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REMARKS TO LAPICZ POSITIONS OF STARS IN NGC 2264

(Research Note)

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RESUMEN

Se reportan correciones a las posiciones de siete estrellas asociadas al cúmulo galáctico NGC 2264 dadas por Lapicz (1984), junto con las posiciones de otros 241 probables miembros del cúmulo.

ABSTRACT

Corrections to Lapicz (1984) positions of seven stars associated with the galactic cluster NGC 2264 are given here, together with the position of other 241 probable members of the cluster.

Key words: **ASTROMETRY**

I. INTRODUCTION

During a photometric and spectroscopic survey f young stars associated with NGC 2264, to be iscussed elsewhere, we used the positions of the ars reported by Lapicz (1984), with the results sted below that motivated this note:

1) Despite the accuracy of the positions quoted y Lapicz for his determinations (1984, error $\simeq$ 0.1 rcsec in each coordinate), we found unacceptable ırge differences in 5 stars belonging to the clusters $\cong$ 15 arcmin in δ).

2) His list of objects does not include all interest-ıg stars reported by Walker (1956) and Vasilevskis, anders, and Balz (1965).

3) At least one star was misidentified.

4) One of his reference stars has large differences hen compared to its corresponding position in the ıtalogue of the Astronomischen Gesellschaft AGK by Heckmann *et al.* (1975).

On the other hand, the Instituto Nacional de strofísica, Optica y Electrónica (INAOE) has a ırge archive of plates ($\approx$ 17 000), taken between 942 and the present, and a plate measuring ngine, so we decided to complement Lapicz eterminations of stellar positions in NGC 2264, in rder to help future researchers working on this ıteresting region of star formation.

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II. PLATE MEASUREMENTS AND REDUCTIONS

For the present purpose, we selected plates ST 3214 and ST 5735, which have NGC 2264 in the proximity of their center, and were taken with the Tonantzintla 30″ – 26″ Schmidt telescope on a 103 aE emulsion in 1967 February 16 and 1973 February 5, with exposure times 20 and 45 minutes, respectively. The center of both plates is $(\alpha,\delta) = (6^h35^m, 10°0)$. The focal distance of the telescope is 2163.2 mm and the scale on the plates is 95.86″/mm. The plate measuring engine has an absolute measuring accuracy of about 7 microns (or 0.7 arcsec on the Tonantzintla plates).

The stars were identified on our plates with the help of the charts of the region given by Walker (1956) and Vasilevskis *et al.* (1965). Twenty AGK 3 stars in the field were used as reference stars (see Table 1, where the adopted 1950.0 AGK3 positions are also given). We excluded star W131 (S Mon) as a reference star, because of its too large angular size on the plates. The proper motions by Heckmann *et al.* (1975) were used to correct the reference stars to the plate epochs. A standard (concentric) projection of the reference positions to the tangent plane coordinates was used here. A linear transformation between the latter and the plate was assumed. The plate constants were then obtained by a simple least square reduction procedure. The plates ST 3214 and ST 5735 were reduced independently, and the derived positions

TABLE 1

REFERENCE POSITIONS USED (EPOCH 1950.0)

AGK3 Number	Walker Number	α	δ
+ 9 743	6	6 36 24.845	9 34 31.49
+ 9 744	7	6 36 26.215	9 41 30.33
+ 9 745	25	6 36 50.431	9 47 55.91
+ 9 746	37	6 37 22.755	9 20 50.66
+ 9 748	50	6 37 43.417	9 51 54.66
+ 9 749	69	6 37 52.429	9 38 33.43
+ 9 750	74	6 37 53.230	9 50 06.77
+ 9 751	83	6 37 57.332	9 42 12.64
+ 9 752	88	6 37 58.103	9 48 53.39
+ 9 755	152	6 38 18.154	9 30 16.70
+ 9 756	178	6 38 24.866	9 30 50.77
+ 9 759	187	6 38 28.041	9 38 43.40
+ 9 760	202	6 38 34.272	9 15 42.87
+ 9 761	206	6 38 37.017	9 46 45.75
+ 9 762	212	6 38 42.101	9 54 08.99
+ 9 764	231	6 39 04.937	9 33 25.57
+10 791	24	6 36 49.369	10 17 12.43
+10 795	73	6 37 53.079	10 00 36.81
+10 796	107	6 38 05.755	10 04 35.55
+10 799	229	6 38 58.027	10 05 00.25

