

the edge of the objective is longer than the focus for the center, that it has negative spherical aberration. This chromatic difference of spherical aberration is inherent in two-part objectives of the ordinary glasses, and the only remedy is to compensate for it by introducing the correct amount of positive aberration by the correcting lens. However, the lower curves show that, instead of compensating for this chromatic difference, the correcting-lens has, on the contrary, increased it somewhat, and the focus for marginal rays is upward of 2 mm longer than the focus for central rays. This agrees almost exactly with the previous determination of the zonal foci of objective and corrector, and is good evidence of the substantial accuracy of the determinations. Before leaving these curves it may be pointed out that the crossing of the curve from the 57 mm zone over the others in passing from short to long waves is due to the longer focus of the central zones in the visual part and is further evidence in favor of the accuracy of the determinations.

To obtain a still more striking comparison of the cause and magnitude of the aberrations present in the system, the color curves can be presented in another form, that of zonal foci curves like *A* and *F*, Fig. 3, previously determined. We have the color-curves, or the positions of focus, of the whole photographic region for eight zones of the objective in Tables III and IV, and these can be readily plotted in the same way and on the same scale as *A* and *F*, Fig. 3. If such curves were plotted for every wave length in these tables, they would show a striking agreement in form, but I have satisfied myself with representing the positions of the focus of eight zones for $H\gamma$, the wave-length for which the system was computed, and for the mean of λ 4250, 4340, 4440, and 4550, the range of spectrum used here in velocity determinations. *E*, Fig. 3, is the curve for $H\gamma$ of the objective alone; *C* is the curve for $H\gamma$ of objective and corrector. *D* is the curve for λ 4250 to λ 4550 of the objective alone; *B* is the curve for λ 4250 to λ 4550 of the objective and corrector.

A comparison of curves *D* and *E* with *F* shows in a striking manner the chromatic differences of spherical aberration in the objective when used with photographic light. If we leave out of account or allow for the deviations in the central zones, we see that the focus of the outer is about 1.8 mm longer than the focus for the central