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SEMIREGULAR VARIATIONS
OF NOVA V841 OPH (1848) AT MINIMUM

V841 Oph (RA = $16^{\text{h}}59^{\text{m}}30^{\text{s}}$; D. = $-12^{\circ}53'53''$; Equin.2000) is an old nova which erupted in 1848 reaching at maximum an apparent visual magnitude $m_{\text{V}} \sim 4$. The star had a moderately fast decline ($t_2 \sim 60^{\text{d}}$; $t_3 \sim 110^{\text{d}}$) returning after some years at its normal magnitude $m_{\text{V}} \sim 12.5$. Its amplitude $A_{\text{V}} \sim 8.5$ is less than normal for a nova, so that the star has been considered as a potential recurrent- one.

In the course of a general study of the light curves and spectra of galactic novae, which is being carried out at Asiago, we have collected all the estimates of visual magnitude of V841 Oph published by different Authors (Barnard, Peek , Steavenson) from 1919 to 1947. These magnitudes, although not evenly distributed on the light curve, clearly show the presence of relatively slow brightness fluctuations, between magns. 12 and 13 ,with a periodicity of the order of 51 days (Fig.1). Their amplitude, however, is not constant but varies erratically from 0.5 to 1.0 magns. Moreover, at times the fluctuations cease and the star remains more or less constant at $m_{\text{V}} \sim 12.5$ for weeks or months , perhaps with some flickering of 0.1-0.2 magns. (Fig.2).

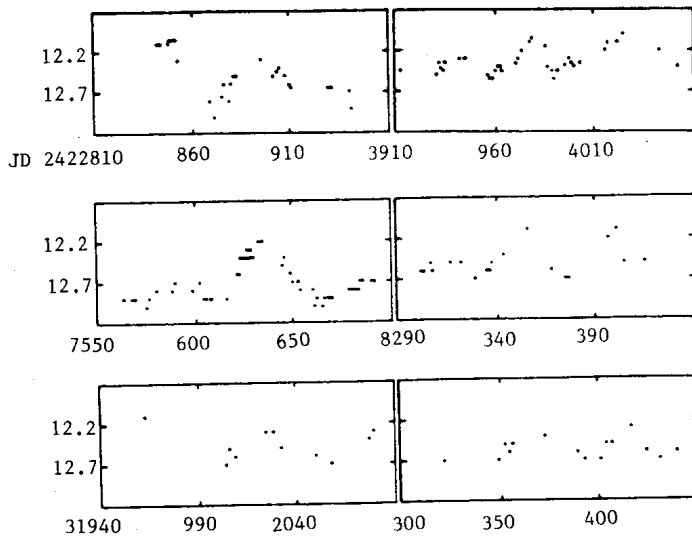


Fig. 1. Semiregular maxima in the light curve of V841 Oph

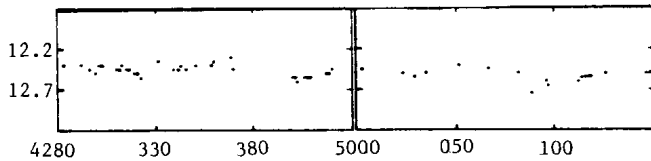


Fig. 2. Light curve of V841 Oph in the quiet periods

The semiregular periodicity of V841 Oph was noticed by Barnard (1921), Turner (1921) and Steavenson (1923) who proposed different periods, from 27 to 50 days, without coming however to a definite conclusion on the length of the period. Since we dispose now of a much more abundant material (420 visual magnitudes at minimum over an interval of 28 years) we have thought it was worthy to examine better the question of the semiregularity of this old nova. We have therefore selected in the general light curve 17 maxima, fairly well defined,

all brighter than m_v 12.3, distributed within the interval 1919-1947, finding, after some tentatives, that the epochs t_M of the maxima were fairly well satisfied by the following elements: $t_M = \text{JD } 242\,7633 + 51.50^d \text{ E}$.

The observed J.D. of the selected maxima, the corresponding date, the visual magnitude, the number E of cycles passed from the epoch T_0 and the phase $(T_0 - T_M)/P$ of each maximum are given in Table I.

Table I - Observed maxima and residuals.

JD 2400000	Date	m_v (max)	E	Phase
22119	1919 Jun 9	12.00	-107	+0.07
22176	Aug 5	12.10	-106	-0.04
22481	1920 Jun 5	12.10	-100	+0.04
22849	1921 Jun 8	12.05	- 93	-0.11
22893	Jul 22	12.30	- 92	+0.04
23199	1922 May 24	12.05	- 86	+0.10
23253	Jul 17	12.10	- 85	+0.05
23978	1924 Jul 11	12.05	- 71	-0.03
24025	Aug 27	12.00	- 70	+0.06
24701	1926 Jul 4	12.10	- 57	-0.07
24750	Aug 22	12.00	- 56	-0.02
24795	Oct 6	12.05	- 55	+0.11
27635	1934 Jul 16	12.20	-	+0.04
28355	1936 Jul 5	12.10	+ 14	+0.02
28401	Aug 20	12.10	+ 15	-0.09
31962	1946 May 21	12.10	+ 84	+0.06
32417	1947 Aug 19	12.30	+ 93	-0.11

The mean light curve of the nova at minimum, during the periods of semiregular activity is shown in Fig.3, the phases having been computed with the precedent elements. Of course the magnitudes of the star observed in its periods of quiescence, as shown in Fig.2, have not been taken into consideration.

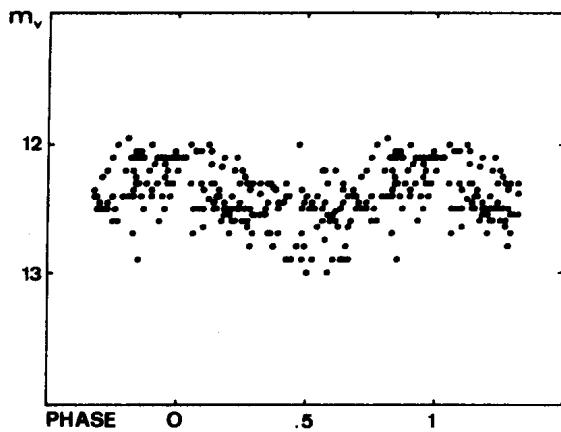


FIG.3 . MEAN LIGHT CURVE OF V841 OPH

The mean light curve reproduced in Fig.3 is typical of semiregular variables. The mean amplitude is 0.42 ,between m_v 12.15 and m_v 12.57 , the curve has a sinusoidal-like shape. The relatively high dispersion of the points is mostly due to the variable amplitude of the oscillations and also to the fact that the period, although its average value 51.5^d is maintained for 28 years, changes irregularly between 45 and 57 days from cycle to cycle.

This very interesting old nova has now been included in a regular programme of spectroscopic and photometric observations at Asiago.

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Steavenson W.H. ,1923 ,Monthly Not. of the RAS 83,160.
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