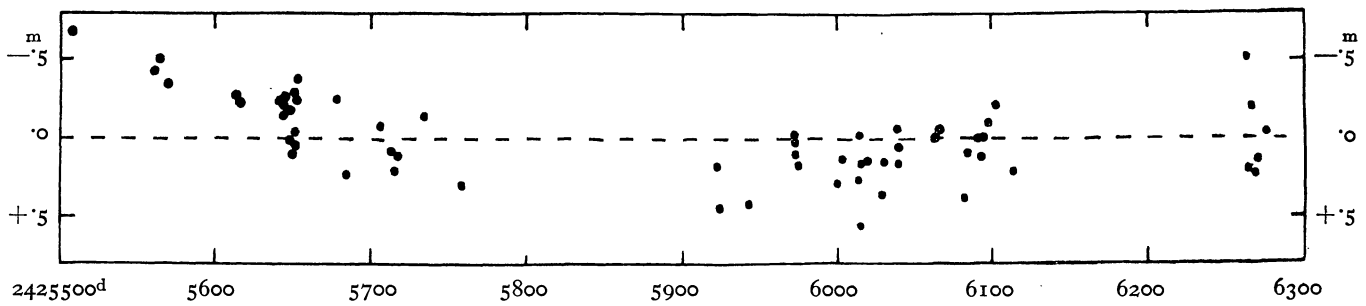# B.D. +31°703 a variable star
Martin, W.C.

FIGURE 1.

Observations with phases between ·75 and ·00 (minimum)
Ordinate: magnitude difference with mean light curve; abscissa: Julian Day

between the individual observations and the mean lightcurve as a function of the Julian Day are shown. As the maxima and the branches seem to be the most irregular part of the lightcurve, only observations with phases between ·75 and ·00, corresponding to the more regular minimum have been plotted. The decrease in the mean brightness of the minima from the beginning of the observations at J.D. 2425507 to J.D. 2425758 is obvious. The mean brightness is seen to increase from J.D. 2425922 to the end of the observations at J.D. 2426272, so that there has occurred a minimum at about J.D. 2425830, where unfortunately there is a gap in the observations.

The scatter of the dots in the diagram ($\pm$ ^{m}·14 m.e.) is very little more than one would expect from observational errors alone ($\pm$^{m}·10 m.e.), so that the minimum brightness changes almost solely in a secular manner.

The mean brightness has fallen considerably since van Gent's observations were made. This is clearly shown by Table 3, where the mean brightness of the minimum as derived from Alden's and Oosterhoff's observations is given in the system of Figure 1.

TABLE 3.

Observer	J.D.	mean brightness at minimum
Alden	2426364	+ ^{m}·4
,,	65	+ ·4
,,	95	+ ·4
,,	96	+ ·5
,,	6772	+ ·5
Oosterhoff	7889	+ 1·4
,,	8159	+ 1·4
,,	60	+ 1·5

B.D. + 31°703 a variable star, by *W. Chr. Martin.*

The star B.D. + 31°703 = H.D. 25799, α = 4^h0^m3, δ = + 32°6′ (1900), m_{pg} = 6·70, Sp = B3 was one of the three comparison stars, used by the writer in *B.A.N.* No. 312 for a photometric research of the variable AG Per. In *B.A.N.* No. 312 five plate pairs, taken without grating, were rejected, because none of the available reduction curves gave magnitudes for the 3 comparison stars c, d and e, which agreed with the magnitude intervals d—e and c—d as measured on 21 other plate pairs (cf. l.c.).

New plates, taken with a grating on October 21 1938, now show that the interval d—e is variable. From J.D. 2429193·59—·65 d—e increases from ^{m}·20 to ^{m}·30, after which it remains constant till the end of the observations at J.D. 2429193·69. Comparison with the well known brightness of AG Per shows that d is responsible for the change in d—e. The fact that d—e is constant (^{m}·19) on the dates given in *B.A.N.* No. 312, together with the nature of the light variation at J.D. 2429193 makes it probable that

d = B.D. + 31°703 is an eclipsing variable with a constant maximum and a relative short minimum of ^{m}·11 depth. In this connection it is of interest that the radial velocity is variable (Pearce, *D.A.O.* 5, 24, 1931).

The five rejected plates were reduced anew, with AG Per (which was then in maximum), e and c as comparison stars. The resulting magnitudes are given in the table together with those from the plates taken with grating in October 1938. The dates are hel. J.D. — 2420000.

date	d—e	date	d—e	date	d—e
8932·3756	^{m}·21	9192·41—·57	^{m}·172	9193·6097	^{m}·248
·4067	·22	·58—·63	·182	·6236	·270
·4146	·27	·65—·68	·196	·6374	·280
46·4236	·25	93·4910	·193	·6526	·310
·4344	·31	·5180	·192	·6665	·306
47·3591	·28	·5318	·196	·6795	·301
·3689	·30	·5668	·213	·6887	·291
·3781	·30	·5806	·206	96·52—·55	·193
·3874	·28	·5944	·196		