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UBV PHOTOMETRY OF THE SOUTHERN OPEN CLUSTER NGC 5822

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RESUMEN

Fotometría en UBV tanto fotoeléctrica como fotográfica hasta V = 15.50 se efectuó para 424 estrellas dentro y alrededor de NGC 5822. Se encontró un exceso de color promedio de +0.18 correspondiente a una absorción visual de $A_v = +0.54$. El cúmulo tiene una rama gigante prominente. El módulo de distancia y la distancia al cúmulo se encontró igual a 9.33 y 735 pc respectivamente. El diámetro angular es de 54 minutos de arco que corresponde a un diámetro lineal de 11.5 pc. Usando el método de Lindoff se obtuvo una edad igual a 2.76×10^8 años.

ABSTRACT

Photoelectric and photographic UBV photometry, to V = 15.50, is carried out for 424 stars in and around NGC 5822. A mean color excess of +0.18, corresponding to a visual absorption of $A_v = +0.54$ was found. The cluster has a pronounced giant branch. The true distance modulus and the distance of the cluster were found to be 9.33 and 735 pc, respectively. The angular diameter is 54′, corresponding to a linear diameter of 11.5 pc. An age of 2.76×10^8 years, using the Lindoff method, was obtained.

Key words: PHOTOMETRY — OPEN CLUSTER — NGC 5822.

I. INTRODUCTION

The open cluster NGC 5822, of Trumpler class III1m, was observed with the ADH Baker-Schmidt telescope of the Boyden Observatory by Professor H. Haffner in 1958.

The 1950 coordinates of the cluster are:

$$R.A. = 15^h\ 1^m\!.5,\ Dec. = -54^\circ\ 09'$$

and

$$l^{II} = 321\overset{\circ}{.}7,\ b^{II} = +\ 3\overset{\circ}{.}6$$

The photographic material consisted of four plates in B, four in V and three in U. Of the 55 photoelectric standards used for calibration 20 were obtained by H. Haffner (in the region of NGC 5822) using the 152 cm reflector at the Boyden Observatory. The remaining 35 photoelectric standards were taken from a study of the neighboring cluster NGC 5823 by Schnur at ESO, in Chile (Schnur 1971).

The open clusters NGC 5822 and 5823 are close enough to be photographed on the same ADH plate. Both these clusters are studied by Brück, et al. (1968), while NGC 5823 is studied by E. Cullmann at Würzburg Observatory, (Cullmann 1971).

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II. PHOTOMETRY

Figure 1 is an enlargement of the cluster NGC 5822. In Figure 2, again an enlargement of the same cluster, the stars used in this investigation

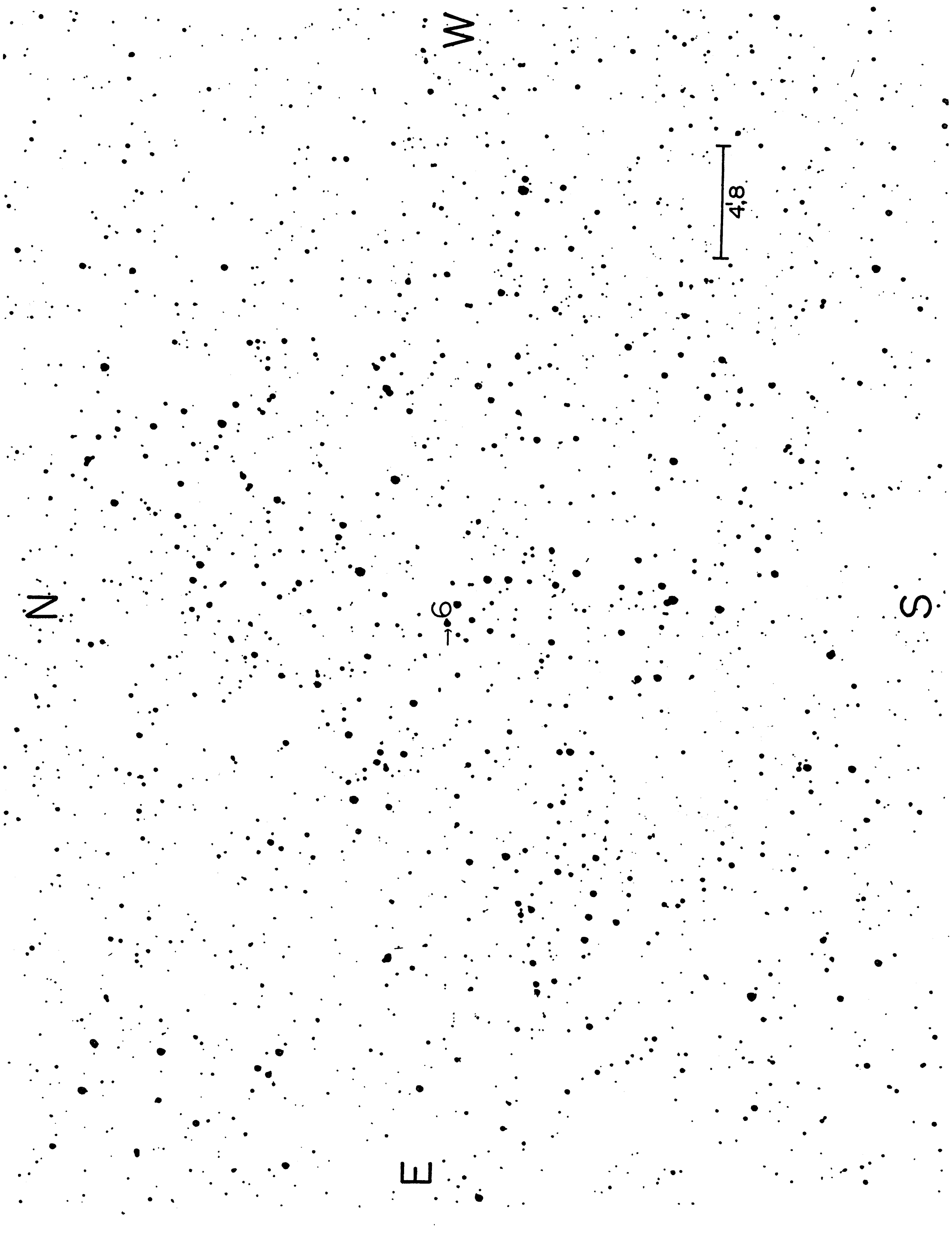

FIG. 1. The cluster NGC 5822, reproduction from a V-plate. The number 6 marks the adopted center of the cluster.

