

XXIX. *An Account of an Occultation of the Star ζ Tauri by the Moon, observed at Leicester: By the Rev. Mr. Ludlam, in a Letter to the Rev. Mr. Maskelyne, Astronomer Royal.*

Reverend SIR,

Read June 4,
1770. **I** Here fend you an account of the occultation of the star ζ Tauri by the moon, as we saw it at Leicester April 28, 1770. The necessary observations for examining the clock, are subjoined, which I think should always be done by those who have not fixed observatories; or where their instruments are not well adjusted at first, and frequently examined afterwards. Without being thus particular, no one can judge what degree of credit may be afforded to such observations; and it has, besides, this advantage, that if a mistake should be made in the calculations grounded on them, any person versed in Astronomy can rectify it.

I beg the favour of you to communicate this to the Royal Society; and am,

With the greatest respect,

Their and your most humble servant,

Leicester, April 29, 1770.

W. Ludlam.

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The immersion was noted at $1x^h 41^m 7^s$ by the clock. I think it might be two seconds sooner, because the clock being of necessity at a distance from the telescope, the instant of the immersion was signified by striking upon a bell. The emersion was about $x^h 31'$ but with some uncertainty, the star being hid by a cloud at its first coming out.

By the observed transits of the sun and stars, the clock lost three seconds between the 25^{th} and 28^{th} . On the 25^{th} , by corresponding altitudes, the clock was $1' 46''$, 8 too slow; whence on the 28^{th} it was $1' 49''$, 8 too slow. This confirms the observation made by corresponding altitudes on the 28^{th} , by which it was $1' 50''$ too slow at noon: the clock was then losing at the rate of four seconds a day; whence, on the 28^{th} at $1x^h$, it was $1' 51''$, 5 slower than mean time. The equation of time on the 28^{th} at $1x^h$ was $2' 47''$, 5, whence the immersion was at $1x^h 45' 44''$ apparent time.

The Telescope made use of was one of Dollonds, with a triple object glass of $33\frac{1}{3}$ inches focal distance, and which magnifies 52 times.

Day of the month 1770	Transits Time by the clock Passage over						Object	
	First wire		Meridian		Third wire			
	M	s	H	M	s	M	s	
April 24	53	54	XXII ¹	54	42	55	27 $\frac{1}{2}$	} Sun
	56	6		56	53 $\frac{1}{2}$	57	58	
26	7	36	x	8	21	9	5 $\frac{1}{2}$	} Virginis
27	11	8	ix	11	55	12	41	
	3	39	x	4	25	5	9 $\frac{1}{2}$	} Virginis
	17	28		18	24	19	9	
	46	35		47	21	48	6 $\frac{1}{2}$	} Spica V
	53	24	XXIII	54	11	54	56 $\frac{1}{4}$	
	55	35		56	22	57	8	} Sun
28	7	9	ix	7	56	8	43	
	59	41	x	0	26 $\frac{1}{2}$	1	11	} Virginis
	13	30		14	25 $\frac{1}{2}$	15	10	
	42	36 $\frac{1}{2}$		43	23	44	8	} Spica V
	53	10	XXIII	53	57 $\frac{1}{2}$	54	44	
	55	21 $\frac{1}{2}$		56	9	56	55	} Sun
29	3	10 $\frac{1}{2}$	ix	3	58	4	44	
	53	0	XXIII	53	47	54	33 $\frac{1}{2}$	} Sun
	55	13		56	0	56	40	

Corresponding altitudes taken with an Hadley's quadrant of seven inches radius, by reflection from water.

Sun		April 25, 1770	
Double Alt. 65°		Index err. + 1 ^m	
Time by the clock.			
	Eastern Az.	Western Az.	Meridian
Up. limb	VIII 21 48 $\frac{1}{2}$	III 30 43	XI 56 15 $\frac{3}{4}$
Center	23 42	28 52	17
Low. limb	25 37	26 54 $\frac{1}{2}$	15 $\frac{3}{4}$
Second set. Doub. Alt. 67° 30'			
Up. limb	VIII 30 45	III 21 45	15
Center	32 40	19 49	14 $\frac{1}{2}$
Low. limb	34 35 $\frac{1}{2}$	17 53	14 $\frac{1}{2}$
Third set. Doub. Alt. 70°			
Up. limb	VIII 39 53	III 12 34 $\frac{1}{2}$	13 $\frac{3}{4}$
Center	41 50	10 41	15 $\frac{3}{4}$
Low. limb	43 48		
Mean of all three sets			XI 56 15.2
Cor. for $\frac{1}{2}$ interval 3 ^h 20'			— 16.3
Passage over true meridian			XI 55 58.9
Clock too slow			1 46.8
Sun		April 28, 1770	
Double Alt. 79° 11'		Index err. + 1 ^m	
Time by the clock.			
	Eastern Az.	Western Az.	Meridian
Up. limb	ix 8 12 $\frac{1}{2}$	ii 43 6 $\frac{1}{2}$	XI 55 39 $\frac{1}{2}$
Center	10 16	41 3	39 $\frac{1}{2}$
Low. limb	12 22 $\frac{1}{2}$	38 56	38 $\frac{3}{4}$
Mean			XI 55 39.5
Cor. for $\frac{1}{2}$ interval 2 ^h 20'			— 13.5
Passage over true meridian			XI 55 26
Clock too slow			1 50