1975JAVSO...4...31J

RY CARINAE: A COMPLEX STAR GROUP

by

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RY Carinae is classified in the General Catalog of Variable Stars by Kukarkin et al. (1970) as Mira type with period 421.53 days, a brightest maximum of $9^m.8$ visual and faintest minimum of $< 15^m.0$ visual. The notes to the catalog indicate that average maximum is $11^m.0$ and average minimum $15^m.0$. There is also a remark to the effect that, since J.D. 2423600 the period has decreased to 419 days with considerable variation.

We have undertaken a study of RY Carinae with plates from the Harvard College Observatory plate collection. The plates used are all blue-sensitive; however, we adopted the visual magnitude sequence from the AAVSO chart and an extrapolation of this for our magnitude determinations. Thus, although the scale of our magnitudes is probably correct, there is an error in the zero-point that depends on the average color of the comparison stars.

Figure 1a is a light curve showing blue magnitude estimates from the patrol plates (3-inch Ross-Fecker lens) between J.D. 2425000 and 2430000. The period that best fits the data is 417.3 days with an epoch of J.D. 2426142. The long, flat minimum seems uncharacteristic of a Mira-type star.

When we began examining plates taken with larger cameras (24-inch Bruce doublet and 10-inch Metcalf triplet) we realized that the star we had been measuring was composed of more than one component. Figure 2a is a photograph showing RY Carinae itself, a nearby non-variable star of estimated magnitude $14^m.3$, and an additional newly discovered variable star labeled "x." Figure 2b is a photograph of the same region on a different date showing the non-variable star and another object labeled "z" that was only visible on this one plate. Apparently, the magnitudes that we had been measuring when RY Car was not near maximum were those appropriate to the non-variable star.

Magnitude estimates for RY Carinae itself were made on the Bruce and Metcalf plates yielding the light curve in Figure 1b. Again, the period is 417.3 days. The observations extend from J.D. 2425000 to 2434000, an interval of almost 25 years, and there is no evidence for large departure from the adopted period. The range in brightness is from $12^m.5$ to $< 17^m.2$, giving a blue amplitude of more than $4^m.7$.

Variable x appeared on 25 plates at magnitudes between $15^m.7$ and $17^m.0$. The number of observations is insufficient to determine a light curve for this star or to indicate definitely the nature of the light variation.

We wish to thank Mrs. Janet Mattei of the AAVSO for suggesting this study of RY Carinae and providing the finding chart. The Newton, Mass., Public Schools provided support for one of us (CJ) through its work-study program.

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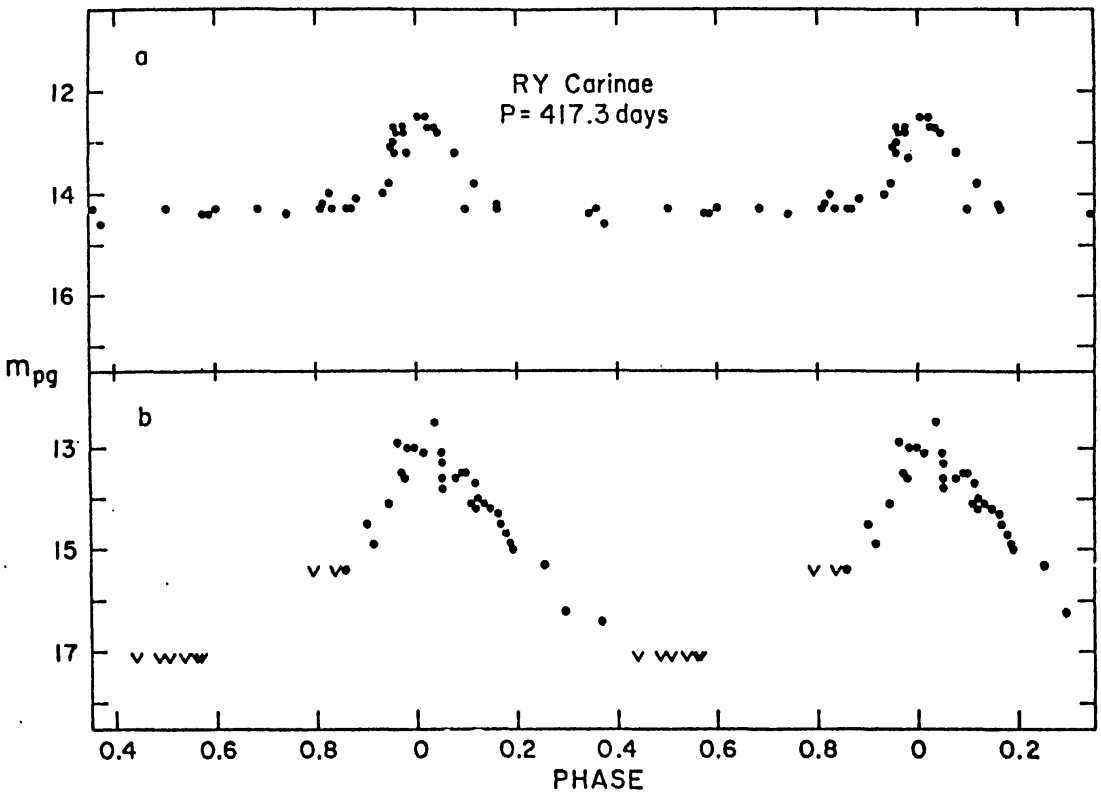