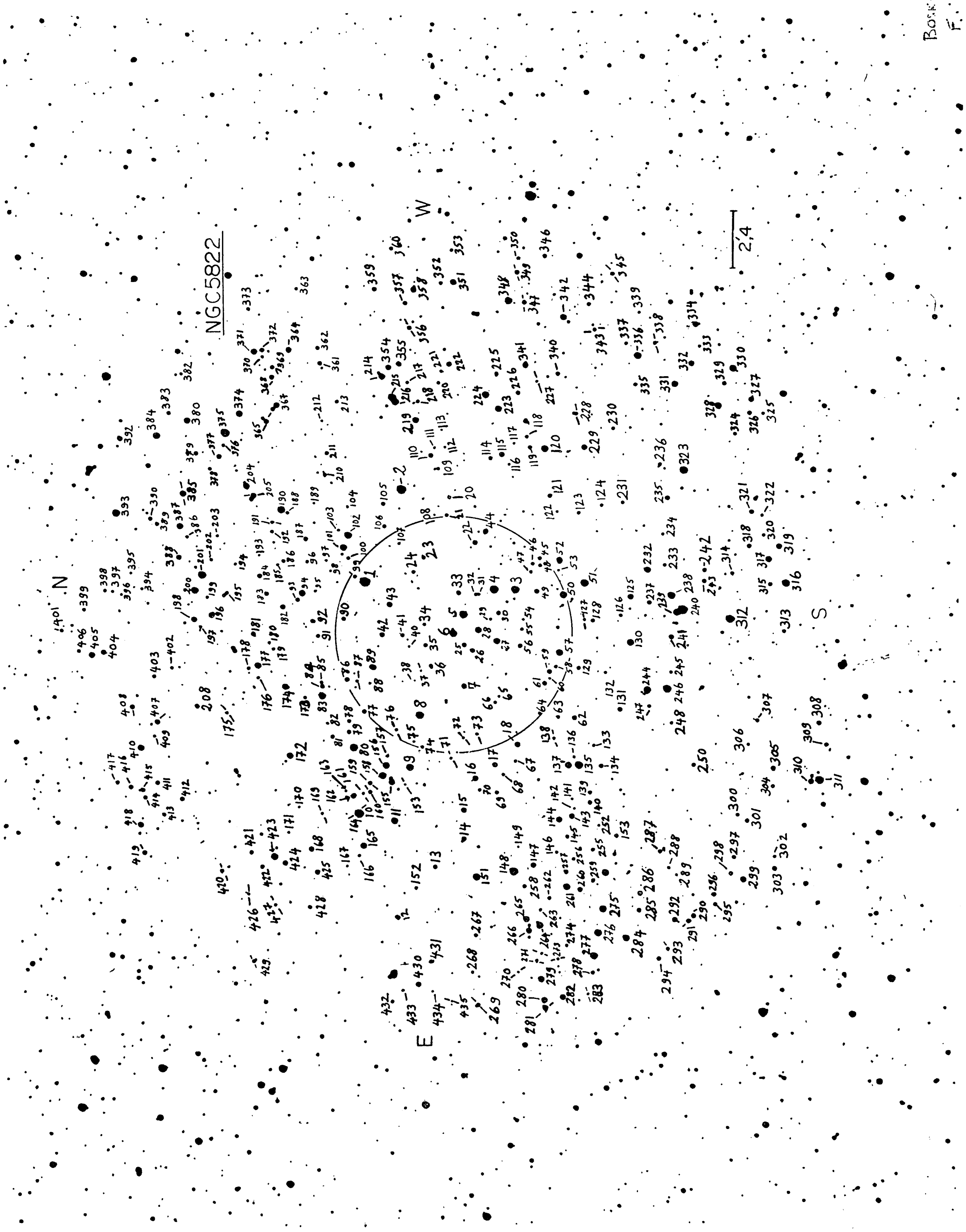

FIG. 2. Identification chart for NGC 5822, reproduction from a V-plate. The circle shows the unit area used for starcounts the adopted center of the cluster being number 6. Nos. 1-24 are the photoelectric sequence stars.

