

# The Southern Double Stars of James Dunlop II: Modern Identification of the First Dedicated Published Catalogue of Southern Double Stars

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**Abstract:** The first dedicated catalogue of southern double stars was published in 1829 by James Dunlop. Basing our work solely on the published data, we present modern designations of the doubles listed by Dunlop in the *Appendix*. We find that of the 253 listed; 168 have discoverer codes in the WDS under "DUN"; 31 are listed under another discoverer code; 27 remain unidentified; 11 are single stars; 8 are double stars not in the WDS and 8 are multiple systems.

## 1. Introduction

This paper (Dunlop Paper II) continues a series of papers on the double stars of James Dunlop, one of three astronomers who worked at the privately-owned observatory in Parramatta, NSW Australia in the 1820's. The Parramatta Observatory was the venture of Sir Thomas Makdougll Brisbane (1773-1860) the 6th British Governor of the Colony of NSW from 1822 to 1825.

In Dunlop Paper I (Letchford, White and Ernest, this issue) we presented a history and description of the first published dedicated catalogue of southern double stars, by James Dunlop (1793-1848) and issued in 1829 as *Approximate Places of Double Stars in the Southern Hemisphere*, observed at Paramatta in New South Wales (Dunlop, 1829).

The Dunlop papers follow three papers (Rümker Papers I, II, and III) previously published in this journal on the double star work of another of the Parramatta astronomers, Carl Rümker (Letchford, White, & Ernest, 2017, 2018a, 2018b).

In this paper (Dunlop Paper II), we present modern designations of the pairs in Dunlop's original catalogue.

## 2. Modern Identification of the Dunlop Doubles

We identified the stars in the original catalogue us-

ing the same method as presented in our paper on the southern doubles of Carl Rümker (Letchford, White, & Ernest, 2017, Rümker Paper I). In addition, we compared our identifications with those of Andrew James who has written excellent and extensive notes on many (not all) of the individual doubles of Dunlop and has them available on the web. We agree with James' identifications except where he suggests possible candidates for some of those we classify as "unidentified". In such cases (e.g. DUN 50 which has a missing declination in the original published catalogue, which James identifies as RST 2482), we have chosen only to identify those we are more confident about.

The Table of Identification for the Dunlop pairs is given in the Appendix of this paper.

Dunlop's catalogue of 1829 is a real assortment of data. As detailed in Dunlop Paper I, it consists of discoveries made with two different telescopes; the Parramatta Observatory's 3¼ inch refracting telescope (measures from this telescope Dunlop designated with an asterisk, \*) and Dunlop's homemade 9 inch speculum mirrored reflector. Statistics on the observations are summarized in Table 1.

We note from Table 1 that the number of confirmed doubles found with the 3¼ inch is 121, and 132 for the 9 inch, and that the number of doubles either unidentified or in which only one star was found by the

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Table 1: Statistics of Modern Identifications

	3¼ inch refractor (*)	9 inch reflector
Telescope	121	132
In WDS as "DUN"	83	85
In WDS as another discoverer	21	12
"unidentified"	5	11
"one"	5	10
"two"	7	6
"three", "four", "five"	0	8

authors are 10 and 21 respectively. This suggests that Dunlop did his best work with the 3¼ inch, which might be expected given its superior build quality (Letchford, White and Ernest, Dunlop Paper I, IN PRINT).

Except for DUN 58, it is not obvious from Dunlop's published catalogue which pair should be taken as the Dunlop double in those entries marked with a "three", "four", or "five" in Column 2. In such cases only the brightest star was inserted into the Modern Identification of the Appendix.

### 2.1 Notes on Some Individual Pairs

DUN 3 is described as a single star by Dunlop, but is the double LDS 2199 (01270-3233).

The single star DUN 54\* is part of the open cluster NGC 2451 which in fact is two open clusters NGC 2451A and NGC 2451B aligned along the same line of sight.

DUN 64\* and DUN 65\* are a group of stars associated with  $\gamma$  Argus, now  $\gamma$  Velorum. The identification of these pairs is made difficult by the fact that Dunlop recorded both as having the same RA and DE. We base our identification on his magnitude estimates: 2.3 and 8 for DUN 64\* and 2.3 and 6 for DUN 65\*. Thus: DUN 64 AC and DUN 65 AB are the respective discoverer and component codes.

DUN 122\* and DUN 123\* are listed in the WDS as DUN 252AC and DUN 252AB respectively, i.e. \*alf01 Cru ( $\alpha$  Crucis), both with WDS 12266-6306.

DUN 252AB\* is listed in the WDS with 12266-6306 (otherwise DUN 122\* and 123\*). We identify it as two stars (HR 8996 and HD 222830) not previously categorized as double.

DUN 253AB\* is listed in the WDS as 14067-3622, but is identified here as LAL 192, WDS 23544-2703.

