

Reinhold R. Kriegler, Bremen:

A modern vertical Ottoman sundial for 53, 7° Nord

Originally I had dreamt to build a beautiful Islamic sundial for the wall of the **Fatih Mosque in Bremen!**

I had documented **the construction of the minaret** of this mosque in 1998 and have later on scanned the paper-copies of my photos and created the link <http://www.ta-dip.de/fatih-moschee.html> , which turned out into one of the most popular links of my website, thousands of times visited! I proposed my sundial idea to some officials of the mosque.



Fig. 1: The Fatih Mosque in Bremen



Fig. 2: RK and Hodyscha Sükrü Kural



Fig. 3: RK with Deviator at the wall of Fatih Mosque

In February 2004 I went there to determine the wall deviation with my deviator tool.

The mosque showed no interest. I waited several years in case they would change their mind. However I saw that this waiting was for nothing and so I decided to build such an Islamic sundial **for myself**. When **Gianni Ferrari** reported about his **Ottoman Sundials calculations** for friends in Northern Italy I asked him whether he would also calculate one for me in **Kopernikusstraße in Bremen**. I was so delighted about his very quick and very positive answer!

Reinhold,

I will be happy to calculate an Islamic (or best an Ottoman) sundial for you!

...

I am waiting your data :-)

Soon after not only the calculation and drawing arrived at me via internet, but also manifold explanations and suggestions and supports:

Reinhold,

I send to you attached the drawing in JPG and DXF format (DXF for AutoCAD) of the Arab sundial calculated for your latitude and for the declination of your wall.

The DXF file can be printed in the dimension that you want.

In the drawing there are:

- A sundial with solar time graduated in hours, 20 and 4 minutes (15, 5, 1 degrees of hour angle). The noon line coincides with the Zawaal time (Zuhr prayer). The lines start in G0.
- The meridian line of this sundial is also the noon line for the sundial with G1 gnomon
- 7 curves for the Asr prayer. Intervals equal to 20 minutes (5° of hour angle)
- The curve of the second Asr (gnomon G2)
- 7 lines for the hours to sunset; intervals = 20 minutes. Maghrib prayer
- One curve for Fajr prayer (gnomon G2)
- One curve for Isha prayer (gnomon G2)
- One line for the Quibla
- The lengths of the horizontal gnomons
- The line of the polar style. This style comes out from G0 and rests on G1

The measure (in the drawing) are :

- external rectangle 2000 x 1950 units
- inner rectangle 1700 x 1740
- Long gnomon 360
- Short gnomon 180

Data:

- Latitude 53.1146°N
- Wall declination 26.466°W

I think that it is sufficiently "Arab"

Ciao
Gianni

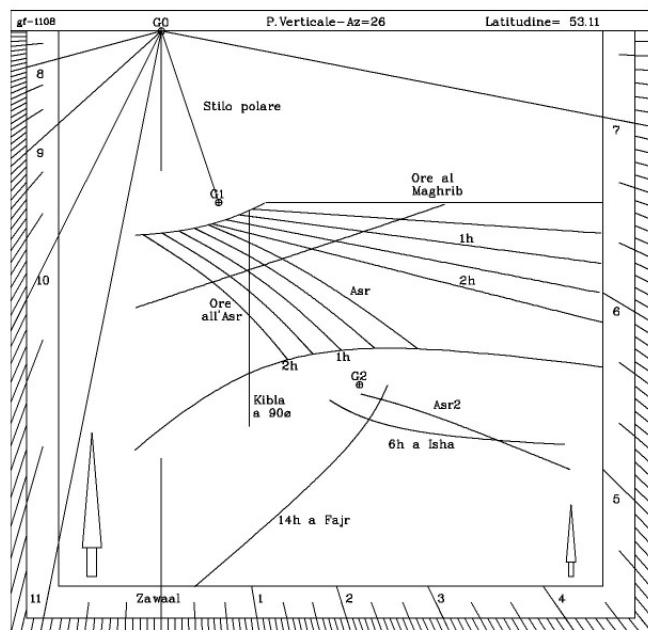


Fig. 4: The calculation-drawing by Gianni Ferrari

Later Gianni Ferrari added this:

NOTE 1– The Isha and Fajr lines are not complete because at your latitude in summer days the Sun cannot go under $h = -13.33^\circ$. The curves are calculated when the Sun has an altitude = -18°

I went with my memory stick to a copy shop and asked them for four big copies of this calculation drawing.

