

TRANSIT OF VENUS.

To the EDITOR of the YORK HERALD.

SIR,—On a former occasion you inserted for me in the *York Herald* an article on the transit of Venus. That important event will take place on the morning of Wednesday next, December 9th. The following particulars were not stated in the article alluded to, the calculations not having been then made, but I believe they will be interesting to a large number of the readers of the *Herald*:—

The transit will begin on the morning of December 9th at 45 minutes 58 seconds after one o'clock, according to the civil, or common method of reckoning, and terminate at 26 minutes 54 seconds after six o'clock in the morning, thus lasting 4 hours 40 minutes 56 seconds. The least distance of the centres of the sun and Venus will take place at 6 minutes 32 seconds after four o'clock. If we suppose the sun's diameter to be divided into 12 equal parts, that distance will be about 5 such parts, or more accurately, if the sun's diameter be considered 236, the distance will be 100, Venus being *above* the sun's centre.

Venus will be seen as a beautiful round black spot, the sun's diameter being rather more than 30 times the diameter of the spot, or exactly 30.4112 times. The important moments of observation are—(1) When the disc of Venus just reaches that of the sun, which calculation shows must take place at 45 mins. 58 secs. after one o'clock. (2) When the disc of Venus is just within that of the sun, which takes place at 15 mins. 24 secs. after two o'clock. (3) When Venus just reaches the other side of the sun, at 57 mins. 26 secs. after five o'clock. (4) When her disc just leaves that of the sun, which occurs at 26 mins. 54 secs. after six o'clock.

Those who are in possession of a terrestrial globe may easily determine to what portions of the earth the beginning of the transit will be visible, in the following way:—Let them elevate the south pole of the globe $22^{\circ} 57'$ above the horizon, and bring to the graduated edge of the brass meridian the point of the equator of which the longitude is $151^{\circ} 36'$ east. To every place in the hemisphere then above the horizon of the globe the beginning of the transit will be visible. It will thus be seen that the beginning will be visible, from a part of the Pacific Ocean, considerably beyond, that is, nearer to America than the Sandwich Islands, to the western part of India, and Chinese Tartary, and to all the countries lying between those limits, including the greater part of Asia, as also Australia and the East India Islands.

To get the hemisphere to which the end of the transit will be visible, elevate the South pole of the globe 22 degs. 58 secs. (it will be seen that this scarcely differs from the former elevation, the sun changing his declination very little in five hours in December), and bring to the graduated edge of the brass meridian, the point of the equator of which the longitude is 81 degs. 24 secs, east. To all places in the hemisphere then above the horizon, the end of the transit will be visible. It will thus be seen that the termination will be visible from the eastern part of Siberia, Japan, and New Zealand, to the western part of Africa, the South of Italy, and Central Europe, and, of course, to all the countries lying between those limits. No point within 900 miles of Great Britain will witness any part, not even the termination of it, nor will it be visible to France, Germany, Spain, or Portugal.

It is devoutly to be hoped that those astronomers who, at vast expense, either to themselves, as Lord Lindsay, or to the Governments to which they belong, have gone to the ends of the earth (it is essential to the success of the method that the stations be far apart) to observe it will have the opportunity of doing so under favourable atmospherical conditions. This has not always been the fortune of astronomers when upon similar errands. It is on record that a former Astronomer-Royal, "Dr. Maskelyne, was chosen by the Government to go to St. Helena (where, however, clouds prevented any part of it being seen.)"—See "Popular Astronomy," by our present Astronomer-Royal, Sir George Biddell Airy, p. 145.

As most of the scientific nations in the world are taking part in this important business there is little doubt that a sufficient number of successful observations will be made which will be available in solving the grand problem of finding the sun's distance, and from that his magnitude, as also the distances and magnitudes of all the other bodies of the solar system.

It is highly desirable that success should attend the efforts of the observers, as there is very little doubt that we have been over-estimating the distance of the sun, as well as that of the other heavenly bodies, by a quantity equal to about tenpence in the pound, and their weights by three times that amount, or half-a-crown in the pound.

Calculations by the celebrated Leverrier, one of the discoverers of the planet Neptune, now Astronomer-Royal of France, Professor Hansen, of Gotha, Foncault, and other astronomers prove this satisfactorily. There will be another "Transit of Venus" December 6th, 1882, or in about eight years after that which will take place on Wednesday morning, after that there will not be another for $121\frac{1}{2}$ years, or till June 7th, 2004, and in eight years after that, there will be another, on June 5th, 2012.—I am, Sir, yours very truly,

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