### 2.2 Omissions in the WDS

In the course of our investigation, we identified 13 apparent doubles first discovered by Dunlop but which are not in the WDS, namely those indicated by a "two" in Column 2 of the Appendix: 35\*, 37, 100, 107, 112\*, 118, 119\*, 149\*, 153\*, 164\*, 167, 198, 252\*.

### 3. Format of the Appendix "Identification of Dunlop's Double Stars"

We present in the Appendix a detailed cross identification of Dunlop (1829). The column details are given in Table 2.

### 4. Conclusion

Basing our work solely on the published data, we present modern designations of the double stars listed by Dunlop. We find that of the 253 listed; 168 have dis-

Table 2: Explanation of Columns in "Identification of Dunlop's Double Stars", Appendix

Column	Name	Data
1	DUN	A running catalogue entry corresponding to the entries of Dunlop, 1829. An asterisk '*' indicates that Dunlop observed this pair with the 3 1/4 refractor; without, with the 9 inch reflector.
2	WDS	Washington Double Star Catalog (WDS) designation. "one" indicates that only one star could be found. "two" indicates that two stars were found that are not recorded as double stars in the current WDS. So for "three", "four" and "five". "Unidentified" means that the pair remains unidentified.
3	DisC	Discoverer Code as it appears in the WDS
4	Comp	Component as and only if it appears in the WDS
5	SIMBAD	Main SIMBAD name of star: Primary on first line; secondary on second
6	ASCC	All-sky Compiled Catalogue of 2.5 million stars, 3 <sup>rd</sup> version, identification number: Primary on first line; secondary on second
7	GAIA DR2	Gaia data release 2, Source ID: Primary on first line; secondary on second

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coverer codes in the WDS with "DUN"; 33 are listed under another discoverer code; 31 remain unidentified or are single stars; 13 are double stars not in the WDS and 8 (9 if 54\* is included here) are members of multiple systems.

The Table of Identification for the Dunlop pairs is given in the Appendix accompanying this paper.

### 5. Acknowledgements

Simbad database, operated at CDS, Strasbourg, France (SIMBAD).

The Aladin sky atlas developed at CDS, Strasbourg Observatory, France.

The Washington Double Star Catalog maintained by the USNO (WDS).

All-sky Compiled Catalogue of 2.5 million stars, 3rd version (ASCC).

The Gaia Catalogue (Gaia DR2, Gaia Collaboration, 2018), from VizieR (GAIA DR2).

### 6. References

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<http://vizier.u-strasbg.fr/viz-bin/VizieR-3?-source=I/345/gaia2>

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### Appendix

#### Identification of Dunlop's Double Stars

(see Table 2, Section 3, for explanation of columns)

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
1*	00315-6257	LCL 119	AC	*bet01 Tuc	2292377	4900927434176620160
				*bet02 Tuc	2292378	4900926678262376704
2*	00524-6930	DUN 2		*lam01 Tuc	2373287	4691995692046507520
				HD 5208	2373289	4691996001284152576
3	01270-3233	LDS 2199		V* R Scl	1716249	5016138145186249088
				CCDM J01270-3233B		
4*	01388-5327	DUN 4		HD 10241	2103580	4912810337375316992
				CPD-54 358B	2103581	4912810337375317632
5*	01398-5612	DUN 5		*p Eri A	2199057	4911306239828325632
				*p Eri B	2199056	4911306239828325760
6	02165-5131	DUN 6	AB	*phi Eri	2104402	4936685751335824896
				CD-52 465	2104399	4936685716976087552
7	02397-5934	DUN 7	A,BC	HD 16852	2200322	4726060211542143616
				HD 16853	2200329	4726066018337928192
8*	02572-2458	S 423	AB,C	HD 18455A	1525490	
				HD 18445	1525486	5076269164798852864
9*	02583-4018	PZ 2		*tet01 Eri	1909803	5044368071869592832
				*tet02 Eri	1909804	5044368071868204160
10	03046-5119	DUN 10	AB	HD 19330	2105363	4747692278185293312
				CD-51 706	2105365	4747693686934567040
11	unidentified					
12	03152-6427	DUN 12	A,BC	HD 20586	2295352	4672336699019592320
				CCDM J03152-6427BC	2295353	4672336694724418560
13*	unidentified					
14	03382-5947	DUN 14		HD 22989	2201630	4728825002249947904
				HD 22960	2201628	4728825036609672576
15*	03398-4022	DUN 15		HD 22986A	1910857	4849246401941883264
				HD 22986B	1910855	4849246397645456000
16*	03486-3737	DUN 16		HD 24072	1817423	4856719713756945664
				HD 24071	1817421	4856719713756946176
17*	04010-5424	DUN 17	AB	HD 25590	2106767	4779816503255644672
				HD 25591	2106768	4779816297097214336
18*	04509-5328	DUN 18	AB	*iot Pic A	2108254	4777112872882315648
				*iot Pic B	2108256	4777112872882315264

