

CORRESPONDENCE.

*To the Editors of 'The Observatory.'**Large Prominences.*

GENTLEMEN,—

The large prominence recorded visually by Father Fényi on 1915 December 23, and referred to in your notes (*Observatory*, May 1915, p. 236), was almost equalled in height by one photographed here on November 1, 1916; but these have been greatly exceeded by an eruption which occurred on May 26, 1916, at latitude $+45^\circ$ to $+65^\circ$ on the east limb.

The Kashmir spectroheliograph is designed to photograph, if necessary, a very extended region of sky surrounding the Sun, and, being warned by the first photograph on the above date that a big eruption was in progress, I took special care to include the outermost region in the slow traverse of the image across the slit. In this way the highest portions of the prominence were recorded at a distance exceeding a solar radius from the limb, the actual measured height of the highest point being 18'·5 or 500,000 miles. This is certainly the greatest height ever recorded; but I may remark that it is easier to photograph these faint extensions in calcium light than it is to observe them visually in hydrogen, and Father Fényi's record must be considered a very remarkable one, especially as at heights exceeding 8' or 10' prominences appear always to be faint and in rapid movement away from the Sun. It is characteristic of this type of prominence that the outermost parts leave the Sun with accelerating velocity, and fade away to invisibility in a few minutes.

The prominence of May 26 at 8^h 56^m (I dian Standard Time) resembled an enormous fountain, a portion having the appearance of falling back on the Sun. The highest part became detached from the main mass, and was found to be ascending at a speed of 190 kilometres per second when at a mean height of 16'. The main column rapidly broke up into separate roundish masses, each about 1000 to 5000 miles in diameter and glowing brightly, yet in something less than ten minutes these had faded to invisibility.

This rapid dissolution is not, I believe, due to a diffusion of the gases in space, or to loss of heat in the ordinary sense. The glowing gas is probably of such a degree of tenuity that the free path of each individual atom is almost infinitely great, and, as the atoms move apparently in parallel courses or streams, the mass of gas can have no temperature and cannot lose heat, nor can it disintegrate by diffusion. The motion of translation of the atoms is not converted into radiant energy, as in hot bodies generally. The luminosity is, of course, due to the internal energy of the atoms, and this may be maintained by absorption

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of the intense solar radiation. It is remarkable that prominences of about 1' in height, even when detached from the chromosphere, and suspended apparently motionless above the Sun, will often maintain their luminosity indefinitely. At this height the disc of the Sun will subtend 140° , but when a mass of gas is projected to a height of 16' the angular size of the Sun is reduced to 60° , and the intensity of the solar radiation will then be five or six times less, and it may be supposed that this would be insufficient to maintain luminosity. While it is possible that this may account for the rapid fading of very high prominences, it may be remarked that in the prominence described the entire column from top to bottom faded almost simultaneously.

I am, Gentlemen,

Kashner Temporary Observatory,
1916, July 13.

Yours faithfully,

J. EVERSHED.