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 Emersion of the first Satellite of *Jupiter*, they determined that Cape to be $1^h.\ 11'$ or $17\frac{3}{4}$ *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° 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°. 25'. he being then in the Latitude of 34°. 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 $7^h.\ 17'\frac{1}{2}$ *P. M.* and by comparing this Eclipse with that we observ'd with great exactness on *Febr.* 11°. 1682. (which agrees perfectly well with our Numbers) I conclude the middle of this to have been at *London* at $3^h.\ 48'$ *P. M.* To which adding $1^h.\ 46'$ 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 5ʰ. 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 ſmooth, 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 *Nurenburg*, *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 with

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′ *Manè*, 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 Arietis* 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 medio Collo 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 upon the bright Limb of the Moon, it was diſtant from the Northern Cuſp 23′. 20″; but this leſs certain by reaſon of the hazey Air. The Star at that time was in ♉ 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 16½ degrees, ſufficiently near what we had before determin'd.