The Spectrum of the "Flash" *.

In this paper the results are given of a detailed study of a series of spectra photographed with a prismatic camera of $2\frac{1}{4}$ inches aperture and 36 inches focus.

These photographs, which are described in detail in the paper, include the spectrum of the cusps taken immediately before and after totality, and the complex bright line spectrum of the "flash" obtained at second and third contacts. The spectra of the upper chromosphere, prominences, and corona are shown in the plates exposed during the total phase of the eclipse.

The wave-length determinations in the case of the flash-spectra cover the whole range of spectrum between D''' and λ 3340 in the extreme ultra-violet, but, owing to the small scale of the images, the results are not considered very trustworthy except in the region more refrangible than K.

Tables are given of all the bright lines measured, with their intensities and the elements with which they have been identified. A separate table is also given of the hydrogen lines, of which at least 28 are shown on one of the plates.

The principal results discussed in the paper are those relating to the constitution of the lower chromosphere and the relation between the bright lines of the flash and the dark lines of the ordinary solar spectrum.

Comparing the wave-lengths of the bright lines with Rowland's tables of the solar lines, the two spectra are found to be in reality

* General results obtained from a detailed examination of spectra photographed at the solar eclipse of January 22, 1898. Abstract of a paper by J. Evershed read at the Royal Society, January 17, 1901.

very closely related, although, owing to great differences in the relative intensities of the lines due to different elements, they would appear at first sight to have little in common.

It is concluded from these results that the flash-spectrum does not really represent the upper, more diffused portion of a stratum of gas which, by its absorption, produces the Fraunhofer dark-line spectrum. The differences in relative intensity are explained as the result of the very unequal heights to which the different elements ascend in the chromosphere; the more diffused gases of low density giving strong emission-lines but weak absorption-lines, whilst low-lying gases of great density give strong absorption-lines but weak lines in the flash-spectrum.

A somewhat unlooked-for result of the investigation is the large proportion of lines in the spectrum of the flash which have been identified with known elements.

The hydrogen spectrum and the part played by hydrogen and helium in the lower chromosphere are also discussed in the paper.