LXII. *An Account of an Obſervation of the Tranſit of* Venus *over the Sun, on the 6th of* June 1761, *at* Madraſs; *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.

MR. 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° 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. Hirſt 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. Hirſt 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 ninepin; yet the preceding limb of Venus was extremely well defined. Mr. Hirſt 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 truely 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 truely circular.

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