

COMMISSION 27 OF THE I. A. U.
 INFORMATION BULLETIN ON VARIABLE STARS

Number 1957

Konkoly Observatory
 Budapest
 1981 April 21
 HU ISSN 0374-0676

VARIABLE STARS IN THE PLEIADES CLUSTER

From October 22 till November 27, 1980, we performed photometry on 8 late G and early K type stars in the Pleiades cluster. From previous measurements on these type of stars in this cluster it looked as if many of them are variable. The 8 stars, which were measured with the Walraven photometer on the Dutch 91 cm telescope (Lub, 1979) on La Silla, ESO, form a random choice of G and K type stars in the cluster. All of these stars are members according to their proper motions and distance moduli. The selected stars are given in Table I. The numbers are from Hertzsprung (1947).

All of these 8 stars turned out to be variable according to our measurements and for 5 of them a lightcurve was obtained. Also two of the comparison stars are variable, but for only one of them a light curve could be obtained. The light curves and the periods are given in Figures 1a and 1b as differences, in $10 \log(I)$ for the V-channel, between the given star and substandard for the cluster, star 804. The zero points for the phase calculations were $JD=2444534.5$ for star 34 and $JD=2444542.5$ for all others.

Table I

Invest. stars		Comp. stars		local standard	
Hz	m_v	Hz	m_v	Hz	m_v
746	11.28	745	9.45	804	7.84
129	11.45	164	9.53		
1220	11.83	1132	9.43		
34	12.04	25	9.47		
1124	12.30	1122	9.29		
1883	12.57	1797	10.10		
879	12.81	727	9.27		
686	13.35	745	9.45		

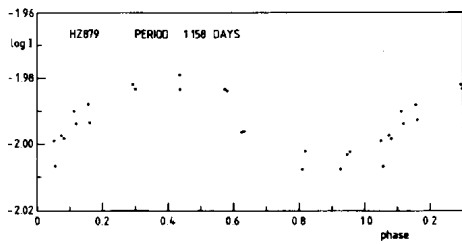
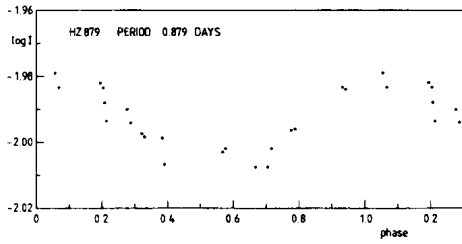
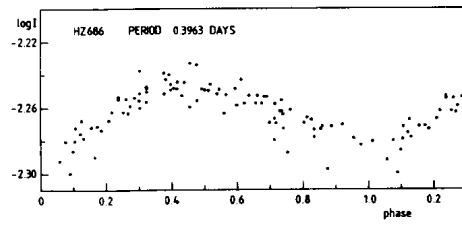
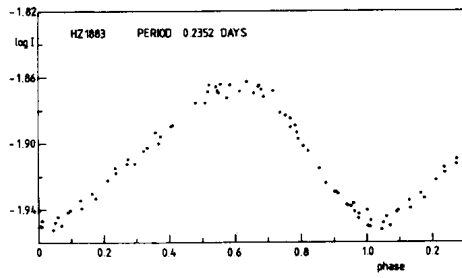


Fig.1.a

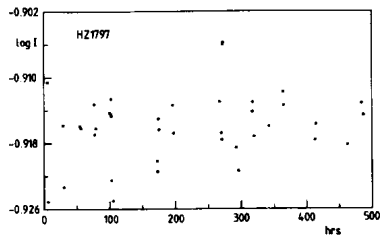
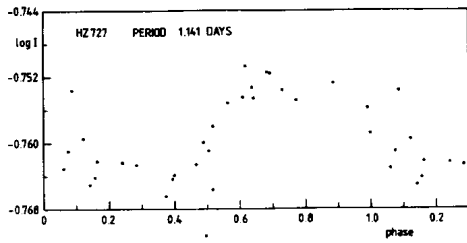
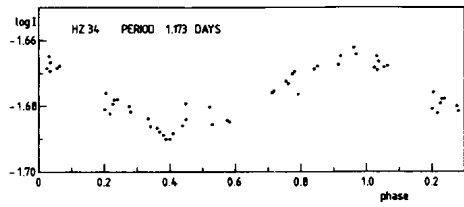
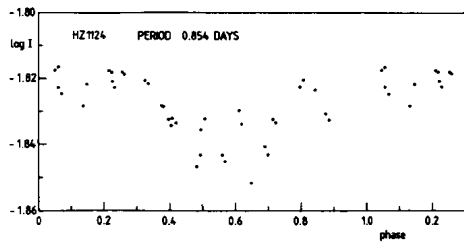