of the problem stars between the two plates were found to agree within our measuring error of 0.58 arcsec in each coordinate, except for stars W41, W45, V19, V125, and V133, which showed a larger dispersion (typically 1.08 arcsec). In particular V19 and V133 had a difference of 1.86 arcsec in position between the two plates. The final coordinates for the stars of Table 2 were then obtained by averaging the results of the two plates. Note that no attempt to correct the object stars for proper motions was made.

The dispersion in α and in δ for the reference stars was found to be about 0.54 arcsec, indistinctly, or 5 microns on the plates, in accordance with the expected accuracy of the plate measuring engine, and somewhat larger than the average standard dispersion of 0.25 arcsec of the AGK 3 catalogue.

III. RESULTS AND DISCUSSION

From the 18 AGK 3 stars measured by Lapicz, we found a typical difference between Lapicz and the AGK 3 catalogue of 0.25 arcsec in α and 0.21 arcsec in δ, in accordance with the uncertainties of the AGK 3 catalogue. But for star BD + 9° 1321 (AGK 3 + 9° 743) we find deviations in α and δ of 1.81 arcsec and 41.27 arcmin, respectively. (This last star was excluded in the above analysis of dispersion). The objects by Lapicz which deviate by more than 3σ from our values are stars W79, W153, W191, W213 and W215, suggesting a misidentification of these stars by Lapicz. The coordinates given by him for his star W273 are very similar to those calculated by us for W233. As Walker (1956) reports only 239 stars in his study of NGC 2264, we assumed that the star reported by Lapicz as W273 is W233.

Table 2 contains the mean positions (1950.0 epoch) of all Walker stars, and some selected Vasilevskis *et al.* stars, where we also include the magnitudes and colors given by these authors, for completeness.

TABLE 2

MEAN POSITIONS OF THE STARS (EPOCH 1950.0)

Walker Number	Vasilevskis Number	α h m s	δ ° ′ ″	V	$B-V$
001	--	6 36 15.40	9 45 40.8	14.32	0.93
002	--	6 36 20.91	9 43 48.1	9.68	0.27
003	--	6 36 22.38	9 23 55.4	14.58	1.45
004	--	6 36 25.02	9 23 40.2	13.46	0.43
005	--	6 36 24.91	9.33 03.4	14.11	0.54
006	--	6 36 24.78	9 34 31.1	8.17	0.38
007	--	6 36 26.18	9 41 30.4	7.74	-0.11
008	--	6 36 26.80	9 33 29.1	13.62	1.26
009	--	6 36 28.91	10 12 04.9	11.98	2.04
010	--	6 36 29.89	9 35 07.5	11.24	0.59
011	--	6 36 31.16	9 29 03.9	16.04	0.87
012	--	6 36 31.40	9 28 42.2	15.47	1.30
013	--	6 36 32.83	9 39 49.9	12.04	1.68
014	--	6 36 33.81	9 29 14.2	14.82	0.80
015	--	6 36 34.98	9 29 35.3	14.64	1.22
016	--	6 36 36.65	9 28 35.6	16.10	0.96
017	--	6 36 36.95	9 32 00.0	12.87	0.36
018	--	6 36 38.83	9 27 00.1	15.20	0.85
019	--	6 36 42.41	9 25 31.8	15.51	0.83
020	--	6 36 43.43	9 44 49.5	10.27	0.43

TABLE 2 (CONTINUED)

