

LXII. *An Account of an Observation of the Transit of Venus over the Sun, on the 6th of June 1761, at Madras; by the Rev. Mr. William Hirst, Chaplain of one of his Majesty's Ships in the East Indies: Contained in a Letter wrote by him to the Right Honourable the Earl of Macclesfield, President of the Royal Society. Dated Fort St. George, 1st July 1761.*

Read April 22, 1762. **M**R. Hirst began to make observations for regulating his clock, near three weeks before the day of the transit of Venus, by taking equal altitudes first, and then by meridional passages of Spica virginis, and of the Sun; of which latter, he had a good observation on the day before the transit, and another good one the day after it; so that there can be no doubt as to the accuracy of his time.

The place of his observation was fort St. George, on the top of the governor's house, whose latitude, as determined by many observations made not long ago, with an excellent quadrant, Mr. Hirst says, is $13^{\circ} 8'$ N. and he makes it 3 minutes and 4 seconds of time eastward of Pondichery.

Mr. Hirst's clock was made by M. Gallonde of Paris, and was constructed for astronomical uses; it did not stop in winding up, and scaped dead seconds.

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The telescope Mr. Hirst observed with, was a reflecter 2 feet long, made by Mr. Adams, of Fleet-street, London, and lately sent, as a present, by the East India company, to the Nabob Mahommed Allah Cawn, of whom Governor Pigot was so kind to borrow it, on this occasion. The governor himself, and also Mr. Call, a very ingenious gentleman, assisted in the observation; the former with a 4 feet refracter, of Mr. Dollond's new construction; the latter with a 2 feet reflecter, formerly belonging to Dr. Mead.

Some time before five, in the morning of the 6th of June, Mr. Hirst, and the rest of the gentlemen, met on the terrass of the fort-house, and were at their glasses, at the time the Sun rose, lest Venus might enter the disk before the time calculated by the astronomers. The Jesuits had calculated the beginning for Pondichery, at 6^h 57'. The London calculations, reduced to the meridian of fort St. George, gave it at 7^h 26' 35'' apparent time.

The morning proved favourable to the utmost of their wishes, which the more increased their impatience. At length, as Mr. Hirst was stedfastly looking at the under limb of the Sun, towards the south, where he expected the planet would enter, he plainly perceived a kind of penumbra, or dusky shade; on which he cried out, *'tis a-coming*, and begged Mr. Call to take notice of it. Two or three seconds after this, namely, at 7^h 31' 10'' apparent time, happened the first exterior contact of Venus with the Sun, which all the three observers pronounced at the same instant, as with one voice. Mr. Hirst is apprehensive, that to be able to discern an atmosphere about a planet at so great a distance as Venus, may be regarded

garded as chimerical ; yet affirms, that such nebuloſity was ſeen by them, without preſuming to aſſign the cauſe. They loſt ſight of this phænomenon as the planet entered the diſk, nor could Mr. Hiſt perceive it after the egreſs.

The total ingreſs, or firſt internal contact, was determined with a precision equal to that of the firſt external contact, at $7^h\ 47'\ 55''$ apparent time.

Mr. Hiſt thinks it neceſſary to take notice of another odd phænomenon. At the total immerſion, the planet, inſtead of appearing truly circular, reſembled more the form of a bergamot pear, or, as Governor Pigot then expreſſed it, looked like a nine-pin ; yet the preceding limb of Venus was extremely well defined. Mr. Hiſt ſuſpected this appearance might be owing to their teleſcopes not being nicely enough ſet to their focal lengths : accordingly, he took care to try this ſeveral times, during the tranſit, but found it not to be the caſe ; for though the planet was as black as ink, and the whole body truly circular, juſt before the beginning of the egreſs, yet it was no ſooner in contact with the Sun's preceding limb, than it aſſumed the ſame figure as before, at the Sun's ſubſequent limb ; the ſubſequent limb of Venus keeping well defined, and truly circular.

The beginning of the egreſs, or ſecond interior contact, was obſerved only by Mr. Hiſt and Mr. Call, Mr. Pigot having retired. This phaſis came on at $1^h\ 39'\ 38''$, P. M. and the total egreſs, by Mr. Hiſt alone, at $1^h\ 55'\ 44''$, apparent time, Mr. Call unfortunately loſing the ſolar image out of the field of his teleſcope.