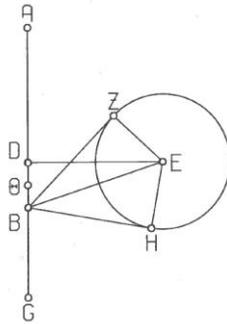# Ptolemy on the "Bisection of Eccentricity"

Fig. 10.2

"But since it is not clear whether the uniform motion of the epicycle takes place about point D, here too we took two greatest elongations one as evening-star [48$1/3°$] and the other as morning-star [43$7/12°$] in each of which the mean motion of the sun was a quadrant from the apogee…. Therefore, where BE=60;3 and the radius of the epicycle is 43;10, BD≈ 2½ But we showed that the distance between B, the center of the ecliptic, and the center of the eccenter on which the epicycle is always carried, is 1¼ in the same units; thus it is half BD." [p. H303]

"For the other three, Mars, Jupiter, and Saturn, the hypothesis which we find for the motion is the same and like that established for Venus, namely one in which the eccenter on which the epicycle center is always carried, is described on a center which is the point bisecting the line joining the center of the ecliptic and the point about which the epicycle has its uniform motion; for in the case of each of these planets too, using rough estimation, the eccentricity turns out to be about twice that derived from the size of the retrograde arcs at greatest and least distances of the epicycle. However, the demonstrations by which we calculate the amounts of both anomalies and the apogees cannot proceed along the same lines for these planets as for the previous two, since these reach every possible elongation from the sun, and it is not possible, as it was for the greatest elongations for Mercury and Venus, when the planet is at the point where our line of sight is tangent to the epicycle. So, since that approach is not available, we have used observations of their oppositions to the mean position of the sun to demonstrate, first of all, the ratios of their eccentricities and [the positions of] their apogees. For only in such positions [of the planets] do we find the ecliptic anomaly isolated, with no effect from the anomaly related to the sun." [p. H316]