PHOTOMETRIC OBSERVATIONS OF LX PERSEI

LX Persei (BD+47°781, BV 307, R.A. (1900) $03^{h}06^{m}.4$, Dec. (1900) +47°43!5, V = 8.20) was reported to be an eclipsing variable by Strohmeier et al. (1962). The depth of the primary eclipse was about $1^{m}.1$ (photographic), but no secondary eclipse was detected. FitzGerald (1964, 1974) and Weiler (1974) have studied the system spectroscopically, and have found it to consist of two G-type stars (G5IV + G5IV?) of nearly equal mass. One component has strong CaII emission; for this and other reasons, LX Per is a strong candidate for inclusion in the "RS CVn" class of eclipsing binary stars (Hall, 1972).

FitzGerald (1964) noted that the spectroscopic properties of LX Per were inconsistent with the lack of a secondary eclipse. For this reason, photometric observations of this star were made, primarily to search for such an eclipse.

OBSERVATIONS: Observations were made in 1967 using the 48 cm reflector at the David Dunlap Observatory, and in 1970 using the no. 3 41 cm reflector at Kitt Peak National Observatory. The comparison star was HD 20192 (m = 7.8, spectral type G9II). Magnitudes were corrected for differential extinction and were reduced to differential values on the UBV system. This was accomplished by use of appropriate filters and by reference to secondary UBV standards in the α Persei cluster. Phases were calculated using the epoch JD 2427033.120 given in the General Catalogue of Variable Stars and the best spectroscopic period 8.038207 (± 0.000117) days, covering the period 1962 to 1973 (FitzGerald 1974). The results are presented in the table and shown on the figure.

DISCUSSION: The shoulder of the secondary eclipse was observed success-
fully on two dates. The eclipse has a depth of at least $0^{m}.165$ in both B
and V light. The similar behaviour in both B and V light is consist-
ent with the near-identical properties of the two components of the system.

The phase of secondary eclipse is not the same on the two dates
JD 2439825 and JD 2440886. This may be due to period changes between 1962
and 1973, or due to a real variation in the phase of secondary eclipse in
a system of constant period. Fitting the two secondary eclipses together
produces a period of 8.038500 day, which is not consistent with the spectro-
scopic period of 8.038207 (± 0.000117) days. On the other hand, several
other "RS CVn" stars show variations in the phase of secondary eclipse.
Further photometric observations of this system would be desirable, but the
near-integral period makes the system difficult to observe.

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TABLE

JD .	Cycle and Phase	ΔV	ΔB
2439786.6889	1586.6186	0.304	
800.5729	1588.3459	0.297	
.6778	.3589	0.286	
825.5097	1591.4482	0.320	
.6451	.4650	0.309	
.6722	.4684	0.321	
.7139	.4736	0.362	
.7563	.4788	0.429	
829.6000	.9570	0.297	
844.6167	1593.8252	0.305	
851.5542	1594.6882	0.305	
2440886.7271	1723.4698	0.299	
.7368	.4710	0.310	
.7542	.4732	0.324	
.7653	.4746	0.341	−0.014
.7799	.4764	0.358	−0.006
.7868	.4772	0.360	+0.013
.8042	.4794	0.387	+0.027
.8160	.4809	0.402	+0.015
.8285	.4824	0.408	+0.051
.8333	.4830	0.421	+0.059
.8451	.4845	0.458	+0.068
.8563	.4859	0.453	+0.088
.8694	.4875	0.465	+0.104