I mounted one of the copies on a provisional thin wooden board, fixed on a wooden frame and used an old brass triangle for the pole style- imitation and two threads, imitating the future cones for the prayer-lines and hung this out on the balcony to let the sun work and indicate the wanted shadow plays.

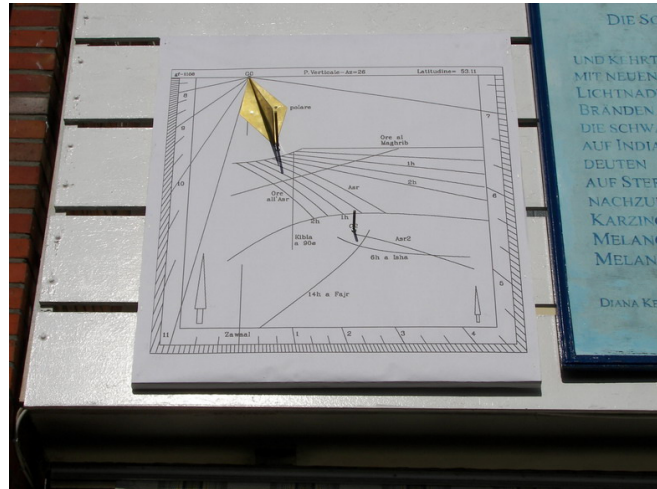


Fig. 5: The trial-copy hanging on the balcony

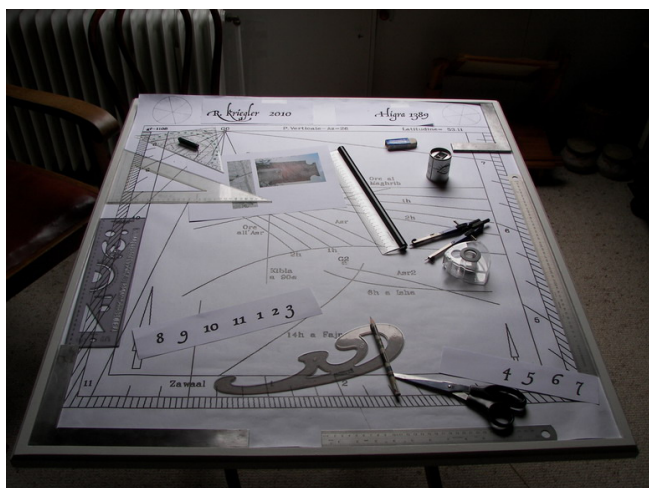


Fig. 6: RK painting the board

When I saw it would become good I started to build the real sundial. I visited a carpenter, “**Tischlerei Bischoff**”, who has his workshop only about 700 meters away from my house and took my drawing and some pictures of Ottoman sundials with me to explain the task. I asked whether they could cut a board for outside use and make a nice frame around it and also whether they could make the wooden cones and find a solution for the pretty big pole style construction. The master agreed and cut a part of the future board for me. With this board I went to a good colour-shop and

asked for suitable colours for pre-painting and final cover.

After the colours were dried I covered the board with big sheets of graphite paper and put the original sundial drawing on top. For the letters of the sundial design I used Gianni Ferrari’s computer generated letters in respect to his calculation work except of the hour numbers.



For the motto line and for the hour numbers I used **Operina Fiore** letters – invented by the ingenious Italian **Ludovico degli Arrighi**, whose letters I admire since many years very much. They are nowadays also available as pretty well cut computer-generated letter-fonts.

Fig. 7: Preparations to copy the sundial design to the board.

After this was done carefully I started to paint all lines and letters with black colour.