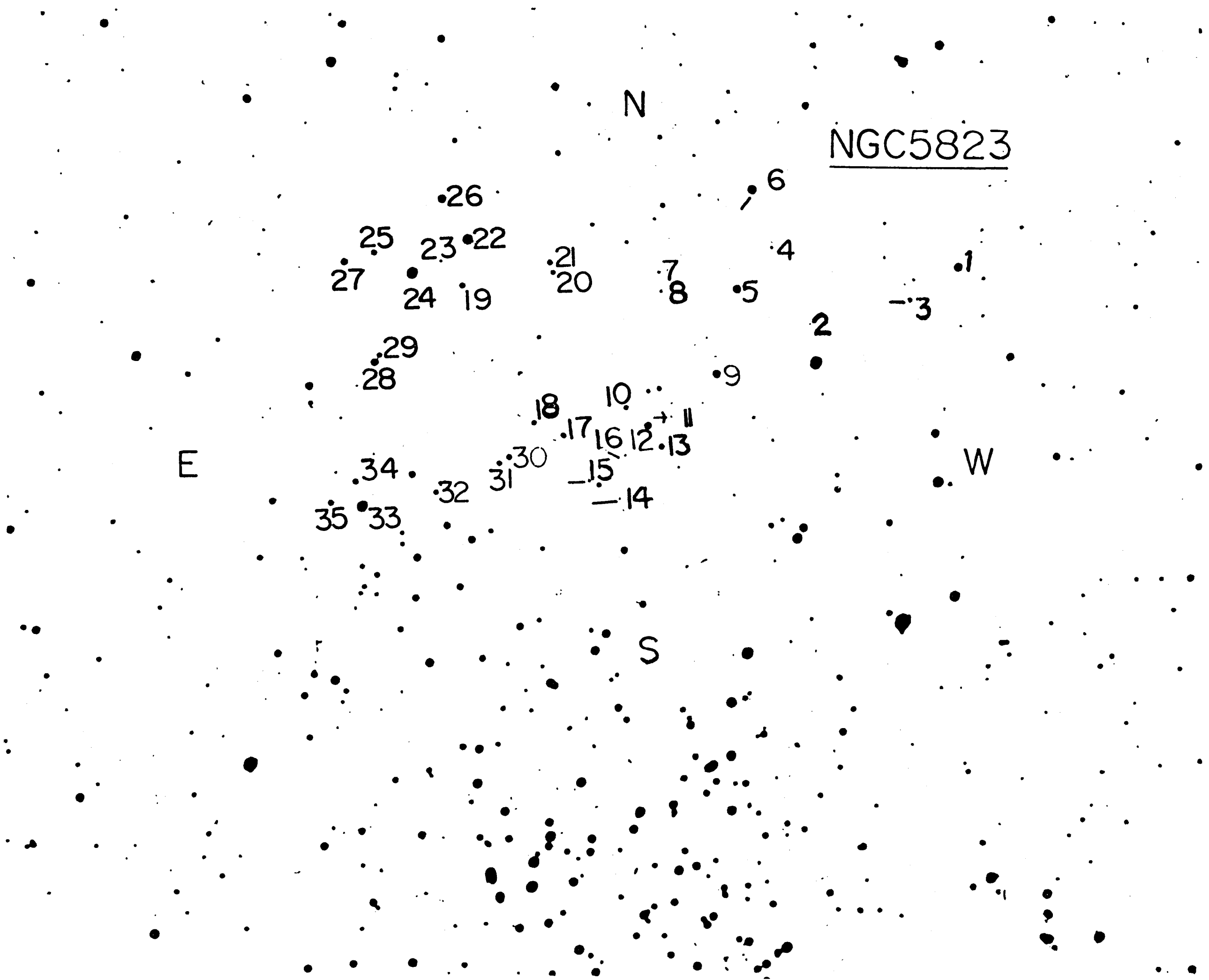

FIG. 3. The photoelectric sequence in NGC 5823 mentioned in the text, (reproduction from a V-plate).

are numbered. Numbers 1 through 24 indicate the photoelectric standards measured by Haffner. In Figure 3 are shown the photoelectric standards, marked 1 through 35, near the cluster NGC 5823; these standards were measured by G. Schnur. In Tables 1 and 2 are listed the photoelectric standards referred to above.

The plate material is listed in Table 3. Photometry using these plates was performed on the semi-automatic Becker-Askania iris diaphragm photometer of the Ege University Observatory in Izmir, Turkey. The color systems of the photographic plates were derived by the help of the standard photoelectric sequences. The reductions were carried out, by a computer program, at the Instituto de Astronomía, University of México.

The color system of the photographic plates is determined by the following relations:

$$U_1 = U$$
$$B_1 = B + 0.084\,(B - V) - 0.083$$
$$V_1 = V - 0.098\,(B - V) + 0.084$$

where U_1, B_1, and V_1 are the instrumental magnitudes obtained directly from the calibration curve and U, B, V are the corrected magnitudes using the equations given above.

TABLE 1

PHOTOELECTRIC STANDARD STARS, NGC 5822

No.	V	B − V	U − B
1	9.09	1.27	1.19
2	9.46	1.06	0.71
3	10.29	1.04	0.79
4	9.96	0.74	0.40
5	10.29	0.43	0.14
7	12.23	0.38	0.14
8	10.40	1.04	0.81
9	10.82	0.35	0.14
10	9.62	1.17	1.08
11	11.02	0.99	0.73
14	12.70	1.77	....
15	12.23	0.44	0.09
16	12.09	0.43	0.22
17	12.35	0.52	0.08
18	12.10	0.42	0.13
20	13.67	0.85	....
21	13.77	0.68	....
22	12.61	0.48	0.12
23	13.54	0.92	....
24	13.70	1.02	....

A total of 411 stars was measured in and around the cluster. However 7 stars were later left out because of uncertainties. All plates listed in Table 3 were measured. On comparing the three U plates it became evident that results obtained from plate ADH 4660 disagreed with the other two U plates. Such disagreement may have been due to plate quality, measuring, or other errors. Therefore this plate was left out altogether. Table 5 lists the V magnitudes and the B − V and U − B colors, of the stars marked on the chart in Figure 2. They are obtained by averaging the magnitudes U, B, and V over the measured plates.

To give an idea of the errors in the measured magnitudes we give in Table 4 averaged probable errors for U, B, and V within different magnitude intervals.

Figure 4 shows the color-magnitude diagram for these stars, including the photoelectric standards. A well defined main sequence, a prominent giant branch, and a lot of field stars can be seen. The two-color diagram is shown in Figure 5; stars with photoelectric magnitudes are shown by open circles and those with photographic magnitudes, by filled circles.

TABLE 2

PHOTOELECTRIC STANDARD STARS, NGC 5823

No.	V	B − V	U − B
1	11.21	1.45	1.57
2	15.67	1.10	0.54
3	14.34	1.65	0.91
4	14.15	1.56	1.07
5	12.65	0.57	0.17
6	12.27	0.40	0.21
7	13.88	1.78	1.62
8	15.16	0.82	0.55
9	12.39	0.83	0.34
10	14.37	0.66	0.47
11	15.27	1.03	0.40
12	12.89	0.62	0.14
13	12.68	1.60	1.61
14	15.01	1.18	0.63
15	14.11	1.71	1.40
16	15.71	1.12	0.44
17	13.06	1.58	1.62
18	13.93	0.90	0.38
19	12.09	2.02	2.33
20	14.41	0.69	0.53
21	13.80	0.75	0.24
22	11.72	0.45	0.04
23	15.88	0.90	1.21
24	11.54	0.19	0.17
25	13.56	0.81	0.20
26	12.47	0.51	0.09
27	12.00	1.63	1.65
28	11.32	1.97	2.30
29	14.03	0.79	0.21
30	13.84	0.78	0.22
31*	14.64	0.77	0.42
32	13.03	1.70	1.70
33	11.51	0.39	0.14
34	13.76	0.73	0.43
35	13.85	0.64	0.00

No. 31 this star may be variable.

The dashed curve is the two-color diagram for unreddened stars (Schmidt-Kaler 1965), the full line indicates the standard zero-age main sequence for a color excess of E(B − V) = 0.18 superimposed.

The distance modulus from the color-magnitude diagram with a shift of E(B − V) = 0.18 yields an apparent distance modulus of 9.80 magnitudes. Assuming that $\frac{A_v}{E(B-V)} = 3.0$, the color excess E(B − V) = 0.18 corresponds to an absorption of