Fig. 1.b

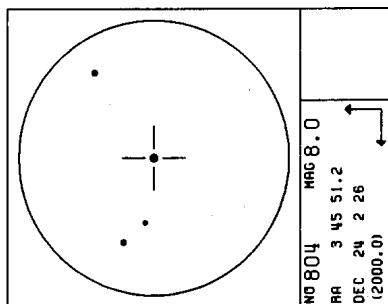
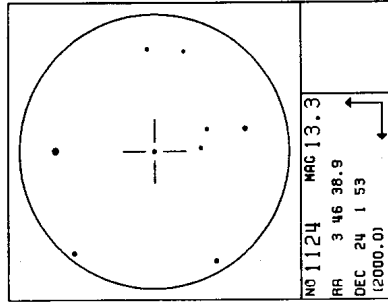
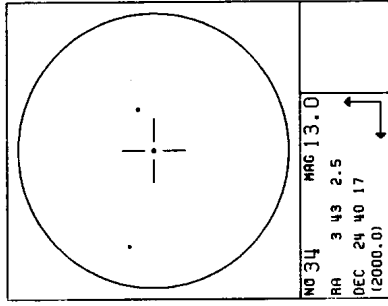
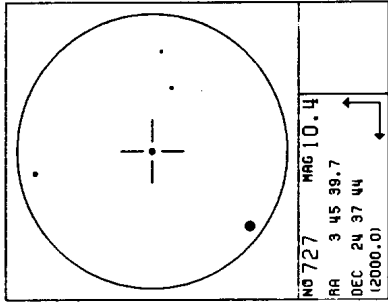
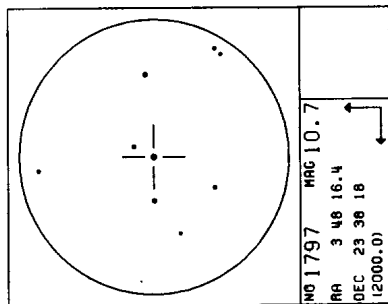
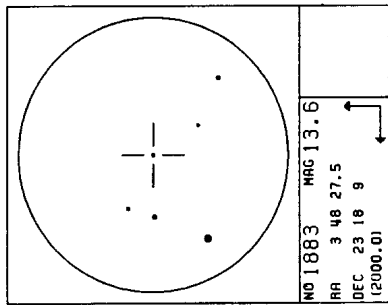
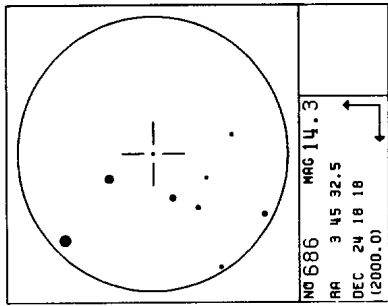
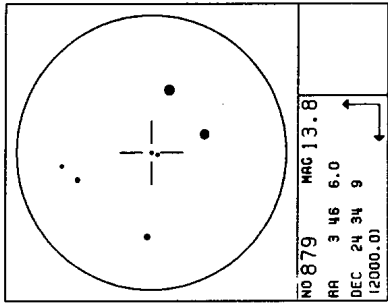


Fig. 2.

Star 1883 shows clearly a BY Draconis lightcurve but has a rather short period for this type of star. Like most of the BY Draconis stars this star is a flare star (Haro et al, 1973). The light curve is stable within 0.003 magnitudes in the V band, which, together with the short period, rules out the possibility of rotational variation. Variations like described by Hartmann and Rosner (1979) in the form of modifications of the convective energy transport seem much more likely.

Star 686 is also known as a flare star (Haro et al, 1966, 1972). The period of star 686 is not certain; a period of 1.98 days seems also possible, for which the amplitude would probably be larger. For star 879 two periods are given, of which the shorter one seems more likely. Star 1124 showed a minimum which was getting deeper during our observing period. The period for star 34 was difficult to obtain because of the rather bad coverage of the light curve. The stars 686, 879, 1124 and 34 are possibly also BY Draconis stars. Star 727 seems a regular variable star, but the light curve and thus the type are still uncertain. No light curve could be obtained for star 1797. For all of these stars and for star 804 search maps are given in Figure 2. The diameter of each field is 12', the magnitudes indicated are photographic magnitudes and the limiting magnitude is around $m_v=13.5$

A paper on star 1883 together with Dr. M. Walker of Lick Observatory, who did radial velocity measurements on this star, is in preparation.

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