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UBVRI OBSERVATIONS OF BH CRUCIS

The red variable star BH Crucis ($\alpha = 12^{\text{h}}13^{\text{m}}5$, $\delta = -56^{\circ}01'9$; 1950) was discovered by Welch (1969). Photoelectric UBV observations have been discussed by Walker, Marino, and Welch (1972), and by Walker and Marino (1972). They found the light elements for this star to be

JD(min.) 2440827 + 420^d25F.

The most notable feature of the light curve is a double maximum. Keenan (1971) has published a description of the spectrum which shows the star to be a member of a class intermediate between the carbon and S-type stars.

Occasional observations were made by the author during observing runs at the Cerro Tololo Inter-American Observatory in the interval 1971-74. The telescopes used are listed in the second column of Table I. The UBV measures were made through CTIO UBV filter set No. 2 (V, no. 291; B, no. 43; U, no. 247; red leak, OG5 + OG2) together with a refrigerated 1P21 photomultiplier. Standards were chosen from the list of Johnson and Harris (1974). The VRI measures were obtained through CTIO VRI filter set No. 2 (V Corning 3384 and 9780; R, Schott KG-1/4, OG-5/2, and RG-6/1.5; I, Schott RG-715/2 and RG-780/1) together with standards chosen from Johnson et al. (1966). The r.m.s. errors of a single observation in Table I are about 0^m020 for the UBV observations and about 0^m025 for the VRI observations. The exception, of course, is the (U-B) color index; these measures are an indication only that the star is very red. The presence of the double colons means that the flux measured was just above the background noise.

The UBV observations reported herein fall within the general range in colors and magnitudes quoted by Walker and Marino (1972). The phases given in Table I were calculated using the light elements quoted above. [Note that the inked-in phases on the abscisse in the figure in both Walker and Marino (1972) and Walker, Marino and Welch (1972) are in error. However, the shape of the light curve is accurate.] As is evident from the light curve of Walker et al., the light

curve does not precisely repeat from cycle to cycle. An attempt to improve the period indicated a possibly improved value of 419.27, but the new data are too few to be conclusive. Hence, for the present, the light elements given by Walker et al. should be used.

Johnson (1966) tabulates intrinsic colors for giant and supergiant stars. The brightness of the star near phase 0.25 approximates the star's average magnitude. The (R-I, V-R) color indices herein, taken near phase 0.25, indicate BH Crucis to have the colors of a M4 star from the (R-I) index, or more red than a M5 star from the (V-R) color index.

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TABLE I
UBV Data for Welch's Red Variable

U.T. Date	CTIO Telescope	D_c 2440000+	Phase	V^*	B-V	U-B	I	R-I	V-R
011871	#2 16 in.	969.7935	0.340	7.67	+2.65	+5.1::			
011871	"	969.7963	0.340	7.66	2.65	4.8::			
012071	"	971.7894	0.345	7.71	2.68	3.9:			
012071	"	971.7924	0.345	7.70	2.67	4.0:			
052071	"	1091.5172	0.629	7.32	2.46	2.20			
052171	"	1091.5748	0.630	7.30	2.49	2.20			
051272	"	1449.5728	0.481	7.75	2.61	3.6			
051572	"	1452.5832	0.489	7.77	2.63	3.1			
031973	24 in.	1760.7096	0.222	(8.79)			4.62	+1.70	+2.47
032073	"	1761.6230	0.224	(8.74)			4.62	1.70	2.42
032273	"	1763.6250	0.229	(8.71)			4.58	1.69	2.44
032673	"	1767.6949	0.238	(8.48)			4.52	1.66	2.30
032973	"	1770.6748	0.246	(8.52)			4.52	1.64	2.36
042074	#1 16 in.	2157.5293	0.166	9.24	3.66	3.4:			
042074	"	2157.5336	0.166	9.24	3.64	5.4::			

* Note that V-magnitudes in parenthesis are values calculated from the VRI data.

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