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PHOTOELECTRIC OBSERVATIONS OF 4 CANUM VENATICORUM

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Photoelectric observations were obtained of 4 Canum Venaticorum (=HD 107904: $\alpha = 12^h18^m9$, $\delta = +43° 6'$ (1900)), which was suggested as a possible member of the δ Scuti group of variable stars by Jones and Haslam (1966). The radial velocity was first found to be variable at the David Dunlap Observatory (Young 1945). Its absolute magnitude $M_v = +0.8$, from its membership in the Hyades moving group, spectral type gF0n (Wilson and Joy 1950), and color index $(B-V) = +0^m35$, place it close to members of the δ Scuti class in the HR diagram. Jones and Haslam obtained spectra of 4 CVn on two nights and determined a radial velocity curve with a period of 0^d1707, which is typical of δ Scuti variables.

The photoelectric observations of 4 CVn and a comparison star HD 108100 (spectral type F2), approximately 1.2 magnitudes fainter and one-half degree distant, were made on nine nights during May and June 1966, using the Francis C. McMath 24-inch Cassegrain reflector. The photoelectric spectrophotometer was used with an E.M.I. 9558Q photomultiplier in the visual at 5540 Å with a bandpass of 200 Å. On some nights the comparison star showed a change in brightness of about 0^m02 in four hours.

Light curves from three of the nights are shown in Figure 1. The period used was Jones and Haslam's period of 0^d1707. Figure 1 indicates, first, that the radial velocity period will not fit these observations, and second, that these curves show outstanding variations in form and amplitude on the different nights. The curve from June 11 indicates a period longer than 0^d1707. A period of about 0^d19 would fit this curve, but even with this period, the light curves from other nights would not coincide. On May 25 the star varied by not more than $+0^m02$ for a period of about two hours. From a comparison with other nights' observations this phenomenon ap-

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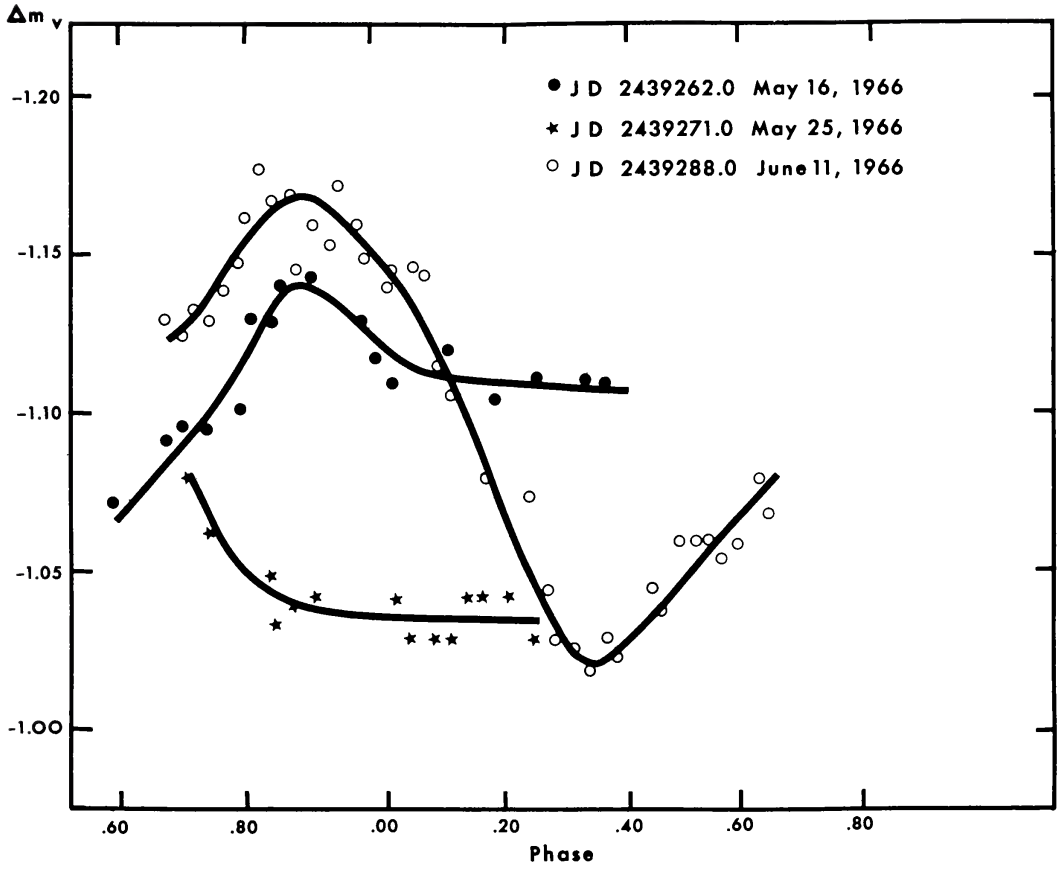

FIG. 1 — A plot of magnitude difference (variable minus comparison) *vs.* phase on three nights using a period of 0^d1707.

peared to occur at a minimum. This is considerably different from June 11 when at a minimum the star varied by 0^m075 in two hours. A similar situation occurred on June 10 (not shown), except that this phenomenon was at a maximum on the curve. The light curve from May 16 shows a small decline, and then appears to become constant compared to the behavior on June 11. The light curves obtained on the other nights also differed from each other in form and amplitude. These observations, especially those from May 25 and June 10, indicate that some beat phenomenon is probably occurring.

Color indices were also obtained of 4 CVn and the comparison star using a combination of Schott glass filters and transformed to the standard *UBV* system. The color indices for the variable are the means of observations scattered over more than one night. For 4 CVn, $(B-V) = +0^m387$, and for HD 108100, $(B-V) = +0^m361$. These agree well with those found by Wachmann (1966).

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This star shows several characteristics of the δ Scuti class, such as a light curve with a variable form and amplitude. Its spectral class, colors, and suspected period are also typical of these variables. Since 4 CVn has these properties, it may tentatively be considered a member of the δ Scuti variables. Further observations are needed on successive nights over a long time baseline to obtain an accurate period and to determine any beat phenomenon, also a characteristic of these variables.

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Editor's note: See also "Light Variation of 4 Canum Venaticorum (=HD 107904)," by Arlo U. Landolt, page 516 of the December 1966 issue of the *Publications.*

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