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A BIBLIOGRAPHY OF INDIVIDUAL GLOBULAR CLUSTERS

FIRST SUPPLEMENT

HELEN B. SAWYER HOGG

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FIRST SUPPLEMENT

By Helen B. Sawyer Hogg

I. Purpose

The first bibliography of individual globular clusters was published by the writer in 1947 as volume 1, no. 20, of the Publications of the David Dunlap Observatory. Until that time, the extensive bibliographical material on globular clusters had been in an unwieldy state, so that a worker who wished to determine what had been done on any given cluster could do so only by a vast amount of searching of irrelevant material. That such a compilation was needed has been proved by the number of requests the Observatory has had for it.

Since that time, the card catalogue which formed the basis of that publication has been maintained continuously by the writer, who looks over all the astronomical literature of the world as it is received at the David Dunlap Observatory. From this catalogue this first supplement has been compiled, to include the literature from 1948 through 1962, as well as earlier references brought to the writer's attention since the publication of the first bibliography. Of course, the Astronomischer Jahresbericht and the Bulletin Signalétique of the Centre National de la Recherche Scientifique are a great help in providing information. In the future it is definitely planned to issue supplements at shorter intervals of time.

The literature on all clusters, both globular and galactic, is in a much better state of co-ordination than it was at the time of the original bibliography. This has been achieved through the efforts of G. Alter, J. Ruprecht and V. Vanýsek of Prague in their publication of the "Catalogue of Star Clusters and Associations," 1957. In this monumental work, all references are indexed on cards 148 by 208 millimetres under the individual clusters. Five annual supplements have already appeared, each as an Appendix to the Bulletin of the Astronomical Institutes of Czechoslovakia, and a sixth is in preparation. The writer is a co-author in these supplements. References to the original work in 1957 are indexed under individual clusters in this

David Dunlap bibliography, but the supplements are only listed by title in Section B because the references they contain are included in this present work.

Despite this other bibliography, the writer considers that there is still a need for the present publication. The formats of the Czech and Canadian bibliographies are quite different, and each has its own area of usefulness. The Czech bibliography, for lack of space on the cards, does not give the title of the paper or the initials of the author, or the name of more than one author. The abbreviation of references has to be truncated, and the arrangement is not fully chronological or alphabetical. The David Dunlap Observatory bibliography attempts to avoid all of these difficulties.

II. Use of the Bibliography

The form of this supplement is essentially the same as that of the original bibliography. The plan for listing is as follows. A paper which deals principally with one, or a few, clusters is listed by author and title under each cluster in Section A. If a paper whose title is listed under one cluster (with which it is chiefly concerned) refers briefly to other clusters, this is noted under each of them by a "See also" direction. On the other hand, a paper which is concerned with lists of many clusters, or one on a general subject which makes brief reference to a specific cluster, is listed under the cluster by date and author only. The title and complete reference will be found in Section B, which is arranged chronologically by year, and alphabetically by author within each year. When an author in this section has more than one paper in a year, a Roman numeral following the date distinguishes the paper. As a guide for the reader, many of these longer and more important references have been broken down into sub-sections, so that a perusal of Section B will show the sort of information the longer papers contain. We wish to interject a note of caution here, that some important papers on globular clusters are not included in this supplement because there is no mention of a specific cluster.

The actual abbreviations for references have been carried on as in the first bibliography. In general the name of the place appears first, and the type of publication second. The word observatory is frequently taken for granted. Because of the fact that the bibliography is built up piece by piece over a long period of time, it is hard to achieve a complete uniformity in it. When useful plates or photographs accompany an article, this is usually, but not always, noted. Symposia are usually

indexed under the year of publication which is frequently later than the year of presentation. An attempt has been made to include, as well as periodicals, astronomical books which contribute pertinent information. In general, material mentioned by directors in their observatory reports is not indexed because its usefulness is ultimately supplanted by the full publication of the research. In special instances, however, an observatory report has been included.

It is inevitable that in a work of this magnitude errors and omissions will occur, though every effort is made to keep these to a minimum. It has not been possible to include references from a few semi-popular periodicals in some foreign languages which are little understood in the English-speaking world, and hard to obtain in North America. Most of these accounts are popular interpretations of scientific papers published in regular journals and their omission is probably not serious.

Because the study of variable stars in globular clusters constitutes an active branch of this field, we wish to note that references which give information on specific variables in globular clusters have been published by the writer in the two catalogues of variables in globular clusters, Publications of the David Dunlap Observatory, volume 1, no. 4, 1939, and volume 2, no. 2, 1955. Recently an article by Richard Stothers, *A. J.*, v. 68, p. 242, 1963 (which is beyond the chronological scope of this bibliography) gives an extensive reference list for slow variables in globular clusters.

III. Clusters included in this Bibliography

In this supplement are included all clusters belonging to our galaxy which are currently classified as globular. Also included are several of the more recently discovered globular clusters, such as those from the Palomar list of Abell, which are well beyond the recognized limits of our own galaxy, but bear no obvious relation to any other. Not included in this bibliography are clusters which are considered members of the Magellanic Clouds or of any other external galaxies.

With the above restrictions, 119 globular clusters are included. Figure 1 shows the distribution of these clusters in the new galactic co-ordinates, l^{II} and b^{II}.

Table I is a catalogue of 119 globular clusters with some of the current data about them. The table is arranged in order of NGC number, and therefore not always in order of current right ascension. If there is no NGC number, the arrangement is by right ascension. New clusters are named for the observatory at which they were announced.

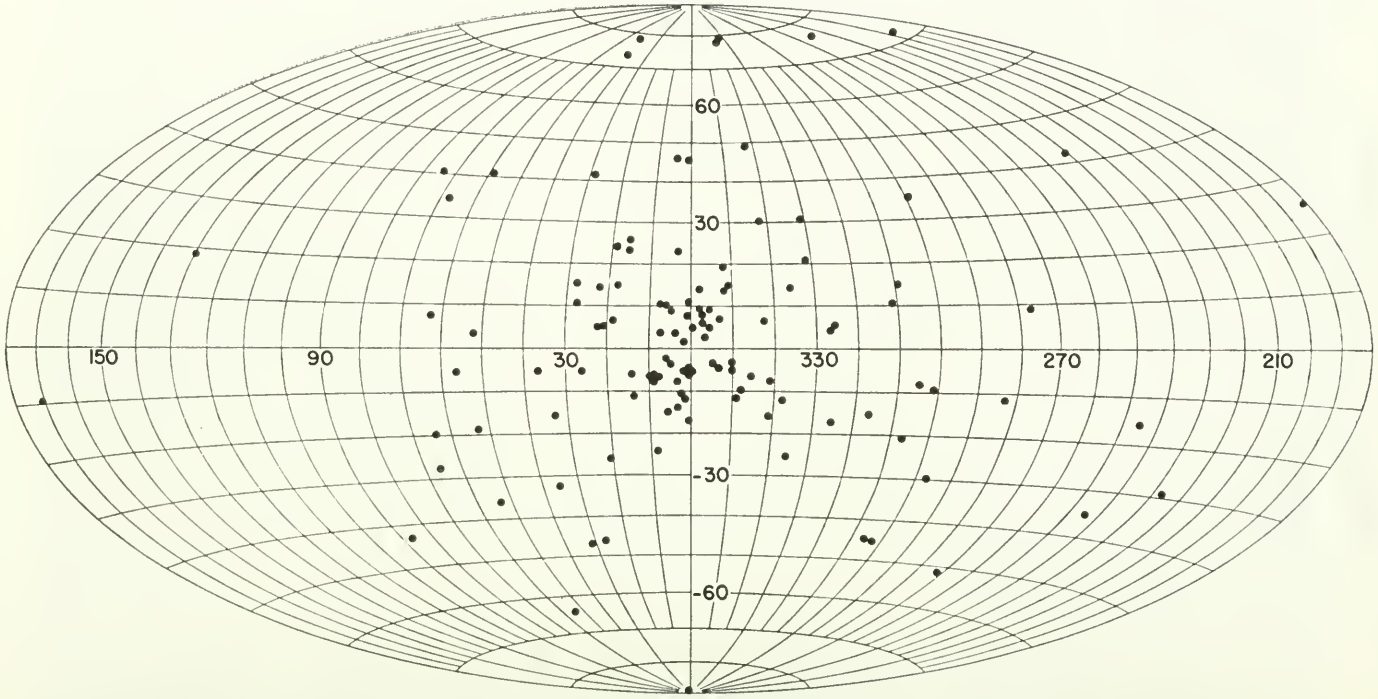

FIG. 1—Distribution of 119 globular clusters in galactic co-ordinates, on the new standard system.

