ASTRONOMISCHE NACHRICHTEN.

Band 158.

N^o 3784.

16.

List of seventy two new double stars.

By *T. E. Espin.*

In the following list the numbers have been continued from A. N. 3717. The stars have all been found during the year 1901, with the exception of Nos. 58 and 59. Most of the stars have been measured on more than one night. The mean results of the measures are here given.

No.	BD.	α 1880	δ 1880	P.	D.	Mags.	Notes
40	+51° 18	0 ^h 5 ^m 1	+51° 24'	90°±	4"±	9.0 11.5	AB
				—	20±	— 10	AC
41	+48. 67	0 12.0	+48 51	217.3	5.2	7.5 9.1	
42	+53. 54	0 16.3	+52 56	191.0	10.5	8.2 9.3	
43	+54. 144	0 39.0	+54 19	117.5	13.8	8.0 9.0	Note
				72.6	14.2	— 12.5	
44	+56. 156	0 49.9	+56 51	243.0	5±	8.0 10.0	
45	+48. 320	0 54.5	+48 54	242.0	7.9	6.2 10.0	
46	+54. 340	1 31.0	+54 37	36.8	2.9	9.0 10.0	
				288.1	53.0	— 9.5	
47	+47. 580	2 4.6	+47 41	292.4	4.8	8.4 11.0	AB
				259.1	19.8	— 10.5	AC
48	+42. 456	2 5.0	+42 17	182.9	10.9	7.2 11.0	
49	+46. 566	2 17.1	+46 31	150.3	35.7	8.7 10.0	AB
				94.5±	1.7±	10.7 11.0	BC
50	+54. 601	2 36.3	+54 25	26.0	2.3	9.3 9.4	
51	+53. 578	2 41.6	+53 26	280±	3±	10 10.2	BC
				320±	70±	— 9	AB
52	+60. 673	3 13.8	+60 19	285.7	6.1	8.6 12.0	
53	+59. 650	3 15.7	+59 7	—	2 1/2±	9.3 9.8	
54	+48. 960	3 28.6	+48 40	249.0	4.0	9.1 11.5	
55	+58. 698	3 56.2	+58 58	261.1	9.3	8.0 13.0	
56	+58. 766	4 32.0	+58 31	205.3	9.9	8.5 8.8	
57	+47. 1075	4 47.4	+47 27	—	3±	10 10	Note
58	β Camelop.	4 52.7	+60 16	167.5	14.9	7.5 11.5	BC
				208.6	81.0	— 4.0	AB ($\Sigma\Sigma\Sigma$ 57)
59	+33. 1005	5 10.8	+33 24	8.4	13.3	7.5 8.2	AB. Note
				326.7	13.0	— 13.8	BC
				355.6	4.8	12 12	DE
				170.4	78.1	— —	AE
60	+40. 1261	5 13.1	+40 42	269.4	5.7	9.1 9.1	
61	+40. 1263	5 13.7	+40 39	356.7	2.4	9.0 9.2	
62	+40. 1277	5 15.8	+40 57	61.9	2.7	9.5 12.0	AB
				306.6	14.2	— —	AC
63	+41. 1227	5 30.4	+41 13	169.9	7.9	8.0 11.0	
64	+41. 1264	5 36.6	+41 47	70.4	2.5	9.2 10.2	
65	+41. 1488	6 17.6	+41 39	87.5	1.6	9.2 10.2	
66	—	6 20.7	+58 32	275.2	2.5	9.1 9.3	Not in BD.
67	+40. 1734	6 42.8	+40 38	309.7	6.2	8.2 9.3	
68	+40. 1738	6 43.8	+40 33	75.0	8.7	8.0 10.0	
69	+51. 1365	6 43.8	+51 47	132.4	5.1	9.2 10.2	

