XXXIII. *An Account of the Tranſit of* Venus *over the Sun, on* Saturday *Morning, 6th* June 1761, *at* Savile-Houſe, *about* 8″ *of Time Weſt of* St. Paul's *, London.

Read June 11, 1761. HIS Royal Highneſs the Duke of York, being deſirous of obſerving the rare phænomenon of Venus's paſſage over the diſk of the ſun, I had the honour of being commanded by his Royal Highneſs, to attend him on that occaſion at Savile-houſe, which was a place the moſt proper for that obſervation, on account of its remarkable elevation above all the neighbouring buildings, and conſequently above the groſs vapours of the town.

In obedience to theſe orders, on Friday, 5th June, I carried thither the inſtruments proper for this obſervation, together with an aſtronomical clock, made by Mr. Shelton, and the fellow of that which was laſt made for the Royal Obſervatory at Greenwich, and which ſtands in the tranſit-room, and went to the ſaid houſe on Saturday morning, at four o'clock, in company with the Reverend Dr. Blair, and Dr. Bevis, and immediately put the inſtruments in order.

The inſtruments, made uſe of on this occaſion, were a reflecting teleſcope of 18 inches focus, with a helioſcope adapted to it, and having a field of more than the ſun's diameter, proper for ſhewing Venus on the ſun's diſk, with great eaſe and ſatisfaction;

* N. B. St. Paul's is 22½″ weſt of Greenwich obſervatory.

and

and another reflector of 2 feet focus, with an achromic object-glaſs micrometer of 40 feet focus, being the ſame ſort of inſtrument with thoſe that were made, by order of the Royal Society, for Dr. Bradley, at the Royal Obſervatory at Greenwich; and for Mr. Maſkelyne, who went to St. Helena; and Mr. Maſon, who went to Bencoolen; differing in one particular from their inſtruments, which had only a common object-glaſs micrometer.

I intended to have meaſured the diſtance of Venus from each limb of the ſun, in chords parallel to the plane of the equator, and in chords parallel to the horizon, and alſo to have taken the appulſes of the limbs of the ſun and Venus to a vertical and horizontal wire, and had all the apparatus neceſſary for thoſe obſervations; but the cloudineſs of the morning prevented my putting any of thoſe methods into practice, for the clouds continued ſo cloſe, that we had no ſight of the ſun, till a quarter of an hour before ſix o'clock, when, through an opening, which laſted for about two minutes, Dr. Blair, Dr. Bevis, and I, plainly and diſtinctly ſaw Venus on the ſun, and concluded, that ſhe was then conſiderably paſt the middle of her tranſit. About a quarter after ſix, I made the firſt obſervation, which was, in meaſuring the diameter of Venus; and ſoon after, I meaſured her diſtance from the ſun's limb, in the direction of a line going through the ſun's center; and ſo continued meaſuring in the ſame manner, and ſometimes meaſuring the diameter of Venus, till near the internal contact; only about a quarter after ſeven, I meaſured the diſtance of Venus from the ſun's limb, in

a ſuppoſed direction of her tranſit line, or path over the ſun.

About half an hour after ſeven, the clouds diſperſed, and we had the ſun perfectly clear during the remainder of the tranſit. When Venus approached the internal contact, I took off the micrometer, and changed the magnifying power of the teleſcope, which, during the meaſurements, had been that of 70 times, into another of 140 times, and with this magnifying power, I obſerved the internal contact; in which, I think, I cannot have erred ſo much as two ſeconds, for the air was extremely clear, and at reſt. With the ſame magnifying power, I obſerved the total exit; and I do not think I have erred in this above five ſeconds, though this is a more uncertain obſervation than the former, and can by no means be determined ſo accurately as the internal contact; and what I have erred in this laſt obſervation, is rather in exceſs, in making the exit too late.

I have mentioned, above, the magnifying power of the teleſcope I uſed; becauſe I have found, by experience, that the different lengths of teleſcopes, their different magnifying powers, and their different goodneſs, as well as the different goodneſs of eyes, want of practice, and different ſtate of the air, will produce differences of times in thoſe ſort of obſervations.