TABLE I

CATALOGUE OF 119 GLOBULAR CLUSTERS

No.	R.A. 1960 h m	Dec. ° ′	l^{II} °	b^{II} °	Conc.	Ang. diam. ′	Int. mag.	Sp. type	Colour P–V	Rad. vel. km./sec.	No. vars.	Mag. 25 br. st.	App. mod.	D kpc.
104	00 22.3	−72 18	305.89	−44.90	III	44	4.68	G3		− 24	11	13.44	14.5	6
288	00 50.7	−26 49	149.66	−89.40	X	12.4	8.96			− 47	1	14.80	15.7	12
362	01 00.9	−71 04	301.64	−46.25	III	17.7	8.0	F8		+221	14	14.12	15.7	12
1261	03 11.2	−55 23	270.56	−52.12	II	4.0	9.5	F8		+ 46				29
Pal 1	03 27.2	+79 30	130.02	+19.06	XII	1.3					0	19		
Pal 2	04 43.7	+31 24	170.49	−08.98	IX	1.7								
1841*	04 51.0	−84 04	297.02	−30.15		2.4	12.2							
1851	05 12.7	−40 04	244.49	−35.05	II	11.5	7.72	dF5		+309	2			17
1904	05 22.6	−24 33	227.23	−29.33	V	7.8	8.39	dF3		+196	5	15.29	16.3	15
2298	06 47.6	−35 58	245.63	−16.01	VI	4.2	10.48	F8		+ 64	6			30
2419	07 35.5	+38 59	180.37	+25.25	II	6.2	11.51	F5	0.64	+ 14	36	17.84	18.8	62
2808	09 11.1	−64 41	282.18	−11.26	I	18.8	7.8	F8		+101	4	14.9	16.2	8
Pal 3	10 03.5	+00 15	240.16	+41.86	XII	2.2					1			
3201	10 15.9	−46 12	277.21	+08.64	X	29.3	8.8			+493	77		15.08	4
Pal 4	11 27.1	+29 12	202.31	+71.80	XII	2.5	14.4				2	19.90	20.5	125
4147	12 08.1	+18 46	252.89	+77.19	VI:	4.1	11.01	A5	0.48	+191	16	16.58	17.06	26
4372	12 23.6	−72 27	301.01	−09.90	XII	19.8	9.1			+ 66	0			6
4590	12 37.3	−26 32	299.62	+36.04	X	9.8	9.12	A6	0.59	−116	38	14.80	16.1	12
4833	12 56.7	−70 39	303.59	−08.01	VIII	12.7	8.5			+204	10		15.65	5
5024	13 11.0	+18 23	333.00	+79.76	V	14.4	8.68	F4	0.50	−112	43	15.07	16.7	20
5053	13 14.4	+17 54	335.55	+78.95	XI	8.9	10.9		0.55		10	15.6	16.4	17
5139	13 24.4	−47 06	309.10	+14.97	VIII	65.4	4.25	F7		+230	165		14.65	5
5272	13 40.4	+28 35	42.24	+78.70	VI	18.6	7.21	F7	0.56	−153	189	14.23	15.7	13
5286	13 43.6	−51 10	311.57	+10.58	V	13.6	9.5	F8		+ 45	0			12
5466	14 03.6	+28 43	42.13	+73.59	XII	9.2	10.39		0.64		22	15.72	16.4	16

*A. D. Thackeray wonders if this cluster is really a member of the Magellanic Clouds.

TABLE 1—*continued*

CATALOGUE OF 119 GLOBULAR CLUSTERS

No.	R.A. 1960	Dec.	l^{II}	b^{II}	Conc.	Ang. diam.	Int. mag.	Sp. type	Colour P–V	Rad. vel. km./sec.	No. vars.	Mag. 25 br. st.	App. mod.	D kpc.
	h m	° ′	°	°		′								
5634	14 27.5	−05 48	342.22	+49.26	IV	3.7	10.8	F4	0.56	− 63	7	16.32	17.1	23
5694	14 37.3	−26 22	331.06	+30.37	VII	2.2	10.87	A9	0.61	−187	0	16.79	17.7	32
14499	14 54.2	−82 04	307.36	−20.50	XI	6.2	11.6							
5824	15 01.5	−32 55	332.55	+22.06	I	3.7	10.08	dF5	0.63	− 58	27			46
Pal 5	15 14.0	+00 03	00.86	+45.87	XII	10.3					5	16.90	16.90	24
5897	15 15.1	−20 52	342.94	+30.29	XI	8.7	9.61		0.62		4	15.26	16.2	14
5904	15 16.5	+02 14	03.86	+46.80	V	19.9	7.04	F5	0.63	+ 49	97	13.97	15.2	9
5927	15 25.1	−50 31	326.63	+04.86	VIII	12.0	9.7	G2		− 96				3
5946	15 32.5	−50 32	327.58	+04.19	IX	2.6	11.0							
5986	15 43.5	−37 39	337.04	+13.28	VII	6.0	8.72	G0	0.75	+ 2	5		15.78	14
Pal 14	16 09.4	+15 03	28.77	+42.15		8.4					0			
6093	16 14.7	−22 53	352.67	+19.45	II	5.1	8.39	dF4	0.76	+ 18	8	14.88	16.05	11
6101	16 21.1	−72 07	317.73	−15.83	X	14.6	10.2							
6121	16 21.2	−26 25	350.99	+15.97	IX	22.8	7.41		0.92	+ 65	43	13.11	13.97	3
6139	16 25.0	−38 45	342.37	+06.94	II	2.6	10.4	F8		+ 20				13
6144	16 24.8	−25 57	351.92	+15.68	XI	6.2	10.85		0.82		1	15.76	16.0	10
6171	16 30.3	−12 58	03.37	+23.02	X	7.8	10.10	G2	0.97	−147	24	15.5	16.2	8
6205	16 40.3	+36 32	59.00	+40.91	V	23.2	6.78	F5	0.57	−241	10	13.75	14.8	8
6218	16 45.1	−01 53	15.70	+26.32	IX	12.2	7.95	F7	0.77	− 16	1	13.97	15.2	7
6229	16 45.9	+47 36	73.64	+40.30	IV	3.8	10.26	F7	0.64	−150	22	16.18	17.7	28
6235	16 51.0	−22 07	358.91	+13.52	X	1.9	10.8				2	16.24	17.13	16
6254	16 55.0	−04 03	15.13	+23.07	VII	12.2	7.64	G0	0.79	+ 71	3	14.06	15.2	7
Pal 15	16 58.1	−00 29	18.89	+24.27										
6266	16 58.7	−30 04	353.58	+07.30	IV	6.3	8.16	F8	0.95	− 75	83	15.87	16.74	8
6273	17 00.1	−26 12	356.88	+09.40	VIII	5.3	8.29	F5	0.90	+102	4	14.80	15.95	7

TABLE I—*continued*

CATALOGUE OF 119 GLOBULAR CLUSTERS

No.	R.A. 1960	Dec.	l^{II}	b^{II}	Conc.	Ang. diam.	Int. mag.	Sp. type	Colour P–V	Rad. vel. km./sec.	No. vars.	Mag. 25 br. st.	App. mod.	D kpc.
	h m	° ′	°	°		′								
6284	17 02.1	−24 42	358.37	+09.93	IX:	2.7	10.61	F8	0.91	+ 22	6	16.06	17.26	17
6287	17 02.7	−22 39	00.13	+11.04	VII	2.7	11.24		1.13		3	16.08	17.28	10
6293	17 07.7	−26 31	357.64	+07.84	IV	3.5	9.38	F5	0.86	− 73	5	15.39	16.69	12
6304	17 12.0	−29 25	355.84	+05.37	VI	3.8	9.82	G5	1.22	− 98	11		16.38	6
6316	17 14.0	−28 06	357.17	+05.78	III	2.4	10.10		1.17					
6325	17 15.6	−23 43	00.98	+07.99	IV:	1.6	12.66		1.52					
6333	17 16.8	−18 29	05.53	+10.72	VIII	5.5	8.92	F2	0.87	+224	13	15.50	16.39	8
6341	17 15.9	+43 11	68.35	+34.86	IV	12.2	7.30	F2	0.53	−118	16	13.86	15.2	10
6342	17 18.8	−19 33	04.90	+09.73	IV	1.3	11.35		1.20					
6352	17 22.4	−48 27	341.37	−07.19	XI:	8.9	9.1							
6355	17 21.5	−26 20	359.58	+05.42		1:	9.6		1.41					
6356	17 21.3	−17 47	06.73	+10.21	II	3.5	9.68	G5	1.06	+ 31	5	16.38	17.2	11
HP 1	17 25.5	−29 58	357.06	+02.65	IX	1.3								
6362	17 27.6	−67 01	325.54	−17.56	X	8.5	8.3			− 18	31			7
6366	17 25.6	−05 03	18.42	+16.03	XI	5.8	12.1				2	15.78	16.25	2
6380	17 32.6	−39 02	350.28	−03.56										
6388	17 33.3	−44 43	345.54	−06.74	III	6.8	8.7	G3		+ 81				13
Ton 2	17 33.4	−39 02	350.79	−03.42										
6397	17 37.6	−53 39	338.18	−11.98	IX	19:	7.3	F5		+ 11	3	12.61	13.0	2
6401	17 36.2	−23 53	03.45	+03.97		1			1.17:					
6402	17 35.5	−03 15	21.30	+14.78	VIII	6.7	9.44	G0	1.12	−129	72	15.44	16.72	7
Pal 6	17 41.2	−26 12	02.09	+01.78	XI	1.8						20		
6426	17 42.9	+03 12	28.07	+16.28	IX	2.2	12.33		0.85		12			21
6440	17 46.5	−20 21	07.72	+03.80	V	1.7	12.05	G5	1.81	−133				4
6441	17 47.5	−37 02	353.53	−05.00	III	3.0	8.93	G2		− 70				9

