

*XL. A Letter from M. Pingré, of the Royal Academy of Sciences at Paris, to the Rev. Mr. Maskelyne, Astronomer Royal, F. R. S.*

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Read Dec. 6, <sup>1770.</sup> I Should long ere now have sent you my American observations, could I have presumed you would have so far honoured them as to receive them with pleasure. With your permission, Sir, I shall in future direct to you, and at present send you my several observations in chronological order.

At Fort Royal in Martinico, on the new bastion, emergence of the first satellite, the 12th of May, 1769, at 16<sup>h</sup> 28' 23'' apparent time, serene sky; the satellite very near  $\alpha$ , with an achromatic telescope of five feet, having only two glasses for the object glass, and two plano-convex eye-glasses; the magnifying power about 140 times, made by M. l'Estang at Paris.

The 13th, emergence of the third satellite, at 10<sup>h</sup> 01' 00'' apparent time, very serene, the same telescope; at 10<sup>h</sup> 01' 22'' by M. de Fleurieu, captain of the king's frigate Isis, with an achromatic telescope 2  $\frac{1}{2}$  feet long, made at London by Mr. Dollond, a two-glass object-glass, and two plano-convex eye-glasses, the magnifying less than the former, but much clearer.

The 14th, emergence of the first satellite at 10<sup>h</sup> 57' 14'' apparent time, M. de Fleurieu with the same telescope. I had been much fatigued, and quitted my post.

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The same day, by several meridian altitudes of stars taken some to the North, some to the South, I found the latitude  $14^{\circ} 35' 49\frac{1}{2}''$ . M. de Fleurieu made it  $14^{\circ} 35' 54\frac{1}{2}'$ .

The 15th the rains began.

At Cape Francis in the island of St. Domingo.

June 3 we first perceived Venus entering on the Sun's disk.

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- at 2 26  $14\frac{1}{2}$  apparent time, with Dollond's  $2\frac{1}{2}$  feet telescope. M. de Fleurieu.
- 2 26  $16\frac{1}{2}$  apparent time, with an achromatic of 3 feet, by l'Estang. M. la Filiere.
- 2 26  $20\frac{1}{2}$  apparent time, with a common telescope of 2 feet, only 2 lenses. M. des Saqui Tourés.
- 2 26  $12\frac{1}{2}$  apparent time, with a five-feet achromatic. Myself.

After having given our eyes some respite, we returned to the telescopes ; and M. de Fleurieu perceived a luminous little circle all round Venus, not yet entered more than about one third of her diameter. This luminous thread made, to all appearance, a perfect circle with the part of the circumference of Venus already advanced on the solar disk. I likewise observed the same phenomenon, but a good while after M. de Fleurieu.

Venus appeared totally entered

	h	'	''	
at 2	44	45		M. de Fleurieu.
	44	41		M. le Chev. de la Filiere.
	44	50		M. Saqui des Tourés.
	44	44		Myself.

During both these observations, every thing was quiet and still, not a word uttered, to intimate that any one had observed the contact.

Stormy weather almost every night hindered us from observing the eclipses of the satellites. However, the 10th of June proving a clear night, afforded us an opportunity of determining the latitude of our observatory; which by meridian altitudes of several stars, both to the North and South, I determined to be  $19^{\circ} 47' 03''$ . The new church of the Cape, situated nearly in the middle of the town, may be about  $20''$  or  $25''$  more Southward than our observatory, whence its latitude  $19^{\circ} 46' 40''$  North.

As to the longitude, we had no other way but to take with our quadrant some altitudes of the moon's lower limb:

Mine were these:

Alt. °	Times by clock.			Apparent times.			
	h	'	''	h	'	''	'''
37	9	12	53	9	8	30	54
36		17	25		13	2	43
35		21	55		17	32	31
34		26	21		21	58	20
33		30	48,5		26	25	58

These altitudes taken with a quadrant of two French feet radius, 1' 6'' must be added to each, to correct the error of the quadrant.

M. de Fleurieu's were :

Alt. °	Times by clock.			Apparent times.		
	'	h	''	h	'	''
34 45	9	22	28,5	9	18	05,80
34 15		24	41,5	20	18	74
33 45		26	56	22	33	19
32 45		31	23,5	27	0	57
32 15		33	36,5	29	13	51
31 45		36	51,5	31	28	46

These altitudes were taken with an English quadrant of M. Siffon's make, 16 inches radius. 8 34'' are to be added to each altitude to correct the error of the instrument, and for the semi-diameter of the wire.

On computing these altitudes by M. Clairaut's tables, corrected *nearly* by observations made at Paris the 30th of May and the 1st of June 1751, I find the longitude of Cape Francois, West of the meridian of Paris, by my own altitudes, 4<sup>h</sup> 58' 8'', and by those of M. de Fleurieu 4<sup>h</sup> 58' 20''.

I return to Venus: the time which we have noted for the total entry is that when we perceived a very slender thread of light between the limbs of the ☉ and ♀. I judged that the limbs were in contact, but a few seconds before that instant. At the exit of ♀ in 1761, the limbs, being not yet in contact, and even sensibly distant asunder, I saw as it were a dark spot detach itself from Venus, and gain  
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the limb of the Sun; at which instant I estimated the internal contact. Many have this year seen the same phenomenon at the total entry of Venus. I was in expectation of it; neither I or my associates perceived any such thing. In 1761 the Sun's limbs were most exquisitely well defined; in 1769 they undulated, especially at the beginning of the entry; at the total entry the undulation was considerably less, and notwithstanding this undulation I believe our observation a good one. On comparing the duration of the transit observed at the Prince of Wales's Fort, with that of Father Hell, at Wardhus, I find, on a first calculus, which I believe at least *nearly* exact, that the Sun's parallax is  $9''.11$ .

August 16, at St. Croix in Teneriffe, the first satellite emerged at  $9^h 16' 5''$ , apparent time.

I am, &c.

Paris, March 10, 1770.

Pingré.