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### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
19*	one			HD 34496	1724040	4826073060516094080
20*	05248-5219	DUN 20	AB,C	* tet Pic	2109422	4771835629385988992
				HD 35859	2109419	477183595026248832
21	05302-4705	DUN 21	AD	HD 36553	2012117	4798709239757160320
				HD 36520	2012100	4798709067958473216
22*	05312-4219	DUN 22		HD 36648	1915227	4806195676992118784
				CD-42 1975B	1915228	4806195299034996864
23	06048-4828	DUN 23		V* V575 Pup	2013728	5554191685020871424
				TYC 8105-1651-2	2013729	5554191685019290368
24	one			*del Pic	2111224	5499415974230271488
25	06189-3212	JSP 96		TYC 7077-705-1	1728092	2892904187481797504
				TYC 7077-705-2	1728093	2892904187482208128
26*	06122-6532	DUN 26	AB	HD 43618	2379551	5476519984615508224
				HD 43639	2379552	5476521251625953152
27*	06163-5913	DUN 27	AB	HD 44120	2206307	5482551183847322752
				HD 44105	2206304	5482551183847322496
28*	06240-3642	DUN 28	AC	HD 45145	1824828	5575351648860045312
				HD 45158	1824835	5575351545780828032
29*	06291-4022	DUN 29		HD 46039	1918620	5570747993673945984
				HD 46040	1918630	5570747890594733568
30	06298-5014	DUN 30	AB,CD	HR 2384	2112078	
				TYC 8111-2008-2	2112074	
31*	06386-4813	DUN 31		HD 47973	2015711	5551248086235237248
				CD-48 2416	2015712	5551248292393667200
32*	06423-3824	DUN 32		HD 48543A	1826228	5576835955197352192
				HD 48543B	1826226	5576836023916828288
33	one			HD 49319	1826535	5575933531029392896
34*	06442-5442	DUN 34		HD 49219	2112826	5497185992850609152
				HD 49192	2112821	5497185133857153920
35*	two			HD 49942	1920145	5562241106570387584
				HD 49850	1920113	5562253407356693120
36*	06504-3142	H 5 108	A,BC	V* HZC Ma	1730756	5583324035874959360
				CD-31 3719	1730759	5583323314320455936
37	two			HD 53142	<b>2113773</b>	5505040697762533760
				HD 53348	<b>2113809</b>	5505041728554364928

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### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
38*	07040-4337	DUN 38	AB	HD 53705	1921369	5559265690666326016
				HD 53706	1921372	5559265690666327168
39*	07033-5911	DUN 39		HD 53921A	2208454	5480486644608749696
				HD 53921B	2208456	5480486640313882880
40*	07092-5622	DUN 40		HD 55327	2208793	5490000787442758144
				HD 55352	2208795	5490000787442760576
41	07104-5536	RMK 5		HD 55598	2208862	5490328648067150720
				CD-55 1708	2208857	5490328648067151104
42*	07087-7030	DUN 42		*gam02 Vol	2445952	5267405895348357120
				*gam01 Vol	2445949	5267405964069463680
43*	07171-3706	DUN 43	AB	*pi. Pup Aa	1829087	5589311357724458368
				HD 56856	1829080	5589305477912168192
44	unidentified	RMK 6		HD 57852	2114933	5492026740697659648
				HD57853	2114936	5492026740697659264
45*	07214-4832	DUN 45		HD 58017	2018751	5506905297684851584
				HD 58018	2018756	5506905228965376768
46	unidentified					
47	07247-3149	DUN 47	A,CD	HD 58535	1734969	5592885801315568768
				HD 58534	1734962	5592886110552963968
48*	unidentified					
49	07289-3151	DUN 49		HD 59499	1735664	5593011729755869696
				HD 59500	1735667	5593011832835083008
50	unidentified					
51	07292-4318	DUN 51		*sig Pup	1923547	5512070906388269568
				*sig Pup B	1923553	5512071009471894912
52*	07343-2328	H N 19		*n Pup A	1550714	5618420137803147008
				*n Pup B	1550719	5618420137803146240
53*	07388-2648	H 3 27	AB	*k02 Pup	1645677	5612323414549657728
				*k01 Pup	1645672	5612323414549657984
54*	one			* c Pup	1831780	5538814190271704960
55*	07442-5027	DUN 55	AC	HD 63008	2116430	5493209501673364736
				CD-50 2948	2116437	5493209437253410432
56*	07471-4130	DUN 56		HD 63425	1925301	5535916496103849088
				V* V394 Pup	1925303	5535916393024640896