Walker Number	Vasilevskis Number	α h m s	δ ° ′ ″	V	$B-V$
021	--	6 36 43.96	9 29 26.1	14.06	0.78
022	--	6 36 44.27	9 32 26.4	17.06	1.08
023	--	6 36 44.78	9 23 44.1	13.72	0.83
024	--	6 36 49.33	10 17 13.0	8.56	-0.06
025	--	6 36 50.39	9 47 54.9	7.80	0.39
026	--	6 36 52.10	9 25 53.0	11.78	0.48
027	--	6 36 52.76	9 29 59.0	12.04	0.53
028	--	6 37 03.00	9 28 53.5	12.28	0.47
029	--	6 37 05.35	10 18 38.0	10.12	0.45
030	8	6 37 08.06	9 30 54.6	10.75	0.05
031	--	6 37 08.94	9 25 01.0	10.25	0.34
032	--	6 37 10.48	10 07 40.7	12.99	0.77
033	10	6 37 10.93	9 37 16.3	11.67	2.54
034	--	6 37 12.09	10 08 31.2	10.91	0.41
035	--	6 37 19.32	9 25 30.7	10.32	0.10
036	16	6 37 19.96	9 37 34.9	10.88	0.03
037	--	6 37 22.74	9 20 49.7	8.08	1.46
038	--	6 37 29.22	10 06 34.2	10.95	1.04
039	--	6 37 31.60	9 20 01.5	11.32	0.13
040	27	6 37 32.74	9 35 09.2	14.42	1.10
041	28	6 37 35.02	9 38 33.2	14.06	0.80
042	29	6 37 36.11	9 39 21.2	13.24	0.84
043	30	6 37 36.45	9 44 39.7	10.50	0.21
044	--	6 37 39.29	9 37 02.0	16.30	0.58
045	33	6 37 39.49	9 38 34.6	15.25	0.94
046	34	6 37 39.62	9 48 58.1	9.19	0.21
047	--	6 37 40.92	9 43 45.8	16.64	2.00
048	--	6 37 41.33	9 40 51.9	15.14	1.63
049	--	6 37 41.72	9 36 14.8	15.34	1.00
050	37	6 37 43.46	9 51 54.5	8.11	-0.12
051	--	6 37 43.67	9 38 37.1	15.95	1.52
052	--	6 37 43.93	9 45 06.9	15.55	1.26
053	--	6 37 44.80	9 45 11.3	16.46	1.04
054	40	6 37 44.74	9 53 00.0	14.35	1.25
055	--	6 37 45.94	9 37 30.5	14.76	1.36
056	41	6 37 46.47	9 33 57.3	14.96	1.48
057	--	6 37 46.35	9 44 19.3	14.84	2.57
058	--	6 37 46.44	9 51 14.1	15.50	0.97
059	42	6 37 46.81	9 46 04.8	15.11	1.10
060	--	6 37 47.01	10 04 42.0	12.46	1.03
061	43	6 37 48.80	9 44 05.5	15.01	0.89
062	44	6 37 48.91	9 35 47.3	12.43	0.58
063	45	6 37 49.38	9 41 41.9	14.66	0.88
064	--	6 37 49.46	10 00 33.7	15.34	0.94
065	--	6 37 49.72	9 22 02.0	11.71	0.56
066	46	6 37 51.57	9 50 12.9	12.28	0.70
067	47	6 37 52.14	9 50 20.5	10.80	0.62
068	48	6 37 52.23	9 57 48.6	11.72	0.67
069	49	6 37 52.47	9 38 33.2	8.26	1.41
070	50	6 37 52.43	9 29 42.8	11.08	0.62
071	--	6 37 52.57	9 45 07.4	16.95	1.03
072	--	6 37 52.99	9 37 43.9	16.49	1.61
073	51	6 37 53.06	10 00 36.1	9.32	0.85
074	52	6 37 53.15	9 50 07.2	8.44	-0.13
075	--	6 37 54.15	9 38 50.3	15.64	1.38
076	53	6 37 54.31	9 51 30.4	14.11	0.76
077	54	6 37 55.13	9 37 53.7	14.51	1.18
078	--	6 37 56.17	9 53 52.7	15.40	1.23
079	57	6 37 56.30	9 36 49.9	15.93	0.51
080	--	6 37 56.66	9 54 35.4	15.25	1.54
081	--	6 37 56.66	9 52 43.7	16.27	1.26
082	--	6 37 57.31	9 43 01.6	15.54	0.65
083	58	6 37 57.35	9 42 13.3	7.93	-0.14
084	59	6 37 57.33	9 36 29.0	12.01	0.66
085	--	6 37 57.64	9 35 12.7	14.98	1.09
086	--	6 37 57.96	9 36 27.4	16.33	1.51

