

Read November 16, 1769.

XL. *Observation of a Solar Eclipse the 4th of June, 1769, at the Observatory at Aufthorpe, near Leeds, in the County of York. By J. Smeaton, F. R. S.*

	h	'	"
BEGINNING by mean time, A. M.	6	33	I
Middle - - - - -	7	26	38
End - - - - -	8	20	16
Total duration - - - - -	1	47	15
Digits eclipsed - - - - -	6	46	

N. B. The beginning and end of the eclipse were observed by an excellent $3\frac{1}{2}$ feet treble object-glass telescope, constructed by Dollond, with the smallest magnifier, which enlarged the diameter somewhat above 80 times. As there is no defect in quantity of light from the Sun, the object glass was contracted by an aperture to $2\frac{1}{2}$ inches, and the object was perfectly sharp and distinct.

The quantity was taken by a parallel wire micrometer, upon an equatoreal apparatus, which rendered it very commodious for the purpose ; by which the part of the Sun's diameter, remaining unclipsed, measured at right angles to a line joining the horns, was 889 such parts as the Sun's diameter, taken the same

same day at $1\frac{1}{2}$ in the afternoon, measured between two parallels of declination, 2041 .

The latitude I have not yet got so correctly as I expect to do; but I do not at present know, whether it exceeds or falls short of $53^{\circ}48'$. The supposed longitude is $6'$ of time west of Greenwich; this is deduced from its position with Wakefield, whose longitude is set down in Maskelyne's British Mariner's Guide, as determined from an observation of the transit of Venus, 1761.

The exact knowledge at what point of the Sun's circumference to look for the beginning (which was communicated to me by Mr. Maskelyne), I found of great use; insomuch that, I believe, I saw the first discernible impression; I have, however, allowed $2''$ for the time elapsed between the first perception, and the being sure it was the approach of the Moon that affected that part of the Sun's limb; and which latter only could be noted by the clock. The first approach did not, however, affect the Sun's circumference by any thing like a penumbra or shade; but began by some asperities of the Moon's limb, seeming to thrust themselves into that of the Sun; and which appeared before any continued part of the Sun's circumference was cut off; or, perhaps, it might be occasioned by the first approach of the Moon's limb, disturbing the little protuberances upon the Sun's circumference, occasioned by the undulation of the air, and which, when rendered exceedingly distinct, appeared almost like the teeth of a fine saw. This whole appearance, to a telescope less distinct, would probably look like a penumbra or shadow.

Some time before the great spot was immersed, there appeared two parts of the Moon's circumference more protuberant than the rest, near the right hand horn; which so remarkably interrupted the regularity of the curve, that it was taken notice of by all about me; and which, doubtless, was occasioned by two mountains upon the Moon's surface, remarkably higher than the rest; and I doubt not but the same thing will have occurred to other observers.

* * Mr. Smeaton was prevented, by clouds, from
 * observing the entrance of Venus upon the Sun,
 the evening before.

END OF PART I.