

**X      A P P E N D I X**

## APPENDIX A: A CATALOG OF HYDROGEN-DEFICIENT STARS

J. S. Drilling  
Department of Physics and Astronomy  
Louisiana State University  
Baton Rouge, USA

P. W. Hill  
University Observatory  
St. Andrews, Scotland

The following four tables were originally presented as part of the paper entitled 'Basic Data on Hydrogen-Deficient Stars' by J. S. Drilling, which appears earlier in this volume. A number of corrections and additions have been made by the participants, mostly by P. W. Hill using the SIMBAD data base. A much improved version of the catalog therefore follows. Helium-rich central stars of planetary nebulae, helium-rich white dwarfs, and Wolf-Rayet stars are not included. A complete list of helium-rich central stars is given by Mendez et al. elsewhere in this volume.

TABLE A1. EXTREME HELIUM STARS

Name	$\alpha$ (2000)	$\delta$	$l$	$b$	$V$	$B-V$	$r.v.$ (km/s)	Ref.	Remarks
BD+37°442	01 58 35.4	+38 34 08	137	-22	9.99	-0.29	-156	1,50	sd0?
KS Per	04 48 53.8	+43 16 32	162	-1	7.85	0.49	+5	3,50	HD 30353; binary
LSS 99	06 54 46.3	-10 48 41	223	-4	12.29	0.70	+109	6,50,68	
BD+37°1977	09 24 23.9	+36 42 54	187	46	10.21		-59	7,22,41	sd0?
BD+10°2179	10 38 55.2	+10 03 48	235	54	9.95	-0.19	+158	33,50,68	
CPD-58°2721	10 47 56.8	-59 08 37	288	0	10.50	0.72	-12	9,10,50	LSS 1922; binary
DY Cen	13 25 34.0	-54 14 47	308	8	12.52*	0.35*		12,19	RCB
LSS 3184	14 01 36.5	-66 10 02	310	-4	12.60	0.03	-89	6,68	
HD 124448	14 14 58.6	-46 17 19	318	14	9.98	-0.10	-65	34,50,68	
CoD-48°10153	15 38 59.4	-48 35 57	329	6	11.48	0.44	-4	14,50,68	LSS 3378
BD-9°4395	16 28 35.2	-09 19 34	6	26	10.54	0.06	-58	16,50,68	
V652 Her	16 48 04.7	+13 15 41	31	33	10.51*	-0.18*	+3	42,23,58	BD+13°3224; pec.
HDE 320156	17 37 58.5	-35 23 05	354	-2	9.78	0.84	+7	9,10,50	LSS 4300; binary
V2076 Oph	17 41 50.2	-17 54 08	9	6	9.83	0.14	+70	35,50,17	HD 160641
CoD-46°11775	17 42 33.7	-46 58 46	344	-9	11.22	0.06	-91	6,68	LSE 78
LSS 4357	17 44 25.4	-19 38 03	8	5	12.62	0.41	-99	6,50,68	
LSIV-1°2	17 51 26.7	-01 43 15	24	13	11.01	0.38		9,50	
BD-1°3438	18 03 55.3	-01 00 13	27	10	10.33	0.46		16,50	LSIV-1°3
LSIV+6°2	18 06 55.3	+06 21 46	34	13	12.17	-0.07		6	
PV Te1	18 23 14.7	-56 37 43	338	-19	9.27	-0.01	-171	36,50,68	HD 168476
V348 Sgr	18 40 19.8	-22 54 29	11	-8	11.83*	0.30*	+174	19,24	RCB?
LSS 5121	18 43 16.4	-18 31 47	15	-7	13.25	0.32	-62	6,50,68	
MV Sgr	18 44 32.1	-20 57 16	13	-8	12.70*	0.26*	-68	25	RCB
LSIV-14°109	18 59 39.4	-14 26 11	21	-8	11.15	0.33		27,50	
$\nu$ Sgr	19 21 43.6	-15 57 18	22	-14	4.61	0.10	+12	31,50,59	binary
HDE 225642	19 45 17.0	+33 58 25	69	5	10.31	0.16	-88	32,50,68	LSII+33°5
BD+1°4381	20 51 21.4	+02 18 47	50	-25	9.56	0.19	+12	27,50,68	LSIV+2°13

\*At or near maximum light.