TABLE 2 (CONTINUED)

Walker Number	Vasilevskis Number	α h m s	δ ° ′ ″	V	$B-V$
087	--	6 37 57.77	10 11 21.1	10.74	0.23
088	61	6 37 58.10	9 48 53.5	9.02	-0.10
089	--	6 37 58.16	9 49 59.1	16.34	1.05
090	62	6 37 59.49	9 50 53.6	13.03	0.18
091	--	6 38 00.58	10 11 35.3	12.32	0.67
092	67	6 38 00.90	9 52 08.9	11.69	0.86
093	68	6 38 01.88	9 48 58.3	13.22	0.92
094	--	6 38 01.93	10 14 18.8	10.42	0.43
095	--	6 38 02.29	9 35 32.2	15.74	1.11
096	69	6 38 02.36	9 52 20.3	14.08	1.10
097	--	6 38 03.38	9 39 31.6	16.77	1.17
098	--	6 38 03.16	10 12 40.0	11.75	0.62
099	71	6 38 03.50	9 27 03.3	10.80	0.29
100	72	6 38 03.68	9 54 35.9	9.98	0.14
101	--	6 38 03.80	9 35 44.7	16.63	1.72
102	--	6 38 03.90	9 35 34.4	15.67	1.39
103	73	6 38 04.05	9 24 50.2	10.03	0.02
104	74	6 38 04.30	9 56 14.6	11.36	0.26
105	75	6 38 04.99	9 39 41.4	14.94	0.89
106	76	6 38 05.26	9 40 17.8	13.30	0.73
107	--	6 38 05.76	10 04 35.1	8.81	-0.06
108	78	6 38 06.10	9 47 37.9	11.87	0.55
109	79	6 38 06.35	9 54 41.0	9.08	-0.10
110	80	6 38 06.47	9 46 16.0	14.42	1.02
111	--	6 38 06.58	9 40 09.8	16.81	1.15
112	81	6 38 06.87	9 41 59.8	10.77	0.01
113	--	6 38 06.96	9 40 50.4	16.63	0.41
114	--	6 38 07.62	9 16 46.1	11.54	0.52
115	82	6 38 08.81	9 36 17.2	14.38	1.03
116	83	6 38 08.97	9 33 32.0	11.68	0.59
117	84	6 38 09.22	9 50 02.6	13.52	0.70
118	--	6 38 09.75	9 22 56.4	11.78	0.56
119	--	6 38 10.55	9 40 18.7	15.49	1.24
120	85	6 38 10.65	9 34 15.7	14.02	1.48
121	86	6 38 11.28	9 57 02.4	10.80	0.23
122	--	6 38 11.21	9 39 22.7	15.98	1.53
123	--	6 38 11.35	9 38 45.9	16.54	1.40
124	--	6 38 11.46	9 42 35.5	16.66	1.14
125	87	6 38 11.81	9 51 31.7	12.29	0.63
126	88	6 38 11.89	9 40 41.0	15.03	1.15
127	--	6 38 12.01	9 33 07.7	15.66	1.54
128	--	6 38 12.04	9 14 30.6	10.99	0.21
129	--	6 38 12.85	9 44 12.6	16.38	1.26
130	--	6 38 12.95	9 33 43.1	16.43	1.12
131	245	6 38 13.41	9 56 36.7	4.62	-0.24
132	91	6 38 13.62	9 36 24.4	10.23	-0.03
133	--	6 38 14.03	9 33 50.1	13.77	1.08
134	92	6 38 14.09	9 58 12.3	12.38	0.84
135	93	6 38 14.28	9 36 15.1	14.93	1.03
136	--	6 38 14.70	9 38 03.7	15.16	1.58
137	94	6 38 14.81	9 55 10.0	9.88	-0.06
138	97	6 38 15.99	9 27 03.8	10.14	0.07
139	98	6 38 16.12	9 35 37.6	13.25	1.20
140	--	6 38 16.31	9 37 45.7	16.16	1.59
141	100	6 38 16.58	9 37 01.1	14.70	1.15
142	101	6 38 16.44	9 55 40.9	8.50	-0.03
143	101	6 38 16.73	9 55 42.5	8.50	-0.03
144	99	6 38 16.56	9 51 14.5	13.83	1.38
145	102	6 38 16.76	9 31 05.7	10.64	0.05
146	103	6 38 16.89	9 41 34.0	14.57	1.10
147	--	6 38 17.03	9 18 14.0	10.96	0.77
148	106	6 38 17.71	9 37 12.6	13.60	0.69
149	105	6 38 17.69	9 37 49.3	14.21	0.99
150	--	6 38 17.74	9 38 06.0	15.34	1.20
151	107	6 38 17.83	9 50 46.7	12.53	0.52

