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VARIABLE STARS AMONG THE FOUR-COLOUR (uvby) STANDARD STARS

From 1971 to 1973 four-colour (uvby) observations were made in the southern sky by Mr. Bent Grønbech, Dr. Bengt Strömgren and the author with a four-channel spectrograph-photometer attached to the Danish 50 cm reflector on Cerro La Silla (ESO), Chile. Among the 133 four-colour standards (Crawford and Barnes, 1970) measured regularly, five were noted as being variable. Of these, HR 2707 and 7152 were previously known (V571 Mon and ε CrA), while HR 373 and 3084 do not appear in the General Catalogue of Variable Stars (GCVS, 3.ed) and HR 4133 appears in the Special Supplement to GCVS (1972) as a suspected variable. However, HR 373 has been noted as variable by Cousins (1962), who found a range of $0^m.12$ in V from five observations.

Table 1

	HR 373	HR 3084	HR 4133
V	$5^m.407$	$4^m.500$	$3^m.860$
scatter	$0^m.051$	$0^m.016$	$0^m.015$
weight	55.5	82.0	32.0
no.of nights	24	41	16

The y observations have been transformed to the standard V magnitudes of the UBV system. In Table 1 the mean V magnitudes are given; the weight is the number of observations, some of them having only half weight. The internal r.m.s. error of one V value determined from 7094 standard star observations is $0^m.008$ (including HR 2707, 3084 and 4133, but excluding HR 373 and 7152).

The spectral type of HR 373 is gG5, and the star is probably a yellow semi-regular variable (SRd). If this is true, it must be one of the brightest members of its class since only o^1 Cen and V441 Her (89 Her) are brighter. The amplitude is probably not very much larger than $0^m.2$ and the star may resemble IS Gem and VW Dra (HR 2512 and 6448) with respect to amplitude, period and spectral type. It shows no variation in b-y or m_1 but the scatter in c_1 is 0.014 while the r.m.s. error of one c_1 value computed from the standard star observations is $0^m.005$.

HR 3084 is a spectroscopic binary with variable radial velocity, spectral type B3V (Catalogue of Bright Stars) or B3IV (Cousins and Stoy, 1963). The variations have an amplitude of about $0^{m}.07$ and could be due to pulsations (β Canis Majoris type variable) or to ellipsoidal variations. The four-colour indices show no variations.

HR 4133 is an early type supergiant (B1Ib) and the variations have an amplitude of about $0^{m}.07$. They are possibly intrinsic, due to pulsations (Abt, 1957). The four-colour indices ahow no variations.

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