TABLE A2. COOL HYDROGEN-DEFICIENT STARS

Name	$\alpha$	(2000)	$\delta$	$l$	$b$	$V^*$	$B-V^*$	$r.v.$ (km/s)	Ref.
XX Cam	04 08	38.7	+53 21 39	150	1	7.30	0.87	+16	11,19,28
HV 5637	05 11	32	-67 56 00	LMC		15.79	1.37		4,48
W Men	05 26	24	-71 11 18	LMC		13.86	0.42	+264	4,8,48
HV 12842	05 45	03	-64 24 24	LMC		13.65	0.51		4,48
SU Tau	05 49	06	+19 04 00	189	-4	9.70	1.10	+37	11,19,54
UW Cen	12 43	17.1	-54 31 41	302	8	9.11	0.67		12,19
Y Mus	13 05	48.4	-65 30 48	304	-3	10.37	0.97		12,19
S Aps	15 09	24.6	-72 03 45	313	-12	9.88	1.28		12,19
HD 137613	15 27	48.3	-25 10 11	342	26	7.50	1.19	+55	12,19,28
R CrB	15 48	34.4	+28 09 24	45	51	5.83	0.59	+21	11,19,28
RT Nor	16 24	19.0	-59 20 42	327	-7	10.24	1.12		12,19
HD 148839	16 35	45.9	-67 07 37	322	-13	8.31	0.93	-31	12,13
RZ Nor	16 32	41.6	-53 17 09	332	-4	11.00	1.33		12,19
LR Sco	17 27	54	-43 50 54	345	-5	9.72	0.55		15,19
WX CrA	18 08	50.4	-37 19 46	355	-8	10.43	1.26		12,19
V3795 Sgr	18 13	24	-25 47 24	6	-4	10.97	1.02		12,80
VZ Sgr	18 15	09	-29 42 24	3	-6	10.15	0.73		12,19
RS Te1	18 18	51.3	-46 32 54	348	-14	9.77	0.81		12,19
GU Sgr	18 24	15.5	-24 15 29	8	-5	10.11	1.17		12,19
HD 173409	18 46	26.5	-31 20 34	4	-13	9.54	0.89	-65	19,20,28
V CrA	18 47	32.2	-38 09 31	358	-16	10.24	0.79		15,19
HD 175893	18 58	47.4	-29 30 17	7	-14	9.30	1.15	+42	12,19,28
SV Sge	19 08	12	+17 37 42	51	4	10.39	1.86	+4	11,19,28
RY Sgr	19 16	32.8	-33 31 18	4	-19	6.18	0.62	-10	5,19,29
V605 Aql	19 18	20.4	+01 46 51	38	-5	11.0p			19,26
HD 182040	19 23	10.1	-10 42 10	27	-12	6.98	1.05	-47	12,19,28
V482 Cyg	19 59	44	+33 58 30	70	2	12.1p			19,26
U Aqr	22 03	20.0	-16 37 40	39	-50	11.17	0.99	+103	12,19,21
UV Cas	23 02	13	+59 36 42	110	0	10.60	1.38	-27	2,19,54

\*At or near maximum light.

