FERNIE: My remark is that I would be relieved if R CrB behaves more like a Mira star, because then I wouldn't worry about the low radial velocity amplitude.

My question is: I understand that Miss TRIMBLE's results indicated a large amplitude of pulsation. Do you know whether she still believes this?

KIPPENHAHN: To your remark: If the R CrB pulsation resembles more that of Mira pulsation one might expect the ratio of radial velocity amplitude to photometric amplitude to be smaller, but on the other hand the colour variation unfortunately should be rather big. I think even if one believes that the mechanism which is driving the pulsation is similar to that working in Mira stars, one should not expect that the fully developed pulsation should resemble that of a Mira star.

To your question: I have no information about Miss TRIMBLE's work of pulsation of R CrB models. But computing the pulsations of our R CrB models would mean to make assumptions on the interaction between pulsation and convection. One has not yet succeeded in doing this for Mira stars properly.

Some Properties of Magnetic Variables

Karl D. RAKOŠ (Vienna)

It is certain, that the mechanism causing variations of the magnetic field and spectral lines in Ap stars must also cause variations in their luminosities. The light curves are synchronous with the magnetic variations and usually the maximum of the positive magnetic field strength coincides with the minimum of the light curve. In the past the oblique rotator theory was not able to explain easily such brightness change. There is no simple reason to suppose, that the brightness of the surface of a star would increase or decrease at one magnetic pole only. Since that time a few stars were found with some indications for secondary minima and maxima in the light curves, but the first established double wave in a light curve was recently found by H. M. MAITZEN and K. D. RAKOŠ in HD 125 248 (1970), see Figure 1. It is a very exciting result, only the light curve in yellow light shows two maxima and two minima. The light curves in blue and ultraviolet are very smooth and show no evidence for secondary waves.

The photoelectric observations of α Andromedae made by the author at Lowell Observatory show also very nicely double waves in all three colors, see Figure 2. The period of the light curve derived from these observations lies near one day.

$$P = 0\overset{d}{.}9636$$

It is in good agreement with the line width in the spectrum of this star. Very remarkable is the difference between primary and secondary minimum for different colors. The secondary minimum and maximum for ultra-violet and blue can be found only from a very long set of good observations.

HD 125 248 and α Andromedae show very instructivly how effective the secondary wave can be hidden in the light curve of magnetic stars.

Figure 3 shows the smooth light curves in UBV for HD 224 801 (K. D. RAKOŠ, 1963). The secondary wave can be recognized easily.

The observations of HD 71 866 (K. D. RAKOŠ, 1962) also show the secondary minimum and maximum in yellow. The U and B light curves show no evidence for secondary waves, very similar as HD 125 248, see Figure 4.

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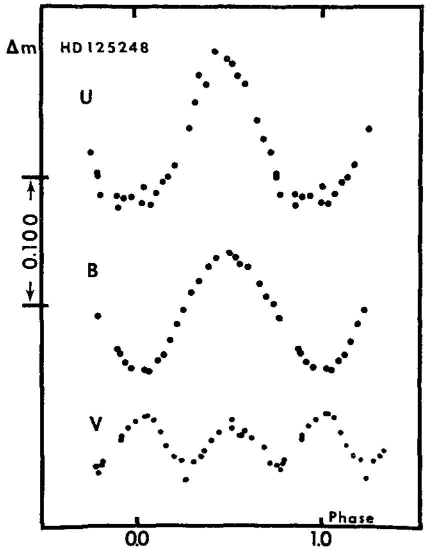

Figure 1: UBV light curves of HD 125 248. P = 9ᵈ295.

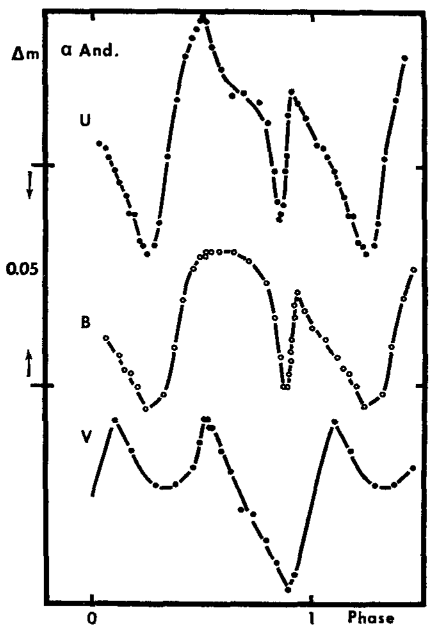

Figure 2: UBV light curves of Alpha Andromedae. P = 0ᵈ9636.