TABLE I—*continued*

CATALOGUE OF 119 GLOBULAR CLUSTERS

No.	R.A. 1960	Dec.	l^{II}	b^{II}	Conc.	Ang. diam.	Int. mag.	Sp. type	Colour P–V	Rad. vel. km./sec.	No. vars.	Mag. 25 br. st.	App. mod.	D kpc.
	h m	° ′	°	°		′								
6453	17 48.7	−34 37	355.74	−03.97	IV	3.6	11.4		1.04:					
6496	17 56.2	−44 15	348.08	−10.01	XII	12.7	10.3							
6517	17 59.6	−08 57	19.23	+06.77	IV	1.0	12.90		1.67					
6522	18 01.0	−30 02	01.03	−03.93	VI	1.5	10.40	F8	1.02		9		17.77	12
6528	18 02.2	−30 04	01.13	−04.17	V	1.2	11.04		1.27		0			
6535	18 01.8	−00 18	27.18	+10.43	XI:	1.3	11.9				1	15.97	16.88	14
6539	18 02.6	−07 35	20.80	+06.78	X	3.5	12.39		1.67		1			
6541	18 05.0	−43 44	349.28	−11.19	III	23.2	7.9	F6		−148	1	13.35	14.67	4
6544	18 04.9	−25 01	05.83	−02.22		1:		G1	1.27	− 12				5
6553	18 06.9	−25 56	05.25	−03.06	XI	3.2	10.20		1.39		6			
6558	18 07.7	−31 47	00.19	−06.02							9			
I 1276	18 08.5	−07 14	21.82	+05.67	XII	6.0					5	18	18.7	
6569	18 11.1	−31 50	00.49	−06.68	VIII	2.2	10.63		1.11		5		17.35	
6584	18 15.4	−52 14	342.14	−16.41	VIII	9.7	9.4	F7		+160	0			13
6624	18 21.1	−30 23	02.80	−07.92	VI	2.7	9.53	G2	1.00	+ 69				13
6626	18 22.1	−24 54	07.80	−05.59	IV	15.0	8.48	F9	0.97	+ 1	16	14.73	15.62	5
6637	18 28.8	−32 23	01.72	−10.26	V	3.8	8.94	G5	0.87	+ 95	5			7
6638	18 28.5	−25 32	07.90	−07.16	VI	2.2	10.24	G2	0.96	− 14		16.22		15
6642	18 29.0	−23 30	09.78	−06.34		0.8	10.3							
6652	18 33.2	−33 02	01.53	−11.38	VI:	2.3	9.86	G2	0.78	−124				16
6656	18 33.9	−23 58	09.87	−07.55	VII	17.0	6.48	F6	0.86	−144	24	12.93	14.15	3
Pal 8	18 39.1	−19 51	14.11	−06.79	X	1.6								
6681	18 40.7	−32 20	02.85	−12.52	V	4.1	8.95	G2	0.59	+198	2			20
6712	18 50.8	−08 46	25.34	−04.32	IX:	4.2	9.98	G2	1.04	−131	12	15.35	16.48	7
6715	18 52.6	−30 31	05.63	−14.11	III	5.5	8.74	F7	0.70	+122	80		17.4	17

TABLE I—*continued*

CATALOGUE OF 119 GLOBULAR CLUSTERS

No.	R.A. 1960	Dec.	l^{II}	b^{II}	Conc.	Ang. diam.	Int. mag.	Sp. type	Colour P–V	Rad. vel. km./sec.	No. vars.	Mag. 25 br. st.	App. mod.	D kpc.
	h m	° ′	°	°		′								
6717	18 52.7	−22 46	12.86	−10.91	VIII	2.6						16		
6723	18 56.9	−36 41	00.07	−17.30	VII	7.5	7.75	G3	0.61	− 3	19	14.20	15.34	10
6752	19 07.3	−60 03	336.49	−25.62	VI	41.9	7.2	F6		− 39	1	13.26	14.2	6
6760	19 09.1	+00 58	36.10	−03.91	IX:	2.4	11.25		1.55		4	16.77	17.45	4
6779	19 15.0	+30 06	62.65	+08.34	X	5.0	9.55	F5	0.74	−145	12	15.31	16.3	13
Pal 10	19 16.4	+18 29	52.44	+02.68	XII	3.1						20		
6809	19 37.5	−31 02	08.83	−23.28	XI	14.8	7.08		0.55	+170	6	13.58	14.5	6
Pal 11	19 43.1	−08 08	31.79	−15.60	XI	2.8					0	17		
6838	19 51.9	+18 41	56.74	−04.55		6.1	8.3	G2	0.95	− 80	4	14.82	14.6	5
6864	20 03.8	−22 02	20.31	−25.76	I	4.6	9.50	G1	0.71	−198	11	17.06	18.1	29
6934	20 32.2	+07 16	52.10	−18.88	VIII	6.2	10.01	F9	0.62	−360	51	15.78	16.9	19
6981	20 51.2	−12 42	35.15	−32.68	IX	5.1	10.24	G2	0.57	−255	39	15.86	17.0	21
7006	20 59.6	+16 02	63.77	−19.39	I	2.2	11.45	F1	0.61	−348	49	17.1	18.8	49
7078	21 28.1	+12 00	65.02	−27.32	IV	12.3	7.33	F3	0.59	−107	103	14.31	15.9	13
7089	21 31.4	−01 00	53.37	−35.78	II	11.7	7.30	F3	0.57	− 5	17	14.61	16.2	15
7099	21 38.1	−23 22	27.16	−46.83	V	8.9	8.58	F3	0.48	−174	4	14.63	15.54	12
Pal 12	21 44.3	−21 25	30.52	−47.64	XII	2.1					3	17		
Pal 13	23 04.7	+12 31	87.07	−42.72	XII	4.0					4	19		34
7492	23 06.2	−15 51	53.32	−63.46	XII	4.3	12.33				1	16.82	17.9	33

OBJECTS NOT INCLUDED IN TABLE I

	R.A. 1950	Dec.	Reference
	h m	° ′	
NGC 2158	06 04.4	+24 06	van den Bergh, S., and Sher, D. *Dunlap Pub.*, v. 2, no. 7, p. 203, 1960.
Melotte 66	07 24.8	−47 38	Eggen, O. J., and Stoy, R. H. *Roy. Obs. Bull.*, no. 53, 1962.
Bjurakan Object	10 52.0	+40 44	Kinman, T. D., and Rosino, L. *A. S. P. Pub.*, v. 74, p. 499. (See Section A.)
Anon. Object	17 45.7	−60 45	Sawyer, H. B. *Dunlap Pub.*, v. 2, no. 2, p. 36, 1955.
NGC 6684	18 44.1	−65 14	*Ibid.*
NGC 6749	19 02.6	+01 48	Setteducati, A. F., and Weaver, H. F. *Newly Found Star Clusters*, I. Radio Ast. Lab., Univ. of Cal. 1960.

REFERENCE SOURCES

The main sources of information for the respective columns in the catalogue are as follows: concentration class, Shapley and Sawyer, *Harv. Bull.*, no. 849, 1927; apparent diameter, Mowbray, *Ap. J.*, v. 104, p. 47, 1947, and Shapley and Sayer, *Harv. Repr.*, no. 116, 1935; integrated photographic magnitudes, Christie, *Ap. J.*, v. 91, p. 8, 1940, and Sawyer and Shapley, *Harv. Bull.*, no. 848, 1927; spectral type, Mayall, *Ap. J.*, v. 104, p. 290, 1946, Morgan, *A. S. P. Pub.*, v. 68, p. 509, 1956, Kinman, *M. N.*, v. 119, p. 553, 1959; colours, Kron and Mayall, *A. J.*, v. 65, p. 590, 1960; radial velocities, Mayall, *op. cit.*, and Kinman, *M. N.*, v. 119, p. 171, 1959; variables, Sawyer Hogg, *Bamberg Kl. Veröff.*, no. 34. 1962; magnitude of 25 brightest stars from miscellaneous sources; distance in kiloparsecs is an average of three nearly simultaneous determinations, (when available) Kinman, *M. N.*, v. 119, p. 171, 1959, Sawyer Hogg, *Hd. der Ap.*, v. 53, p. 205, 1959, Kron and Mayall, *A. J.*, v. 65, p. 605, 1960. More accurate values for the above quantities are available for short lists of clusters, but the aim has been to keep this catalogue as homogeneous as possible throughout.

Columns 2 and 3 give the right ascension and declination for the epoch of 1960. (This is to provide a usable position for telescopes at present. Positions for the epoch of 1950 can be found in Section A.) Columns 4 and 5 are the galactic longitude and latitude on the new standards. Successive columns then give concentration class, apparent diameter, integrated magnitude, spectral type, colour, radial velocity, number of variable stars, magnitude of the 25 brightest stars, apparent modulus, and the distance in kiloparsecs.

The footnotes to the table list certain clusters which have been dropped from the list of globular clusters, with references which give the reason for this. They also list references from which most of the material in the catalogue is derived. In the case of some clusters, however, the reader can obtain values from the material indexed in Section A.