TABLE A3. INTERMEDIATE HELIUM STARS

Name	$\alpha$	(2000)	$\delta$	$l$	$b$	$V$	B-V	r.v. (km/s)	Ref.	Remarks
$\delta$ Ori C	05 32	00.5	-00 17 04	204	-18	6.85	-0.15	+12	59,67,70	HD 36485
HD 37017	05 35	21.8	-04 29 36	208	-19	6.54	-0.14	+29	59,67,70	
$\sigma$ Ori E	05 38	47.1	-02 35 39	207	-17	6.65*	-0.19*	+29	59,67,70	HD 37479
HD 37776	05 40	56.3	-01 30 26	206	-16	6.98	-0.14	+27	59,67,70	
HDE 260858	06 37	46.7	+12 46 04	200	3	9.14			18,70	
HDE 264111	06 47	53.8	+04 40 01	208	1	9.65	0.04	var?	30,51,70	
CoD-27°3748	07 12	02.3	-27 43 04	240	-8	9.27	-0.19		44,70	CPD-27°1791
HD 58260	07 23	19.7	-36 20 26	249	-10	6.73	-0.14	+36	59,67,70	
HD 60344	07 33	02.2	-23 56 03	239	-2	7.71	-0.17	+30	52,74,77	
HD 64740	07 53	03.7	-49 36 47	263	-11	4.62	-0.23	+8	53,59,70	
HD 66522	08 01	35.1	-50 36 22	265	-11	7.21	0.05	+15	70,74,78	
CoD-46°4639	08 49	39.7	-46 50 51	266	-2	10.0	0.08		49,52,70	CPD-46°3093
HD 96446	11 06	05.7	-59 56 59	290	0	6.68	-0.16	+7	59,67,70	
CPD-62°2124	11 35	37.7	-63 15 54	295	-2	11.04	0.10	-7	55,57,70	LSS 2394
HD 133518	15 06	56.0	-52 01 49	323	5	6.39	-0.10	-2	52,59,70	
HD 144941	16 09	24.6	-27 16 30	348	18	10.11	0.05	-53	52,64,70	
HD 149257	16 35	45.3	-45 37 17	338	1	8.48	-0.04	+6	70,73,74	
CPD-69°2698	17 12	32.8	-70 05 07	322	-18	9.36	-0.11	-65	52,64,70	CoD-69°1618
HD 164769	18 03	51.1	-27 18 15	3	-3	9.25	-0.07		44,70	
HD 168785	18 22	45.3	-30 08 23	3	-8	8.49	-0.04	+5	52,65,70	
HD 184927	19 35	32.0	+31 16 36	66	5	7.46	-0.17	-16	56,59,60	
HD 186205	19 42	37.9	+09 13 40	47	-7	8.53	0.05	-3	59,67,70	
LSII+35°51	20 08	58.2	+35 28 25	73	1	11.1p			70	
LSII+36°37	20 14	08.5	+36 46 58	74	1	11.30	0.33		55,70	

\*At or near maximum light.

TABLE A4. HELIUM-RICH sdO STARS WITH  $B < 14.5$ .

Name	$\alpha$ (2000)	$\delta$	$l$	$b$	$V$	$B-V$	$r.v.$ (km/s)	Ref.	Remarks
SB 21	00 04 24	-24 25	45	-79	13.87			45,72	TON S 137
SB 58	00 10 00	-26 13	36	-81	12.90			45,72	
LB 1566	00 40 16	-55 02	306	-62	13.11	-0.30		45,74	JL 202
SB 705	01 43 12	-38 33	263	-74	13.03			45,72	
HD 49798	06 48 04.8	-44 18 59	254	-19	8.29	-0.24	-18	37,67	
TD1 32705	07 14 30.8	+22 17 17	195	15	11.7			81	UV0711+22
CoD-31°4800	07 36 30.0	-32 12 57	246	-6	10.52	-0.31		38	CPD-31°1701
LSS 630	07 39 41.9	-27 27 48	243	-3	13.56	-0.28	-9	40,45	
BD-3°2179	08 02 14.5	-03 58 16	225	14	10.33	-0.30		71	
BD+75°325	08 10 49.2	+74 57 55	140	31	9.54	-0.37	-19	39,67	
TD1 32708	08 35 20.1	-01 55 45	227	22	11.44	-0.31		6, 81	UV0832-01
CoD-34°5246	08 46 53.0	-35 24 11	257	5	12.55	-0.27		6	LSS 1150
TD1 32709	09 07 08.3	-03 06 09	233	28	11.93	-0.31		6, 81	UV0904-02
LSS 1274	09 18 55.7	-57 04 38	277	-5	12.91	-0.21	+24	6,68	
BD+48°1777	09 30 39.7	+48 15 43	170	46	10.75	-0.34	-29	7	
LSS 1349	09 46 56.9	-50 12 39	275	3	13.36	0.05		6	
CoD-24°9052	10 25 51.1	-24 53 22	266	27	9.6		+30	47	
HD 113001B	13 00 26.0	+35 45 23	111	81	10.58	-0.25	-9	49,59,67	
HZ 44	13 23 42	+36 07	89	79	11.71	-0.27		49,67	
LSE 153	13 53 06	-46 45	314	15	11.35	-0.26	-17	43,68	
HD 127493	14 32 21.6	-22 39 25	331	35	10.05	-0.24	+13	49,59,61	
HD 128220B	14 35 15.8	+19 12 54	20	65	8.54*	+0.21*	-7	49,59,67	
LSE 259	16 53 54	-56 02	332	-8	12.6		+43	43,68	
BD+39°3226	17 46 31.9	+39 19 09	65	29	10.21	-0.29	-273	46,75	
LSE 263	19 02 12	-51 30	345	-23	11.8		+13	43,68	
JL 9	19 08 18	-72 30	323	-27	13.24	-0.28		46,74	
LSIV+10°9	20 43 02.5	+10 34 10	56	-19	11.99	-0.27		43,71	
BD+25°4655	21 59 42.0	+26 25 57	82	-22	9.69	-0.26	+59	49,75,79	
GS 259-8	22 49 03	+37 54	97	-19	12.5			49	
PHL 540	23 29 12	-10 05	70	-64	13.38			46,76	
TON S 103	23 33 54	-28 51	23	-73	14.64	-0.23		45,74	PHL 561
SB 933	23 59 12	-40 32	338	-73	14.24			45,72	

