

Clearing the Lunar Distance Graphically.

The true distance can also be found approximately with the compasses, and the scale of chords, by the following rule. The letters referred to are those shown in the example (p. 74), where the same distance, &c., as given in the two previous examples are used in the projection.

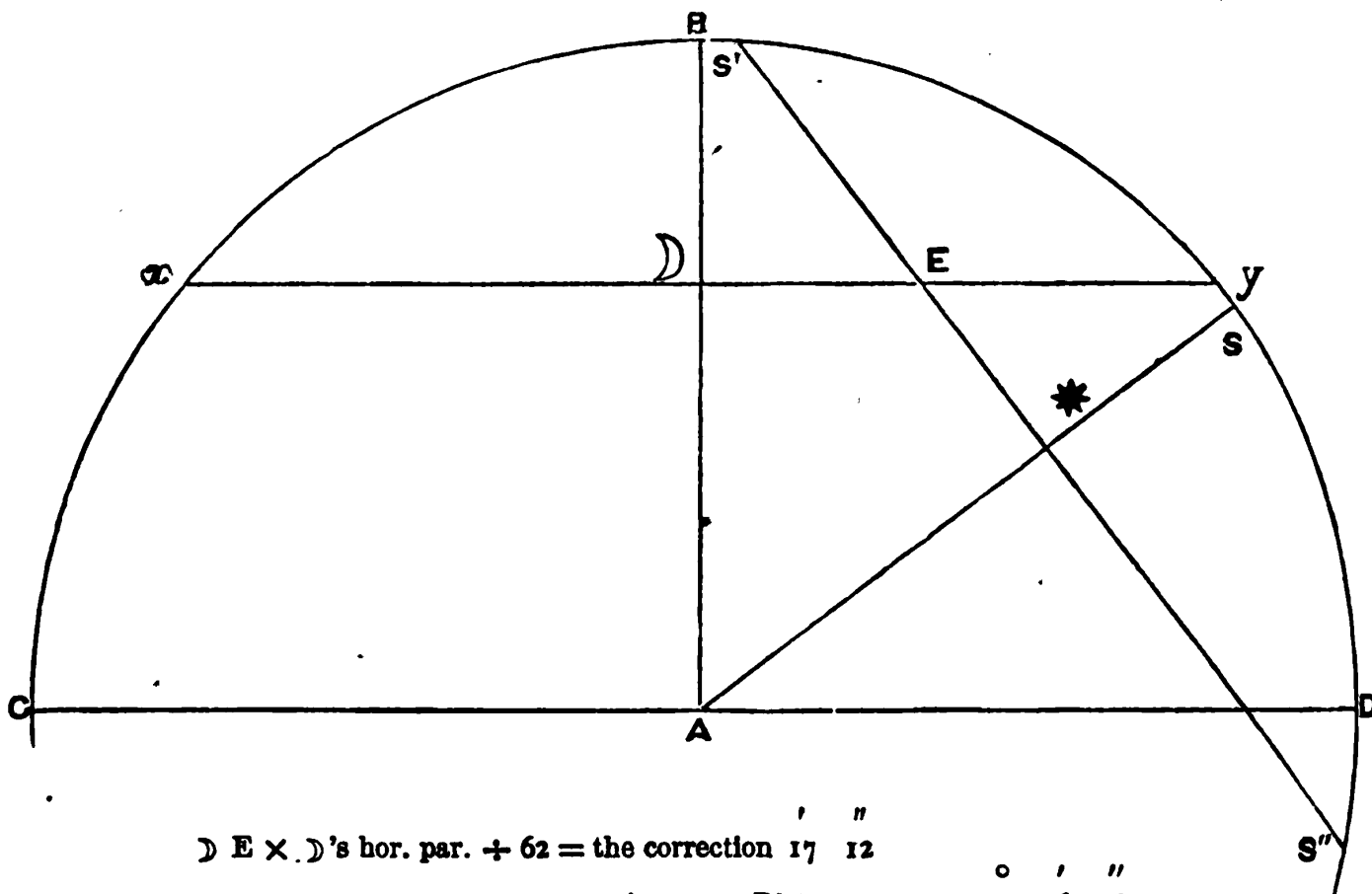
With the compasses take 60° from the scale of chords, and describe the semicircle $D B C$, and on the diameter $C D$ erect the perpendicular $A B$; mark it D . On the right hand side of this line from B to S , lay off the apparent distance between the two bodies, taken from the same scale of chords. Subtract the moon's apparent altitude from 90° , and, taking the result in the compasses as measured from the scale of chords, set off this distance on each side of B to x and y .

Subtract the sun's, star's, or planet's altitude from 90° , and, taking the result in the compasses, as measured from the scale of chords, set this distance off on each side of S to S' and S'' . Draw the lines $x y$ and $s' s''$, marking the point of their intersection E ; then is $D E$ the line of correction, which measure from the scale of chords, if the line $s' s''$ intersect the line $x y$ to the right of the line $A B$, the correction is subtractive; but if to the left, it is additive.

Multiply the line of correction by the horizontal parallax, expressed in minutes and decimals of a minute (as regards the seconds), and divide the product by 62 when the correction is subtractive; but when additive, divide by 53; the result in either case is the correction to be applied to the apparent distance to get the true distance. This projection will, in all suitable cases, give a close approximate to the results of rigorous computation (in the present example within $1''$), but it will be well to bear in mind that altitudes taken either too near the horizon or the zenith are, for various reasons, most liable to error. This remark applies, however, to all methods alike. The chief use of this method is that it serves a check on computation. Great care must be taken to measure accurately with the compasses. A little practice will enable any one, accustomed to use the compasses and scales, to clear a lunar distance in a very short space of time. When the distance is greater than 90° it will not be advisable to use this method.

Graphic method of clearing a Lunar Distance by the Scale of Chords.

	°	'	"		°	'	"		°	'	"
☾'s app. alt. ..	39	30	40	Mars' app. alt. ..	40	10	46	☾'s apparent dist.	53	16	58
☾'s co-alt. ...	50	29	20	Mars' co-alt. ..	49	49	14	☾'s horizontal parallax	55	17	



CE × ☾'s hor. par. + 62 = the correction	°	'	"
	17	12	
Apparent Distance	°	'	"
	53	16	58
Correction -		17	12
True Distance =	<u>52</u>	<u>59</u>	<u>46</u>

To compute the Altitude of a Heavenly Body.

It frequently happens that, at the time when a lunar distance is required, the altitude of one, or both, of the bodies may be so high, or so low as to prevent their being taken in an artificial horizon, in which case the altitude should be computed, the error of the watch on M. T. at place having been previously determined; and since the *Altitudes* employed in clearing the lunar distance are not required to the same degree of precision as those used in finding the time, it will be sufficient if they are computed within 20" or 30" of the truth.