

VISIT OF VENUS.

She Crosses the Disc of the God of Day.

Very Satisfactory Observation at Cambridge.

The Spectacle as Viewed Through Telescopes and Smoked Glass.

Whether it was an ingenious plan to attract public attention from Mrs. Langtry to herself or a desire to scrutinize a little more closely the features of her old flame Apollo does not appear, but certain it was that Venus made herself unobtrusively conspicuous in the eyes of mankind yesterday. As certain peoples of the East when they worship their deities cover their faces in the awful presence, so yesterday the people of Boston covered their faces while in the presence of the goddess, the only difference being that the ignorant heathen use their cloaks, but smoked glass was good enough for the civilized world. Smoked glass was, therefore, in great demand. The remains of old lamp-chimneys, window panes, bottles, anything that was transparent, were brought into requisition, and the streets were lined with the curious gazers. The amateur scientist dissected his telescope and devised ingenious schemes for getting an image of the sun. The men with portable telescopes reaped rich harvests. The professional astronomers were happy in getting a clear sky, even if the early part of the transit was obscured by the clouds drifting over old Sol's disc. A good sight of the little speck was hard to get with common smoked glass, but after looking carefully for a minute or two the observer was always ready to swear that he had seen it, especially if somebody had told him where to look, but one might query how large a part of the imagination played in his success. It was amusing to compare the sizes which different people gave to what they saw. One man would compare it to a pin-head and another to a quarter of a dollar, while others took all the grades between.

That portion of the public who took the trouble to mount the three flights of stairs at 110 Washington street in the morning to the rooms of the Boston Scientific Society were rewarded for their pains. The apparatus used by Messrs. Ritchie & Low was simple. It consisted of a portable lumiere, constructed by the members of the society. A silver or glass mirror reflected the rays of the sun through a telescope on to a screen. The luminous disc appeared at times very much brighter than at others, and across its surface the continuous drifting of what looked like light, fleecy clouds, observed at times the dark shadow of Venus, which was nevertheless always visible to sharp eyes. Those who expected to see the contact were disappointed, as the planet did not become visible until it had got fairly upon the sun's disc. But it was watched all the day by a constantly-changing throng, and would have been seen by many more, undoubtedly, if they had known of the opportunity.

The most important observations in this vicinity, and presumably in the country, occurred at Cambridge, and no less than seven telescopes were used, including the great telescope, the equatorial telescope, the ordinary telescope in the west dome, the comet-seeker, the four-inch telescope and a six-inch telescope, the latter being mounted on a temporary frame of wood on the south lawn, just outside the building, and managed by Professor Searle, who was able to make the apparatus practical by assistance of a plain glass mirror, the same which was for a long time used at the observatory in making photographs of the sun. Professor Pickering was in charge, and with his assistants was very busily engaged throughout the day in adjusting the instruments, making calculations, etc. The most important observation was to take the time of the contact of the approaching edge of the planet's disc and the sun's circumference, the contact of the departing edge of the disc and the inner part of the circumference, and the time of the similar phenomena on the other side of the sun. The clouds interfered somewhat with the arrangements in the morning, but the observations in the afternoon were much more satisfactory than those of the morning. Whereas the time of the first contact of Venus and the sun was taken by three observers and the second by four, six times of both the third and fourth contact were obtained. Some 800 diameters of Venus were secured, which is many more than had been anticipated, and will tend to render the average data very satisfactory. There are various corrections to be made in these observations before they can be averaged, and the mean cannot at present be estimated at all definitely. The nautical almanac gives the diameter as 65". The clearing away of the clouds afforded an excellent opportunity for a spectrum examination. The result of this is important, showing that Venus has not such an extensive atmosphere, or an atmosphere of such a quality as to produce much absorption of the sun's light. The photometer observations in the afternoon also proved to be very good. It appeared from these that the light from the disc of Venus is less than that from the skies surrounding the sun. The light received from the sun's atmosphere being appreciable, it must be taken into account. It was not intended to take any official photographs, but one or two were secured for personal purposes. On the whole Professor Pickering expresses himself as very much gratified at the result of the day's work. The data obtained is, in all probability, much more extensive than that which has come into the hands of any other American observatory. There is a vast amount of computation to be accomplished by Professor Pickering and his large corps of assistants before the distance of the earth from the sun, according to this data, can be announced. The result will be awaited with much interest, and will probably be more reliable than any figures of this nature given for a long time.