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### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
57	07418-7236	DUN 57		*zet Vol	2447249	5263150888430032256
				*zet Vol B	2447251	5263150888430032384
58	three			HD 65013	1926351	5531438838080560384
				HD 65037	1926359	5531438558901143680
59	07592-4959	DUN 59	AB	HD 66005	2022196	5514090400016110976
				HD 66006	2022202	5514090434376720512
60	08014-5431	DUN 60		V* V461 Car	2117504	5320234267972369152
				CD-54 2029	2117508	5320234057513080320
61	08069-2707	DUN 61		HD 67409	1652760	5694066331642125824
				CD-26 5531	1652767	5694066709599229568
62*	08047-6250	DUN 62		HD 67536	2304263	5289522090708710656
				CD-62 329	2304251	5289516936747952768
63*	08098-4238	DUN 63		HD 68242A	1928607	5533290621824556672
				HD 68242B	1928610	5533290621824555264
64*	08095-4720	DUN 65	AC	*gam02 Vel	2023562	
				CD-46 3848	2023566	5519219999721187968
65*	08095-4720	DUN 65	AB	*gam02 Vel	2023562	
				*gam01 Vel	2023557	5519266900766220800
66*	08079-6837	RMK 7		*eps Vol A	2383172	5270986008289935232
				*eps Vol B	2383174	5270986008289935488
67	08140-3619	DUN 67		HD 69081	1835488	5541637564345383808
				HD 69082	1835490	5541624335846120192
68	08136-3621	DUN 68		HD 68944	1835397	5541636739711787264
				HD 68962	1835404	5541636945870181632
69	08255-5144	DUN 69	AB	HD 71510	2118943	5322244690627583104
				CD-51 3003	2118941	5322244690627585280
70*	08295-4443	DUN 70		HD 72127A	1931221	5522979294390810752
				HD 72127B	1931220	5522979294390810624
71	08306-4031	DUN 71		HD 72318	1931403	5527782446519946880
				HD 72317	1931411	5527782480879666816
72	08404-4223	DUN 72	A, BC	HD 74105	1932766	5525075856907721216
				HD 74104	1932764	5525076548400146688
73*	08562-5532	DUN 73	AB	HD 76824	2215700	5305072895992630784
				HD 76823	2215701	5305073136510805760
74*	08570-5914	DUN 74		*b01 Car	2215750	5303286052150068352
				CD-58 2350	2215754	5303286017790332416
75	09179-6948	RMK 10		HD80807	2386328	5222647212228907136
				CPD-691035B	2386329	5222650171466372480

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DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
76*	09286-4530	DUN 76	AC	HD 82109	2032680	5423001668454182656
				HD 82121	2032690	5423001462295754368
77	09293-4432	DUN 77	AB	HD 82207	1938548	5423340970868485504
				HD 82241	1938560	5423346674585062144
78*	09308-3153	DUN 78		*zet01 Ant A	1753443	5632038276500794496
				*zet01 Ant B	1753440	5632038276500795648
79*	09336-4945	DUN 79		HD 82965	2033099	5409197334336573056
				HD 82986	2033117	5409197437415809024
80	09450-4929	DUN 80	AB	HD 84627	2034180	5409029212137818368
				HD 84612	2034174	5409029212137815808
81	09543-4517	DUN 81		HD 85980	2035254	54117711119252271872
				HD 85980B	2035252	54117711119252271360
82	09333-8601	DUN 82		HD 85300	2453141	5189985016733501440
				CPD-85 210B	2453130	5189985021031273472
83	10021-5459	DUN 83		HD 87254	2130673	5260124688857959040
				HD 87221	2224417	5260124345260563200
84*	10032-5203	HJ 4282		HD 87364	2130814	5404964317652126336
				HD 298817	2130810	5404964283292384384
85	10288-6235	DUN 85		HD 91027	2316921	5252242702326780160
				HD 91026	2316914	5252242667967046016
86*	10312-4214	DUN 86	AB	HD 91239	1945198	5368269388368281600
				HD 91223	1945183	5368269285289064832
87*	10307-6121	DUN 87		HD 91270	2317155	5253945227372557312
				HD 91269	2317146	5253948354108765696
88*	10320-4504	PZ 3		HD 91355	2039586	5367389229311297280
				HD 91356	2039582	5367389229311295872
89*	10333-5523	DUN 89	AB	HD 300791	2230402	5352404294598481920
				HD 91593	2230408	5352404397648913152
90	unidentified					
91*	10319-7207	DUN 91		HD 91601	2456738	5229628256374245248
				CPD-71 1045B	2456739	5229628256374246528
92*	one			*p Car	2317331	5253796346588022656
93*	10349-6408	DUN 93	AB	HD 91906	2317750	5251822104760873344
				HD 307860	2317757	5251822139120626432
94*	10387-5911	DUN 94		HD 92397	2231436	5350588691654540544
				HD 92398	2231442	5350588691654545792



