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PHOTOMETRIC VARIABLE STARS IN THE FIELD OF OPEN CLUSTERS

During the years 1975 to 1978 one of us (J.J.C.) was carrying out photoelectric observations of several open clusters of the southern hemisphere. Most of the selected clusters have either not been previously observed photoelectrically or the existing data are far from being complete. The results of these investigations are being prepared for publication.

The purpose of this note is to report the variability detected in nine stars located in the vicinity of the following open clusters: Collinder 135, NGC 2547, Pismis 13, NGC 3293, and NGC 5138. Two hundred and eighty stars in the above clusters were observed photoelectrically in the UBV system using the 150-cm telescope of the Bosque Alegre station of the Córdoba Observatory (Argentina) and the 41-cm, 61-cm and 91-cm telescopes of Cerro Tololo Inter-American Observatory. Mean coefficients were employed in both observatories to correct for atmospheric extinction and nightly observations of about 15 E-region primary standards (Cousins 1972) were used to transform to the UBV system. The external and internal mean errors of a single observation are about 0.01 mag in all the cases.

Among the new variables there are five whose individual measurements differ more than 0.2 mag, while the other four stars have ΔV variations in the range $0.12 < V < 0.20$. Five of the nine variables are found to be physical members of the clusters.

The individual photometric data for the new variables are presented in Table I, whose columns are self-explanatory. Some remarks on individual stars in the clusters are given at the end of the table.

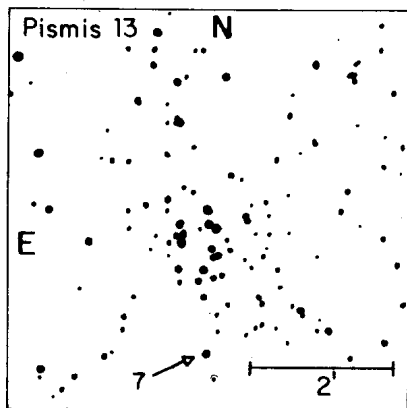
TABLE I

UBV observations of new photometric variables

Star	Membership	Sp.Type	HJD 2440000 +	V	B-V	U-B
Collinder 135						
HD 55718	n-m	B3V	3563.6219	5.93	-0.13	-0.63
			3567.5201	5.72	-0.15	-0.63
			3574.6507	6.06	-0.19	-0.60
			3580.5223	5.96	-0.17	-0.64
HD 57034	n-m	B8	2458.6881	8.32	-0.05	-0.26
			2461.7097	8.08	-0.04	-0.27
			3563.6579	8.13	-0.04	-0.21
			3576.5309	8.12	-0.05	-0.24
NGC 2547						
CD-49 ⁰ 3379	n-m	K2	3167.6822	9.47	1.03	0.54
			3168.6913	9.54	1.06	0.52
			3169.7038	9.59	1.05	0.51
			3221.5488	9.49	1.05	0.61
			3222.5516	9.51	1.07	0.62
CD-48 ⁰ 3526	m	F2	3167.7169	10.95	0.36	-
			3168.6788	10.97	0.36	-
			3169.6781	11.00	0.39	-
			3562.6163	11.06	0.38	0.00
			3576.5878	11.11	0.38	0.05
3577.5484	11.09	0.36	0.05			
CD-48 ⁰ 3533	m	F0	3167.6524	10.63	0.30	0.06
			3169.6885	10.69	0.30	0.09
			3562.6060	10.76	0.31	0.06
			3576.6093	10.78	0.30	0.10
CD-49 ⁰ 3384	n-m	M	3167.7287	9.59	1.65	2.08
			3168.7003	9.71	1.69	1.97
			3169.7419	9.78	1.66	1.83
			3221.5668	9.62	1.70	2.30
			3566.6330	9.67	1.77	2.09

Table I (continued)

Star	Membership	Sp.Type	HJD 2440000 +	V	B-V	U-B
Pismis 13						
7	m	B8	3569.7382	13.74	0.57	0.13
			3570.6995	13.62	0.55	0.06
NGC 3293						
CPD-57 ^o 3502	m	M0Iab	3564.7559	7.22	2.05	2.30
			3567.7657	7.37	2.02	2.16
			3575.7305	7.41	2.05	1.98
			3581.7101	7.56	2.00	-
NGC 5138						
63	m	K3	3563.8418	10.24	1.51	1.78
			3568.8357	10.28	1.49	1.71
			3570.8896	10.26	1.50	1.73
			3575.7715	10.30	1.52	1.72
			3578.8354	10.44	1.48	1.75



REMARKS ON INDIVIDUAL STARS

- HD 55718: This is a double star ($\rho \approx 2''$) in the field of the very inconspicuous open cluster Cr 135. The UBV photometry refers to the combined light of both components. The spectral type of the A component has been taken from Kennedy and Buscombe (1974). The system lies well above the cluster main sequence in the colour-magnitude diagram. The reddening and distance obtained by Clariá and Kepler (1979), viz. $E(B-V)=0.01$ and $d=620$ pc, are both inconsistent with cluster membership.
- HD 57034: Clariá and Kepler (1979) obtained $\beta=2.836$, $E(B-V) = 0.02$ and $V_0 - M_V = 7.50$ implying a foreground star.
- CD-49°3379: This red star is slightly outside the main cluster region. Its position in the colour-magnitude diagram excludes it from cluster membership. Star No.14 of Fernie (1959).
- CD-48°3526: The location of this star in the two colour-magnitude diagrams and in the (U-B) vs. (B-V) diagram is consistent with cluster membership. Star No.17 of Fernie (1959).
- CD-48°3533: This star, No.22 of Fernie (1959), lies in the central region of the cluster. The UBV photometry is consistent with the star being an F-type cluster member.
- CD-49°3384: Its location about 1.5 mag below the main-sequence turn-off suggests that it may not be a cluster member. Star No. 25 of Fernie (1959).
- Pismis 13: This cluster is a compact group of faint stars in Vela; hence Ruprecht (1966) placed it as belonging to class II2p. The UBV data of star 7 are compatible with this star being a late B-type cluster member with $E(B-V) = 0.66$. A finding chart for the suspected variable No.7 (Clariá 1979) in Pismis 13 is shown in Figure 1.
- CPD-57°3502: From the spectral classification (M0Iab) and radial velocity (-12 km/sec) given by Feast (1958), the star is very probably a cluster member.
- NGC 5138: The colour-magnitude diagram of this cluster shows four red stars which could be giant cluster members. They are Lindoff's (1972) stars 22, 63, 79 and 151. DD0 photometry of star 63 imply $E(B-V)=0.12$ and a K5 III-IV spectral type suggesting that this star is probably not a cluster member.

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