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UNUSUAL LIGHT VARIATIONS OF THE CARBON STAR AFGL 2881

We studied light variations of the infrared object AFGL 2881 (Price and Walker, 1976) on plates taken with the Schmidt telescope of the Radioastrophysical Observatory. The finding chart published by Cohen and Kuhi (1977) was used for identification of the optical counterpart of the object.

The character of light variations of this carbon star turned out to be rather unusual.

At first, from June 1975 till Dec. 1978 (J.D. 2442572 - 2443858) the star behaved as a long-period variable (Fig. 1). At the maximum light the red magnitude m_R was $10.8 + 11.1$, $m_V = 13.0 + 13.4$ and $m_B \approx 18$ (the object is visible only on one B-plate). At the minimum light $m_R \approx 13.0 + 13.7$, $m_V \approx 15.0$. The three observed maxima give the following light elements

$$\text{Max} = \text{J.D. } 2442690 + 560 \text{ E} \quad (1)$$

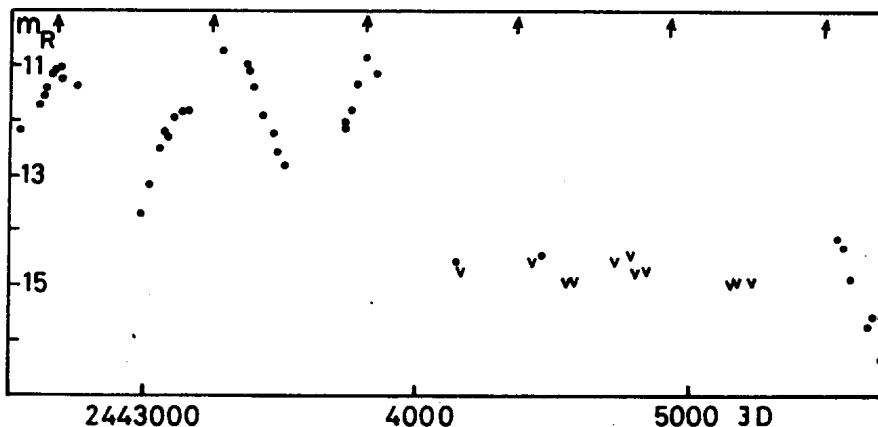


Figure 1. The m_R light curve of the object AFGL 2881. "v" stands for observations below plate limit. Small arrows at the top represent the predicted dates of maxima.

On plates taken later, however, the star was unexpectedly faint. On most of the 13 red plates taken between Oct. 1979 and Oct. 1982 the star was below plate limit, and never was seen brighter than $m_R = 14.4$, even at phases 0.14 and 0.87 according to the equation (1). During the observing season 1983 when exposures were made longer than previously, the star was observed declining from $m_R = 14$ at the beginning to $m_R = 16$ at the end of the season.

Thus our observations indicated that after Dec. 1978 the star AFGL 2881 faded in red light by two to three magnitudes in comparison to the earlier mean light curve.

More details on the variability of the AFGL 2881 will be given in a forthcoming paper in the Investigation of the Sun and Red Stars.

It would be important to know how rapidly the star faded and what was its photometric behaviour during the long interval of faint light. It is highly desirable to look through suitable red or V-plates, at least those taken after 1978 in plate collections of other observatories. It would be also interesting to compare the optical variations with those in infrared.

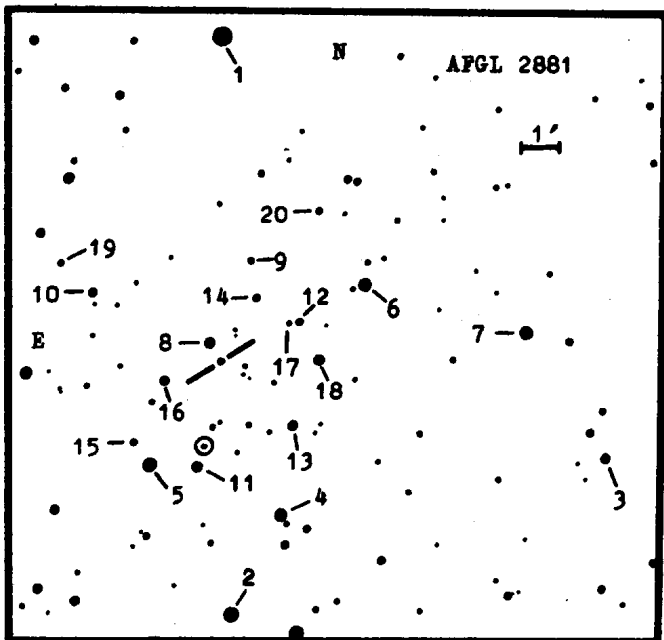


Figure 2. The finding chart for AFGL 2881 (R.A. = $22^{\text{h}}16^{\text{m}}5$, Decl. = $+43^{\circ}32'$, 1950) and comparison stars. The anonymous red star (see text) is marked with a circle.

Not less interesting would be to follow possible return of the star to its previous bright condition.

Probably, the star AFGL 2881 faded because of additional dust expelled from its surface as in the case of the variable carbon star HV 2379 (Bessell and Wood, 1983).

On the objective prism plate taken in Aug. 1974 we found another very red star 2.2 arcmin south of the AFGL 2881. It is ~ 30 arcsec north of comparison star No.11 (Figure 2). On this particular plate the anonymous red star turned out to be about 1.5 mag brighter than AFGL 2881, contrary to that seen on direct plates taken later. Positions of both red stars support identity of AFGL 2881 with the star No.3125 in the General Catalogue of Cool Carbon Stars (Stephenson, 1973), or with the star Case 749 (Blanco, 1956), suggested by Altamore et al. (1980). On our plates in most cases this anonymous red star is below plate limit. However, long-period variations with preliminary cycle length of about 440^d for this red star are suspected.

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