

I. *An Observation of the end of the Total Lunar Eclipse on the 5th of March 1718. observed near the Cape of Good Hope, serving to determine the Longitude thereof. With Remarks thereon.*
By E. Halley, R. S. Secr.

THIS now better than thirty Years since I had a Dispute with some of the *French Geographers* about the Longitude of the Cape of *Good Hope*, said to have been observ'd by the Religious Missionaries sent to *China* in the Year 1685. By an Emerision of the first Satellite of *Jupiter*, they determined that Cape to be $1^{\text{h}} 11'$ or $17'$ grad. more Easterly than *Paris*, that is 20 grad. from *London*; which for the reasons I then gave, I concluded could not be more than 17 grad. See *Phil. Transact.* N^o 185. Very lately I have fallen upon an Observation which I believe will determine the Controversy in my favour: for I had accidentally a Journal of an Officer of the Ship *Emperor* put into my Hands, who in his return from *India*, on the fifth of *March 1718.* observ'd the End of a Lunar Eclipse, when the visible altitude of the Moons Centre was $13^{\circ} 25'$. he being then in the Latitude of $34^{\circ} 23'$ South and as they found afterwards, just 180 Leagues to the Eastwards of *Cape Bonne Esperance*. By Calculation I find that in that Latitude the Moon had that height at $7^{\text{h}} 17'$ P.M. and by comparing this Eclipse with that we observ'd with great exactness on *Febr. 11^o 1682.* (which agrees perfectly well with our Numbers) I conclude the middle of this to have been at *London* at $3^{\text{h}} 48'$ P.M. To which adding $1^{\text{h}} 46'$ for the

the Semiduration (this being very certain from the observ'd Continuance of the Eclipse of 1682.) the End will be found to have been at *London* at 5^h. 34'. The Ship was therefore in a Meridian 26° to the Eastwards of *London*: But she was at that time 180 Leagues to the Eastwards of the *Cape*, which distance in that Latitude gives eleven Degrees of Longitude; this therefore being deducted from the Longitude of the Ship, leaves just 15 *grad.* or one Hour, for the difference of Meridians between *London* and the *Cape*. So that by this account the *Cape* is yet nearer our Meridian than I had formerly made it, and near six Degrees nearer than *M. De la Hire* places it in his *Tables*.

This Eclipse was attended with all the Circumstances requisite to make the Conclusion as certain as the nature of the thing will admit of: For the Moon was nearly in *Perigæo*, and the Eclipse almost central; for which reasons she emerged out of the Shadow as swiftly as possible: The Sea was very smooch, there having been little Wind for above 30 Hours before; and the Moon was not too high to be well observed with a Forestaff. Nor were they long at Sea before they made the Land, for in less than five Days, on the tenth of *March* at Noon, they had past *Cape d'Agulhas* the most Southerly Promontory of *Africa*, which then bore from them *North East*, about seven Leagues distant. The End of this Eclipse, though not visible here, might have been seen in *Germany*, both at *Nuremburg*, *Leipsick* and *Berlin*, but we cannot learn that it was any where observed there; however our Numbers in this Case may be securely relied on.

On this occasion it may not be amiss to insert an Observation or two I procured to be made at the *Cape*, by Mr *Alexander Brown* a *Scotch* Gentleman, who went to reside in *India* on our Companies account. He carried
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with him a very good *Brass Quadrant* of above two Foot Radius, and at the *Dutch Settlement* at *Table Bay*, having rectify'd his *Pendulum-Clock* by correspondent Altitudes, on the 4th of *August* 1694, at 5^h. 59' *Minut*, the distance of the bright Limb of the Moon from the right Shoulder of *Orion* was observ'd to be 25° 3'. And the next Morning *Aug* 5. at 5^h. 21'. 12", the same Limb was distant from *Procyon* 25°. 57', and at 5^h. 36'. 48" from the *Lucida Arctis* 58°. 29'.

It were much to be wisht that the Moon had, either of these Mornings, been accurately observ'd at *Greenwich* or *Paris*, or at some Place in *Europe*, whose Longitude from them is well known. But that failing us, I had recourse to the Period of the Lunar Motions, which is perform'd in 18 Years and ten or eleven Days, after which the Errors of our Lunar Computations return very nearly the same; and I found among my own old Observations, one that tallyed well with that of the 4th of *August*. *Viz.* Anno 1676. *July* 23°. 13^h. 11'. 35". at *Oxford*, I observ'd the Moon to apply to the Star in *med. Cello Tauri*, by *Bayer* markt. *A*. The Star at that time was distant from the Southern and nearest Cusp of the Moon by the Micrometer 20°. 32". and at 13^h. 17'. 15". when it seem'd to immerge up'n the bright Limb of the Moon, it was distant from the Northern Cusp 24°. 20"; but this less certain by reason of the hazey Air. The Star at that time was in α 28°. 56'. with 1°. 13'. 20". *North* Lat. whereby I found that our Lunar Tables, founded on *Sir Isaac Newton's* correct Theory of her Motion, gave her place at that time only two Minutes too slow; which Error being allowed on the 4th of *August* 1694, the result was, that 5^h. 59'. at *Cape Bonne Esperance* was at *London* 4^h. 53'. whence the difference of Longitude 16 $\frac{1}{2}$ degrees, sufficiently near what we had before determin'd.