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### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
95*	10393-5536	DUN 95	AB	*x Vel	2231547	5352174702825907840
				HD 92463	2231572	5352174805905137920
96*	one			HD 92964	2232192	5350406619413548032
97	10432-6110	DUN 97	AB	HD 93010	2318912	5254068613204875264
				CPD-60 2203B	2318913	5254068613204866432
98*	10451-5941	DUN 98	AH	*eta Car	2232700	5350358580171706624
				HD 303308	2232708	5350358683250920704
99*	10443-7052	DUN 99	AB	HD 93344	2457524	5231271579581900800
				HD 93359	2457533	5231271476495341952
100	two			HD 93540	2319277	5239810318189195776
				HD 93600	2319318	5239808668922019584
101	10510-5957	HJ 4378		HD 94173	2233856	5338305738062716544
				CPD-59 2783	2233851	5338305841141942272
102*	10535-5851	DUN 102	AB	*u Car	2234363	5338833263115792512
				HD 94491	2234336	5338832919518362752
103*	10535-5851	DUN 103	AC	*u Car	2234363	5338833263115792512
				CPD-58 2836	2234366	5338833297475543936
104	three			HD 95429	2138437	5359955053246566144
105*	11049-6103	DUN 105		HD 96264	2321918	5337284326102045568
				HIP 54171	2321912	5337283948144897664
106	one			HD 98161	1855147	5397046115926029056
107	two			HD 98537	2459375	5226029103836945280
				HD 98486	2459352	5226076112259827968
108	four			HD 98897	2239471	5339606563379239040
109*	11286-4240	BSO 6		HD 99803	1949977	5382258371728407680
				CD-41 6565B	1949980	5382258371728407040
110	three			HD 100015	2240660	5343376445138829824
111*	11323-2916	H 3 96		*17 Crt A	1670309	3482326708703712896
				*17 Crt B	1670306	3482326708703712640
112*	two			HD 100838	2143041	5369911474631774080
				HD 100786	2142996	5369911058009191424
113*	11370-3858	DUN 113		HD 100954	1856216	5384606275726561792
				HD 100965	1856220	5384603045914957952

## The Southern Double Stars of James Dunlop II: Modern Identification of the First Dedicated ...

### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
114	11400-3806	DUN 114		HD 101406	1856371	5385035016545554560
				SAO 202691	1856373	5385035016545554688
115	11400-3327	I 232		HD 101387	1762657	3477249370166290048
				TYC 7220-1242-2	1762658	
116*	11567-3216	DUN 116	AB	HD 103743	1763493	3466924200065405824
				HD 103742	1763490	3466924200065405184
117*	12048-6200	DUN 117	AB	HD 104901	2330777	6057680496326765184
				V* BY Cru	2330784	6057680423278480512
118	two			HD 106132	2246408	6058972663008775808
				HD 106145	2246421	6058971941454265216
119*	two			HD 106344	2397544	5860530296185991552
				HD 106362	2397555	5860530399265248512
120*	unidentified					
121	unidentified					
122*	12266-6306	DUN 252	AC	*alf01 Cru	2333718	
				HD 108250	2333711	6053807844582485248
123*	12266-6306	DUN 252	AB	*alf01 Cru	2333718	
				*alf02 Cru	2333721	
124*	12312-5707	DUN 124	AB	*gam Cru	2248482	
				HD 108925	2248502	6071671369457586688
125*	12477-5941	DUN 125	AC	*bet Cru	2250231	
				HD 111160	2250260	6056724299185776512
126*	12546-5711	DUN 126	AB	*mu.01 Cru	2250896	6060547163653418112
				*mu.02 Cru	2250898	6060547331128876928
127*	12598-5555	DUN 127		HD 112764	2251414	6061478965373623680
				HD 112781	2251416	6061478209476557696
128	13069-4954	DUN 128		*ksi02 Cen	2052802	6081542475600377472
				V* V1261 Cen	2052804	6081530720270030208
129*	13081-6518	RMK 16	AB	*tet Mus A	2401910	5858915766471945984
				*tet Mus B	2401908	5858915766471941248
130	unidentified					
131*	13152-6754	DUN 131	AC	*eta Mus A	2402372	5845487808865581568
				*eta Mus C	2402368	5845487911944804864
132*	unidentified					