\*AB

## REFERENCES

1. Rebeirot, E. 1966, *Publ. Obs. Haute Provence* 8, No. 19.
2. Shenavrin, V. I. 1979, *Soviet Astr.* 23, 696.
3. Nariai, K. 1972, *PASJ* 24, 495.
4. Feast, M. W. 1972, *M.N.R.A.S.* 158, 11P.
5. Feast, M. W., et al. 1977, *M.N.R.A.S.* 178, 415.
6. Drilling, J. S. 1986, in preparation.
7. Berger, J., Fringant, A. M., and Rebeirot, E. 1974, *Compt. Rend. Serie B* 278, 227.
8. Rodgers, A. W. 1970, *Obs.* 90, 197.
9. Drilling, J. S. 1980, *Ap. J.* 242, L43.
10. Jeffery, C. S., and Drilling, J. S. 1986, in preparation.
11. Fernie, J. D., Sherwood, V., and DuPuy, D. L. 1972, *Ap. J.* 172, 383.
12. Kilkeny, D., Coulson, I. M., Laing, J. D., Jones, J. S., and Engelbrecht, C. 1985, *S. African Astr. Obs. Circ. No. 9*, p. 87.
13. Warner, B. 1967, *M.N.R.A.S.* 137, 119.
14. Drilling, J. S. 1973, *Ap. J.* 179, L31.
15. Walker, H. J. 1986, private communication.
16. MacConnell, D. J., Frye, R. L., and Bidelman, W. P. 1972, *PASP* 84, 388.
17. Lynas-Gray, A. E., et al. 1986, this volume.
18. Hill, P. W. 1986, private communication.
19. Bidelman, W. P. 1979, *Mass Loss and Evolution of O-type Stars*, eds. P. S. Conti and C. W. H. de Loore (Dordrecht: D. Reidel), p. 305.
20. Vandervort, G. L. 1958, *AJ* 63, 477.
21. Bond, H. E., Luck, R. E., and Newman, M. J. 1979, *Ap. J.* 233, 205.
22. Wolff, S. C., Pilachowski, C. A., and Wolstencroft, R. D. 1974, *Ap. J.* 194, L83.
23. Hill, P. W., Kilkeny, D., Schönberner, D., and Walker, H. J. 1981, *M.N.R.A.S.* 197, 81.
24. Houziaux, L. 1968, *BAC* 19, 265.
25. Herbig, G. H. 1964, *Ap. J.* 140, 1317.
26. General Catalog of Variable Stars.
27. Drilling, J. S. 1979, *Ap. J.* 228, 491.
28. Bidelman, W. P. 1953, *Ap. J.* 117, 25.
29. Alexander, J. B. et al. 1972, *M.N.R.A.S.* 158, 305.
30. Landolt, A. U. 1973, *PASP* 85, 661.
31. Schönberner, D., and Drilling, J. S. 1983, *Ap. J.* 268, 225.
32. Drilling, J. S. 1978, *Ap. J.* 223, L29.
33. Klemola, A. R. 1961, *Ap. J.* 134, 130.
34. Popper, D. M. 1942, *PASP* 54, 160.
35. Bidelman, W. P. 1952, *Ap. J.* 116, 227.
36. Thackeray, A. D., and Wesselink, A. J. 1952, *Obs.* 72, 248.
37. Jaschek, M., and Jaschek, C. 1963, *PASP* 75, 365.
38. Garrison, R. F., and Hiltner, W. A. 1973, *Ap. J.* 179, L117.

