free from systematic error, but star spectra made with the instrument still gave velocities up to and sometimes greater than 2 kms. per second different from the mean of the values obtained by other observers of the same star.

Knowing that such differences could not be due to accidental errors of measurement a close search was made for the seat of the trouble, and it was found to be due to the fact that the star light was distributed irregularly and unsymmetrically over the collimator and camera lenses. The slit was placed in all positions, both at and near the apparent star focus and at a considerable distance within and without, but in no position could the illumination be made even approximately uniform. The position of the correcting lens was altered in each direction without any improvement, and the lens itself was inverted in its cell, which made matters worse. Acting on a suggestion of Dr. R. H. Curtiss, of the Allegheny Observatory, to whom I am indebted also for other help, I made a double slide carrier for the correcting lens, adjustable from the eye-end, which allowed the lens to be collimated exactly by means of a bright star, but this gave no useful result.

It was noticed, when the slit was very narrow, that the illumination became more uniform, which was likely due to the diffractional spreading of the light. Furthermore, when the slit was made 0·2 mm. wide the illumination was uniform, the inference being that with a slit of this width the entire star image was transmitted while with a narrower one part of the image was cut off by the jaws. Indeed the star image seemed to have a core about 7″ in diameter which was much too large, and pointed to some defect in objective or correcting lens, or both. This was also indicated by the very long exposures required to obtain measurable spectra.

The difficulty was narrowed down and shown to be in great part due to the correcting lens. At $H\gamma$ more than twice as much exposure was required when the correcting lens was in place as without it, showing that it apparently increased the diameter of the image. This was shown also by measurements