## The Southern Double Stars of James Dunlop II: Modern Identification of the First Dedicated ...

### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
133*	13226-6059	DUN 133	AB,C	*J Cen	2339008	5869474548409857024
				HD 116072	2339002	5869474617129630976
134	one			*iot Cen	1862167	6165699748415726848
135	five			HD 116119	2339037	5868514605999645696
136	13310-3924	SEE 179		*d Cen	1862827	6161403234933132032
				HD 117425	1862820	6161399867678728960
137*	13321-6303	DUN 137		HD 117460	2340319	5865249812400697472
				CD-62 732B	2340318	5865249812400694272
138*	13368-2630	H N 69	AB	HD 118349A	1675685	6188997162858447360
				HD 118349B	1675683	6188994207920947328
139	three			HD 118258	2255294	6064406277664894208
140	13458-7159	DUN 140		CPD-71 1507	2468095	5839923627169745664
				CPD-71 1507B	2468099	5839923622864522112
141*	13417-5434	DUN 141		*Q Cen A	2154813	6065381024758288128
				*Q Cen B	2154815	6065381029065308416
142*	13440-5914	DUN 142		HD 119283	2256060	5870795061866221952
				HD 119312	2256069	5870795096225959808
143	13492-6206	DUN 143		HD 120112	2342940	5865546577434035712
				HD 120113	2342944	5865546680492798976
144	13496-4722	DUN 144		HD 120275A	2056192	6095002662584749056
				HD 120275B	2056190	6095002623922974080
145	13546-6654	DUN 145		HD 120891	2404962	5850667092761177856
				CD-66 1486	2404966	5850667092761180416
146*	13493-4031	DUN 146		HD 120272	1959103	6113942884244624384
				HD 120287	1959109	6113945804822385408
147*	13521-5249	RMK 18		HD 120642	2155481	6065984557860591360
				HD 120641	2155477	6065984179910876032
148*	13518-3300	H 3 101		V* V983 Cen	1769687	6170485544575679104
				* 3 Cen B	1769689	6170485544575678592
149*	two			HD 120974	1864369	6115338095775994880
				HD 120957	1864353	6115337546020644480
150	13575-5743	DUN 150	AB	V* V412 Cen	2257485	5871308465073102720
				HD 121506	2257470	5871311316931389312
151	13573-5602	DUN 151		HD 121504	2257462	5872266689452551552
				CPD-55 5793	2257469	5872266723812297216

## The Southern Double Stars of James Dunlop II: Modern Identification of the First Dedicated ...

### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
152	one			*ups02 Cen	2057267	6097035006747824768
153*	two			*chi Cen	1960483	6110115278109271808
				HD 123021	1960490	6110115621706655616
154	14055-3633	DUN 154		HD 122917	1865200	6120853555338661888
				CD-35 9249B	1865203	6120853555338661248
155*	14077-5341	DUN 155		CPD-53 5879	2156705	5896839777864869120
				HD 123186	2156706	5896839846584347264
156	14067-3622	DUN 253	AB	*tet Cen	1865291	
157	14096-5130	HJ 4651		V* V869 Cen	2156835	6089748096519831296
				HD 123530	2156844	6089747340605583616
158	unidentified					
159*	14226-5828	DUN 159	AB	HD 125628A	2260099	5891112112577938816
				HD 125628B	2260102	5891112112577932800
160*	14261-4513	DUN 160		*tau01 Lup	2059445	6099307559838681216
				CD-44 9321	2059437	6099307181888632960
161	one			HD 124580	2058511	6096524382383054720
162	14339-4628	DUN 162		HD 127629	2060207	6098217909463037440
163*	14380-5431	DUN 163		HD 128291	2159018	5894221187876054656
				HD 128306	2159023	5894221119156564352
164*	two			*eta Cen	1962822	6103094140452223872
				HD 127992	1962835	6103093865574313216
165*	14396-6050	RHD 1	AB	*alf Cen A	2348879	
				*alf Cen B	2348875	
166	14425-6459	DUN 166	AB	*alf Cir	2349085	5849837854817580672
				*alf Cir B		5849837820492182272
167	two			HD 128974	1867812	6202874511432521600
				HD 128975	1867814	6202873686798792704
168	14428-5511	DUN 168		HD 129107	2262002	5893460978673615104
				CPD-54 6120B	2262001	5893460978673614336
169*	14452-5536	DUN 169		V* BU Cir	2262258	5893392327911628928
				HD 129578	2262269	5893392362271368192
170	unidentified					