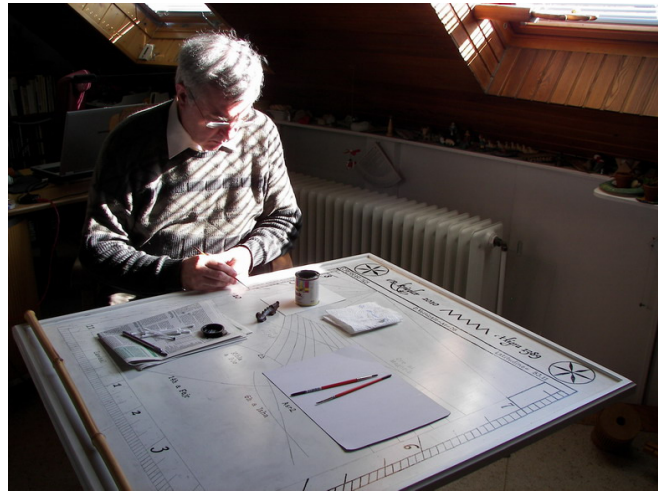


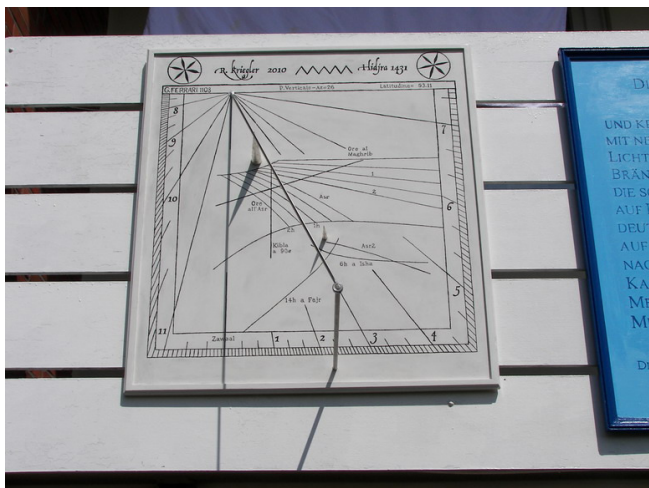
Fig. 8: RK painting the sundial design

After having finished this I took the sundial again to the carpenter in order to insert the pre-painted cones carefully and to arrange the construction of the very long pole style. On the other side of the street there is an excellent metal company **W. Unbescheiden** and the metal worker **Konrad Böttcher** very sensitively constructed and inserted the pole style.



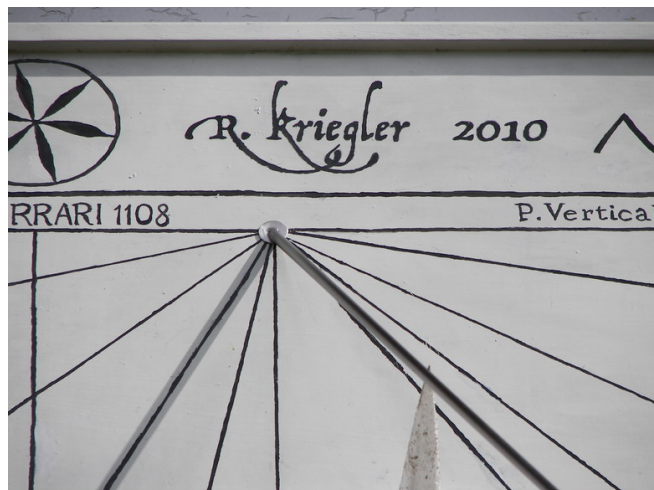
Fig. 9: Konrad Böttcher, handling the pole style

After I had brought the sundial home I silver-plated the two gnomons and added four hooks on the backside of the sundial to hang and fix it between the balcony boards.



Then the big day came: Since **Saturday, April 18** my vertical Ottoman sundial is now hanging on the balcony and I was very happy to see how precisely the sundial is indicating all wanted values.

Fig. 10: The Ottoman sundial at local noon



In the motto line you will find two Naniflowers (Hexafoliae). In case you want to get more information about this sign, which is used on sundials in several countries, I would like to ask you to visit my website and then chose the link “From Naniflower to Hexafolia”

<http://www.ta-dip.de/sonnenuhren/sonnenuhren-aus-nah-und-fern/s-ue-d-a-m-e-r-i-k-a/b-o-l-i-y-i-e-n/from-naniflower-to-hexafolia.html>

Fig. 11: Detail

Frank King has carefully examined my little article about this Ottoman sundial at www.ta-dip.de and has put a good number of excellent questions of which I would like to quote at least the first one:

“1. Gianni's notes refer to "7 lines" for the hours to sunset (20-minute intervals). I see 5 lines on the dial (30-minutes intervals). Is this just to make the dial less cluttered?”