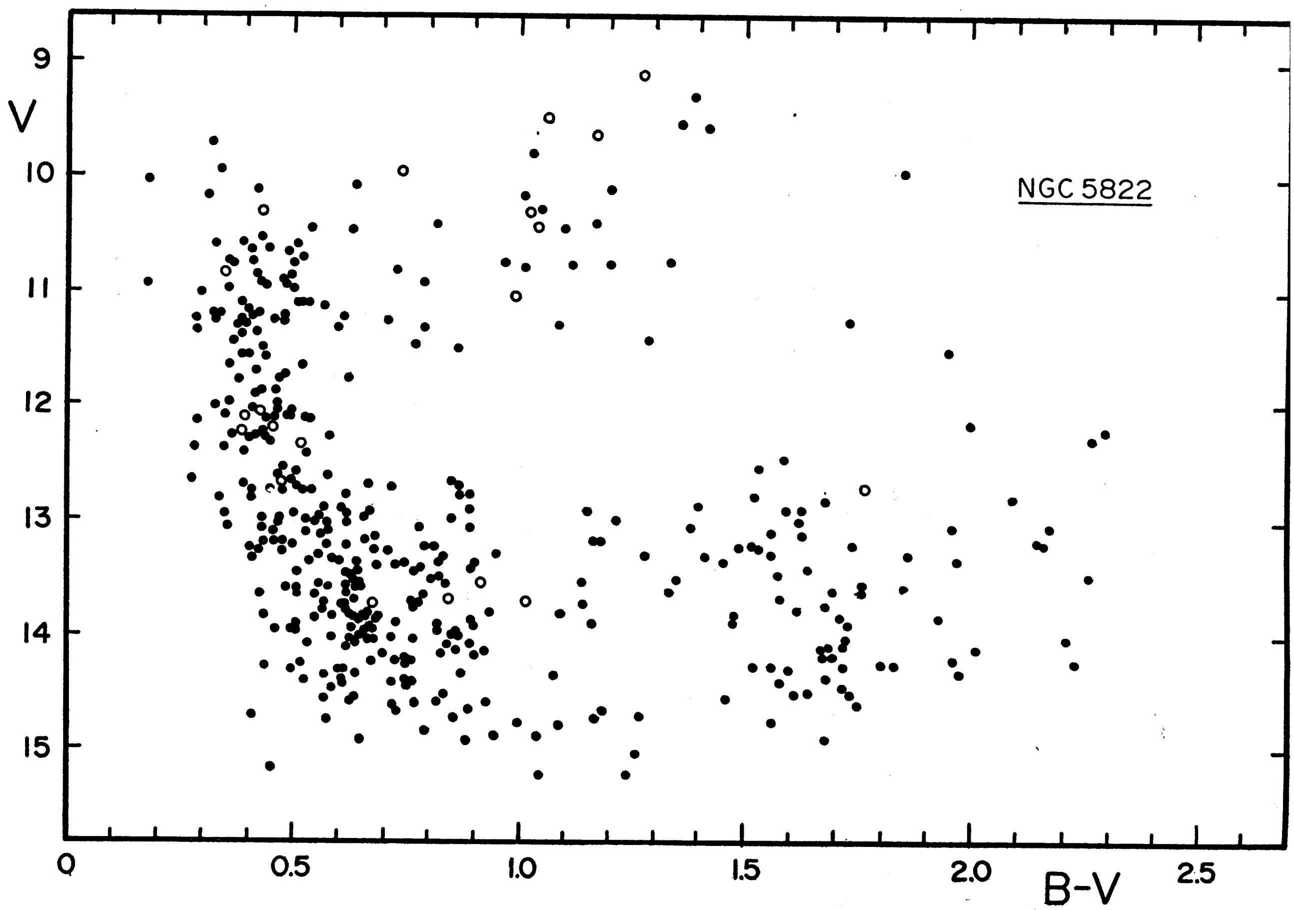

FIG. 4. Color-magnitude diagram for the region of NGC 5822. Stars with photoelectric magnitudes are shown by open circles, and those with photographic magnitudes filled circles.

TABLE 3
PLATE MATERIAL

Color	Plate No.	Emulsion	Filter	Exposure Time	Date	Plate Center α_{1950}	Plate Center δ_{1950}	Observer*
V	ADH 4583	103a – D	GG11	5^m	1958, May 7	15^{h}01^m	–54°48′	Ha
	ADH 4584	103a – D	GG11	5	1958, May 7	15 01	–54 48	"
	ADH 4585	103a – D	GG11	5	1958, May 7	15 01	–54°48	"
	ADH 4586	103a – D	GG11	5	1958, May 7	15 01	–54°48	"
B	ADH 4656	IIa – O	BG12 + GG18	10	1958, May 21	15 02	–55 0	Be
	ADH 4657	IIa – O	BG12 + GG18	10	1958, May 21	15 02	–55 0	"
	ADH 4658	IIa – O	BG12 + GG18	10	1958, May 21	15 02	–55 0	"
	ADH 4659	IIa – O	BG12 + GG18	10	1958, May 21	15 02	–55 0	"
U	ADH 5343	103a – O	UG2	30	1958, March 19-20	15 01	–54 48	Be
	ADH 4661	103a – O	UG2	30	1958, May 21	15 02	–55 0	"
	ADH 4660	103a – O	UG2	30	1958, May 21	15 02	–55 0	"

