U Ophiuchi whose apparent magnitude is 6.35, is −0.19, and hence the parallax is 0".00449.

A graph showing the sine curves for the two components with the velocities represented by open circles is shown in Fig. 1.

R S Vulpeculæ

The eclipsing variable R S Vulpeculæ = 19h 13.1m +22° 16′, 1900, typ. A vis. mag. 7.30 was placed under observation April 26, 1919 and the first plate used in the principal orbit was obtained on July 20, H. D. A fine grained Seed 23 plate was obtained on July 30 and used for the second spectrum. Fourteen plates were obtained in this interval, all of which have been measured and used. The spectrum is of type B8 instead of A, and the magnitude as judged by comparison with U Coronæ and T W Draconis appears considerably brighter than given by Nijland and Stewart.

This binary is especially interesting on account of the great disparity in size of the two components, the fainter star being five times the diameter of the brighter and nine tenths as bright. It would consequently be expected, when the two stars are of nearly equal brightness, that the second spectrum would be plainly visible, but it can only be seen and measured with great difficulty, and it is estimated to be of only about one-fourth the intensity of the brighter spectrum. Nevertheless, it was measured on six plates, and although the residuals are in some cases rather large, the probable error of the measures of the second spectrum on a single plate being ±8.1 km., the lines and plates are in fair interagreement. Consequently, there can be no doubt of the reality of the second spectrum, even though the mass of the fainter body is only 0.31 that of the brighter, a greater difference in masses when both spectra appear than has previously been found. Why the second spectrum should be so relatively faint when the two stars are of nearly equal brightness is not apparent. It may be that, although the continuous part of the spectra are of nearly equal intensity, the absorption lines of the second body are fainter than those of the primary rendering them difficult to see when the continuous spectrum of the primary is superposed. Or, again, a more likely explanation is that the lines are widened so much by the rotation of the large diameter faint star as to be made relatively very faint. One plate was made about 2.9 hours after primary minimum, which, according to Stewart's orbit*, would be about an hour after the total phase, so that although it would receive most of the light from the fainter component, about one-fifth would come from the brighter. This spectrum has much the same character as the others, except that the lines are much weaker and thus is in agreement with the above hypothesis. Further, an additional plate was obtained on July 30 on Seed 23 emulsion and the finer grain enables the second spectrum to be more readily and certainly measured. On this plate the enhanced line 4549 is plainly doubled, the intensity of the second spectrum being relatively much stronger than in the other lines. Further, the silicon pair 4128, 4131 show fairly strong companions, while the second spectrum in the hydrogen and helium lines is very weak. This would make it appear as if the faint diffuse companion were of Type B9 with relatively weak hydrogen and helium lines, while the bright dense star is B8 or even earlier. The relative intensities of the doubled lines 4549, 4131, 4128 are more nearly

*Astrophysical Journal, 42: 315, 1915.