

CARBON STARS AT INTERMEDIATE GALACTIC LATITUDES*

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ABSTRACT

A list is presented of carbon stars located between $\pm 6^\circ$ and $\pm 18^\circ$ of galactic latitude at certain selected longitudes in the northern Milky Way.

In the Warner and Swasey Observatory survey of the northern Milky Way by means of infrared-sensitive plates (Nassau and Blanco 1954*b*), in addition to the continuous survey made within 6° of the galactic equator, ten belt-shaped regions oriented perpendicular to the galactic equator were surveyed. These regions reach from $\pm 6^\circ$ to $\pm 18^\circ$ of galactic latitude and are located every 21° of longitude from $l = 342^\circ$ to $l = 171^\circ$. The plates in each belt were taken with sufficient overlap to allow complete cover-

TABLE 1*a*

No	BD	1900	m_i	l	b	Remarks
694	49° 41	0 ^h 12 ^m 2 +49° 44'	7 1	85°	-12°	ST Cas, I, N*, D235, R
695	43 53	0 14 6 +44 09	4 8	85	-18	VX And, I?, N*, D236, N
696	53 66	0 19 1 +53 44	8 0	87	- 8	R6*, D238, R
697	62 596	3 33 2 +62 19	5 1	109	+ 7	U Cam, M, N*, D264, N
698	67 350	4 40 8 +67 59	4 1	110	+16	ST Cam, SR, N*, D275, N
699	15 691	4 44 9 +15 37	6 8	152	-16	N*, D6, N
700	31 1388	6 35 7 +31 33	6 4	151	+13	VW Gem, I, N*, D193, R
701	10 1428	7 03 2 +10 11	6 8	174	+10	R CMi, M, Se, D78, Sp
702	14 1598	7 07 1 +14 46	7 8	170	+13	VX Gem, M, Nep, D81, N
703	+ 9 3576	18 04 0 + 9 26	8 4	4	+12	R4*, D116, R
704	-22 4946	18 55 5 -22 47	5 8	341	-14	V 1058 Sgr, M, —
705	+23 3572	19 04 5 +24 08	4 8	24	+ 6	
706	45 2906	19 25 8 +45 50	6 2	46	+12	AW Cyg, I, N*, D310, N
707	43 3425	19 54 0 +43 59	5 1	47	+ 7	AX Cyg, I, N*, D317, N
708	32 3954	20 45 2 +32 51	6 4	44	- 8	N*, D225, N
709	69 1349	23 36 1 +69 47	7 8	84	+ 8	

age of a 4° -wide strip. Discussions of the surface distribution of these stars have already been published by Nassau and Blanco (1954*b*, 1957). The carbon-type stars found in these regions are presented in Tables 1*a* and 1*b*. The format of these catalogues is identical with those of the previously published lists of carbon stars (Nassau and Blanco 1954*a*, 1957). Table 1*a* includes stars which are in the *BD* catalogue; Table 1*b*, non-*BD* stars. The first column is the Warner and Swasey Observatory number and is continued from the last published carbon-star catalogue. The *BD* number follows; in the case of the stars in Table 1*b* this refers to a nearby reference star from which the carbon star may be located in the *BD* charts by the difference-co-ordinates Δx and Δy that follow. These co-ordinates are in millimeter units and correspond to the scale of the *BD* charts. The

