

## HEADQUARTERS, BATTALION OF ENGINEERS,

*Willett's Point, N. Y. H., February 9, 1871.*

SIR: I have the honor to submit the following report upon the duties which you assigned to me during the recent solar eclipse in Sicily:

My instruments consisted of a comet-seeker, having a large field of view, (magnifying power about 8,) and a good Casella aneroid barometer, designed to be carried on the person like a watch. My station was the highest attainable point on Mount Etna. My duties were to study the physical characteristics of the corona.

In company of Professor Silvestri, of the University of Catania, and a party of five English astronomers, I proceeded on December 21 to the Casa Ferentina, a small hut on the side of Mount Etna, elevated about 4,950 feet above the sea. Here we spent a stormy night. At daylight on the 22d snow was still falling heavily, but about 8 a. m. the weather cleared.

Leaving the rest of the party at the casa, I proceeded up the mountain with a guide. The soft snow, varying in depth from 6 inches to 2 feet, made the route impassable for mules, and a gale of wind, loaded with particles of sleet, which blew strongly in our faces, rendered the ascent exhausting. By noon an elevation of 8,736 feet above the sea had been reached, at a point near the summit of Montagnuola. The smoke blowing from the crater made a further ascent inexpedient. A station was accordingly selected, as well sheltered from wind as possible, and every preparation was made for observing. The clouds, in cumulose masses, were all far below us, and first contact occurred under favorable circumstances, which gave every promise of continuance. Suddenly, however, the mountain was enveloped in a cloud which soon produced a storm of hail that rattled among the ice and lava with a sound like the breaking of glass. The gradual loss of light began to give an inky tinge to the deep gray of the storm; totality was rapidly approaching, and, there being no prospect of a favorable change, at fifteen minutes before the instant, I started down the mountain with all possible speed, vainly hoping to escape from the cloud. At an elevation of 7,500 feet I was overtaken by the shadow, which swept with great rapidity over us, darkening the gloom to an awe-inspiring degree. The amount of light was sufficient to render ordinary type visible, but the peculiar ghastly effect was like nothing usual in nature. After continuing about a minute, this gave place suddenly to a rosy red tint, which lasted fully a minute and then gradually changed to the former inky gray. In a moment or two more I had a glimpse of the sun's crescent, resembling that of the earliest new moon.

This peculiar action of clouds in absorbing least the red rays of the feebly-returning light is, I regret to say, the only result of my observations. Possibly it may serve to explain the color sometimes observed in the corona when viewed through a hazy atmosphere.

I append the following barometrical observations to illustrate the surprising accuracy of the little instrument, which was no larger than an ordinary watch. It was corrected for temperature by the maker; but, being carried in the pocket, was not subjected to much change in this respect. It was read carefully by microscope. Some of the air-temperatures are only approximate. The altitude of the station in Catania has been assumed at 50 feet.

Date.	Hour.	Station.	Air-temperature.	Barometer.	Intermediate altitude.	Altitude above sea.
1870.			<i>Fahr.</i>	<i>Inches.</i>	<i>Feet.</i>	<i>Feet.</i>
December 21	7 a. m. ....	Catania .....	52	29.90	.....	50
21	9.15 a. m. ...	Nicolosi .....	50	27.50	2,287	2,337
21	2 p. m. ....	Casa Ferentina .....	47	25.00	2,591	4,928
22	8.45 a. m. ...	do .....	35	24.58	.....	.....
22	12 m. ....	Highest station .....	15	21.21	3,808	8,736
22	1.30 p. m. ...	do .....	15	21.17	.....	.....
22	2.10 p. m. ...	Totality station .....	20	22.28	1,206	7,530
22	3.30 p. m. ...	Casa Ferentina .....	45	24.44	2,544	4,966
22	6.45 p. m. ...	Nicolosi .....	45	26.92	2,608	2,378

The computations have been made by the usual formulæ, applied from station to station, and the different altitudes thus deduced for the same place in ascending and descending, furnish the following checks upon the accuracy of the work :

Nicolosi .....	{ ascending, 2,337 feet.
	{ descending, 2,378 feet.
Casa Ferentina..	{ ascending, 4,928 feet.
	{ descending, 4,986 feet.

In closing, permit me to express to you, sir, my appreciation of the official and personal courtesies which has rendered the expedition a most pleasant one to me.

I am, sir, very respectfully, your obedient servant,

HENRY L. ABBOT,

*Major of Engineers and Breret Brigadier-General.*

Professor BENJAMIN PEIRCE, *in charge of Solar Eclipse Expedition.*

REPORT OF OBSERVATIONS OF THE TOTAL SOLAR ECLIPSE OF DECEMBER 22, 1870, MADE AT CARLENTINI, SICILY, BY JAMES C. WATSON, PH. D., DIRECTOR OF THE OBSERVATORY AT ANN ARBOR, MICHIGAN.

ANN ARBOR, *March, 1871.*

DEAR SIR: Having received an invitation from you to join your party in Sicily to observe the solar eclipse of December 22, 1870, I have the honor to transmit to you the following report of my observations:

I left Ann Arbor the latter part of October and proceeded via England and the continent, reaching Catania on the 17th of December. After consultation with you and with Dr. Peters, I finally, with your approval, selected the village of Carlentini, twenty-one miles south of Catania, and very near the central line of the eclipse, as my observing-station; but on account of the reputed unhealthiness of this village to a person not acclimated, I did not go there until the day of the eclipse. My telescope and stand had been shipped from Liverpool direct to Sicily, so that I found them in Catania upon my arrival there, and having decided upon observing simply the phenomena presented by the corona, it was not necessary for me to convey other instruments to Carlentini. Accompanied by your courier as a general assistant, I left Catania early on the morning of December 22 by special conveyance, and reached Carlentini at 11 o'clock. I had been provided with a letter of introduction to MM. Alfio and Luigi Modica, prominent citizens of the place, and I found upon my arrival that they had already been advised of my intended visit and of its object, and that they had already selected various positions which seemed to them convenient as stations for observation. Having examined the localities suggested by them, I finally decided to observe from a point just outside the south wall of the town, where I would, from the nature of the ground, be protected from the wind, which was blowing quite briskly. There was no opportunity during my stay in Carlentini to determine the geographical position of my station; but it may be easily determined from the data of the trigonometrical survey of the island in the possession of the Italian government. The station was 200 feet south of the south wall known as the wall of Charles IV of Spain, and 100 feet east of its southwest corner, as shown by the above diagram.