IV. Acknowledgments

The reference sources for this publication were practically all available in the libraries of the David Dunlap Observatory and the University of Toronto. A few items, however, were obtained from the libraries of the Dominion Observatory, the Dominion Astrophysical Observatory and the National Research Council at Ottawa. It is a pleasure to acknowledge my debt to the librarians of these institutions for their help in locating references, especially to Mrs. Nancy McKenzie and Mrs. Jean Lehmann of the David Dunlap Observatory, and to Mrs. Joan Topley for preparing the final copy for the printer.

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Richmond Hill, Ontario
August 15, 1963

SECTION A

References for Individual Clusters

α and δ for 1950

NGC 104 (47 Tucanae) $\alpha\ 00^h\ 21^m\ 9$, $\delta\ -\ 72°\ 21'$ $l^{II}\ 305°.89$, $b^{II} -44°.90$

1908 Leavitt, H. S. 1777 variables in the Magellanic Clouds. *Harv. Ann.*, v. 60, no. 4. (Announcement of HV 810, 811, 812, 813, 814).

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1960 Feast, M. W., Thackeray, A. D., and Wesselink, A. J. 47 Tucanae: the membership of two RR Lyrae variables. *M. N.*, v. 120, p. 64. First reference, T. D. Kinman, *M. N.*, v. 119, p. 575, 1959.

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1928*a* Ludendorff, 1928 Shapley, 1935 Walters, 1947*abd* Sawyer, 1947*abde* Parenago, Kukarkin, Florja, 1949*cefh* Shapley, 1950*b* Becker, 1951*ae* Payne-Gaposchkin, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953 Kholopov, 1953*di* Rosino, 1954 Cimino, 1954*a* Payne-Gaposchkin, 1954*b* Rosino, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1955*Ia*, *IId* Struve, 1956*c* Baum, 1956*a* Schmidt, 1956 Woolley, 1957 Stohl, 1957 Woolley and Robertson, 1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1958*I*, *II* Kinman, 1958*b* Ledoux and Walraven, 1958*Ic*, *II* Sawyer Hogg, 1959*Iad*, *IIabei*, *III* Kinman, 1959*b* Larsson-Leander, 1959 Matsunami *et al.*, 1959*Ibeikmop*, *IIcd*, *III* Sawyer Hogg, 1959*ab* Thackeray, 1960 Feast, Thackeray, Wesselink, 1960 Gingerich, 1960 Sandage and Wallerstein, 1960*bceg* Wilkens, 1961*a* Haffner, 1961 Hénon, 1961 Lohmann, 1961 Kurochkin, 1961 Michie, 1961 Poveda, 1961*I*, *IIb*, *III* Sawyer Hogg, 1961 Woolley, 1961*I*, *II* Woolley and Dickens, 1962 Aller, 1962*IIb* Arp, 1962 van den Bergh, 1962 Fernie, 1962 King, 1962 Kinman, 1962 Michie, 1962 Sawyer Hogg.

See also: 7078 1961 King, 6838 1961 Stephenson, 104 1961 Wildey, 5139 1962 Fehrenbach and Duflot, 6712 1962 Smith and Sandage.

NGC 288 $\alpha\ 00^h\ 50^m2,\ \delta\ -26°\ 52'$ $l^{II}149°.66,\ b^{II}\ -89°.40$

1921*II* Gregory, 1947*abd* Sawyer, 1948*I* Sawyer, 1949*abcde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*d* Rosino, 1954 Cuffey, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1955*IIc* Struve, 1956*c* Baum, 1956*a* Schmidt, 1957 Shapley, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Johnson, 1959*Iad*, *IIa* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*bcg* Wilkens, 1961 Hénon, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 362 $\alpha\ 01^h00^m6,\ \delta\ -71°\ 07'$ $l^{II}301°.64,\ b^{II}\ -46°.25$

1935 Walters, 1947*abd* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953 Kholopov, 1953*d* Rosino, 1954 Cimino, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1956*c* Baum, 1956 van den Bergh, 1956*a* Schmidt, 1957 van den Bergh, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*I* Sandage, 1959 van Agt and Oosterhoff, 1959*Iad*, *IIbi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*bcg* Wilkens, 1961 Kurochkin, 1961 Payne-Gaposchkin, 1961*I* Sawyer Hogg, 1962 Aller, 1962 Fernie, 1962 Sawyer Hogg.

NGC 1261 $\alpha\ 03^h10^m9,\ \delta\ -55°\ 25'$ $l^{II}270°.56,\ b^{II}\ -52°.12$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabc* Lohmann, 1953 Dreyer, 1953*d* Rosino, 1954 Cuffey, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*c* Baum, 1957 Shapley, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959*Iacd*, *IIci* Kinman, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens, 1962 Fernie.

Palomar 1 $\alpha\ 03^h25^m7,\ \delta\ +79°\ 28'$ $l^{II}130°.02,\ b^{II}\ +19°.06$

1955 Abell, G. O. Globular clusters and planetary nebulae discovered on the National Geographic Society–Palomar Observatory Sky Survey. *A. S. P. Pub.*, v. 67, pp. 258–261. (Discovery by Abell).

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1958 Alter, Ruprecht, Vanýsek, 1958 van den Bergh, 1958 Burbidge and Sandage, 1958 Heckmann, 1959*Ip* Sawyer Hogg, 1961*III* Sawyer Hogg, 1962*I* Rosino.

Palomar 2 $\alpha\ 04^h\ 43^m1,\ \delta\ +31°\ 23'$ $l^{II}170°.49,\ b^{II}-08°.98$

1955 Abell, G. O. Globular clusters and planetary nebulae discovered on the National Geographic Society–Palomar Observatory Sky Survey. *A. S. P. Pub.*, v. 67, pp. 258–261. (Discovery by A. G. Wilson).

1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1959 *Ip* Sawyer Hogg, 1962*I* Rosino.

NGC 1841 $\alpha\ 04^h\ 52^m5,\ \delta\ -84°\ 05'$ $l^{II}297°.02,\ b^{II}\ -30°.15$

1947*abd* Sawyer, 1949*b* Shapley, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*c* Baum, 1958 Alter, Ruprecht, Vanýsek, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens.

NGC 1851 $\alpha\ 05^h\ 12^m4,\ \delta\ -40°\ 05'$ $l^{II}244°.49,\ b^{II}\ -35°.05$

1912 Knox Shaw, 1928*a* Ludendorff, 1947 Parenago, 1947*abd* Sawyer, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*d* Rosino, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*c* Baum, 1956*ab* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dzigvashvili, 1959*Iabd*, *IIbi* Kinman, 1959 Matsunami *et al.*, 1959*Iip*, *III* Sawyer Hogg, 1960 Kurth, 1960*bd* Wilkens, 1962 Fernie, 1962 Sawyer Hogg.

NGC 1904 (Messier 79) $\alpha\ 05^h\ 22^m.2,\ \delta\ -24°\ 34'$ $l^{II}227°.23,\ b^{II}\ -29°.33$

1952 Rosino, L. Ricerche sugli ammassi globulari VIII. Stelle variabili e distanza dell' ammasso globulare NGC 1904 = M 79. *Univ. Bologna Oss. Pub.*, v. V, no. 20; *Soc. Astr. Ital. Mem.*, v. 23, pp. 101–107.

1947 Parenago, 1947*abcd* Sawyer, 1948*b* Perek, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1953*i* Rosino, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956*c* Baum, 1956 van den Bergh, 1956*b* Schmidt, 1957 van den Bergh, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958 Maffei (photo), 1959 van Agt and Oosterhoff, 1959 Dzigvashvili, 1959*Iabd*, *IIbi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960 Kurth, 1960*b* Roberts, 1960*bcg* Wilkens, 1961 Hénon, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 2298 $\alpha\ 06^h\ 47^m.2,\ \delta\ -35°\ 57'$ $l^{II}245°.63,\ b^{II}\ -16°.01$

1947 Parenago, 1947*abd* Sawyer, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd*, *II* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960 Kurth, 1960*bd* Wilkens, 1962 Fernie, 1962 Sawyer Hogg.

NGC 2419 $\alpha\ 07^h\ 34^m.8,\ \delta\ +39°\ 00'$ $l^{II}180°.37,\ b^{II}\ +25°.25$

1959 de Vaucouleurs, G. Magnitudes and colors of galaxies in the UBV system. *Lowell Bull.*, v. 4, no. 97, p. 105.

1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*abde* Parenago, Kukarkin, Florja, 1949*bcde* Shapley, 1952*Iabd*, *IIIc* Lohmann, 1953 Dreyer, 1953 Lohmann, 1953*cd* Rosino, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956*c* Baum, 1956 van den Bergh, 1956*b* Schmidt, 1957 van den Bergh, 1957 Stohl, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958 Náprstková, 1958*Ib* Sawyer Hogg, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIi*, *III* Kinman, 1959 Matsunami *et al.*, 1959*Ibdip*, *IIe* Sawyer Hogg, 1960*acfhikl* Kron and Mayall, 1960 Kurth, 1960*b* Roberts, 1960*acef* Wilkens, 1961 Hénon, 1961 Kurochkin, 1961*I*, *IIb* Sawyer Hogg, 1961 Sharov and Pavlovskaya, 1962 Fernie, 1962 Kinman, 1962 Rosino and Sawyer Hogg, 1962 Sawyer Hogg.