* Ha = Haffner, Be = Bester

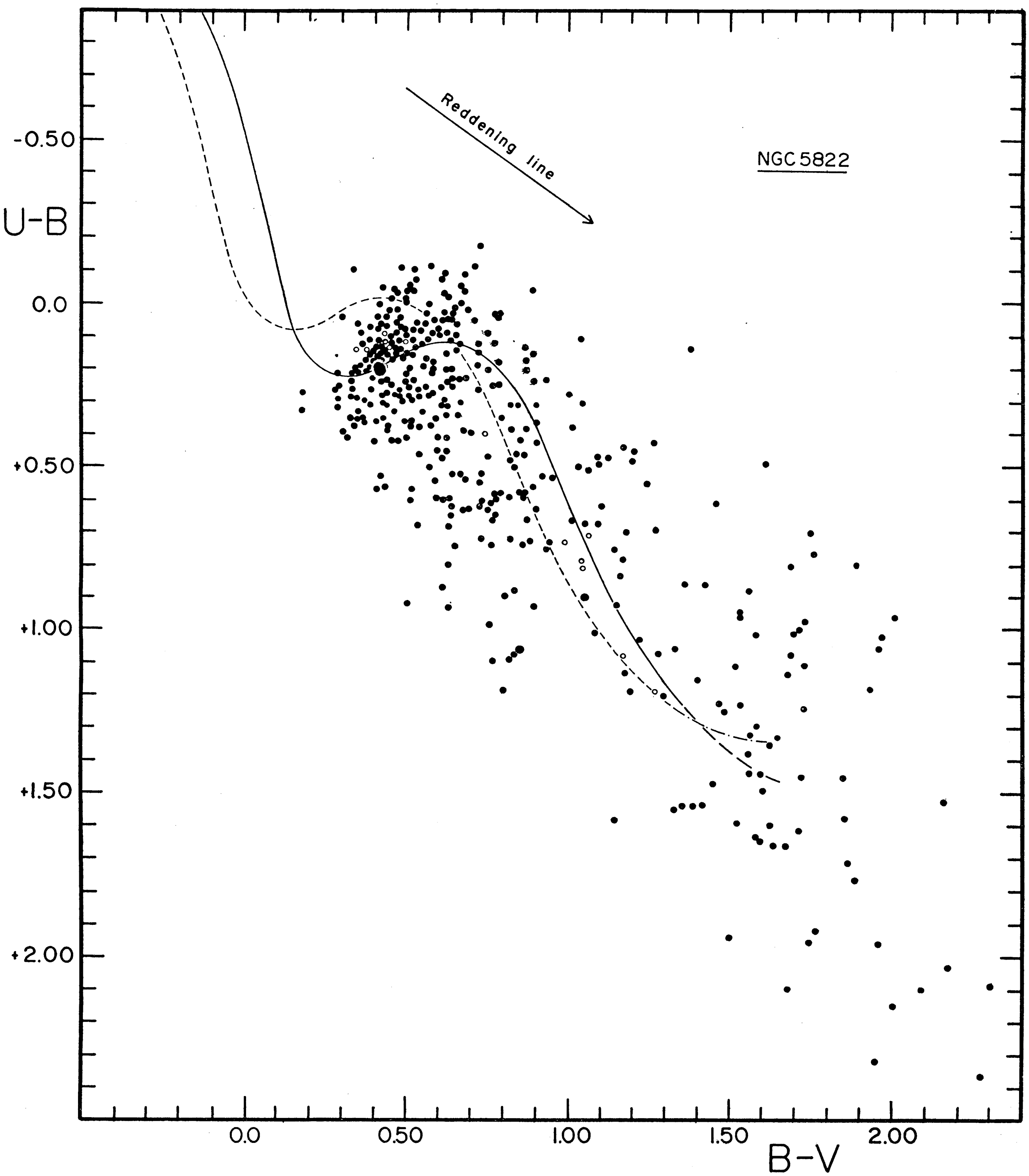

FIG. 5. Two-color diagram for the region of NGC 5822. The dashed line indicates the two-color diagram for unreddened stars and the full line the best agreement with the stars in NGC 5822, drawn for $E(B - V) = 0^m.18$. Photoelectric measures are shown by open circles, photographic measures by filled circles.

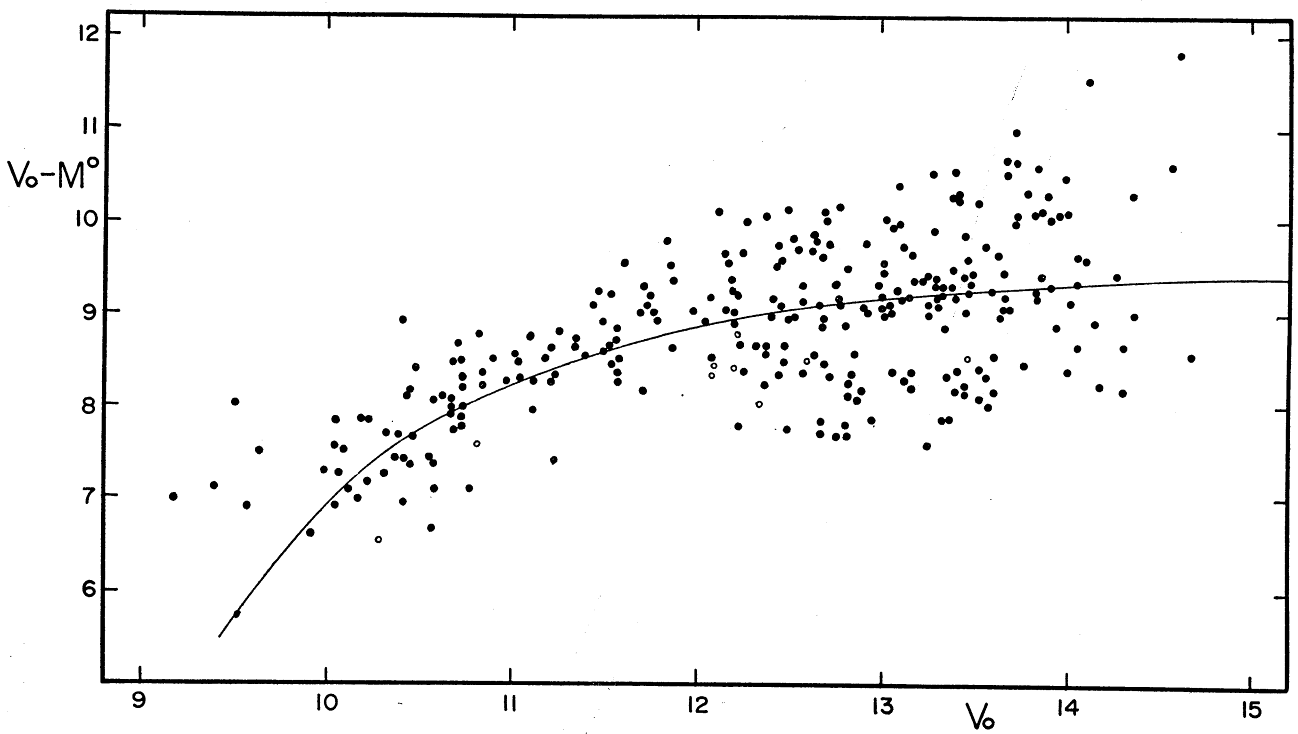

FIG. 6. Evolution deviation curve for NGC 5822. V_0 is the apparent visual magnitude corrected for interstellar absorption and M^0 is the absolute magnitude a star would have if it were on the zero-age main sequence. The open circles indicate photoelectric, and filled circles photographic measures.

$A_v = 0.54$. The true distance modulus is therefore $9^m.26$. We also determined the distance modulus from the evolution deviation curve, Johnson (1960). After correcting the observed B − V for the mean interstellar reddening, we have computed the absolute visual magnitudes M^0, which the stars would have if they were on the zero-age main sequence, based on the standard zero-age main sequence, Table 2 (Johnson and Iriarte 1958). For the brighter stars in the cluster, we obtain deviation from a straight line, when $V_0 - M^0$ is plotted against V_0. This is shown in Figure 6. Here the theoretical evolution deviation curve is given according to Lindoff (1968).

A value of $9^m.40$ for the true distance modulus is obtained from fainter, presumably unevolved stars. (Only stars with $(B - V)_0 \leq 1^m.10$ have been considered here). Finally, we adopted the mean value for the true distance modulus as $9^m.33$, which corresponds to a distance of 735 pc. We estimate this modulus to be accurate to within ±0.10 magnitude, not taking into account any uncertainty in the value of $R = \dfrac{A_v}{E(B-V)} = 3.0$.