No.	BD.	α 1880	δ 1880	P.	D.	Mags.	Notes
70	+51°1391	6 ^h 59 ^m .4	+51°51'	248°4 265.8	7 ^h 5 47.7	12.5 13.0 — 4.5	BC AB
71	+53.1223	8 4.4	+53 37	285.1	3.2	9.0 9.1	
72	+49.1798	8 55.2	+49 31	294.0	10.2	8.5 11.5	
73	+55.1515	12 4.3	+55 35	304.7 21.0	3.6 30.6	10 10 — 8.5	BC AB
74	+41.2588	12 12.7	+41 44	120.6	9.3	8.0 12	
75	+46.2054	12 15.9	+46 29	217.6	4.3	9.0 9.4	
76	+50.2324	16 40.9	+50 50	47.0	2.5	9.0 9.5	
77	+51.2178	17 5.3	+51 0	274.0	17.0	6.6 11.8	
78	+51.2283	17 54.6	+51 12	136.5	6.5	8.8 11.5	
79	+55.2014	18 0.5	+55 52	81.4 94.2	5.6 24.6	9.3 11.5 — 9.3	AB AC
80	+32.3418	19 19.5	+32 55	187.1	3.8	8.6 9.0	
81	+39.3766	19 22.5	+39 54	221.1	9.8	8.2 13.5	
82	+40.3728	19 22.7	+40 5	174.8	2.6	8.9 10.5	
83	+44.3241	19 42.4	+44 40	214.7	7.7	9.3 9.5	
84	+38.3772	19 45.2	+38 24	156.3	11.4	6.5 11.6	Another comes 26" sp
85	+43.3471	19 59.9	+43 51	31.9 86.6	2.7 10.1	9.2 10 — 11.5	AB AC, another comes N
86	—	20 1.3	+35 37	288.5 163.2 79.0 318.2	11.5 4.2 11.7 14.8	9.0 10.0 10 11.5 — 12.0 — 11.0	AB. Not in the BD. BC. Note AD AE
87	+36.3917	20 5.7	+36 23	301.5	8.9	8.4 9.0	
88	+50.3150	20 34.3	+50 41	127.7	7.9	8.6 9.0	
89	+47.3154	20 34.4	+47 39	199.1	16.5	6.5 11.2	
90	+47.3159	20 35.8	+47 9	140.1	8.3	7.6 12.0	
91	—	20 38.4	+49 47	187.6 242.1	4.4 16.0	9.5 9.7 — 9.8	AB. Not in the BD. BC. Note
92	+48.3193	20 38.7	+48 50	108.6	10.1	8.3 8.6	Note
93	+51.2954	20 44.3	+51 58	273.0	7.4	6.0 11.1	
94	+49.3386	20 45.8	+49 41	80.1 13.1	2.4 103.1	9.5 10.0 — 6.5	BC. Note AB
95	—	20 51.5	+46 54	280.0 126.0	6.1 12.6	9.0 12 — 11	AB AC (h 1597)
96	+49.3455	21 0.7	+50 0	250.9	8.0	8.0 10.0	
97	+44.3761	21 12.1	+44 19	291.8	6.6	9.1 10.0	
98	+51.3042	21 15.6	+51 49	255.5 86.9 310.6	4.9 29.8 26.6	9.0 13.5 6.5 9.0 — 9.2	CD AC AB
99	+44.3833	21 24.7	+44 29	199.5	4.7	8.6 12.0	
100	+44.3835	21 24.8	+44 41	158.5	3.6	8.9 9.3	
101	—	21 32±	+45 37	13.7	3.2	9.5 11.0	Not in the BD.
102	+47.3505	21 33.6	+47 57	35.5	11.6	8.1 10.0	
103	+53.2782	22 1.1	+53 48	213.6	1.6	9.1 9.3	
104	+44.4117	22 18.3	+44 54	52.3	5.9	8.5 13.8	
105	+49.3886	22 28.1	+49 44	294.7	11.7	8.1 13.8	
106	+48.3795	22 34.1	+48 49	264.8	7.9	8.9 9.5	
107	+49.4038	23 0.4	+49 28	216.6	4.5	8.8 11.0	
108	+51.3606	23 20.1	+52 0	243.1	2.0	9.1 9.2	
109	+53.3182	23 26.3	+53 21	47.3	5.6	8.6 10.7	
110	+48.4092	23 27.9	+48 49	34.0 333.0	4.8 16.2	9.0 11.0 — 10.5	AB. Note AC (h 1891?)
111	+51.3677	23 32.6	+52 1	11.2	3.6	8.8 11.2	
112	+52.3574	23 53.1	+52 49	222.9	1.4	9.0 9.2	Note

Notes.

43. Found while searching for a pair of Mr. Edwin Holmes with which it may be identical. It is given as two stars in the Catalogue AG. Cambr. Mass. Nos. 320, 321. The distance would seem to have decreased.