TABLE 2 (CONTINUED)

Walker Number	Vasilevskis Number	α h m s	δ ° ′ ″	V	B − V
152	108	6 38 18.10	9 30 16.2	9.10	−0.07
153	--	6 38 18.40	9 43 38.1	15.86	1.14
154	109	6 38 18.71	9 34 11.1	12.74	0.71
155	--	6 38 19.23	9 38 14.9	16.48	1.43
156	--	6 38 19.96	9 51 40.6	14.66	1.25
157	115	6 38 19.26	9 35 54.8	10.06	−0.06
158	114	6 38 19.29	9 57 36.5	10.36	0.36
159	118	6 38 19.76	9 39 19.8	10.97	0.07
160	--	6 38 20.54	9 36 06.7	14.85	0.96
161	119	6 38 20.64	9 51 10.3	14.96	0.67
162	--	6 38 20.97	9 33 54.4	15.28	1.34
163	120	6 38 21.13	9 38 44.4	13.79	0.92
164	122	6 38 21.29	9 39 16.3	13.29	0.81
165	121	6 38 21.21	9 25 48.1	10.94	0.15
166	--	6 38 21.91	9 37 38.9	16.26	1.53
167	123	6 38 21.71	9 38 38.1	14.04	0.75
168	--	6 38 21.95	10 01 23.7	15.13	1.26
169	126	6 38 22.73	9 46 53.4	13.48	0.68
170	--	6 38 22.80	9 44 07.7	15.93	1.47
171	127	6 38 23.33	9 41 07.5	13.83	0.68
172	--	6 38 23.06	10 11 17.6	10.04	−0.05
173	--	6 38 23.55	9 45 44.9	16.41	1.29
174	129	6 38 23.92	9 44 08.1	15.19	1.08
175	--	6 38 24.33	9 33 04.2	16.12	1.41
176	--	6 38 24.64	9 38 19.6	15.79	1.59
177	--	6 38 24.49	10 20 14.6	9.20	0.77
178	130	6 38 24.83	9 30 51.5	7.14	−0.20
179	131	6 38 25.18	9 55 54.6	9.95	0.01
180	134	6 38 25.52	10 03 33.4	12.86	0.51
181	136	6 38 25.99	9 55 48.6	10.03	−0.04
182	--	6 38 26.81	9 14 08.7	10.31	0.08
183	--	6 38 27.15	9 29 25.2	15.22	0.97
184	137	6 38 27.33	9 55 23.6	14.14	1.00
185	--	6 38 27.37	9 42 20.9	15.97	0.94
186	--	6 38 28.02	9 58 01.9	15.62	1.56
187	138	6 38 28.03	9 38 44.1	9.21	−0.06
188	--	6 38 28.10	9 38 26.2	15.96	0.51
189	140	6 38 28.28	9 30 25.5	11.20	0.47
190	141	6 38 28.55	9 58 36.8	12.26	0.68
191	--	6 38 29.61	9 36 15.2	15.37	1.34
192	144	6 38 30.49	9 43 06.5	13.84	0.48
193	145	6 38 30.47	9 34 11.0	9.77	0.25
194	146	6 38 30.79	9 41 11.9	13.15	0.60
195	148	6 38 31.29	9 55 05.8	12.64	0.53
196	149	6 38 31.70	10 00 05.7	11.46	0.53
197	--	6 38 32.00	9 57 26.1	16.28	0.93
198	152	6 38 33.07	9 36 30.7	15.32	1.25
199	153	6 38 33.42	9 36 47.8	15.00	1.09
200	--	6 38 33.39	9 42 36.1	16.95	1.40
201	--	6 38 33.95	9 42 38.9	15.76	1.04
202	--	6 38 34.23	9 15 42.6	8.98	0.09
203	156	6 38 34.82	9 30 18.3	12.90	0.76
204	159	6 38 36.18	9 36 30.7	15.24	1.16
205	160	6 38 36.31	9 25 10.8	10.60	0.34
206	162	6 38 36.97	9 46 45.5	8.70	−0.08
207	--	6 38 36.95	9 46 06.6	15.62	0.93
208	164	6 38 38.28	9 30 20.3	12.54	0.81
209	165	6 38 38.93	9 36 50.8	11.29	0.38
210	167	6 38 39.95	9 29 18.0	13.27	0.77
211	--	6 38 40.82	9 39 34.4	16.10	1.84
212	168	6 38 42.10	9 54 08.8	7.47	−0.14
213	173	6 38 43.84	9 41 33.4	13.74	0.85
214	174	6 38 44.22	9 42 30.7	13.25	0.75
215	175	6 38 44.93	9 52 41.7	9.29	0.08
216	176	6 38 46.21	9 57 48.3	11.69	0.77