## The Southern Double Stars of James Dunlop II: Modern Identification of the First Dedicated ...

### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
171	14534-4551	DUN 171	AB	HD 131168	2062279	5907676972474481920
				CD-45 9492B	2062275	5907676976779709312
172	one			*zet Cir	2408966	5848760573954755968
173	14529-3748	SHT 57		HR 5543	1868661	6198599507144514432
174*	one			HD 131464	2062468	5906831108744751616
175	15019-5155	HJ 4723	AB	HD 132606A	2161181	5900200263369385728
				HD 132606B	2161182	5900200263369382272
176*	15123-5206	DUN 176		*zet Lup	2162355	5888394463418285312
				HD 134483	2162342	5888394257280681856
177*	15119-4844	DUN 177		*kap Lup	2064147	5902489309143933056
				*kap02 Lup	2064151	5902489102985502208
178*	15116-4517	DUN 178	AC	HD 134444	2064113	5904208906640444928
				HD 134443	2064106	5904209082753017600
179*	15145-4323	DUN 179		HD 135034	1966427	6003544598199761408
				HD 135034B	1966431	6003544632559500288
180*	15185-4753	DUN 180	AC	*mu.02 Lup	2064815	
				HD 135748	2064822	5902970620350884736
181	15202-3823	DUN 181	AB	HD 136125	1870909	6006932605834289792
				CPD-37 6455	1870908	6006932635892069248
182*	15227-4441	DUN 182	AC	*eps Lup	1967246	6000130236633865856
				*eps Lup C		6000130236647036288
183*	15253-3844	DUN 183	AB	*k Lup	1871257	6006429373106563712
				HD 137059	1871250	6006429235667604096
184	15263-4252	DUN 184		HD 137214	1967615	6000758641901550720
				CD-42 10392	1967618	6000758573181780736
185	15285-5136	SEE 234		HD 137465	2164420	5888999332297729024
186	15331-5812	DUN 186		HD 138168	2266206	5882204934544123264
				HD 138181	2266209	5882204934544118528
187	15336-4732	DUN 187		HD 138362	2066357	5986870951058297728
				CPD-47 7206	2066352	5986870916698555136
188	15367-6619	DUN 188		*eps Tr A	2412057	5823955832118781184
				HD 138510	2412046	5823955694698562816
189	15388-5222	DUN 189	AB	HD 139129	2165954	5886050373367262080
				CD-51 9323	2165944	5886050437749100800

## The Southern Double Stars of James Dunlop II: Modern Identification of the First Dedicated ...

### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
190	15430-5807	DUN 190	AB	V* V359 Nor	2266975	5882323574372973952
				TYC 8704-2534-1	2266976	5882323578753114624
191	15453-5841	DUN 191	AB,C	HIP 77160	2267183	
				HD 140177	2267181	5834232658151618304
192	15471-3531	DUN 192	AB,C	HD 140817	1872803	6011560759514133760
				HD 140840	1872805	6011549008483608192
193	15511-5503	DUN 193		HD 141318	2267782	5884607985911748224
				SAO 243045	2267783	5884608088990966528
194	15549-6045	DUN 194	AC	HD 141913	2354178	5832716255424187392
				CD-60 5919	2354188	5832716362853215104
195	15548-5020	DUN 195	AB	HD 142080	2168121	5982530525830998016
				CD-49 10123	2168122	5982530525831001344
196*	15569-3358	PZ 4		* ksi01 Lup	1777138	6012174802400278016
				* ksi02 Lup	1777140	6012174836760016512
197*	16001-3824	RMK 21	AC	*eta Lup	1873533	5998019895872140800
				HD 143099	1873521	5998065285088239360
198	two			V* QY Nor	2169105	5932866131031997696
				CD-53 6383	2169101	5932864657931055744
199	16086-3906	DUN 199	AC	V * V1027 Sco	1874042	5997082115537645696
				V * V856 Sco	1874040	5997082081177906048
200	16225-4355	DUN 200		HD 147225	1972315	5992149225369945344
				CD-43 10723	1972313	5992149191010199168
201	16280-6403	DUN 201		*iot Tr A	2357385	5828317422956035072
				TYC9 045-2914-1	2357386	5828317422956037376
202	16317-4149	DUN 202	AC	HD 148688	1973070	5968761680983851776
				CPD-41 7500C	1973071	5968761582230644992
203	16331-6054	DUN 203		V* NP Tr A	2357806	5830447000863289344
				HD 148628	2357801	5830447005197478400
204	one			HD 149274	1874980	6020514769906985728
205	unidentified					
206	16413-4846	DUN 206	A,C	HD 150136	2073934	5940954177259978880
				HD 150135	2073931	5940954898814487168
207	16444-4224	DUN 207		HD 150674	1973850	5967756491149042304
				HD 150673	1973849	5967756491149041024
208	one			HD 150500	2074201	5942647283393791232