Our distance is probably accurate to within ±35 pc. This is in good agreement with earlier estimates namely, 720 pc (Brück *et al.* 1968), 560 pc (Trumpler 1930), 660 pc (Collinder 1931), 580 pc (Barkhatova 1950), 508 pc (Wallenquist 1959). Thus we can say that our distance is not in serious disagreement with earlier estimates.

III. SIZE AND AGE OF THE CLUSTER

Starcounts were performed in and around the cluster using a polar réseau centered on star No. 6, of Figure 1.

The two independent counts give the surface density of stars where the unit area is the innermost circle of the réseau; this circle, marked in Figure 2,

TABLE 4
PROBABLE ERROR OF THE CATALOGUE FOR DIFFERENT COLORS AND MAGNITUDE INTERVALS

Color	Magnitude								
	9–10	10–11	11–12	12–13	13–14	14–15	15–16	16–17	17–18
V	0.03	0.03	0.04	0.04	0.04	0.05	0.04	....	....
B	....	0.08	0.06	0.06	0.05	0.06	0.08	0.09	....
U	....	0.06	0.06	0.05	0.05	0.10	0.15	0.16	0.15

has a diameter of 9.6 minutes of arc. Figure 7 gives the run of the density of star from the center autwards for $V \leq 14.50$ and $V \leq 13.50$ respectively.

A diameter of 54′ (11.5 pc) which is consistent with both curves shown in that figure, is adopted for the cluster. This diameter is larger than that obtained from earlier estimates, namely, 40′ (Trumpler 1930), 30′ (Collinder 1931), 42′ (Wallenquist 1959), 40′ (Hogg 1965) and 40′ (Brück *et al.* 1968).

Hogg obtained a total of 800 stars which presumably belong to the cluster within a diameter of 40′ with photographic magnitude brighter than 17. We note that our starcounts for $V > 14.50$ down to the plate limit (see Figure 7) do not show any variation in the star density from the center outwards. This implies that there are no cluster members fainter than $V = 14.50$ magnitudes. It is worth while to note that there is a slight increase in the star density at radius around 15′ from the center, the density decreasing again until the background is reached. The two curves in Figure 7 show similar bulges at the same distance from the center. It may be worth while to search for such an effect in other clusters.

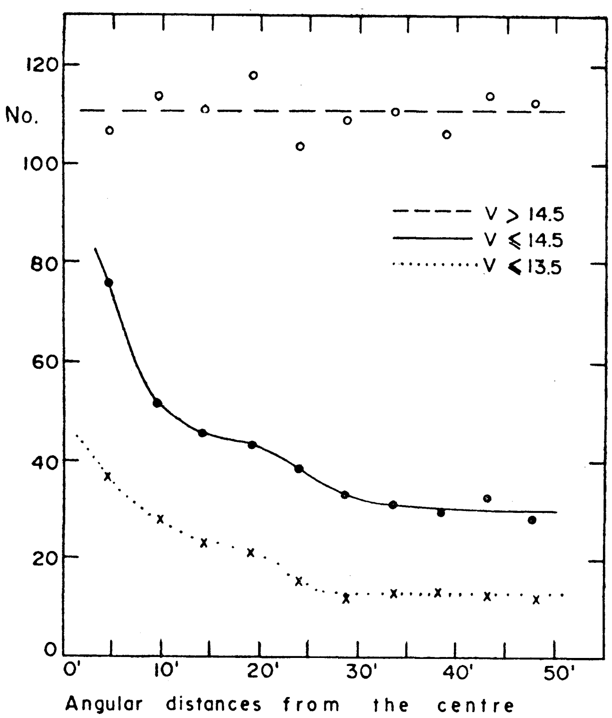

FIG. 7. Number of stars in circular regions of NGC 5822, per unit area as, marked in Figure 2.

The age of the cluster was estimated, by the method outlined by Lindoff (1968), to be 2.76×10^8 years. The age of the cluster can also be determined from the main-sequence "turn-off point" in the color-magnitude diagram (Sandage 1958); the age determined by the "turn off" point is 6×10^8 years. This is twice that obtained by Lindoff's method. Our first estimate is in reasonable agreement with that of Brück and his collaborators whose estimate is 2×10^8 years (Brück *et al.* 1968).

IV. CONCLUSIONS

Investigations done so far on the galactic clusters NGC 5822 and 5823 have yielded results different from one another. Brück *et al.* (1968) conclude that: the two clusters form a physical pair, the distance between their centers is 15 pc, and their ages are the same, namely 2×10^8 years each. They are at mean distance of 700 pc and their diameters are 8 and 4 pcs respectively. Cullmann's study of the cluster NGC 5823 (Cullmann 1971) gives results differing markedly from those of Brück and collaborators. According to Cullmann the distance of the cluster is 1580 pc, its diameter 8 pc, and the total absorption in front of the cluster, 1.56 mag-