See also: 7006 1954 Sandage.

NGC 2808 $\alpha\ 09^h\ 10^m.9,\ \delta\ -64°\ 39'$ $l^{II}282°.18,\ b^{II}\ -11°.26$

1947*abd* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959*Iad*, *IIbei* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*bcg* Wilkens, 1962 Aller, 1962 Fernie, 1962 Sawyer Hogg.

Palomar 3 $\alpha\ 10^h\ 03^m.0,\ \delta\ +00°\ 18'$ $l^{II}240°.16,\ b^{II}\ +41°.86$

1955 Wilson, A. G. Sculptor-type systems in the local group of galaxies. *A. S. P. Pub.*, v. 67, pp. 27–29. (Discovery by Baade and Wilson independently).

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See also: Pal 1 1962 Kinman and Rosino.

NGC 3201 $\alpha\ 10^h\ 15^m.5,\ \delta\ -46°\ 09'$ $l^{II}\ 277°.21,\ b^{II}\ +08°.64$

1953 Kholopov, P. N. Space distribution of RR Lyrae variables in the globular clusters M 5 and NGC 3201. *Var. Stars.* (Russ.), v. 9, pp. 371–378. Ref. *Ast. News Letter* no. 82, 1956.

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1928*a* Ludendorff, 1947*abd* Sawyer, 1948*I* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1955*IIa* Struve, 1956 van den Bergh, 1956 Kourganoff, 1956*a* Schmidt, 1957 van den Bergh, 1957 Kholopov, 1958 Alter, Ruprecht, Vanýsek, 1958 Kholopov, 1958*I, II* Kinman, 1958*I* Sandage, 1958*II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959*Iad, IIad, III* Kinman, 1959 Kurochkin, 1959 Matsunami *et al.*, 1959 Preston, 1959*Iip* Sawyer Hogg, 1960 Pavlovskaya, 1960*acf* Wilkens, 1961 Payne-Gaposchkin, 1961*I, III* Sawyer Hogg, 1961 Sharov and Pavlovskaya, 1962 Fernie, 1962 Sawyer Hogg.

See also: 5272 1955 Kholopov.

Bjurakan Object $10^h\ 52^m.0,\ +44°\ 44'$ $l^{II}\ 176°.39,\ b^{II}\ +62°.53$

1957 Shakhbazian, R. K. On a star cluster in the Big Dipper. *Ast. Circ.*, (Russ.), no. 177, pp. 11–12.

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1958 Heckmann, 1958*Ib* Sawyer Hogg, 1959*Idp* Sawyer Hogg, 1961*III* Sawyer Hogg, 1962*I* Rosino.

Palomar 4 $\alpha\ 11^h\ 26^m.6,\ \delta\ +29°\ 15'$ $l^{II}202°.31,\ b^{II}\ +71°.80$

1955 Wilson, A. G. Sculptor-type systems in the local group of galaxies. *A. S. P. Pub.*, v. 67, pp. 27–29. (Discovery by Hubble and Wilson independently).

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See also: Bjurakan 1957 Shakhbazian.

NGC 4147 $\alpha\ 12^h\ 07^m.6,\ \delta\ +18°\ 49'$ $l^{II}252°.89,\ b^{II}\ +77°.19$

1955 Sandage, A. R., and Walker, M. F. The globular cluster NGC 4147. *A. J.*, v. 60, pp. 230–236.

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1928*a* Ludendorff, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948 Fehrenbach, 1948 Gamalej, 1948*b* Perek, 1949*abcde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953*d* Rosino, 1954 Blamont, 1954 Cuffey, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*ac* Baum, 1956 van den Bergh, 1956*b* Schmidt, 1957 van den Bergh, 1957 Shapley, 1958 Alter, Ruprecht, Vanýsek, 1958*bh* Arp, 1958*bc* Burbidge and Burbidge, 1958*I, II* Kinman, 1958 Maffei (photo), 1958*I* Sandage, 1958*Ie, II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959*c* Arp, 1959 Dzigvashvili, 1959*Id, IIaji* Kinman, 1959 Matsunami *et al.*, 1959*Ibdfip, IIc, III* Sawyer Hogg, 1960 Eggen, 1960*III* Hodge, 1960*acfgijk* Kron and Mayall, 1960 Kurth, 1960*h* Roberts, 1960 Sandage and Wallerstein, 1960*acf* Wilkens, 1961*b* Haffner, 1961 Hénon, 1961*I, III* Sawyer Hogg, 1962*I* Arp, 1962 Fernie, 1962 Kinman, 1962 Sawyer Hogg.

See also: 5272 1956 Baker and Baker; 5272 1956 Johnson and Sandage.

NGC 4372 $\alpha\ 12^h\ 23^m.0,\ \delta\ -72°\ 24'$ $l^{II}301°.01,\ b^{II}\ -09°.90$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1951*b* Bok (photo), 1951 Thackeray, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958 Kinman, 1958*II* Sawyer Hogg, 1959*Iad, IIa* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*bd* Wilkens, 1961*a* Haffner, 1961*I, III* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 4590 (Messier 68) $\alpha\ 12^h\ 36^m.8,\ \delta\ -26°\ 29'$ $l^{II}299°.62,\ b^{II}\ +36°.04$

1938 Luyten, W. J. Bruce proper motion survey. II. A catalogue of 2350 variable stars found with the blink microscope. *Obs. Univ. Minnesota Pub.*, v. II, no. 6. (HV 8460 = FI Hya).

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See also: 6838 1956 Artjuchina.

NGC 4833 $\alpha\ 12^h\ 56^m.0,\ \delta\ -70°\ 36'$ $l^{II}303°.59,\ b^{II}\ -08°.01$

1928*b* Ludendorff, 1947*abd* Sawyer, 1948*I* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabcd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1956

NGC 4833 (cont'd)

van den Bergh, 1956 Kreiken, 1956*a* Schmidt, 1957 van den Bergh, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 van Agt and Oosterhoff, 1959*Iad*, *IIa* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*bcg* Wilkens, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 5024 (Messier 53) α 13^h 10^m.5, δ + 18° 26′ l^{II}333°.00, b^{II} + 79°.76

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NGC 5053 α 13^h 13^m.9, δ + 17° 57′ l^{II}335°.55, b^{II} + 78°.95

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See also: Pal 5 1951 Rosino, 6779 1951 Rosino, 5024 1958 Cuffey, 7492 1961 Cuffey.

NGC 5139 (Omega Centauri) α 13^h 23^m.8, δ − 47° 13′ l^{II}309°.10, b^{II} + 14°.97

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NGC 5139 (cont'd)

skaya, 1960*a* Roberts, 1960*acf* Wilkens, 1961 van den Bergh. 1961*a* Haffner, 1961 Hénon, 1961 Kurochkin, 1961 Lohmann, 1961 Michie, 1961 Payne-Gaposchkin, 1961 *I*, *III* Sawyer Hogg, 1961 Woolley, 1961*II* Woolley and Dickens, 1962 Aller, 1962*IIbc* Arp, 1962 Fernie, 1962 King, 1962 Kinman, 1962*II* Rosino, 1962*I* Sandage, 1962 Sawyer Hogg.

See also: 5053 1949 Rosino, 7078 1955 Kholopov, 3201 1956 Kreiken, 5272 1956 Kreiken, 5904 1956 Kreiken, 7078 1959 Bronkalla, 5272 1959 Oort and van Kerk, 7078 1961 King.

NGC 5272 (Messier 3) α 13^h 39^{m}9, δ + 28° 38′ l^{II}42°.24, b^{II} + 78°.70

1922 Graff, K. Ueber sekundäre Wellen in den Lichtkurven der Sterne vom δ Cephei-typus. *A. N.*, v. 217, p. 310.

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NGC 5272 (cont'd)

1956 van den Bergh, 1956 Haselgrove and Hoyle, 1956 Kourganoff, 1956*cd* Morgan, 1956*ab* Schmidt, 1957 van den Bergh, 1957 Ferrari d'Occhieppo, 1957*I*, *II* von Hoerner, 1957 Kholopov, 1957 Rosino, 1957*I*, *II* Sandage, 1957 Seljach, 1957 Stohl, 1958 Alter, Ruprecht, Vanýsek, 1958*abcdefghijkl* Arp, 1958*abc* Burbidge and Burbidge, 1958 Burbidge and Sandage, 1958 Heckmann, 1958 Kholopov, 1958*I*, *II* Kinman, 1958*c* Ledoux and Walraven, 1958 Maffei (photo), 1958*I*, *II* Sandage, 1958 Saurer, 1958*Idefh*, *II* Sawyer Hogg, 1958 Vandekerkhove, 1958 Wallerstein, 1959 van Agt and Oosterhoff, 1959*abcd* Arp, 1959 Baum, 1959 Dzigvashvili, 1959*Id*, *IIaghij* Kinman, 1959 Kraft, Camp, Hughes, 1959 Kurochkin, 1959 Matsunami *et al.*, 1959*bd* Morgan, 1959 Payne-Gaposchkin, 1959 Preston, 1959 Preston and Spinrad, 1959 Sandage, 1959*Iefghiklmnp*, *IIac*, *III* Sawyer Hogg, 1959 Spinrad, 1959 Struve, 1959 Wallerstein, 1959 Wilson, 1960*abcd* Burbidge, 1960 Eggen, 1960*II*, *III* Hodge, 1960 Johnson, 1960*abcdfgijk* Kron and Mayall, 1960 Kurth, 1960 Pavlovskaya, 1960*bfgh* Roberts, 1960 Sandage and Eggen, 1960 Sandage and Wallerstein, 1960*acef* Wilkens, 1961 van den Bergh, 1961*b* Haffner, 1961 Hénon, 1961 Kurochkin, 1961 Lohmann, 1961 Michie, 1961 Payne-Gaposchkin, 1961 Poveda, 1961 Preston, 1961*I*, *IIb*, *III* Sawyer Hogg, 1961 Stothers and Schwarzschild, 1961 Woolley, 1961*I* Woolley and Dickens, 1962*I*, *IIac* Arp, 1962 van den Bergh and Henry, 1962 Eggen and Sandage, 1962 Fernie, 1962 King, 1962 Kumar, 1962*II* Rosino, 1962*I*, *II* Sandage, 1962 Sawyer Hogg, 1962 Struve.

