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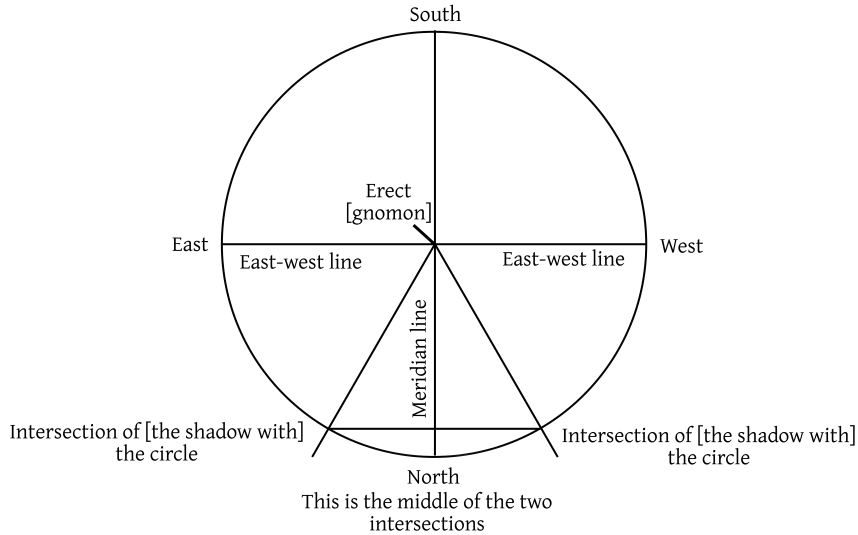
Naṣīr al-Dīn al-Ṭūsī. *Hall-i mushkilāt-i Mu'īniyya*, chapter nine. In F. Jamil Ragep, Fateme Savadi, Sajjad Nikfahm-Khubravan. *al-Risāla al-Mu'īniyya (al-Risāla al-Mughniya) and its Supplement*. Vol. II, *English Translation* (Tehran: Mirath Maktoob), 201-203.

point of Leo to Virgo 28°, approximately 43 degrees. Its days, from both points of view, are short. The fifth part is from Virgo 28° to the midpoint of Scorpio, 47 degrees. Its days are short perigean-wise, long co-ascension-wise. The sixth part is from the midpoint of Scorpio to the midpoint of Aquarius, one full quarter. Its days, from both points of view, are long. In no place have these two causes come together more than in this quarter. For this reason, it is best to make the beginning part or ending part of this quarter the starting point, so the difference will always be additive or subtractive. If the starting point is taken to be at the beginning part of [this] quarter, the true [days] will always be in excess of the mean [days]. If the starting point is taken to be at the ending part of [this] quarter, the mean [days] will always be in excess of the true [days]. This becomes quite clear in practice.

### Section [Nine]

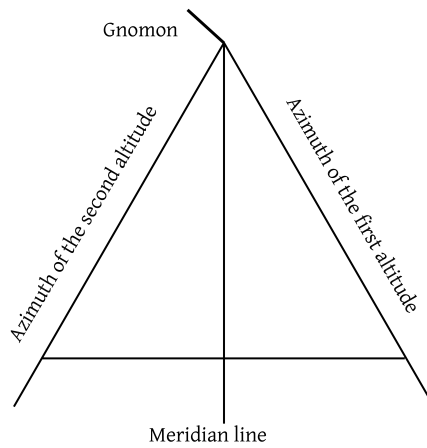
#### On Depicting the Indian Circle, the Azimuth of Cities, and Other Matters

[1] In Chapter Twelve of Book III, two methods have been presented to determine the meridian line. One is the Indian circle whose illustration is thus:



[Figure 1]

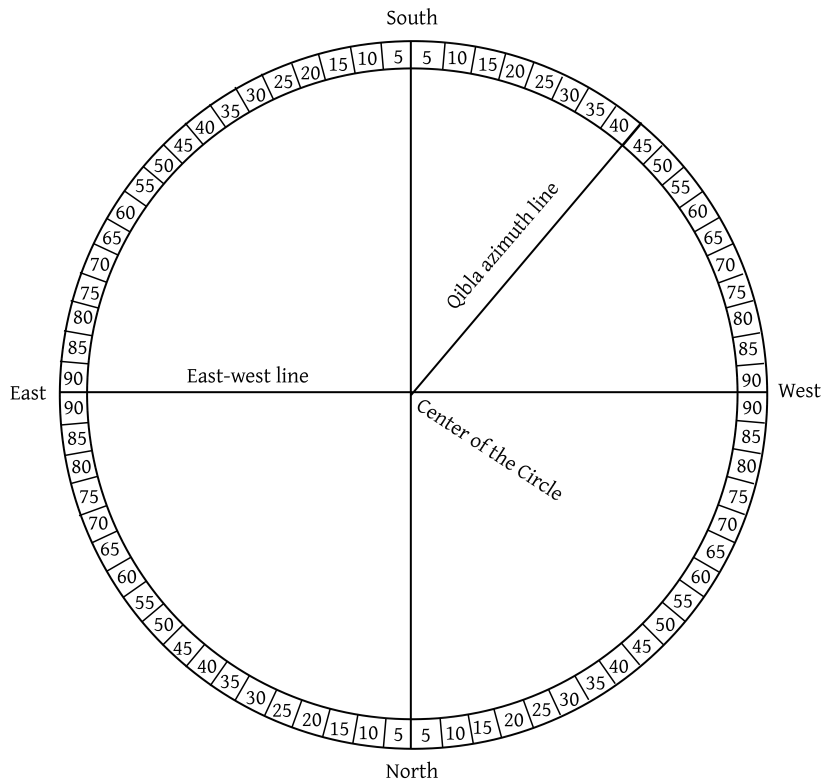
[2] The second method, by means of which the meridian line is found by the observation of two altitudes without positing a circle, is according to this illustration:



[Figure 2]

[3] When the meridian line is obtained, with the east-west line falling at right angles to it, and one marks the center of a circle at the point of intersection, and the horizon circle is drawn about it, resembling the Indian circle, then a figure will appear from [whose] circle one may

obtain the azimuth of cities. [This will be] in the manner that the circle is divided into four parts, each quarter into ninety parts. [In the amount of] the value of the azimuth of the city whose azimuth we wish to know—which can be found in practical handbooks—we move [on the circle] in the direction [of that city] and draw a line from the center to this part, so that the city’s azimuth is designated. As an example, we have taken the azimuth of Mecca to be 40 degrees in the [following] illustration, and we have drawn the azimuth line [in that amount] from the south toward the west, as is clear in the figure:



[Figure 3]