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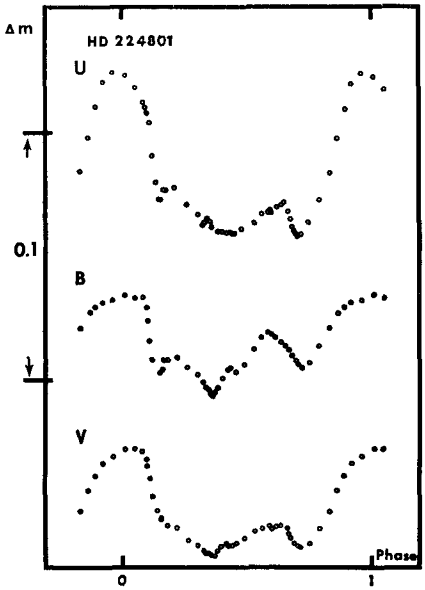

Figure 3: UBV light curves of HD 224 801. P = 3ᵈ7397.

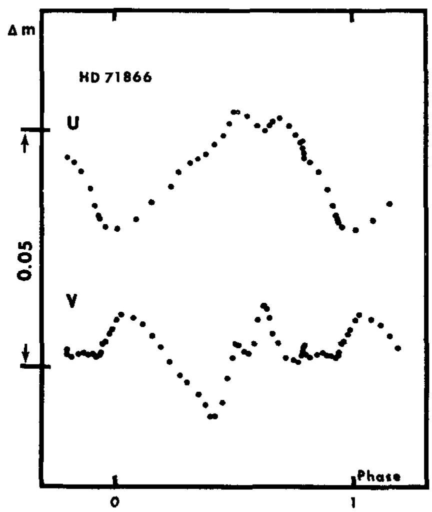

Figure 4: U and V light curve of HD 71 866. P = 6ᵈ7976.

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The observations of HD 65 339 made by the author in 1964 at Lowell Observatory show probably a hidden secondary minimum in U, see Figure 5. New observations from this point of view would be necessary to solve this question.

Three more stars: 73 Draconis, 21 Persei and HD 25 823 may have secondary minima and maxima in their light curves. In general it seems that all Ap stars have secondary waves in their light curves, the question is only in what part of their spectrum.

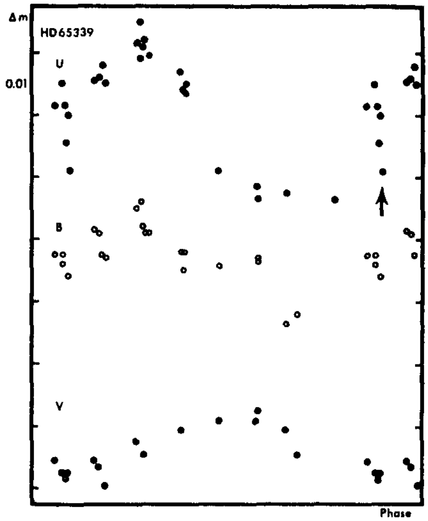

Figure 5: UBV light curves of HD 65 339. Possible secondary minimum in U is marked by arrow. P = 8ᵈ0278.

References:

MAITZEN, H. M., und RAKOŠ, K. D., 1970, UBV Beobachtungen des magnetischen Veränderlichen HD 125 248. stron. and Astrophys. 7, 10—16.

RAKOŠ, K. D., 1963, Photoelectric Investigation of Magnetic and Spectrum Variable Stars II. Lowell Obs. Bulletin No. 121, Vol. VI., No. 2.

RAKOŠ, K. D., 1962, Lichtelektrische Beobachtungen des magnetischen und spektrum-veränderlichen Sternes HD 71 866. Z. f. Aph. 56, 153—160.

Discussion to the paper of RAKOŠ

H. J. WOOD: Could you comment on the short periods such as 2^h04^m which you found for HD 224 801?

RAKOŠ: I have made some suggestions in my paper: Die Sonne — ein veränderlicher Stern?, „Sterne und Weltraum", Heft 1/1971.

HOUCK: OAO-A2 has found much the same results in α^2 CVn in the vacuum ultraviolet which will be reported in the paper by Dr. MOLNAR Friday.

RAKOŠ: I am very glad to hear that.

SINVHAL: Is the phenomenon of secondary waves you are talking about anyway related to the magnetic field strength or to the chemical composition of the star?

RAKOŠ: I do not think so.

DE GROOT: Don't you expect the material to oscillate at both magnetic poles, instead of only at one of them. When the other magnetic pole is seen, this 2^h period would not vanish.

RAKOŠ: If the hot plasma from the solar interior is coming out on one pole and streaming in the direction to the second magnetic pole returning there into the stellar interior we shall expect the pulsations only on the hot pole.