See also: 5053 1949 Rosino, 6341 1953 Arp, Baum, Sandage, 6205 1954 Baum, 6838 1954 Becker, 6205 1954 Savedoff, 6341 1954 Tayler, 6205 1955 Brown, 7078 1955 Kholopov, 4147 1955 Sandage and Walker, 6838 1956 Artjuchina, Pal 4 1956 van den Bergh, 6121 1956 Kholopov, 3201 1956 Kreiken, 6205 1956 Savedoff, 5024 1957 Cuffey, 7078 1957 Izsak, 5024 1958 Cuffey, 104 1958 Thackeray, 5904 1958 Wallerstein, 6656 1959 Arp and Melbourne, 7078 1959 Bronkalla, 5139 1959 Belserene, 5904 1959 Wallerstein, 5904 1960 Epstein, 104 1960 Feast and Thackeray, 7492 1961 Cuffey, 6121 1961 Idlis, 6838 1961 Stephenson, 104 1961 Wildey, 6205 1962 King, 6356 1962 Wallerstein.

NGC 5286 $\alpha\ 13^h\ 43^m.0,\ \delta\ -51°\ 07'$ $l^{II}311°.57,\ b^{II}+10°.58$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*I*, *IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959*Iad*, *IIbi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*ad* Wilkens, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 5466 $\alpha\ 14^h03^m.2,\ \delta\ +28°\ 46'$ $l^{II}42°.13,\ b^{II}+73°.59$

1959 Kukarkin, B. V. On five variable stars near globular cluster NGC 5466. *Var. Stars* (Russ.), v. 12, no. 1, pp. 50–52.

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See also: Pal 5 1951 Rosino, 5024 1958 Cuffey, 7492 1961 Cuffey.

NGC 5634 $\alpha\ 14^h\ 27^m.0,\ \delta\ -05°\ 45'$ $l^{II}342°.22,\ b^{II}\ +49°.26$

1915 Knox Shaw, 1915 Stone, 1921*I* Gregory, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948 Fehrenbach, 1948 Perek, 1948*I* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1953*d* Rosino, 1954 Blamont, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*c* Baum, 1956 van den Bergh, 1956*b* Schmidt, 1957 Shapley, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 van Agt and Oosterhoff, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acfhik* Kron and Mayall, 1960 Kurth, 1960*acf* Wilkens, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 5694 $\alpha\ 14^h36^m.7,\ \delta\ -26°\ 19'$ $l^{II}331°.06,\ b^{II}\ +30°.37$

1915 Stone, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*a* Perek, 1949*acde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*d* Rosino, 1954 Perek, 1954*I* Zagar, 1955 von Hoerner, 1955*I*, *IIbd* Sawyer, 1956*c* Baum, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dzigvashvili, 1959*Id*, *IIi*, *III* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960*acf* Wilkens, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

IC 4499 $\alpha\ 14^h\ 52^m.7,\ \delta\ -82°\ 02'$ $l^{II}307°.36,\ b^{II}\ -20°.50$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1949*b* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*c* Baum, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens.

NGC 5824 $\alpha\ 15^h\ 00^m.9,\ \delta\ -32°\ 53'$ $l^{II}332°.55,\ b^{II}\ +22°.06$

1961 Rosino, L. New variable stars in the globular cluster NGC 5824. *A. S. P. Pub.*, v. 73, pp. 309–313, with plates; *Asiago Cont.*, no. 129.

1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1956*c* Baum, 1956*b* Schmidt, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*II* Sawyer Hogg, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960 Kurth, 1960*ad* Wilkens, 1961*I*, *III* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

Palomar 5 $\alpha\ 15^h\ 13^m.5,\ \delta\ +00°\ 05'$ $l^{II}00°.86,\ b^{II}\ +45°.87$

1951 Rosino, L. Ricerche sugli ammassi globulari. VI. L'ammasso globulare di Baade in A.R. $15^h\ 13^m\ 30^s$, E.D. $+0°\ 4'$ (1950.0). *Univ. Bologna Oss. Pub.*, v. V, no. 15.

1955 Wilson, A. G. Sculptor-type systems in the local group of galaxies. *A. S. P. Pub.*, v. 67, pp. 27–29. (Discovery).

1956 Pietra, S. Ricerche sugli ammassi globulari. XIII. Periodi e curve di luce di stelle variabili nell'ammasso globulari di Baade in AR $15^h\ 13^m\ 30^s$; D $+0°\ 4'$ (1950.0). *Univ. Bologna Oss. Pub.*, v. VI, no. 16.

1956 Mannino, G. Sul periodo di due stelle variabili nell'ammasso globulare di Baade in AR $15^h\ 13^m\ 30^s$, D $+0°\ 4'$ (1950.0). *Soc. Astr. Ital. Mem.* (NS), v. 27, pp. 415–416; *Univ. Bologna Oss. Pub.*, v. 6, no. 17.

1962 Kinman, T. D., and Rosino, L. Notes on faint star clusters. *A. S. P. Pub.*, v. 74, pp. 499–506.

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NGC 5897 $\alpha\ 15^h\ 14^m.5,\ \delta\ -20°\ 50'$ $l^{II}342°.94\ b^{II}+30°.29$

1915 Knox Shaw, 1947*abd* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*d* Rosino, 1953 Sawyer, 1954 Blamont, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956*c* Baum, 1956 van den Bergh, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958 Burbidge and Sandage, 1958 Heckmann, 1958*I, II* Kinman, 1959*IIa* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acfhik* Kron and Mayall, 1960 Sandage and Wallerstein, 1960*acf* Wilkens, 1961 Hénon, 1962 Fernie, 1962 Sawyer Hogg.

NGC 5904 (Messier 5) $\alpha\ 15^h\ 16^m.0,\ \delta\ +02°\ 16'$ $l^{II}03°.86,\ b^{II}+46°.80$

1949 Sawyer, H. B. The early discovery of four globular clusters. *R. A. S. C. Jour.*, v. 43, p. 45.

1953 Kholopov, P. N. Space distribution of RR Lyrae variables in the globular clusters M 5 and NGC 3201. *Var. Stars* (Russ.), v. 9, pp. 371–378; *Ast. News Letter*, no. 82, 1956.

1955 Arp, H. C. Cepheids of period greater than one day in globular clusters. *A. J.*, v. 60, pp. 1–17.

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1957 Arp, H. C. Three color photometry of Cepheids W Virginis, M 5 Nos. 42 and 84, and M 10 Nos. 2 and 3. *A. J.*, v. 62, pp. 129–136.

1958 Reddish, V. C. Correlations in the deviations of magnitudes of stars in clusters. *Obs.*, v. 78, pp. 247–249.

1958 Wallerstein, G. Radial velocities and spectral characteristics of the population II Cepheids M 5 no. 42, M 5 no. 84 and TW Capricorni. *Ap. J.*, v. 127, pp. 583–590. (Plates of spectra).

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1960 Epstein, E. E. Test for variability of stars near the RR Lyrae gap in M 5. *Ap. J.*, v. 131, pp. 517–518; *Harv. Repr.*, no. 550.

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1961 Sandage, A. R. The ages of the open cluster NGC 188 and the globular clusters M 3, M 5, and M 13 compared with the Hubble time. *A. J.*, v. 66, p. 53.