TABLE 5

THE CATALOGUE OF MAGNITUDES AND COLORS FOR NGC 5822

No.	V	B-V	U-B	No.	V	B-V	U-B	No.	V	B-V	U-B
25	12.97	0.53	0.06	96	13.96	0.51	0.28	168	12.11	0.50	-0.01
26	12.91	0.61	0.05	97	14.46	0.59	0.35	169	14.06	0.89	-0.04
27	11.36	0.29	0.25	98	14.65	0.73	0.62	170	14.61	0.77	0.25
28	11.25	0.29	0.31	99	13.54	0.56	0.25	171	14.51	1.79	....
29	14.50	1.73	0.97	100	13.82	0.59	0.45	172	11.25	0.71	-0.11
30	13.12	0.56	0.03	101	10.98	0.36	0.19	173	13.73	0.62	-0.08
31	14.41	0.72	0.19	102	10.73	1.06	0.51	174	11.28	0.38	0.20
32	13.94	0.63	0.24	103	14.55	1.46	0.61	175	14.76	1.09	0.49
33	13.05	1.38	0.14	104	14.53	1.61	0.49	176	14.06	1.72	1.00
34	14.16	0.90	0.31	105	13.36	0.54	0.28	177	11.02	0.30	0.04
35	13.32	0.59	0.05	106	13.56	0.58	0.20	178	13.63	0.62	0.30
36	13.40	0.69	0.63	107	14.56	0.93	0.75	179	13.85	0.67	0.00
37	15.04	1.26	0.47	108	14.82	0.79	0.58	180	14.00	0.65	0.06
38	15.23	1.24	0.55	109	14.22	0.68	0.54	181	12.77	0.62	-0.09
40	15.23	1.04	0.30	110	12.80	0.41	0.04	182	12.10	0.49	0.08
41	13.66	0.55	0.19	111	14.68	0.41	....	183	12.92	1.15	0.93
42	12.69	0.39	0.07	112	14.71	0.86	0.58	184	12.69	0.87	0.20
43	12.14	0.29	0.21	113	14.92	0.88	0.73	185	14.23	0.75	0.09
44	12.41	0.39	0.18	114	13.30	1.28	1.07	186	13.37	1.45	1.47
45	13.45	0.62	0.45	115	12.08	0.35	0.06	187	12.90	0.89	0.15
46	13.81	1.48	1.25	116	14.34	1.08	1.01	188	14.22	0.75	0.20
47	14.12	0.92	0.53	117	14.38	0.75	0.63	189	14.72	1.17	0.44
48	13.99	0.87	0.66	118	13.61	0.51	-0.04	190	10.59	0.51	0.15
49	12.65	0.50	-0.01	119	13.09	0.46	-0.03	191	13.81	0.69	0.02
50	10.77	0.37	0.30	120	10.64	0.41	0.13	192	13.73	1.68	1.14
51	10.47	1.10	0.62	121	12.99	0.47	-0.04	193	14.89	1.68	....
52	11.24	0.61	0.25	122	14.61	1.75	0.70	194	14.33	1.68	....
53	14.74	1.56	0.88	123	13.79	0.62	0.05	195	13.36	0.64	-0.03
54	14.61	0.72	0.26	124	14.08	0.84	0.46	196	11.32	0.79	-0.03
55	13.89	0.90	0.63	125	11.88	0.43	-0.05	197	14.11	2.01	0.95
56	13.24	1.53	1.23	126	14.01	0.63	0.04	198	11.64	0.36	0.09
57	10.96	0.44	0.23	127	13.45	1.58	1.30	199	13.91	1.16	0.83
58	14.04	0.64	0.62	128	14.41	1.58	1.01	200	10.53	0.43	0.19
59	12.71	0.41	0.19	129	13.44	0.77	0.12	201	10.12	1.20	0.48
60	14.86	0.94	0.53	130	11.11	0.63	0.04	202	14.01	0.72	0.12
61	12.98	0.47	0.13	131	12.73	0.45	0.02	203	14.22	0.73	0.55
62	12.71	0.51	0.23	132	15.16	0.45	....	204	11.23	0.48	0.04
63	13.90	0.82	0.72	133	14.03	0.67	-0.05	205	11.78	0.47	0.02
64	14.25	1.72	1.45	134	13.00	0.55	0.12	208	13.89	0.73	0.52
65	14.46	1.72	....	135	9.94	0.34	-0.10	210	13.58	1.76	0.77
66	14.09	1.72	....	136	14.47	0.63	0.68	211	13.32	1.41	1.54
67	14.29	0.60	0.41	137	11.12	0.52	-0.04	212	14.61	0.89	0.93
68	14.16	0.83	0.88	138	14.23	0.52	....	213	13.39	0.73	0.72
69	13.67	1.58	1.64	139	13.30	0.93	0.23	214	11.26	0.33	0.28
70	13.96	0.51	0.36	140	13.21	0.58	-0.11	215	10.07	0.64	0.2
71	14.34	0.57	0.50	141	14.72	0.58	....	216	10.59	0.33	0.35
72	14.55	0.57	....	142	14.74	1.00	0.28	217	13.82	0.44	0.39
73	14.15	0.70	0.39	143	12.14	2.00	2.15	218	13.64	0.51	0.38
74	13.95	0.51	0.60	144	11.59	0.44	0.04	219	11.21	0.34	0.37
75	14.58	0.80	1.19	145	13.35	0.84	0.31	220	13.84	1.93	1.1
76	14.09	1.67	1.66	146	13.95	0.68	-0.09	221	14.02	0.68	0.6
77	12.93	0.35	0.33	147	11.98	0.47	-0.04	222	12.25	0.37	0.3
78	13.60	1.76	1.92	148	9.95	1.85	1.58	223	10.99	0.35	0.3
79	13.18	1.18	1.13	149	14.86	1.04	0.11	224	10.79	1.01	0.6
80	10.25	1.05	0.67	151	10.79	1.12	0.47	225	13.49	0.83	1.0
81	13.25	0.43	0.56	152	13.86	0.65	0.01	226	12.66	0.28	0.2
82	14.41	0.61	0.60	153	14.91	0.65	....	227	14.21	1.96	1.0
83	10.81	0.73	-0.08	155	11.89	0.42	0.00	228	13.82	1.71	1.6
84	13.17	0.48	0.28	156	10.96	0.49	-0.11	229	11.72	0.42	0.1
85	14.28	0.50	0.92	157	14.23	0.49	....	230	13.80	1.62	1.6
86	12.81	1.68	2.10	158	10.87	0.42	0.11	231	13.86	1.47	1.2
87	14.19	1.68	....	159	13.11	0.53	-0.10	232	11.38	0.39	0.2
88	14.52	0.63	0.93	160	13.24	0.68	-0.04	233	13.73	1.14	1.5
89	11.47	0.77	0.66	161	14.32	0.87	0.14	234	14.25	1.52	1.5
90	13.17	0.44	0.37	162	12.12	0.53	-0.07	235	12.81	0.34	0.2
91	13.60	1.33	1.56	163	14.47	0.75	0.47	236	13.64	0.43	0.2
92	13.07	0.43	0.35	164	9.52	1.36	0.86	237	13.04	0.36	0.2
93	13.22	0.81	0.59	165	11.39	0.42	0.06	238	10.46	0.54	0.3
94	11.28	0.40	0.42	166	14.31	2.09	....	239	10.93	0.43	0.3
95	14.39	0.53	0.68	167	14.50	0.83	0.31	240	9.31	1.39	1.5

TABLE 5 (Continued)

