VENUS AND THE SUN.

THE CENTURY'S PHENOMENON.

Interesting Account of the Contact as Seen in New York—Princeton's Successful Observations—Other Reports—A Sight Not to be Again Seen by Living Man.

New-York, Dec. 7.—According to the predictions of the astronomers Venus would be seen touching the lower left edge of the sun at about eight minutes after 9 o'clock, New-York time. At that hour the sun entered one of the gaps between the rows of clouds, and its disk was seen pretty clearly defined. Observers aimed their telescopes upon the critical point and held their breath—at least those who had not been bred in observatories did, for to them it seemed hardly credible that such a prediction could be fulfilled. It made the unpracticed observer start with a feeling half of awe to see a black, perfectly defined line suddenly make its appearance on the very edge of the sun, which a second before had been as bright and clearly curved as the edge of a round golden mirror. But there was the black line, sharp and distinct, at the very place where the astronomers said it would be. In the fraction of a second it was no longer a line but a smoothly rounded black notch in the edge of the sun. The first contact had taken place and Venus was fast swinging into line between the earth and the sun. The black notch deepened. Its curve was as perfect and its outline as sharp as the imagination could conceive. As it grew deeper there presently burst into sight a marvelously beautiful phenomenon. The atmosphere of the planet had caught the sunbeams on its outer edge and bent them round so that it became visible as a beautiful half circle of light. The sight was almost indescribable, and everybody who saw it uttered exclamations of admiration. Half the planet's body was between the eye of the observer and the sun, making a deep, black scallop in the sun's edge; the other half, being yet outside the sun's disk, was invisible, but around its unseen edge, shining against the sky, and arching rainbow-like across the black gap in the sun's edge, was an arc of silvery light. Some observers who were favored with very clear skies saw a yet more beautiful sight. To them that whole portion of Venus's disk which had not yet entered upon the sun's face appeared illuminated within the arc of light by a faint glow, presenting such an appearance as the new moon does when the unilluminated portion visibly reflects back the light poured upon it from the continents and oceans of the earth. In about twenty minutes the black body of the planet had passed completely within the edge of the sun, and then some of the observers saw, with varying degrees of distinctness, the curious phenomenon known as the "black drop." As the outer edge of the planet slowly withdrew from its apparent contact with the inner edge of the sun, instead of separating sharply and clearly, the two edges appeared to remain connected for several seconds by a black or gray ligament.

After the planet had passed fully within the sun's disk, or second contact, as it is technically called, had taken place, the sight was hardly less beautiful. Different spectators got different impressions of it. To some it appeared like a perfectly round black hole in the sun; others compared it to a little black ball floating in a kettle of white hot molten iron. But to those who reflected upon the real significance of the phenomenon it shed a flood of light upon the structure of this wonderful family of worlds to which the earth belongs. They saw in the black circle that seemed so distant against the sun a planet which, in pursuing its regular course of revolution, had come directly between the earth and the sun, and, being unilluminated on the side turned toward the earth, because the sun could not shine upon that side, presented the appearance of a black circle.

There is no mystery whatever about a transit of Venus, and nothing which any person of average capacity and intelligence cannot understand. To understand it, it is only necessary to recollect that the solar system is made up of the sun, an enormous globe in an incandescent condition, which occupies the center, and eight planets, very much smaller than the sun, and not like it in a fiery condition, which revolve around it. As the orbits or paths of these planets around the sun are not very greatly inclined to each other, but all lie pretty near the same plane, it is clear that at times the planets which are nearest the sun must come directly between that body and the planets that are farther away, and in such case must appear, as seen from the outer planets, to pass like black balls or circles across the shining face or disk of the sun. Venus is nearer the sun than the earth is, and consequently at certain intervals, which astronomers, with the aid of mathematics, are able to determine, Venus must be seen from the earth passing across the sun. She was thus seen yesterday, and she will not be seen in that position again during the whole course of the coming century.

Princeton, N.J., Dec. 7.—Professor Young, with a large corps of assistants, watched the transit of Venus from the college observatory. All four contacts were successfully observed, the first at 8 hours, 55 minutes and 24 seconds; the second at 9 hours, 16 minutes and 18 seconds; the third at 2 hours, 39 minutes and 28 seconds; and the fourth at 3 hours, no minutes and 14 seconds—all Washington time. One hundred and eighty-eight photographs were made, most of which are excellent. Some were blurred, however, by clouds. A complete measurement of the diameter of the planet was made by the micrometers. A careful spectroscopic examination of the planet's atmosphere showed lines of water vapor conspicuous in the spectrum. Some other unknown lines were discovered by Professor McNeal.

Observations Elsewhere.

Jacksonville, Fla., Dec. 7.—Professor Eastman reports a highly successful day at Cedar Keys. The morning was cloudy, and the first contact of Venus with the sun was lost by the intervention of a narrow stratum of cloud. The second contact was obtained very well. No ligaments or black drops were seen. One hundred and fifty photographs were taken with dry plates, all of which were good. The French astronomers at St. Augustine had clear weather and made successful observations.

Boston, Dec. 7.—The observations at the Cambridge observatory yesterday afternoon were much more satisfactory than there made in the morning. Spectroscopic examination showed that Venus has not an atmosphere capable of absorbing much light. Photometer observations indicated that the light from the disk of Venus was less than reflected from the sky near the sun.

Poughkeepsie, Dec. 7.—At Vassar college photographs were taken before 11 a.m.

Baltimore, Dec. 7.—On the grounds of the Johns Hopkins hospital, under the direction of Prof. Hastings, observations were successfully made of the second, third and fourth contacts.

San Francisco, Dec. 7.—At Lick observatory, Mount Hamilton, at 8 a.m. there were splendid weather, and forty-eight photographs of the transit were obtained.

Hanover, Dec. 7.—At intervals during yesterday afternoon good views were obtained by Prof. Emerson at the Dartmouth college all views were lost.

Galveston, Dec. 7.—A special to the News from San Antonio says: "The transit of Venus observations were very successful, and both the American and Belgian commissions express satisfaction at the result."

Foreign Observations.

Lisbon, Dec. 7.—The transit of Venus yesterday was favorably observed at Durban and Cape Town.

At Madrid observations were prevented by bad weather. Snow fell, rendering the transit totally invisible from the Greenwich observatory. The transit was plainly visible at Cork.

Ottawa, Dec. 7.—Mr. Stake took a successful observation yesterday morning.

Paris, Dec. 7.—Black clouds, which hid the sun from view, rendered useless the great and precious task at the observatory here to take observations of the transit of Venus yesterday.