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TABLE 1b

No	BD	Δx	Δy	1900	m_i	l	b	Remarks
710	69° 1382	-0 4	-1 0	0h01m0 +69° 31'	9 2	86°	+ 7°	
711	55 34	+0 3	-0 2	0 10 7 +55 36	10 6	86	- 6	
712	69 29	-1 5	-1 2	0 29 7 +69 59	7 6	89	- 8	CP Cas, I, —
713	47 608	+0 2	+5 2	2 13 8 +47 49	9 1	106	-11	
714	48 663	-1 2	-3 5	2 16 5 +48 16	9 1	106	-11	D 247, N?
715	48 690	-2 0	+1 0	2 24 4 +48 23	7 8	107	-10	D 249, N
716	51 585	+1 3	-0 1	2 24 9 +51 58	9 6	109	- 7	
717	48 707	-1 8	-0 3	2 28 9 +48 50	10 2	108	- 9	
718	63 441	-0 1	+1 0	3 32 8 +63 54	10 2	108	+ 8	
719	38 840	-5 5	+0 7	3 58 5 +39 04	9 4	127	- 8	
720	39 961	-0 7	+0 9	4 08 2 +39 11	9 2	128	- 7	
721	49 1348	+2 3	-3 4	5 16 1 +49 03	7 6	128	+ 8	D 279?, N
722	47 1178	+1 2	-0 5	5 28 1 +47 39	9 9	131	+ 9	
723	50 1226	0 0	+1 6	5 40 1 +50 19	6 8	129	+12	D 284, R
724	48 1312	+1 5	+1 0	5 43 3 +48 24	7 0	131	+12	D 286?, R
725	+ 0 1205	+1 7	+1 8	5 49 2 + 1 04	9 1	173	-11	
726	2 1107	+0 2	+2 9	5 55 4 + 2 24	7 7	173	- 9	D 33, N
727	1 1203	-1 4	+1 2	5 58 1 + 1 59	9 3	173	- 8	
728	30 1132	-1 7	0 0	6 03 4 +30 03	9 6	149	+ 7	
729	32 1208	-1 4	+0 1	6 03 8 +32 04	10 1	148	+ 7	
730	30 1141	-1 8	-0 8	6 04 4 +30 38	9 0	149	+ 7	
731	30 1176	+0 7	-1 8	6 10 7 +30 41	9 1	149	+ 8	
732	50 1293	+2 2	-2 5	6 12 6 +50 31	9 9	131	+17	
733	9 1439	+1 1	-0 7	6 50 5 + 9 05	9 6	173	+ 7	
734	11 1368	+0 2	-1 4	6 50 8 +11 06	8 4	172	+ 8	IV Mon, I, N, D 66, N
735	9 1489	+0 2	-1 0	6 56 6 + 8 59	9 6	174	+ 8	
736	9 1498	-0 1	-2 8	6 58 3 + 9 02	9 1	174	+ 8	KL Mon, I, —
737	26 3253	-2 2	-0 5	18 21 6 +26 50	9 6	22	+16	
738	- 1 3679	-0 5	+0 2	19 06 4 - 1 35	9 3	2	- 7	R8*, D 128, N
739	45 2890	-0 9	+0 1	19 19 8 +46 02	9 3	45	+13	
740	- 1 3754	+2 8	+3 4	19 25 1 - 1 02	7 0	4	-10	V 374 Aql, I, Ne*, D 130, N
741	43 3388	+0 9	+0 6	19 48 5 +44 06	10 1	46	+ 8	
742	42 3546	-1 5	+1 6	19 54 8 +42 50	9 7	46	+ 7	V 416 Cyg, I, —
743	15 3998	+0 2	-1 4	20 53 0 +15 07	9 3	31	-10	
744	33 4115	+2 4	+1 2	20 56 1 +33 20	9 6	45	- 9	D 226, R
745	60 2186	+4 4	-1 9	21 00 0 +60 11	8 9	66	9	
746	32 4078	-0 7	-2 9	21 06 5 +32 57	7 9	47	-11	
747	59 2368	-4 8	+0 2	21 18 6 +59 26	8 3	67	+ 7	
748	45 3830	+1 6	+1 9	22 08 4 +46 16	9 3	65	- 8	
749	42 4355	-3 0	+3 0	22 14 2 +43 17	9 1	64	-11	

right-ascension co-ordinate is Δx and is to be taken positive from the reference star eastward. The declination co-ordinate, Δy , is to be taken positive northward. The 1900 co-ordinates of the carbon stars follow, together with estimates of the infrared magnitude at the time of observation and the galactic longitude and latitude to the nearest degree. In the remarks, the variable-star identifications are presented, followed by type of variability and spectral classes taken from the *General Catalogue of Variable Stars* by Kukarkin and Parenago (1948) and subsequent seven supplements. The only disagreement found between the current classifications and the previously published ones is for star No. 701, R CMi. This star shows the infrared CN bands that are characteristic of carbon stars. According to Keenan (1954), R CMi is similar to W Cas, which shows both S- and C-type characteristics. In the remarks, the spectral classes with asterisks are due to Sanford (1944), and the numbers preceded by the letter "D" refer to stars included in the Dearborn survey of red stars (Lee, Baldwin, Hamlin, and Kinnaird 1943; Lee and Bartlett 1947; Lee, Gore, and Bartlett 1947). After the Dearborn numbers the Dearborn spectral classes have been included.

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