Below are the corrected data of the various observations of the contacts, given in Cambridge mean time:

Professors	First Contact.	Second Contact.	Third Contact.	Fourth Contact.
E. C. Pickering	0 10 52	0 40 00	3 03 13	3 23 20
A. Searle	0 10 52	0 40 00	3 03 13	3 23 20
G. C. Wendell	0 20 10	0 40 18	3 03 18	3 23 24
J. H. Edwards	0 10 54	0 40 02	3 03 04	3 23 11
S. C. Chandler, Jr.	0 10 54	0 40 02	3 03 04	3 23 11
W. H. Pickering	0 20 01	0 40 11	3 03 08	3 23 22
Average	0 20 01	0 40 11	3 03 08	3 23 22
Computed time	0 18 53	0 40 13	3 03 20	3 23 35

AT THE NATIONAL OBSERVATORY.

The Observations of Professors Harkness and Frisbie—The Former Says It Will Take Six Years to Work Out the Ultimate Results—The Latter Gets Every Contact With the Big Telescope.

(Special Despatch to The Boston Globe.)
WASHINGTON, December 6.—The observation of the transit of Venus at the National observatory today is said by astronomers to have been fairly successful. A portion of the time during the transit the disc of the sun was obscured by light clouds, and there was a haziness of the atmosphere. The results of the observations taken today in different parts of the world will prove of the greatest value to scientists. Professor Harkness estimates that six years' time will be required to work out the ultimate results. The first object is to determine the distance of the sun from the earth more accurately than is now known, but future astronomical calculations for generations to come will be based to a large extent upon the result of the measurements of today. The size of our solar system and the dimensions and weight of the bodies it contains will be calculated by the new statistics obtained. Professor Harkness was in charge of the observations here. He was assisted by Professor Frisbie, Joseph A. Rogers, photographer, A. H. Bichonon of the Cumberland University of Tennessee, Commander Simpson and Lieutenant-Commander Davis of the navy. Professor Frisbie worked the great equatorial telescope, which has a 28-inch glass and is the largest telescope, with one exception, in the world. He gave the press correspondent the following result of his observations:

	h	m	s.
Time of first contact	8	50	45
Time of second contact	0	16	00
Time of third contact	2	38	57
Time of last contact	2	58	55

Washington mean time.

Professor Frisbie says that when he first observed the planet it was in the form of a faint indentation in the clouds at the edge of the sun's disc. The definition for the first contact was faint, on account of the clouds, but the definition of the second was plain. There was no "black drop," as astronomers term the illusion, by which a planet appears to be suspended by a drop to the surface of the body which it is beginning to cross. There was a tremulousness of the atmosphere at the time of the first observation, caused, Professor Frisbie says, by atmospheric conditions resulting from changeable temperature. If the weather had been steadily cold or warm for several days preceding this apparent flickering would not have been observed. The third contact was quite as definite as the second, but at the time of the fourth contact the tremulousness of the atmosphere was more marked. Venus entered the sun's edge on the lower eastern side and moved upward and across its face. The arrangements made for photographing the transit were very complete. Visual observation is necessary to determine the time of contact, but the camera is required to trace the passage of the planet across the sun, by an ingenious and complicated piece of mechanism. Arrangements had been perfected to take photographs of Venus every three minutes during the transit, the time of taking each photograph being accurately recorded. Eighty-three photographs only were taken, the clouds interfering much of the time with the operations of the photographer. On a plate seven inches square the sun is represented with a diameter of 1 1/4 inches, and Venus is shown by a spot about 1/8 of an inch in diameter. About the time of the first contact twelve photographs were taken, and then no more could be obtained on account of the clouds until about 2 p. m., when, in the space of twenty-five minutes, forty-one pictures were secured. Professor Harkness had not completed his calculations when visited by your correspondent, but he expected to complete them tonight. His observations do not tally with those of Professor Frisbie. Professor Harkness says that at the time of the first contact the clouds were