Theſe obſervations were made in the preſence of his Royal Highneſs the Duke of York, accompanied by their Royal Highneſſes Prince William, Prince Henry, and Prince Frederick; her Royal Highneſs Lady Auguſta was pleaſed likewiſe to do us the honour of looking at this uncommon appearance.

Times

Times and meaſurements, taken at Savile-Houſe, on Saturday morning, 6th June 1761. Mr. Short obſerving, and Dr. Bevis marking down the times.

h	′	″			′	″	
5	46	37	firſt ſaw Venus on the ſun.				
6	15	12	diameter of Venus -	=	0	59.8	
6	20	44½	neareſt diſtance of the limbs		4	48.2	of the ſun and Venus.
6	31	05	ditto - - - - - - - -		4	28.5	
6	50	24	ditto - - - - - - - -		3	49.9	
6	52	38	ditto - - - - - - - -		3	44.8	
6	54	23	ditto - - - - - - - -		3	44.0	
6	59	37½	diameter of Venus - -	=	1	00.7	

Theſe preceding obſervations were taken in the intervals of clouds, and ſomewhat in a hurry.

h	′	″			′	″	
7	01	42½	diameter of Venus -	=	0	58.9	
7	05	36½	neareſt diſtance of the limbs		3	20.1	
7	08	05½	ditto - - - - - - - -		3	12.4	
7	09	28½	ditto - - - - - - - -		3	08.5	
7	11	27½	ditto - - - - - - - -		3	05.5	
7	12	53	ditto - - - - - - - -		3	01.3	
7	18	22	ditto - - - - - - - -		2	48.4	
7	19	54½	diſtance of the limbs in a		4	03.6	ſuppoſed line of Venus's path.
7	22	03½	neareſt diſtance of the limbs		2	37.3	
7	24	23½	ditto - - - - - - - -		2	32.2	
7	26	09½	ditto - - - - - - - -		2	27.0	
7	31	58½	ditto - - - - - - - -		2	13.7	
7	37	24½	ditto - - - - - - - -		1	58.9	
7	40	59½	ditto - - - - - - - -		1	49.5	
7	41	30½	diameter of Venus -	=	0	58.9	
7	43	20	ditto - - - - - - - -	=	0	58.9	
7	44	26	neareſt diſtance of the limbs		1	39.2	
7	47	30	ditto - - - - - - - -		1	30.2	
7	52	01	ditto - - - - - - - -		1	16.9	
7	55	41	ditto - - - - - - - -		1	08.4	
8	01	08	ditto - - - - - - - -		0	52.1	
8	04	32½	ditto - - - - - - - -		0	42.7	
8	18	21½	Internal contact by Mr. Short, through a reflector of 2 feet focus, magnifying 140 times.				
8	36	12½	Total exit by Dr. Blair, through a reflector of 18 inches focus, magnifying 35 times.				
8	37	05½	Total exit by Mr. Short, through a reflector of 2 feet focus, magnifying 140 times.				

The

The diameter of the ſun, in a horizontal direction, was meaſured juſt after the tranſit, and found to be $= 31' 30.8''$.

The clock at Savile-Houſe was ſeveral times compared with my clock in Surry-Street, from Friday evening, the 5th June, to Monday evening, the 8th June; ſo that I am as ſure of the time at Savile-Houſe, as if the obſervation had been made at my houſe in Surry-Street.

Ja. Short.

XXXIV. *Obſervations on the Tranſit of* Venus, June *the* 6*th*, 1761, *made in* Spital-Square; *the Longitude of which is* $4' 11''$ *Weſt of the Royal Obſervatory at* Greenwich, *and the Latitude* $51° 31' 15''$ *North*; *by* John Canton, *M. A. and F. R. S.*

Read Nov. 5, 1761.

HAving meaſured the diameter of Venus, on the ſun, three times, with the object-glaſs micrometer, the mean was found to be 58 ſeconds; and but $\frac{6}{10}$ of a ſecond, the difference of the extremes *.

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* With the ſame micrometer, the diameter of Venus was meaſured, off the ſun, twelve times, March the 29th, 1758, about noon; and the mean was $1' 1'' 42'''$; whence the diameter, at the time of the tranſit, ought, by computation, to have been $1' 0'' 19'''$.

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