in the original plate near this curve is the writing "90 remain to safak", where "safak" is the twilight and 90 are the degrees of hour angle.
- The curve indicating 14 hours remain before the beginning of the morning twilight (Fajr prayer). In the original plate near this curve is the writing "210 degrees remain to fecr" where "fecr" means "the red of the dawn."

Addendum

The 5 prayers of Islam are:

- the prayer of the dawn called Fajr (الفجر), whose period ranges from the beginning of the morning twilight, when the aurora appears, to the rise of the Sun;
- that of the noon, called Zuhr or Dhuhr (ظهر). It has to begin immediately after noon (instant called Zawaal), when the Sun has just crossed the meridian, and to finish at the beginning of the following prayer Asr;
- the most important prayer, that of the afternoon, called Asr (عصر) that can begin when the shadow of an object is equal to its shadow at noon increased by its height;
- the prayer of sunset or of the evening, called Maghrib (مغرب);
- the prayer of the night called Isha'a (العشاء) that has to be recited at the beginning of the night, i.e. at the end of the astronomical twilight.

Ezanic hours

The Ezanic hours correspond to our Italic, with the beginning of the day at sunset. But unlike Italic hours, the day is divided into two cycles of 12+12 hours and not into one of 24. In such a way at sunset they have hour XII, and on equinoxes, at noon, hour VI. See: <http://www.ilpaesedellemeridiane.com/> and <http://www.ilsoleiltempo.it/mappaeng.htm>.

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Gnomonics Up North « *Le Gnomoniste* » (1993-2010)

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In this short article, I would like to offer a reflection on my experience as the editor of a bulletin about Gnomonics. I consider my role as the editor of "Le Gnomoniste" as being a bit different from the typical role of a journal editor.

First, I will discuss some of the specificities of "Le Gnomoniste" and the two aims of the Journal. Then, I shall describe the role of the Editor towards the readers and the members of the Quebec Sundial Society (QSS). Finally, I will use a new direction given to the Bulletin when the editor is also a writer in "Le Gnomoniste": the symbolic representations of a sundial.

Specificities and aims of the Bulletin

I had in mind to edit a journal that would follow two objectives: -To present the dials and the dialists from the territory of Quebec, using the history, the sociology and the characteristics of the specific society (Nation québécoise) living in French in North America; -To promote and introduce the international experience of Gnomonics for the benefit of the members of the QSS.

I had an idea of the specificities of what would justify its presence among other Sundial Journals. First, "Le Gnomoniste" would be a magazine published in *North America*, in *French* and for the members of