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SPECTRAL INFORMATION ON VARIABLE STARS

I have recently systematically searched our objective prism plate collection for certain stars having no spectral types, or uncertain ones, listed in the General Catalogue of Variable Stars, 3rd edition (GCVS) through the Third Supplement, and having quoted magnitudes at maximum brighter than 11.0 either photographically or visually. The stars were chosen to be non-eclipsing and, further, not to be types of variables for which the spectral type is fairly predictable; the most numerous exclusion in the latter category were Cepheid variables and RR Lyrae stars. A few suspected novae were included, and stars given in several recent lists of spectral types were excluded with occasional exceptions. South of declination -30° our plate collection is confined to within about 10° of the Galactic equator.

Within the stated limitations, we had plates covering about 75% of the positions. The identifications on the plates were made with the aid of computer-generated overlays. From extensive experience with these overlays I find that, for positions of the usual GCVS accuracy and stars bright enough to be shown on our plates, the overlays are entirely satisfactory at our plate scale of 97"/mm. They would have been unreliable in crowded star clusters - I did not actually encounter any - on account of the spectral overlaps, which however also render star charts equally difficult to use.

About 45% of the stars were not seen on the plates, and were presumably too faint at the plate epochs. The missed stars include the two suspected novae covered, viz. SY Gem and SZ Per.

A few of these stars do have published spectral types, traced by me through W.P. Bidelman's card file. Where I have been able to add something from our plates, these stars are retained here in Tables II and III. Several stars were thus discarded and this, with a few additions from variables outside the quoted magnitude limit that were encountered accidentally, leaves 29 stars in this note.

In Table I, the columns headed "Type of plate(s)" indicates the types of plates I have used, as follows. b, conventional blue spectral region, spectral dispersion at H γ 280 or 580 A/mm. r, red region from 6800A shortward to at least 5800A and sometimes to 5000A, dispersion at H α 1000 A/mm. These plates are quite useful for distinguishing between M stars and S stars. i, infrared, 6800A to 8800A, 1700 A/mm at λ 7600. These plates do not distinguish between M stars and the weaker S stars, as illustrated by V865 Aql in Table III.

Table I. New Spectral Types

Star	Spec.	Type of plate(s)	Notes	Star	Spec.	Type of plate(s)	Notes
AA Cap	M5	b		UW Oph	M7	i	
SV Car	M9	r		V345 Ori	M3	r	
AD Cir	M5	b,r		FF Peg	M5	r	
CT Cyg	M7	i		TU Pup	M8	r	
DU Cyg	M4	b		V3828 Sgr	M4	r	
RX Del	M2e	b		YY Sco	M7e	b	2
VV Her	M7	i		LR Sco	Fp	b	3
W Lup	M4	r		TX Vel	G5	b	
TW Lyr	M6	b		DM Vel	M6	b,r	
Y Mus	Fp	b	1	HH Vul	M3	r	4
IS Nor	B4	b					

Notes to Table I:

1. (Y Mus.) Hydrogen-deficient. At 580 A/mm the spectrum is identical to that of R CrB near typical maximum.
2. (YY Sco.) Emission strong, with Mira-type distortion of the Balmer decrement.
3. (LR Sco.) The 580 A/mm spectrum seems identical to that of R CrB at maximum. This is remarkable, since the variability type has been considered to be SR on the basis of magnitude determinations at more than a hundred epochs.
4. (HH Vul.) Spectrum K - M in GCVS

Table II. Additional Information for Known Spectral Types

Star	GCVS Spec.	Remarks
V403 Cas	F9:	Spectrum confirmed, but notably red for the type.
S Crv	*	GCVS notes that Miss Cannon called this star M8 in a Harvard Bulletin, but F5 in a Yale zone catalogue. Hansen and Blanco, <i>Astron.J.</i> 80, 1011, give M5 from an infrared objective prism plate. It is at the plate limit of a blue-region 280 A/mm Case plate, where it is M5.
T Crv	-	M6 by Hansen & Blanco in the reference just cited. Mira-type hydrogen emission on a Case plate.
FQ Sgr	-	M8 by Hansen & Blanco; same remark as for previous star.

Table III. Remarks on Some Further Published Types not in the GCVS.

Star	Remarks
FP Aql	M3e by Nassau <u>et al</u> in <i>Astrophys.J.</i> 139, 864.. A 2' error in our measured declination is apparently why this paper did not identify with FP Aql originally. A further red plate - the original was blue - shows M8.
V865 Aql	M6 by Hansen and Blanco from an infrared objective prism plate, and this is its appearance on a comparable plate of my own, but it is a somewhat weak S star according to Keenan, <i>Astrophys.J.</i> 120, 484, as mentioned in my <u>General Catalogue of S Stars</u> . The GCVS type of S ? is probably from the Dearborn survey.
V840 Cyg	Case plates show that this is star 28 ⁰³ (A1 II) in <u>Luminous Stars in the Northern Milky Way, II</u> . Perhaps even more luminous on my plate.
V1125 Cyg	This star would be HD 184128 (Mb) = Dearborn 17840 (M5). I too make it about M5 on a blue plate, and note a similarly bright A0: star about 100" to the south.

C.B. STEPHENSON
 Warner and Swasey Observatory