TABLE 2 (CONTINUED)

Walker Number	Vasilevskis Number	α h m s	δ ° ′ ″	V	$B-V$
217	178	6 38 46.40	9 29 53.0	13.54	1.22
218	--	6 38 48.03	9 46 31.0	16.07	1.21
219	--	6 38 48.44	9 43 08.4	15.78	1.02
220	--	6 38 48.31	9 21 57.2	9.69	0.48
221	--	6 38 48.98	10 05 19.2	12.12	0.35
222	182	6 38 49.41	9 54 32.0	9.88	0.15
223	187	6 38 52.42	9 46 34.6	10.86	0.37
224	188	6 38 52.49	9 23 54.7	11.49	0.53
225	--	6 38 54.14	10 02 55.3	13.19	0.58
226	194	6 38 56.93	9 50 31.1	9.59	0.15
227	--	6 38 57.05	10 03 13.1	11.77	0.53
228	196	6 38 57.97	9 46 27.5	11.07	0.36
229	--	6 38 58.03	10 04 59.1	8.52	1.20
230	199	6 38 58.60	9 29 55.9	12.34	1.33
231	206	6 39 04.88	9 33 25.0	8.96	-0.13
232	--	6 39 05.66	10 04 40.5	9.78	0.02
233	--	6 39 07.06	9 14 55.4	9.54	0.58
234	--	6 39 08.46	10 01 38.0	12.39	0.49
235	--	6 39 08.46	10 02 24.2	13.44	0.40
236	215	6 39 11.23	9 53 01.7	11.35	0.65
237	--	6 39 31.11	9 35 38.6	9.44	1.44
238	--	6 39 32.88	10 12 27.7	9.94	1.24
239	--	6 39 35.36	10 12 18.2	9.33	1.17
---	1	6 36 55.88	9 47 01.7	12.24	0.99
---	2	6 36 56.70	9 37 26.6	13.01	0.97
---	18	6 37 20.11	9 35 43.3	12.80	0.74
---	19	6 37 20.22	9 36 38.1	12.80	0.74
---	20	6 37 20.74	9 38 38.0	11.15	0.69
---	116	6 38 19.33	9 26 25.2	14.41	0.41
---	125	6 38 22.23	9 26 14.1	12.53	1.00
---	133	6 38 25.26	9 30 41.3	10.20	0.00
---	193	6 38 56.36	9 35 38.5	10.20	0.00

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