## The Southern Double Stars of James Dunlop II: Modern Identification of the First Dedicated ...

### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
209	16482-3653	DUN 209		HD 151315	1875678	5971596329361239808
				HD 151316	1875680	5971596260664472704
210	16487-5526	DUN 210	AB	HD 151163	2274180	5929426381963737344
				HD 151162	2274176	5929426416323498112
211	16475-4819	DUN 211	BC	HD 151115	2074679	5939444375994517376
				HD 151116	2074676	5939444272915289216
212	17040-5105	DUN 212	AB	HD 153772	2176845	5937998243333786112
				HD 153771	2176843	5937998243333788416
213	17103-4644	DUN 213		CCDM J17103-4644AB	2076679	5950941488064653056
				CD-46 11258B	2076681	5950941488064651136
214	17133-6712	DUN 214	AB	HD 154903	2418812	5814757008599356928
				TYC 9064-3629-1	2418813	5814757008599360896
215	17193-5323	DUN 215	AB	HD 156239	2178088	5923327700182691840
				HD 156260	2178095	5923327356584965760
216*	17269-4551	DUN 216	AC	HD 157661A	2078475	5951986642593137408
				HD 157649	2078460	5951987398507431808
217	17290-4358	DUN 217		HD 158042	1978893	5958561447264080768
				CD-43 11741B	1978895	5958561447264078208
218	17336-3706	DUN 218	AC	*1am Sco	1880898	
				CD-36 11635	1880889	5962581880247644288
219	17589-3652	DUN 219	AB	HD 163652	1884115	4037358426191922688
				HD 163651	1884101	4037358597990619264
220	18222-5534	DUN 220		V* QW Tel	2280785	6649398690418063232
				CD-55 7677	2280786	6649398690418059392
221	18243-4407	DUN 221		HD 168905	1986993	6721718444965335936
				CD-44 12570	1986998	6721718170088625664
222	18334-3844	DUN 222		*kap02 Cr A	1889607	6726876327040339712
				*kap01 Cr A	1889606	6726876327040344576
223	unidentified					
224	18540-4716	DUN 224	AC	HD 174691	2088578	6710469826831780736
				HD 174713	2088587	6710469655033078016
225	19124-5148	DUN 225	AB	HD 178734	2187130	6656986282721029120
				HD 178710	2187123	6656985939123649920
226	19226-4428	DUN 226		*bet01 Sgr	1992514	6664464851575462016
				HD 181484	1992517	6664464851575461120
227	19526-5458	DUN 227		HD 187420	2189330	6641186850384256896
				HD 187421	2189331	6641186850384254848

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### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
228*	unidentified					
229*	19583-5154	DUN 229		HD 188557	2189635	6666516540271227904
				HD 188534	2189627	6666516505911492224
230	20178-4011	DUN 230		HD 192724A	1995385	6692595444253828480
				HD 192724B	1995387	6692595547333043456
231*	20366-7104	DUN 231		HD 195459	2494845	6374497315769911296
				CD-71 1627	2494836	6374497384489388800
232*	20417-7521	DUN 232		*mu.02 Oct	2495054	6369544118965772416
				HD 196068	2495055	6369544118966055296
233	one			*phi01 Pav	2367957	6454999399628150016
234	20376-4717	HJ 5209	AB	*alf Ind	2094623	6674382927491854848
235*	20450-5029	DUN 235	AC	CCDM J20451-5030AB	2191473	6480764633558584704
				HD 197341	2191478	6480763877644331904
236*	21022-4300	DUN 236		HD 200011	1997452	6484888042680733824
				HD 200026	1997457	6484888008320993152
237	four			V* BT Ind	2288078	6458506566841143040
238	22259-7501	DUN 238	AB	HD 212168	2498785	6357835694518769408
				CPD-75 1748B	2498787	6357835488360338560
239	22298-4345	DUN 239		*del02 Gru	2000590	6520955322607576320
				CD-44 14934	2000587	6520953845138827264
240*	22315-3221	PZ 7	AC	*bet Ps A	1808438	6601750220152445440
				CD-32 17127	1808439	6601750151432831104
241*	22366-3140	DUN 241		HD 214122	1808592	6601132054099267456
				HD 214121	1808596	6607136899415399680
242*	22397-2820	H 6 119	AB	HD 214599	1711391	6608821179430481408
				CD-28 17874B	1711392	6608821076351265024
243	three			*bet Gru	2099216	
244	23023-6418	DUN 244		HD 217488	2371330	6393362255241691648
				CPD-64 4310	2371332	6393362358320906368
245	23086-5944	DUN 245		HD 218392	2290627	6490761943032664960
				CPD-60 7635B	2290626	6490761943032665344
246	23072-5041	DUN 246		HD 218269	2195694	6502570319958250496
				HD 218268	2195691	6502570319958250624



## The Southern Double Stars of James Dunlop II: Modern Identification of the First Dedicated ...

### Appendix: Identification of Dunlop's Double Stars continued

DUN	WDS	DisC	Comp	SIMBAD	ASCC	GAIA DR2
247	23180-6100	DUN 247		HD 219631	2371641	6490359006380772480
				HD 219621	2371639	6490359075100249856
248	23208-5018	DUN 248	AB,C	HD 220003A	2196066	6502030631546224512
				CD-50 13947	2196064	6502030631547502720
249*	23239-5349	DUN 249		V* DQ Gru	2196130	6499534465274954496
				HD 220391	2196129	6499534465274949376
250*	23272-5017	DUN 250		HD 220803	2196210	6525816229153083776
				HD 220815	2196212	6525816332232298112
251*	23395-4638	DUN 251		*tet Phe A	2100751	6525488231089676800
				*tet Phe B	2100750	6525488226794240256
252*	two	DUN 252	AB	HR 8996	2372143	6485678866417832704
				HD 222830	2372146	6485685051170731648
253*	23544-2703	LAL 192		HD 223991A	1713655	2334419836112293120
				HD 223991B	1713654	2334419797455932160