so dense that he did not regard it worth while to attempt to take the time. The second contact he reports at 0.16.23 a. m. He did not observe any "black drop," but shades of that might have existed on the surface and would not have been seen because of the haze. He made a good observation of the third contact, but could not determine the time of the fourth contact on account of the clouds.

AT YALE COLLEGE.

Satisfactory Observations Obtained in the City of Elm—The Times of the Various Contacts.

(Special Despatch to The Boston Globe.)
NEW HAVEN, December 6.—The transit of Venus occupied the attention of the scientists at Yale Observatory, the Sheffield Scientific School and the high school to-day. Professor Waldo, with Professor J. E. Kitchner, took many observations with the new heliometer at the Yale Observatory with extremely satisfactory results. They were assisted by Robert Brown, the secretary of the observatory, Professor S. W. Phillips of Yale College, and A. A. Bull, a mechanic of this city. Although the observatory building was in an incomplete state, yet the observers, by energetic action, were able to complete the arrangements for the observations. The photographs were taken with the new equatorial, which has a photographic lens of about ten feet focus. About 150 plates, showing the sun with Venus on its disc, were obtained. These photographs are about one-quarter the size of the government photographs. They have a reference line photographed on each plate, formed by a horizontal surface of mercury with the heliometer. A very satisfactory and complete series of measures was obtained. It includes a determination of the angles at which Venus entered and left the sun. About 240 measurements of Venus' diameter were obtained. The heliometer times of contact were approximately:

	h.	m.	s.
First contact	0	07	54
Second contact	0	34	00
Third contact	2	51	22
Fourth contact	3	13	07

The weather conditions were much more favorable than were expected on the day previous. Tuesday night a soaking rain set in, and it was supposed that all the elaborate preparations would go for nothing; but there was not more than half an hour's observation in the six hours and over which was occupied in the transit. The observers worked without food, and were unwilling to lose a single minute of the chances to see the various phases of the transit. The following are the times of contact as taken by various scientific men, as reported to Professor Hubert. That gentleman's observations were as follows:

	h.	m.	s.
Fourth contact	3	10	54
First contact	0	08	50
Second contact	0	29	50
Third contact	2	51	07
Fourth contact	3	13	24

Professor Leonard Waldo of Yale College.

	h.	m.	s.
First contact	0	07	54
Second contact	0	29	00
Third contact	2	51	22
Fourth contact	3	12	07

Professor Kitchner.

	h.	m.	s.
Third contact	2	51	22
Fourth contact	3	13	07

Professor Wilson.

	h.	m.	s.
First contact	0	08	40
Third contact	2	51	43
Fourth contact	3	12	03

Professor C. S. Lyman of Yale College.

	h.	m.	s.
Third contact	2	51	43
Fourth contact	3	12	03

Professor Arthur Wright.

	h.	m.	s.
Third contact	2	51	14.5-10
Fourth contact	3	11	50

Professor William Beebe.

	h.	m.	s.
First contact	0	08	13.5
Third contact	2	52	01
Fourth contact	3	12	25

Professor W. H. Brewer.

	h.	m.	s.
Third contact	2	50	00
Fourth contact	3	10	54

J. D. Whitman of the High School.

	h.	m.	s.
First contact	0	09	21
Third contact	2	52	03
Fourth contact	3	13	30

AT HARTFORD.

