

equal being only about one-half as compared with one-fourth for the hydrogen and helium lines.

Altogether 41 lines have been measured in the primary spectrum, H γ H δ He 4472, E388, 4441, 4424, 4026, Fe-Ti 4549, Mg 4481, C 4267, Ca, K, 3934 and in the line grained plate Si 4128, 4131. The lines are of only fair quality for measurement, although much better defined than in ϵ Ophiuchi, but the measures nevertheless are satisfactorily accordant, the probable error of measures of the primary spectrum on a plate being only ± 0.8 km. per second.

In the table of observations given below column 1 contains the plate number, columns 2, 3, date and Julian date of the observation, and column 4 the phase from primary minimum computed from the original phase 2,419,652.963 with a period of 4.477325 days from Stewart's photometric orbit.* Columns 5, 6 contain the velocities of the primary and secondary stars, and columns 8, 9 the residuals in the sense observed minus computed from the final orbit. Column 7 contains the number of lines measured in the primary, and where a second figure is present the number in the secondary spectrum.

TABLE II. OBSERVATIONS OF ϵ RS VELLECTAL.

Plate Number	Date	Julian Date	Phase	Velocity		No. of Lines	Residuals O-C	
				Brighter	Fainter		Brighter	Fainter
1919								
1888	April 26	2 075.981	0.786	-68.3	+132.0	9-10	-2.30	+13.2
1912	" 20	078.988	3.793	+22.2		11	-1.28	
1987	May 6	085.990	1.818	-63.2	+107.4	8-11	-3.20	+7.8
2243	July 1	111.903	1.021	+11.2		10	-2.11	
2269	" 3	113.903	1.517	-70.7	+131.9	9-7	-2.98	-11.5
2298	" 7	117.883	1.050	-76.9	+160.8	9-8	-0.99	+10.3
2305	" 8	118.902	2.069	-39.1		7	+2.56	
2329	" 9	119.870	3.037	+27.5	-163.7	6-3	-1.96	-10.3
2350	" 13	153.818	2.507	-7.5		10	-2.27	
2367	" 14	154.773	-1.161	+28.2		7	-2.79	
2390	" 15	155.878	0.090	-22.9		6	-1.91	
2428	" 18	158.897	3.109	+29.8		10	+2.07	
2441	" 19	159.892	4.101	+11.1		9	+5.08	
2449	" 20	160.727	0.462	-11.1		6	-2.56	
2579	" 30	170.760	1.540	-67.2	+152.2	9-8		-11.6

When these velocities and phases were plotted on cross section paper, it was at once seen that the orbit was not circular, although the photometric orbit does not show eccentricity, but this element can only rarely be obtained with accuracy from the photometric observations. Preliminary elements obtained graphically were assumed as follows:

e eccentricity	0.05
K half amplitude velocity	54.0 km.
γ velocity of system	-22.65 km.
ω longitude of apse	210°
T time of periastron	2,419,652.963 days from minimum.

*Astrophysical Journal, 42, 45, 1915.