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1928*a* Ludendorff, 1935 Walters, 1938*abc* Payne-Gaposchkin and Gaposchkin, 1946 Miczaika, 1947 Parenago, 1947*abcd* Sawyer, 1948 BAAJ, 1948 Becker, 1948 Fehrenbach (error in no.), 1948 Gamalej, 1948*b* Perek, 1948*I, II* Sawyer, 1949 Joy, 1949*abcde* Parenago, Kukarkin, Florja, 1949*acdef* Shapley, 1950*cdefg* Becker, 1950 Kurth, 1951*I, II* Kurth, 1952 Camm, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Kholopov, 1953 Lohmann, 1953*di* Rosino, 1953 Shapley and McKibben, 1954 Belserene, 1954 Bidelman, 1954 Blamont, 1954 Gingerich, 1954*a* Payne-Gaposchkin, 1954*b* Rosino,

NGC 5904 (cont'd)

1954*a* Sandage, 1954*I* Zagar, 1955*I*, *II* Arp, 1955 von Hoerner, 1955*II* Reddish, 1955*I*, *IIbcd* Sawyer, 1956*ac* Baum, 1956 van den Bergh, 1956 Kourganoff, 1956*c* Morgan, 1956*ab* Schmidt, 1957 van den Bergh, 1957 Ferrari d'Occhieppo, 1957 Kholopov, 1957 Roman, 1957 Rosino, 1957 Stohl, 1958 Alter, Ruprecht, Vanýsek, 1958*abdej* Arp, 1958 Burbidge and Sandage, 1958 Kholopov, 1958*I*, *II* Kinman, 1958 Maffei (photo), 1958*I* Sandage, 1958*Ieh*, *II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959*abcd* Arp, 1959 Dzigvashvili, 1959 Johnson, 1959*Iabd*, *IIafhij* Kinman, 1959 Kraft, Camp and Hughes, 1959 Kurochkin, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959 Preston, 1959 Sandage, 1959 *Iafikop*, *IIa*, *III* Sawyer Hogg, 1960 *abcdfgijkl* Kron and Mayall, 1960 Kurth, 1960 Pavlovskaya, 1960*bh* Roberts, 1960 Sandage and Wallerstein, 1960*acf* Wilkens, 1960 Wallerstein and Carlson, 1961 van den Bergh, 1961*ab* Haffner, 1961 Hénon, 1961 Lohmann, 1961*I*, *IIb*. *III* Sawyer Hogg, 1961 Payne-Gaposchkin, 1961 Stothers and Schwarzschild, 1962*I*, *IIabcd* Arp, 1962 Bahner, Hiltner and Kraft, 1962 van den Bergh, 1962 Fernie, 1962 Kumar, 1962*II* Rosino, 1962*I*, *II* Sandage, 1962 Sawyer Hogg, 1962 Struve.

See also: 5053 1949 Rosino, 7099 1949 Rosino, 6205 1954 Baum, 5272 1955 Kholopov, 7078 1955 Kholopov, 5272 1955 Roberts and Sandage, 3201 1956 Kreiken, 5272 1956 Kreiken, 104 1957 Gascoigne and Burr, 7078 1957 Izsak, 6656 1959 Arp and Melbourne, 7078 1959 Bronkalla, 5272 1959 Oort and van Kerk, 5272 1961 Smak, 6397 1961 Woolley *et al.*

NGC 5927 $\alpha\ 15^h\ 24^m.4,\ \delta\ -\ 50°\ 29'$ $l^{II}326°.63,\ b^{II}\ +\ 04°.86$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959*Icd*, *IIci* Kinman, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*ad* Wilkens, 1962 Fernie.

NGC 5946 $\alpha\ 15^h\ 31^m.8,\ \delta\ -\ 50°\ 30'$ $l^{II}327°.58,\ b^{II}\ +\ 04°.19$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Idp* Sawyer Hogg, 1960*ad* Wilkens.

NGC 5986 $\alpha\ 15^h\ 42^m.8,\ \delta\ -\ 37°\ 37'$ $l^{II}337°.04,\ b^{II}\ +\ 13°.28$

1962 Rosino, L. Ricerche nell'emisfero australe. III. Stelle variabili negli ammassi globulari NGC 5986, 6304, 6558, 6569, 6637 (M 69), 6681 (M 70) e zone attigue. *Soc. Astr. Ital. Mem.*, v. XXXIII, no. 4; *Asiago Cont.*, no. 132.

1935 Walters, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Kholopov, 1954 Cimino, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*b* Schmidt, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*II* Sawyer Hogg, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960 Kurth, 1960*ad* Wilkens, 1961 *III* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

Palomar 14 $\alpha\ 16^h\ 08^m.8,\ \delta\ +\ 15°\ 05'$ $l^{II}28°.77,\ b^{II}\ +\ 42°.15$

1959 Arp, H. C. The absolute magnitudes, colors, and metal abundances of stars in globular clusters. *A. J.*, v. 64, pp. 441–447. (Page 446, position of new globular cluster discovered by van den Bergh.)

1960 Arp, H., and van den Bergh, S. A new faint globular cluster. *A. S. P. Pub.*, v. 72, p. 48, with print.

1961*b* Haffner.

NGC 6093 (Messier 80) $\alpha\ 16^h\ 14^m1,\ \delta\ -22°\ 52'$ $l^{II}352°.67,\ b^{II}+19°.45$

1961 Eggen, O. J. Three colour photometry of red variables. *Roy. Obs. Bull.*, no. 29.

1928*b* Ludendorff, 1941 Merrill, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1948*I, II* Sawyer, 1949 Joy, 1949*abde* Parenago, Kukarkin, Florja, 1950*eg* Becker, 1951*b* Payne-Gaposchkin, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1953*i* Rosino, 1953 Shapley and McKibben, 1954 Bidelman, 1954 Blamont, 1954 Gingerich, 1954*b* Payne-Gaposchkin, 1954*b* Rosino, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956 van den Bergh, 1956 Kreiken, 1956*ab* Schmidt, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958*I, II* Kinman, 1958 Maffei (photo), 1958*II* Sawyer Hogg, 1959 Dzigvashvili, 1959*Id, IIai* Kinman, 1959 Matsunami *et al.*, 1959*Iip, IId* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960*acf* Wilkens, 1961 Hénon, 1961*I, III* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6101 $\alpha\ 16^h\ 20^m0,\ \delta\ -72°\ 06'$ $l^{II}317°.73,\ b^{II}-15°.83$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I, II* Kinman, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens, 1962 Fernie.

NGC 6121 (Messier 4) $\alpha\ 16^h\ 20^m6,\ \delta\ -26°\ 24'$ $l^{II}350°.99,\ b^{II}+15°.97$

1949 Sawyer, H. B. The early discovery of four globular clusters. *R. A. S. C. Jour.*, v. 43, p. 45.

1956 Kholopov, P. N. Spatial distribution of stars of various types in the globular cluster M 4. *A. J. UdSSR*, v. 33, p. 46.

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1961 Idlis, G. M. A confirmation of the presence of a diffuse medium in globular stellar clusters. *A. J. UdSSR*, v. 38, p. 184; *Soviet Astronomy AJ*, v. 5, no. 1, pp. 135–136.

1963 Hoffmeister, C. Veränderliche Sterne am Südhimmel. *Sonneberg Veröff.*, v. 6, no. 1, p. 7.

1943 Payne-Gaposchkin, Brenton, Gaposchkin, 1946 Miczaika, 1947*abcd* Sawyer, 1948 King, 1948 Maitre, 1948*I* Sawyer, 1949 Gialanella, 1949 Joy, 1949*abde* Parenago, Kukarkin, Florja, 1949*dfg* Shapley, 1950*dfg* Becker, 1950 Kurth, 1951*I, II* Kurth, 1952*Iabcd, IIIc* Lohmann, 1953 Dreyer, 1953 Kholopov, 1953 Lohmann, 1953*ij* Rosino, 1953 Shapley and McKibben, 1954 Blamont, 1954 Gingerich, 1954*a* Payne-Gaposchkin, 1954*a* Rosino, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1956*b* Baum, 1956 van den Bergh, 1956*a* Schmidt, 1957 van den Bergh, 1957*II* von Hoerner, 1957 Kholopov, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958*e* Arp, 1958 Heckmann, 1958 Kholopov, 1958*I, II* Kinman, 1958 Maffei (photo), 1958*I* Sandage, 1958*II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959*Iabd, IIad* Kinman, 1959 Kurochkin, 1959 Matsunami *et al.*, 1959 Preston, 1959*Idkip* Sawyer Hogg, 1960 Gingerich, 1960*acfik* Kron and Mayall, 1960*a* Roberts, 1960*acf* Wilkens, 1961 van den Bergh, 1961*b* Haffner, 1961 Hénon, 1961 Payne-Gaposchkin, 1961 *I, III* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

See also: 5272 1953 Sandage, 5272 1955 Kholopov, 7078 1955 Kholopov.

NGC 6139 $\alpha\ 16^h\ 24^m3,\ \delta\ -38°\ 44'$ $l^{II}342°.37,\ b^{II}+06°.94$

1921*II* Gregory, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1958*I, II* Kinman, 1959*Iacd, IIci* Kinman, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*ad* Wilkens, 1962 Fernie.

NGC 6144 $\alpha\ 16^h\ 24^m.2,\ \delta\ -25°\ 56'$ $l^{II}351°.92,\ b^{II}\ +15°.68$

1947*abd* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*f* Rosino, 1953 Sawyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958 Maffei (photo), 1959 Matsunami *et al.*, 1959*IIp* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960*ad* Wilkens, 1962 Sawyer Hogg.

NGC 6171 (Messier 107) $\alpha\ 16^h\ 29^m.7,\ \delta\ -12°\ 57'$ $l^{II}03°.37,\ b^{II}\ +23°.02$

1948 Sawyer, H. B. Méchain's additions to Messier's catalogue. *A. J.*, v. 53, p. 117.

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1961 van Agt, S. L. Th. Pseudo-colour-magnitude diagram of the globular cluster NGC 6171. *B. A. N.*, v. 15, no. 508, pp. 327–329, with plate.