39. Gould, N. L., Herbig, G. H., and Morgan, W. W. 1957, *PASP* **69**, 242.
40. Havlen, R. J. 1976, *PASP* **88**, 685.
41. Rossi, L., Viotti, R., Darius, J., and D'Antona, F. 1980, *Proceedings of Second European IUE Conference* (ESA SP-157), p. 323.
42. Berger, J., and Greenstein, J. L. 1963, *PASP*, **75**, 336.
43. Drilling, J. S. 1983, *Ap. J.* **270**, L13.
44. Buscombe, W. 1980, *MK Spectral Classifications: Fourth General Catalogue* (Evanston: Northwestern U.).
45. Hunger, K., Gruschinske, J., Kudritzki, R. P., and Simon, K. P. 1981, *AA* **95**, 244.
46. Heber, U. 1986, private communication.
47. Kilkenny, D., Heber, U., and Hunger, K. 1986, *AA* **155**, 175.
48. Feast, M. W. 1979, *Changing Trends in Variable Star Research*, eds. F. M. Bateson, J. Smak, and I. H. Urch (Hamilton, New Zealand: U. Waikato), p. 246.
49. Hunger, K. 1975, *Problems in Stellar Atmospheres and Envelopes*, eds. B. Baschek, W. H. Kegel, and G. Traving (New York, Heidelberg, Berlin: Springer-Verlag), p. 57.
50. Landolt, A. U. 1986, this volume.
51. Stephenson, C. B. 1967, *Ap. J.* **149**, 35.
52. MacConnell, D. J., Frye, R. L., and Bidelman, W. P. 1970, *PASP* **82**, 730.
53. Hiltner, W. A., Garrison, R. F., and Schildt, R. E., 1969, *Ap. J.* **157**, 313.
54. Rao, N. K. 1986, private communication.
55. Drilling, J. S. 1981, *Ap. J.* **250**, 701.
56. Bond, H. E. 1970, *PASP* **82**, 321.
57. Ardeberg, A., and Maurice, E. 1977, *AA Suppl.* **28**, 153.
58. Landolt, A. U. 1975, *Ap. J.* **196**, 789.
59. Abt, H. A., and Biggs, E. S. 1972, *Bibliography of Stellar Radial Velocities* (Tucson: Kitt Peak National Obs.).
60. Lee, P., and Daigle, P. 1972, *PASP* **84**, 842.
61. Hill, P. W., Kilkenny, D., and van Breda, I. G. 1974, *M.N.R.A.S.* **168**, 451.
62. Dinger, A. C. L. 1969, *Astrophys. Space Sci.* **6**, 118.
63. Wolf, R. E. A. 1973, *AA* **26**, 127.
64. Hunger, K., and Kaufmann, J. P. 1973, *AA* **25**, 261.
65. Kaufman, J. P., Rahe, J., and Schönberner, D. 1974, *AA* **36**, 201.
66. Hack, M. 1967, *Modern Astrophysics*, ed. M. Hack (New York: Gordon and Breach), p. 163.
67. Blanco, V. M., Demers, S., Douglass, G. G., and FitzGerald, M. P. 1968, *Publ. U. S. Naval Obs. Ser. II*, Vol. 21.
68. Drilling, J. S., and Heber, U. 1986, in this volume.
69. Peterson, A. V. 1970, thesis, Calif. Inst. Tech.
70. Walborn, N. R. 1983, *Ap. J.* **268**, 195.
71. Walker, A. R. 1981, *M.N.R.A.S.* **197**, 241.
72. Graham, J. A., and Slettebak, A. 1973, *AJ* **78**, 295.
73. Hron, J., Maitzen, H. M., Moffat, A. F. J., Schmidt-Kaler, Th., and Vogt, N. 1985, *AA Suppl.* **60**, 355.



74. Nicolet, B. 1978, *AA Suppl.* **34**, 1.
75. Dworetzky, M. M., Whitelock, P. A., and Carnochan, D. J. 1982, *M.N.R.A.S.* **201**, 901.
76. Kilkenny, D., Hill, P. W., and Brown, A. 1977, *M.N.R.A.S.* **178**, 123.
77. Kaufmann, J. P., and Hunger, K. 1975, *AA* **38**, 351.
78. Thackeray, A. D., Tritton, S. B., and Walker, E. N. 1973, *Mem.N.R.A.S.* **77**, 199.
79. Greenstein, J. L., and Sargent, A. I. 1974, *Ap. J. Suppl.* **28**, 157.
80. Hoffleit, D. 1972, *IBVS* No. 16.
81. Berger, J. and Fringant, A.-M.: 1980, *AA* **85**, 367