

XX. *Observation of the Transit of Mercury over the Sun's Disc, made at Louvain, in the Netherlands, May 3, 1786. By Nathaniel Pigott, Esq. F. R. S.*

Read June 15, 1786.

Louvain, May 15, 1786.

THE transit of Mercury was to happen a few days after my arrival at this place from England. Although I brought no astronomical instruments with me, I wished to observe this phænomenon; and upon application to M. THYSBAERT, *Président du Collège Royal*, a very distinguished Member of this University, he supplied me, in the politest manner, with the following instruments, and a convenient place for the observation. He carried his attention to the most trifling circumstances, in order to make my situation, in every respect, agreeable. The instruments he provided me with were a Gregorian reflector of 21 inches focal length, with an aperture of $4\frac{1}{2}$ inches, the magnifying power of which I esteemed about 70 or 80, with a good quadrant 18 inches radius, and a compound pendulum clock, steadily fixed, beating dead seconds. These instruments were made in London, and used for the observation

Mr. N. PIGOTT's Observation of the Transit of Mercury. 385
 observation of Mercury. The rate of the clock, and the apparent times thence deduced, were obtained by equal altitudes of the sun, taken with the quadrant. These were the only instruments I had, and therefore such observations as are not dependent on the *measure of time*, are to be considered as made by estimation; however, the most important, the internal and external contacts of Mercury, and hence the egress of his center and the interval of time between the two contacts, were made in a very satisfactory manner. About six o'clock, when I attended for the observation, there being a great number of solar spots, Mercury might easily have been mistaken for one; but his motion soon removed every doubt in that respect. Flying clouds obscured the sun at intervals; but during the last half hour, the weather was fine, the sky clear, the limb of the sun well defined; Mercury round and very black. There seems to have been some mistake, in respect of this phenomenon, either in the calculation or the printing of the *Connoissance des Temps* of this year: the emersion of the center of Mercury is there set down at 19 h. 45' apparent time at Paris; whereas, by my observation, the egress of the center at Louvain was at 20 h. 47' 28'' or 29'' apparent time. Taking here no other equation into consideration, except the difference of meridians between Paris and Louvain, which, by a great number of observations, I determined in 1775 to be 9' 37'' in time*, the emersion of the center at *Paris* must have been at 20 h. 37' 51'' or 52'', which differs nearly 53' from the computed time. By the same reasoning, I should suppose, that the emersion of the center of Mercury at Greenwich was observed at 20 h. 28' 35'' or 36''. Mercury being so very near

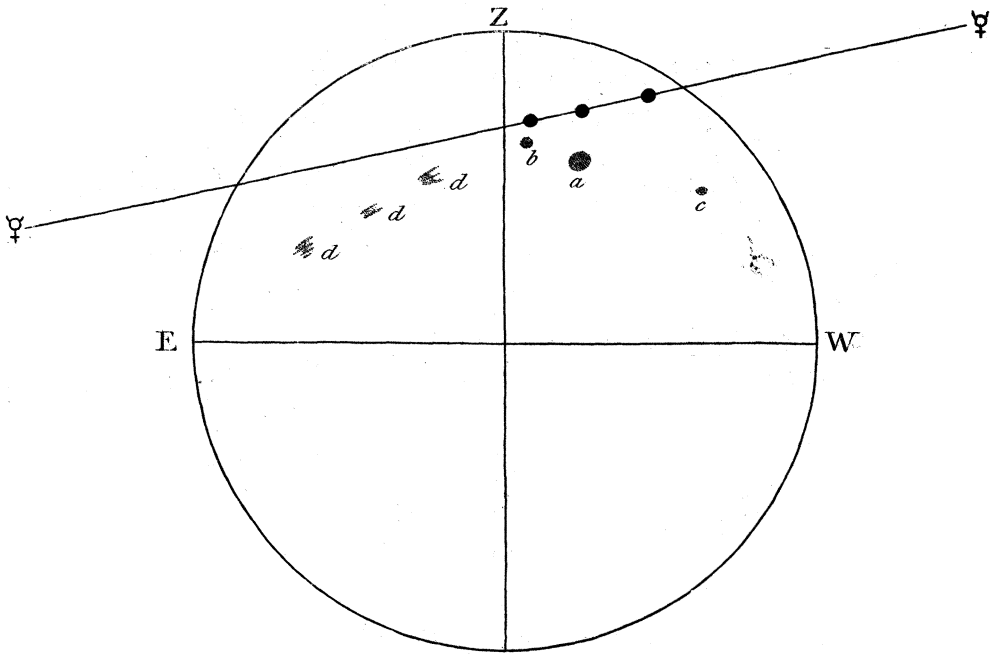
* See Philosophical Transactions, vol. LXVIII. p. 654.

the earth, the effects of parallax must be considerable, and the western situation of Greenwich of $18' 53''$ in time from this place, must occasion a retardation, which, on computation, may be hereafter allowed for, and added to the supposed time of the egress above-mentioned, deduced from my observation here.

While I am writing this Paper, the respective situation of Greenwich and Louvain strikes me. The latitude of Greenwich is $51^{\circ} 28' 40''$, that of Louvain $50^{\circ} 53' 3''$ *; the difference little more than half a degree. Greenwich is $9' 16''$ west, and Louvain $9' 37''$ east of the Paris Observatory; the parallax above-mentioned is therefore nearly, but in a contrary sense, equal at the two places, and thus the effects of both are compensated relatively to Paris. What other advantage may result from this circumstance, would require consideration. I have not leisure, at present, to revolve it in my mind, as I am desirous to lay this Paper before the Royal Society as soon as I can, by the favour of Dr. MASKELYNE, our Astronomer Royal.

* See Philosophical Transactions, vol. LXVIII. p. 643.

Observations of the Transit of Mercury at Louvain.



Apparent time

H. M. S.

18 32 30 flying clouds; Mercury ill defined, with some twisting.

19 13 30 the spot (*a*) appears thrice as large as Mercury; spot (*b*) twice ditto.

19 16 30 a perpendicular from the sun's limb on E. W. bisects Mercury and (*b*).

19 27 30 perpendicular, as above, equi-distant from (*a*) and (*b*).

Apparent time.

H. M. S.

- 19 34 30 perpendicular, as above, bisects Mercury and spot (*a*).
 19 42 30 perpendicular from Mercury on E. W. is beyond spot (*a*).
 19 45 30 it is sensibly beyond spot (*a*).
 20 12 30 perpendicular from the sun's limb on E. W. equidistant from (*a*) and (*c*).
 20 27 30 Mercury very black, round and well defined.
 20 45 41 internal contact; perhaps a few seconds too soon.
 20 47 26 emersion of center by *estimation*.
 20 49 16 external contact.
 20 49 41 Mercury certainly clear of the sun.

a. b. c. d. d. d. are spots in the sun; *Z.* zenith;
E. East; *W.* west of the solar disc.

The internal contact being at 20 h. 45' 41'', and the external at 20 h. 49' 16'', the emersion of the center of Mercury must have been at 20 h. 47' 28'' $\frac{1}{2}$; which differs only 2 $\frac{1}{2}$ seconds from the estimated time; and the duration of total egress was 3 m. 35 f.

N. B. The reasons why the nine first observations are all marked at 30'' is, that in reality they were set down at the *minute* only; and that I have added 2' 30'' to each to reduce the time by the clock to apparent time; more nicety would have been superfluous: but the *four last* were rigorously computed.