The Elated Germans Wire the Cipher "Wonderful" to Their Home Government.

(Special Despatch to The Boston Globe.)
HARTFORD, December 6.—This afternoon the members of the German astronomical expedition, located on the Trinity College campus, telegraphed to Berlin the word "Wonderful." An agreement had been made with the home government that after the transit of Venus the astronomers should cable a cipher message indicating the extent or failure of their observations. The cipher was as follows:

If eight sets—that is, eight complete observations of the heliometer—were obtained, the word "wonderful" should denote it; seven sets, "wonder"; six sets, "work"; five sets, "working"; four sets, "workman"; three sets, "workmaster"; two sets, "worship"; one set, "worst"; no set, "woe." The cipher, as will be observed, was singularly appropriate, and tonight Professor Mueller, Professor Deichmüller, Scientist Bauscheyger and Mechanic Dolter are unanimous in their expressions of satisfaction at the results of their labors.

At an early hour this morning the German party assembled at their observatory buildings on the college campus with faces long and anxious; they had come so far and labored so hard that the prospect of a cloudy day was a great disappointment. The sky was overcast and it was raining slightly. That the word "woe" would click over the wires to the home observatory in Berlin seemed reasonably certain. Just before 9 o'clock the astronomers took their stations in the little buildings, which had been brought from Germany. They remarked incidentally to the policemen on guard, who kept all persons away from their buildings, that matters might look a little more favorable toward noon, and cautioned the officers on no account to allow any one to disturb them. Just at 9 o'clock, only a few minutes before the first contact, the clouds suddenly began to lighten, to such a degree, in fact, that the astronomers at 9.08, when the first external contact or "ingress" of Venus with the sun occurred, were enabled with their powerful instruments to pierce, as at were, the thin film which intervened and to obtain an accurate "set" of the phenomena. The clouds continued to pass away and about 10 o'clock the sun came forth splendidly. It continued throughout the day to shine upon the campus as warmly and as brightly as upon a spring morning. The Germans kept busily at their delicate work and at about 3.30 p. m. the heliometer had taken the entire eight sets and then the word of success was sent to Berlin. The flags of Germany and the United States were then run up on the same staff, and for the first time during the day the professors allowed themselves to be approached, and to receive the congratulations of the faculty and students of the college. According to their views, each measurement as made by them is worth a hundred photographs, in which every American astronomer does not generally concur, having more faith in the improved photographic processes at Yale College.

Professor Waldo made observations with the heliometer, and the Germans will compare notes with him.

Observations were also made at Trinity College by Professor Hart.

GENERALLY SPEAKING

The Observations were Successes, Though at Many Points the Clouds Interfered with the Hopes of the Scientists.

Clouds at Rochester, N. Y.
No observations at Aiken, S. C.
Venus smiled on Cedar Keys, Florida.
People were disappointed at Louisville.
Good observation of first contact at Albany.
Venus kept out of sight of critical eyes at Vassar.
Syracusan scientists met with tolerable success.
Hanover, N. H., was not particularly fortunate.
Clouds interfered with the Pittsburg sky observers.

French telescopes were elated at St. Augustine, Fla.

The transit was invisible from Greenwich Observatory.

The passing of Venus was voted a success by the San Franciscoans.

The spectacle was a fine one at Freehold, N. J. Photographs were taken.

New Yorkers had an excellent opportunity to behold their favorite goddess.

Professor Hough of Chicago got ingress figures and ten photographs were taken.

The planet was visible at Paris and Madrid, but showed her disc at Cape Town and South Wales.

The Bangorians (Me.) smoked a good deal of glass and strained a good many eyes, but did not get many figures.

The observations of the transit of Venus at Montreal were only a partial success. The weather was dark and cloudy, with snow. Neither of the contacts was seen.

At Seagrave Observatory, Providence, thirty photographs were taken of the transit between the second contact and 11 o'clock. The professors were unable to note either the last interval or external contacts.