

the telescope and spectroscope between the exposures of the adjacent spark spectra, one made through the star, and the other through the spark windows, there was sometimes a displacement of the lines of one spectrum with respect to the other. After the diaphragms had been changed as above described this could only be due either to the slit or the comparison apparatus. An examination of the slit jaws showed that they were not brought to a sharp edge but consisted of two flat vertical surfaces about 0.7 mm. wide. One could not say what part of such jaws acted as the source of light, the focus would be uncertain, and trouble might arise from reflections between these flat and nearly parallel surfaces. The slit was taken apart, the jaws bevelled off to a sharp edge and ground perfectly straight. Great care was taken to ensure that the edges of these two jaws lay in one plane perpendicular to the axis. Even when this had been finished a photographic test by adjacent spectra showed occasional displacement of the spectral lines, and there only remained the comparison apparatus to be examined as the cause of the trouble. I may say that this work was done previous to the evolution of the focussing method above referred to, so that the camera focus may have been inexact to the extent of three or four tenths of a millimetre. This amount of displacement of the sensitive surface from the focal surface is quite sufficient to cause a marked displacement of the spectral lines, provided there is any faulty centering of the star or spark light.

*The Comparison Apparatus.*—The iron spark has up to the present time been used for the comparison light, the energy being supplied by a Queen 15-inch spark coil with a capacity, in parallel, of six half gallon jars. The spark gap was originally mounted to one side of the collimator tube, the spark light being reflected into the slit to one side of the light from the star or source to be examined, by a small diagonal prism. This was changed to a direct mounting of the terminals and condensing lens in the optical axis of the collimator about 80 mm. above the slit, as shown in *C*, Plate IV. When the star spectrum was being photographed the apparatus was swung to one side and