Gianni Ferrari answered Frank King’s question:

“Yes, in a first time I had thought to an interval of 20m (5°), as in the Istanbul sundials and I described the curves to Reinhold.

Subsequently to decrease the number of lines (Too many!) also for the different declination of the wall, I passed to intervals of 30m. In total always an interval of 2 hours.”

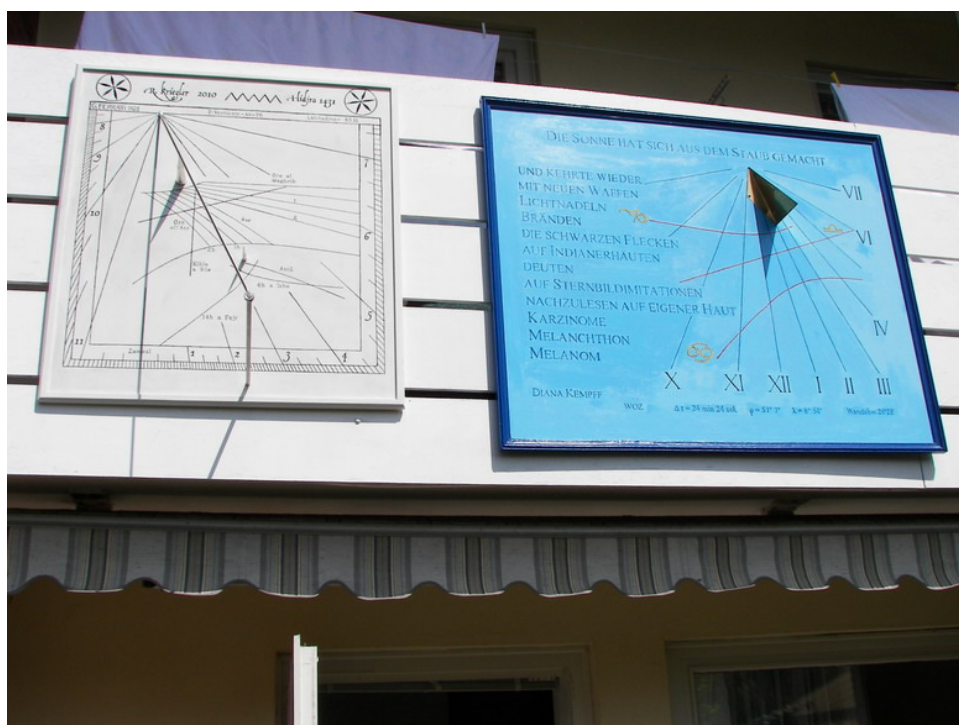


Fig. 12

On April 27, 2010 Gianni Ferrari wrote this in the Italian language sundial mailing list:

Da alcuni anni poi ho iniziato ad annoiare amici gnomonisti insistendo affinché costruissero uno di questi strumenti e oggi posso informare che ne sono stati realizzati 3 ad Aiello nel Friuli (completati alcuni mesi fa) , uno in Germania dell'amico Reinhold Kriegler , installato negli ultimi giorni, e infine un altro, molto grande, è in via di ultimazione a Reggio Emilia per mano di Renzo Righi.

Sono questi i primi orologi verticali di tipo Ottomano, con le sole linee delle preghiere dell'Islam, che sono stati costruiti in Europa e, per quanto a mia conoscenza anche nel mondo, negli ultimi 100-150 anni. I disegni originali sono, nel bene e nel male, opera del sottoscritto ☺

L'orologio di Reinhold Kriegler è il primo al di là delle Alpi e l'unico ad una Latitudine abbastanza alta (53°) : lo potete vedere, insieme a una lunga spiegazione (in tedesco e in parte in inglese), nel suo sito <http://www.ta-dip.de/sonnenuhren/meine-sonnenuhren/ottomanische-sonnenuhr.html>

On April 28, 2010 Gianni Ferrari wrote this in the English language sundial mailing list:

“The clock by Reinhold Kriegler is the first one in Europe, beyond the Alps, and the only one in a place with a high Latitude (about 53°): You can see it, together with a long explanation (in German and partly in English), in his site <http://www.ta-dip.de/sonnenuhren/meine-sonnenuhren/ottomanische-sonnenuhr.html> “