Figure 1a. - The light curve of RY Carinae as derived from Harvard patrol plates.

Figure 1b. - The light curve of RY Carinae from Bruce and Metcalf plates.

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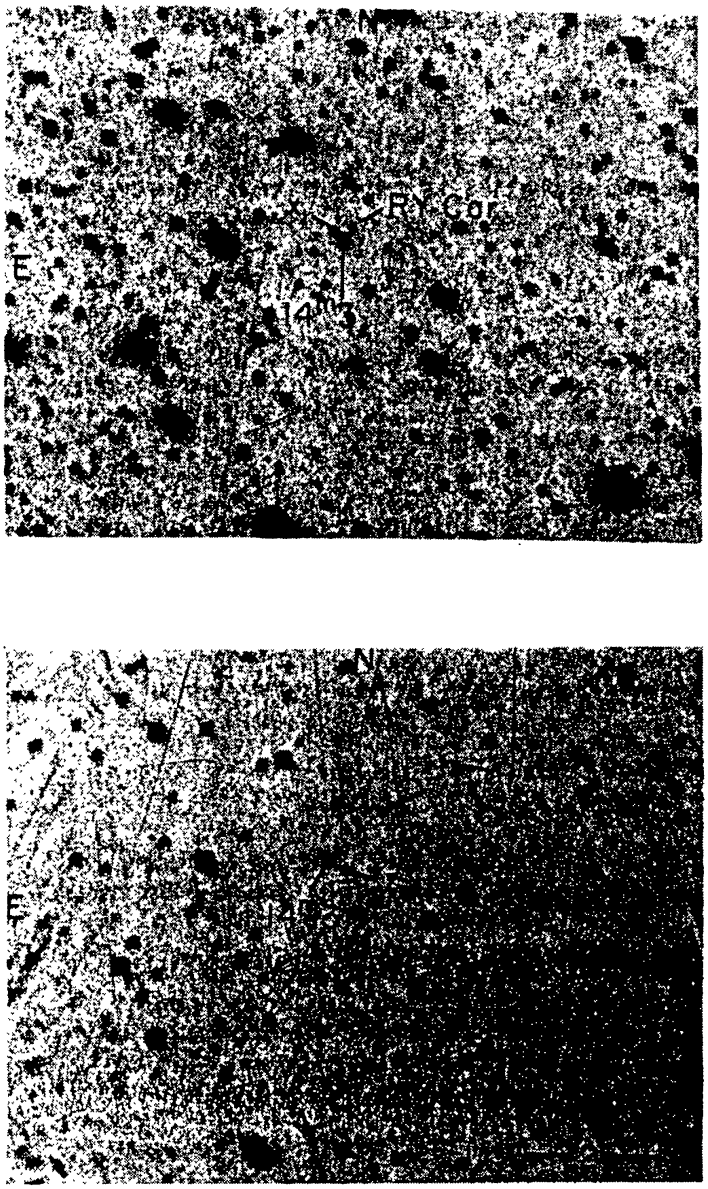

Figure 2a.(top) - The region of RY Carinae on April 19/20, 1950, showing RY Carinae itself, the newly discovered variable x, and the nearby star of magnitude 14.3.

Figure 2b(bottom) - The region of RY Carinae on April 1, 1908 showing a possible variable star z.

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