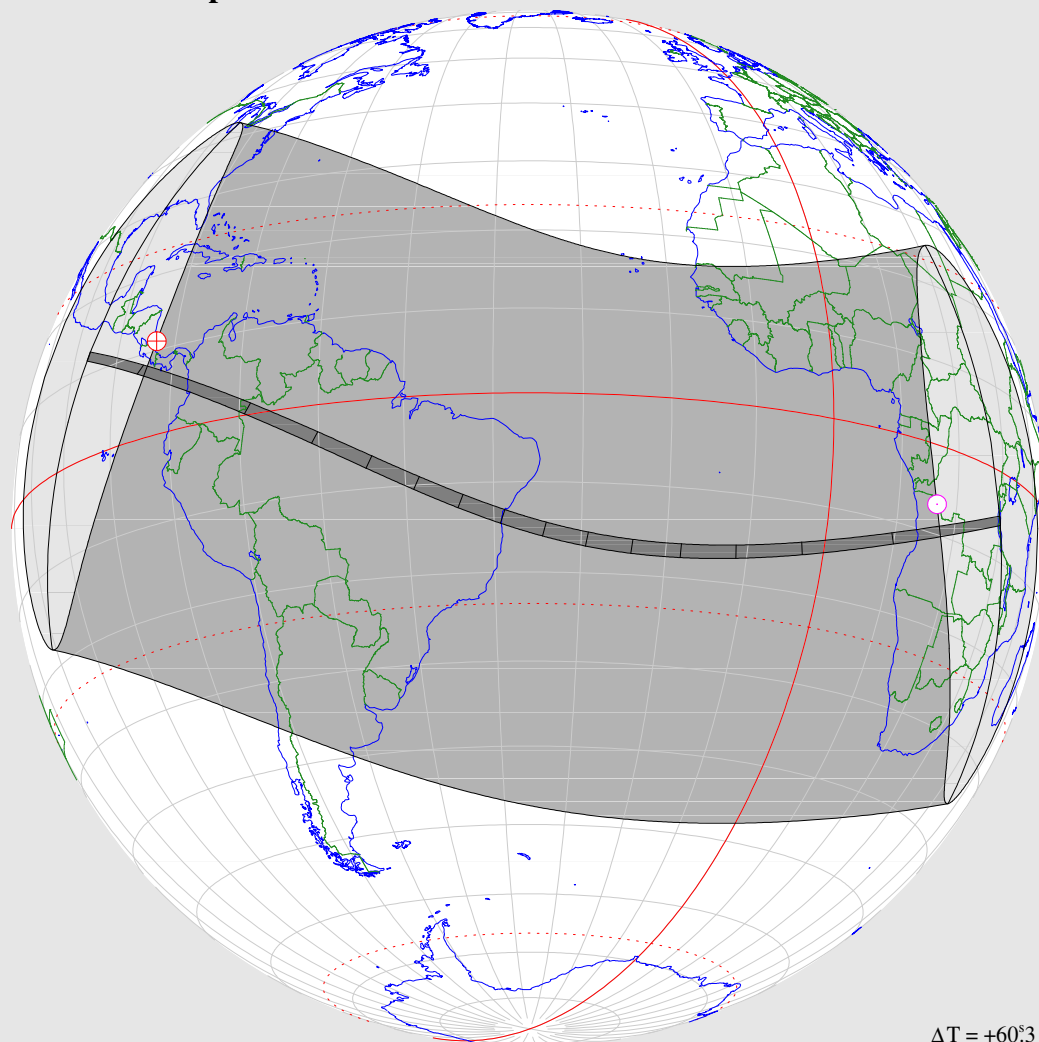


V. - Total Eclipse of the Sun

1640 November 13



$\Delta T = +60^s.3$

©HM Nautical Almanac Office

Globe centred on W 35°9' and S 15°2'

Circumstances	Time (UT)		Longitude	Latitude
	h	m	° / ' / "	° / ' / "
⊕ Eclipse begins; first contact with Earth	11	32.3	W 83 07.2	N 11 10.5
Beginning of northern limit of umbra	12	27.5	W 96 21.7	N 12 50.8
Beginning of centre line; central eclipse begins	12	27.6	W 96 33.0	N 12 21.2
Beginning of southern limit of umbra	12	27.7	W 96 44.4	N 11 51.6
Beginning of northern limit of penumbra	12	41.0	W 85 58.9	N 43 13.5
Beginning of southern limit of penumbra	12	45.9	W 111 22.1	S 17 53.8
Central eclipse at local apparent noon	14	09.2	W 36 05.6	S 14 44.2
End of southern limit of penumbra	15	34.6	E 46 10.8	S 35 28.0
End of northern limit of penumbra	15	39.8	E 22 03.1	N 25 53.1
End of southern limit of umbra	15	52.9	E 29 58.7	S 5 59.7
End of centre line; central eclipse ends	15	53.0	E 29 47.7	S 5 30.1
End of northern limit of umbra	15	53.0	E 29 36.8	S 5 00.5
⊙ Eclipse ends; last contact with Earth	16	48.3	E 16 21.1	S 6 40.9