

Osservazione dell' Eclisse solare del 6 giugno 1891 all' Osservatorio di Padova.

Osservatori	Tempo medio di Padova		Diametro dell' Obiettivo	Ingrandimento	
	principio	fine			
Lorenzoni	6 ^h 3 ^m 37 ^s .3	7 ^h 14 ^m 31 ^s .5	117 ^{mm}	190	(1)
Ciscato	6 3 35.8	7 14 28.4	117	87	(2)

- (1) Equatoriale di Merz. Osservazione ad occhio ed orecchio con oculare negativo ed elioscopio graduato tenuto a mano.
 (2) Rifrattore altazimutale di Starke. Osservazione cronografica con oculare negativo congiunto a circolo di posizione.

On Results Obtained in Photographing Solar Prominences and their Spectra.

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In numbers 3006 and 3037 of the A. N. I have described the methods designed to be used at the Kenwood Physical Observatory in photographing the solar prominences. As the success has been even greater than was at first anticipated, a brief summary of results may be of interest. Working in the fourth order spectrum of a 14438 grating, the prominence lines in the *H* and *K* region have been photographed with both radial and tangential slit. Both *H* and *K* are invariably found to be reversed, the fine bright-lines being at the center of the broad dark bands in the atmospheric spectrum. It is possible that these lines coincide with the calcium lines given by the electric spark, but more measures of the negatives will have to be made before this is certainly known. *H* is found to be double, the companion line being about 1.5 tenth-metre less refrangible, and preliminary measures show that the new line probably corresponds very closely in wave-length with the hydrogen line found by Ames at λ 3970.25 (Phil. Mag. July, 1890). As this line appears on several negatives, it is probable that a set of measures will give its position with a considerable degree of accuracy, and it is hoped that its identity may thus be determined. It falls very nearly in the position of the less refrangible first order ghost of the central reversal of *H*, but is far stronger than the corresponding ghost of *K*, and is probably independent of these troublesome false lines. In the ultra-violet three new lines have been found, so near the positions of the first three hydrogen lines of the »stellar series« that there can be little doubt of their origin. It is an interesting fact that the first of these — the one probably coinciding with Dr. Huggins' stellar line α — is a close, sharp double. This is not the result of poor focusing, as several negatives show the same thing, the fine lines in the carbon fluting of the atmospheric spectrum at this point coming out clearly at the same time. The subject will be investigated as soon as possible with high dispersion.

As soon as the great brilliancy of *H* and *K* reversals had been discovered, I decided to adopt these lines at once for prominence photography, especially on account of the broad dark shade which includes them. The apparatus described in A. N. 3037 was used, the sun being

allowed to drift across the tangential slit of the spectro-scope, and the film-cylinder at the focus of the spectro-scope rotated by the clepsydra. Photographs showing considerable detail in the prominences were thus obtained with a narrow slit. But the almost complete absence of atmospheric light in the dark shades of *H* and *K* suggested a further step. In the only previous attempts at prominence photography which met with the slightest degree of success, a wide tangential slit was used with the hydrogen line at *G'* (*H γ*). But the serious difficulties with this method are evident. With any of the narrow lines in the spectrum a wide slit produces such an increase in the brilliancy of the atmospheric spectrum that no contrast can be obtained in a photograph. In the case of *H* or *K*, however, this difficulty largely disappears, for the slit can be opened to a considerable width without materially increasing the brightness of the background. In this way it has been found perfectly easy to photograph prominences, and the required exposure has been greatly reduced. For prominences beyond a certain height the method requires certain modifications, and a new apparatus is now in the hands of the instrument maker, with which daily photographs of all prominences on the limb can be made with ease and rapidity.

The invisible or »white« prominences also demand attention. At the eclipse of 1886 a prominence 150000 miles high was shown in the photographs taken during totality, while with Tacchini's most persistent endeavors, the spectro-scope failed to render it visible, either before or after totality. Photographs of its spectrum taken during the eclipse brought out *H* and *K* reversals strongly, but no other lines were present, with the possible exception of one in the ultra-violet. Thus this prominence would never have been recorded by the observer, except for the chance intervention of an eclipse and photography. As these invisible prominences are strong in *H* and *K* light, it is evident that they may be photographed as readily as the others have been, and it is expected that some way be found when search is made with a new apparatus for the purpose. A method of rendering visible what has heretofore remained concealed cannot fail to be useful in further studies of the sun.