57. There are three stars here, the middle one is double.

59. A pair found many years ago with a 3 in. refractor. The distant double comes was found with the 13 in. reflector at the Oxford University Observatory and the comes C with the 17 $\frac{1}{4}$. AB was measured by Burnham:

$$\begin{array}{rcl} P. = 11.9 & D. = 13.96 & 1882.239 \\ 8.6 & 14.09 & .244 \end{array}$$

86. A faint group of stars measured on four nights; measures very discordant.

91. In field S of 51 Cygni.

Tow Law, Darlington, England, 1902 Jan. 1.

92. Noted as double in Argelander's zones 25" apart. The following are the $\Delta\alpha$, $\Delta\delta$ in Argelander and in the Cat. of the Astr. Gesellschaft:

$$\begin{array}{rcl} \text{Argelander 1841 Aug. 29} & \Delta\alpha = +1.74 & \Delta\delta = +1.6 \\ \text{Bonn 1877.2} & = +1.24 & = +0.1 \end{array}$$

The comes was N of the principal star till 1877, it is now S.

94. There is another 9.0 mag. star somewhat nearer than the double comes about 80°.

110. There is no star in the BD. in Herschel's place. His place is apparently approximate only, a correction of +1^m brings his place into close agreement with BD. +48°40'92. His observation gives P. 326°4 D. 18°.

112. A neat double found while observing Washburn No. 59.

T. E. Espin.

Fourth List of New Double Stars

discovered and measured with the 36 inch and 12 inch telescopes of the Lick Observatory.

By *R. G. Aitken.*

The present list contains 109 new double stars which have been numbered in continuation of those already published in A. N. 3635, 3668 and 3741. The mean results only of the measures are here given, as the individual measures and the notes will form Bulletin No. 16 of the Lick Observatory.

Seventy-one of these stars, including a number of the closest pairs, were discovered with the 12 inch telescope, but nearly all of the measures were made with the 36 inch.

The 312 new pairs that have now been published may be classified with respect to the angular separation of their components as follows:

0".25 or under	18
0.26 to 0".50	49
0.51 to 1.00	68
1.01 to 2.00	85
2.01 or over	92

No.	Name	RA. 1900.0	Decl. 1900.0	1901 +	Pos. A.	Dist.	Magnitudes	No. of nights
A. 204	BD. -2°148	0 ^h 59 ^m 20 ^s	- 2° 36'	0.97	54°2	0".95	9.2, 9.6	3
» 205	BD. +39°501	2 8 18	+39 18	1.00	306.1	1.54	8.7, 11.5	3
» 206	BD. +36°453	2 11 8	+37 1	1.00	108.1	0.85	8.3, 10.7	3
	A & C = Σ 238			0.97	356.9	10.83	—, 9.0	1
» 207	BD. +38°453	2 12 3	+38 52	1.00	126.4	0.24	9.5, 9.6	2
» 208	BD. -2°529	2 53 19	- 1 59	1.00	266.4	0.56	8.5, 10.0	2
» 209	BD. -3°476	2 54 38	- 2 55	1.00	75.8	1.52	8.7, 9.4	3
» 210	AG. Cambr. 2348	5 6 26	+26 8	0.99	91.2	0.41	8.5, 9.3	3
» 211	BD. +31°894	5 7 54	+31 35	0.97	131.6	4.29	8.5, 12.5	3
» 212	AG. Cambr. 2369	5 9 26	+29 21	0.97	302.4	3.04	8.8, 12.7	3
	A & C			0.97	22.8	19.15	—, —	2
	C & D			1.00	48.6	4.00	10.0, 16.0	2
» 213	AG. Cambr. 2418	5 14 42	+25 38	0.99	14.9	4.19	8.5, 13.5	3
» 214	BD. +31°1181	5 57 32	+31 38	0.92	282.2	0.54	8.7, 10.8	2
» 215	BD. +31°1194	5 59 41	+31 7	0.94	21.5	0.95	9.6, 9.7	3
» 216	BD. +31°1333	6 27 39	+31 15	0.78	109.8	1.82	9.0, 13.8	3
» 217	BD. +30°1275	6 29 59	+30 11	0.83	44.7	0.17	8.7, 8.9	4
» 218	BD. +30°1303	6 35 22	+30 47	0.83	246.8	0.17	8.3, 8.4	4
» 219	AG. Cambr. 3467	6 38 34	+30 12	0.87	316.3	2.02	9.2, 9.6	3
» 220	BD. +31°1440	6 48 49	+31 54	0.88	53.6	0.62	9.1, 12.0	2
» 221	BD. +30°1845	9 12 41	+30 10	0.71	302.4	0.30	8.7, 8.8	3