V	B-V	U-B
12.39	0.35	0.29
13.15	1.18	1.19
12.92	0.67	0.53
10.76	0.50	0.41
13.96	0.82	1.09
10.12	0.42	0.53
13.95	0.46	0.42
14.08	0.54	0.46
13.32	0.41	0.57
13.26	0.48	0.26
14.56	0.63	0.60
14.39	0.61	0.47
13.23	1.49	1.94
13.71	0.81	0.90
13.57	0.49	0.29
13.84	0.55	0.33
13.21	1.74	1.95
13.41	0.78	0.60
13.24	0.41	0.36
12.37	0.29	0.29
10.74	0.36	0.35
13.58	0.64	0.65
14.01	0.59	0.54
10.93	0.79	0.03
11.23	0.33	0.26
11.57	0.39	0.31
13.19	0.46	0.33
14.02	2.27	....
12.78	0.58	0.27
14.54	2.41	....
13.56	0.65	0.74
14.19	1.69	1.08
13.99	0.86	0.59
13.69	0.64	0.62
10.74	1.33	1.06
10.43	0.82	0.48
10.18	0.31	0.40
13.07	0.58	0.21
10.95	0.18	0.33
11.10	0.51	0.20
11.28	0.44	0.31
11.52	1.95	2.32
14.25	1.56	1.32
10.86	0.50	0.36
12.78	0.89	0.56
12.28	2.27	2.36
13.22	0.79	0.35
13.93	0.66	0.34
14.28	0.61	0.87
12.26	0.58	0.27
12.59	0.51	0.25
12.12	0.44	0.27
13.30	0.56	0.17
13.04	2.17	2.03
13.33	1.97	1.02
12.90	1.63	1.34
13.10	1.56	1.38
13.00	1.22	1.03
11.33	0.60	0.09
13.47	0.63	0.20
12.99	0.66	0.12
13.81	1.09	0.67
12.47	1.59	1.65
13.31	0.83	0.50
12.53	1.53	0.96
14.02	0.77	1.10
13.61	1.70	1.01
12.67	0.85	0.42
13.18	0.66	0.13
12.04	0.47	0.13

No.	V	B-V	U-B
311	9.72	0.32	0.41
312	9.81	1.03	0.50
313	13.37	0.77	0.65
314	13.45	0.51	0.57
315	12.99	0.43	0.28
316	10.41	1.17	0.78
317	11.25	1.73	1.11
318	12.74	0.52	-0.05
319	11.66	0.52	0.11
320	13.86	0.67	0.30
321	12.79	0.87	0.38
322	14.25	1.89	0.80
323	10.04	0.18	0.27
324	13.80	0.94	0.73
325	13.96	0.86	0.46
326	13.06	1.96	1.96
327	12.12	0.54	0.26
328	10.99	0.50	0.23
329	13.19	2.15	....
330	10.71	0.52	0.29
331	11.29	1.09	0.47
332	11.77	0.62	-0.03
333	14.23	2.33	....
334	11.75	0.41	0.13
335	13.54	1.14	0.75
336	10.59	0.39	0.11
337	13.83	0.63	0.80
338	13.56	0.64	0.25
339	14.32	0.64	....
340	12.61	0.47	0.28
341	11.44	0.37	0.13
342	11.21	0.42	0.07
343	13.33	0.60	0.08
344	13.20	1.53	0.95
345	13.23	0.62	0.60
346	13.20	2.16	1.53
347	12.87	1.40	1.15
348	10.79	1.20	0.45
349	12.74	0.48	0.07
350	13.56	0.62	0.09
351	11.26	0.46	0.16
352	13.38	0.90	0.42
353	13.67	0.79	0.18
354	11.75	0.48	0.06
355	12.06	0.50	0.22
356	12.88	0.57	0.11
357	13.12	1.63	1.66
358	11.51	0.43	0.14
359	12.75	0.54	0.08
360	13.42	1.88	1.77
361	12.79	1.52	1.11
362	13.29	1.86	1.71
363	13.80	0.67	0.15
364	11.50	0.87	0.07
365	12.27	0.42	0.14
366	12.93	0.50	0.09
367	11.57	0.40	0.15
368	12.24	0.43	0.07
369	12.92	0.63	-0.02
370	13.71	0.78	0.59
371	11.17	0.40	0.15
372	12.62	0.58	0.09
373	13.57	1.85	1.45
374	10.92	0.48	0.13
375	9.58	1.42	0.86
376	13.70	0.76	0.61
377	12.42	0.53	0.13
378	13.58	0.65	0.10
379	12.91	1.59	1.44
380	11.11	0.39	0.15

No.	V	B-V	U-B
381	13.91	1.73	1.24
382	13.88	0.90	0.36
383	13.39	0.90	....
384	10.66	0.49	0.16
385	11.13	0.57	0.00
386	13.87	0.66	0.23
387	11.44	1.29	1.20
388	12.10	0.46	0.10
389	13.06	0.78	0.25
390	12.95	0.56	0.06
391	12.33	0.46	0.11
392	11.66	0.46	0.42
393	10.16	1.01	0.38
394	14.11	1.69	0.81
395	14.20	0.76	0.74
396	14.38	0.76	0.99
397	14.11	0.62	0.34
398	13.79	0.57	0.37
399	13.70	0.57	....
401	13.44	0.64	0.23
402	13.84	0.64	0.11
403	13.36	0.82	0.38
404	12.04	0.41	0.15
405	11.27	0.48	0.12
406	13.38	0.74	0.61
407	12.20	2.30	2.09
408	12.31	0.44	0.15
409	14.27	0.44	....
410	11.21	0.42	0.15
411	12.80	2.09	2.10
412	12.93	0.62	0.31
413	13.46	2.26	....
414	13.06	0.89	0.23
415	13.01	1.62	1.35
416	12.77	0.72	0.15
417	13.27	0.71	0.05
418	11.79	0.38	0.17
419	12.53	0.48	0.08
420	13.05	0.58	0.18
421	13.29	1.56	1.44
422	12.99	0.85	0.58
423	10.61	0.45	0.24
424	11.98	0.36	0.19
425	12.29	0.40	0.22
426	14.28	1.60	1.49
427	13.86	0.68	0.39
428	13.22	0.50	0.15
429	13.12	0.68	0.23
430	12.01	0.33	0.24
431	13.75	0.62	0.41
432	14.12	0.86	0.74
433	13.52	1.35	1.54
434	14.65	1.18	0.70
435	14.69	1.27	0.69

nitudes. From the present study we find that the distance of NGC 5822 is 735 pc, its diameter 11.5 pc, $E(B-V) = 0.18$ and its age, 2.76×10^8 years.

We have not been able to pick out individual members of the cluster as proper motion data, radial velocities, or spectral types of the stars in the region are lacking. However starcounts performed in the region show that the cluster is quite extended. Although the two clusters appear very close in projection, their separation in space is about 800 pc, if we assumed Cullmann's distance for NGC 5823 to be correct.

It is therefore unlikely that NGC 5822 and 5823 form a physical pair. We would like to emphasize that the photometry of Brück *et al.* covers only half of each cluster, hence their results are based on material inferior to that of Cullmann and this paper. In addition, Cullmann's color-color diagram gives a much better determination of the reddening for NGC 5823. That the two clusters NGC 5822-5823 from a physical pair is open to serious doubt.

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