1961 Kukarkin, B. V. A study of variable stars in the globular cluster NGC 6171. *Var. Stars* (Russ.), v. 13, no. 6, pp. 384–389.

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1947 Parenago, 1947*abcd* Sawyer, 1948 BAAJ, 1948 Becker, 1948 Fehrenbach, 1948*b* Perek. 1948*I* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956*c* Baum, 1956*ab* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I, II* Kinman, 1959*Id, IIi* Kinman, 1959 Matsunami *et al.*, 1959*Idip, III* Sawyer Hogg, 1960*acdefik* Kron and Mayall, 1960 Kurth, 1960*bd* Roberts, 1960*acef* Wilkens, 1961 Hénon, 1961 Lohmann, 1961*I, III* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6205 (Messier 13) $\alpha\ 16^h\ 39^m.9,\ \delta\ +36°\ 33'$ $l^{II}59°.00,\ b^{II}\ +40°.91$

1922 Lindblad, B. Spectrophotometric methods for determining stellar luminosity. *Ap. J.*, v. 55, pp. 85–118; *Mt. W. Cont.*, no. 228.

1947 Lohmann, W. Die Masse der kugelförmigen Sternhaufen M 3 und M 13. *Z. f. Naturforschung*, v. 2a, p. 477; *Königstuhl-Heidelberg Mitt.*, no. 49.

1950 Vandekerkhove, E. Etude d'amas résultants. *Obs. Roy. Belgique Comm.*, no. 18, pp. 23–26.

1952 Fatchikin, N. V. Determination of the proper motion of the globular cluster M 13. *Pulkova Bull.*, v. 19, pp. 150–154.

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1955 Baum, W. A. Counting photons one by one. *Sky and Tel.*, v. 14, p. 334. (Photo and key to sequence for M 13).

1955 Brown, A. Color-magnitude array for stars in the globular cluster M 13. *Ap. J.*, v. 122, pp. 146–170; *McDonald Cont.*, no. 256.

NGC 6205 (cont'd)

1957 Kron, G. E. Star clusters, in and out of the galaxy. *A. S. P. Leaflet*, no. 339, with photo.

1959 Baum, W. A., Hiltner, W. A., Johnson, H. L., and Sandage, A. The main sequence of the globular cluster M 13. *Ap. J.*, v. 130, pp. 749–763 with plate.

1959 Eggen, O. J., and Sandage, A. R. Stellar groups. IV. The Groombridge 1830 group of high velocity stars and its relation to the globular clusters. *M. N.*, v. 119, pp. 255–277.

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1959 Iriarte, B. Photoelectric photometry of faint blue stars. *Lowell Bull.*, no. 101, v. 4, pp. 130–135.

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1962 King, I. The distribution of blue stars in M 13. *Ap. J.*, v. 136, pp. 784–787.

1962 Sandage, A. The ages of M 67, NGC 188, M 3, M 5, and M 13 according to Hoyle's 1959 models. *Ap. J.*, v. 135, pp. 349–365.

1789 Wollaston, 1928*a* Ludendorff, 1935 Walters, 1936 Kuiper, 1947 Fricke, 1947 Parenago, 1947*abcd* Sawyer, 1948 BAAJ, 1948 Becker, 1948 Fehrenbach, 1948 Gamalej, 1948 King, 1948 Maitre, 1948*b* Perek, 1948*I, II* Sawyer, 1949 Joy, 1949 *abcde* Parenago, Kukarkin, Florja, 1949*acdeg* Shapley, 1950*a* (photo) *cdef* Becker, 1950 Kurth, 1950 Stebbins, 1951*I, II* Kurth, 1951*b* Payne-Gaposchkin, 1952 Baade, 1952 Camm, 1952*Iabcd, IIIab* Lohmann, 1953*a* Deutsch, 1953 Dreyer, 1953 Gingerich (plate), 1953 Kholopov, 1953 Lohmann, 1953*adefhi* Rosino, 1953 Shapley and McKibben, 1954 Blamont, 1954 Cimino, 1954 Gingerich, 1954*b* Payne-Gaposchkin, 1954*b* Rosino, 1954*a* Sandage, 1954*I, II* Zagar, 1955*I, II* Arp, 1955 Baum, 1955 von Hoerner, 1955*I, II* Reddish, 1955*IIbcd* Sawyer, 1955*Ib* Struve, 1956*acd* Baum, 1956 van den Bergh, 1956 Kourganoff, 1956 Kreiken, 1956*c* Morgan, 1956 Roberts, 1956*ab* Schmidt, 1957 Ferrari d'Occhieppo, 1957 Roman, 1957 Rosino, 1957 Seljach, 1957 Stohl, 1958 Alter, Ruprecht, Vanýsek, 1958*abcefghijk* Arp, 1958 Burbidge and Sandage, 1958 Heckmann, 1958*I, II* Kinman, 1958 Maffei (photo), 1958 Náprstková, 1958*I, II* Sandage, 1958 Saurer (photo), 1958*Iei, II* Sawyer Hogg, 1958 Vandekerkhove, 1958 Wallerstein, 1959 van Agt and Oosterhoff, 1959*abcd* Arp, 1959 Baum, 1959 Dzigvashvili, 1959 Johnson, 1959*Id, IIafghij* Kinman, 1959 Kraft, Camp and Hughes, 1959 Matsunami *et al.*, 1959*bd* Morgan, 1959 Sandage, 1959*Iabefhijklp, III* Sawyer Hogg, 1959 Struve, 1959 Wallerstein, 1960*c* Burbidge, 1960 Chalonge, 1960 Eggen, 1960 Johnson, 1960 Kron, 1960*abcdfgijkl* Kron and Mayall, 1960 Kurth, 1960 Markarian, 1960*abcdefh* Roberts, 1960 Sandage and Wallerstein, 1960 Wallerstein and Carlson, 1960*acf* Wilkens, 1961 van den Bergh, 1961*ab* Haffner, 1961 Hénon, 1961 Kurochkin, 1961 Lohmann, 1961*I, IIb, III* Sawyer Hogg, 1961 Slettebak, Bahner and Stock, 1961 Stothers and Schwarzschild, 1962*I, IIabcd* Arp, 1962 van den Bergh and Henry, 1962 Eggen and Sandage, 1962 Fernie, 1962 King, 1962*II* Rosino, 1962*I, II* Sandage, 1962 Sawyer Hogg, 1962 Struve.

See also: 5273 1953 Sandage and Wallerstein, 5272 1954 Sandage, 5272 1956 Baker and Baker, 5272 1957 Johnson, 5904 1958 Wallerstein, 6656 1959 Arp and Melbourne, 5139 1959 Belserene, 6356 1959 Sandage and Wallerstein, 104 1960 Feast and Thackeray, 6121 1961 Idlis, 7078 1961 King, 5272 1961 Smak, 6522 1961 Whitford, 6397 1961 Woolley *et al.*, 6356 1962 Wallerstein.

NGC 6218 (Messier 12) α 16^h 44^{m}6, δ − 01° 52′ l^{II}15°.70, b^{II} + 26°.32

1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948 Fehrenbach, 1948*b* Perek, 1948*I* Sawyer, 1949 Joy, 1949*abde* Parenago, Kukarkin, Florja, 1949*ace* Shapley, 1950*dg* Becker, 1951*b* Payne-Gaposchkin, 1952 *Iabcd* Lohmann, 1953 Dreyer, 1953 Kholopov, 1953*d* Rosino, 1953 Shapley and McKibben, 1954 Bidelman, 1954 Blamont, 1954 Gingerich, 1954*b* Payne-Gaposchkin, 1954 Perek, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956*c* Baum, 1956 Kreiken, 1956*ab* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIai* Kinman, 1959 Matsunami *et al.*, 1959*Iip*, *III* Sawyer Hogg, 1960*acdfikl* Kron and Mayall, 1960*acf* Wilkens, 1961*b* Haffner, 1961 Hénon, 1961 Lohmann, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6229 α 16^h 45^{m}6, δ + 47° 37′ l^{II}73°.64, b^{II} + 40°.30

1960 Mannino, G. Periodi e curve di luce di 12 stelle variabili dell' ammasso globulare NGC 6229. *Soc. Astr. Ital. Mem.*, v. XXXI, nos. 2–3; *Univ. Bologna Oss. Pub.*, v. VII, no. 13.

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NGC 6235 α 16^h 50^{m}4, δ − 22° 06′ l^{II}358°.91, b^{II} + 13°.52

1921*I* Gregory, 1944 Wallenquist and Lundby, 1947*d* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952 Johnson, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Sawyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*ad* Wilkens, 1962 Sawyer Hogg.

NGC 6254 (Messier 10) α 16^h 54^{m}5, δ − 04° 02′ l^{II}15°.13, b^{II} + 23°.07

1955 Arp, H. C. Cepheids of period greater than one day in globular clusters. *A. J.*, v. 60, pp. 1–17.

1957 Arp, H. C. Three color photometry of Cepheids W Virginis, M 5 Nos. 42 and 84, and M 10 Nos. 2 and 3. *A. J.*, v. 62, pp. 129–136.

1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1948*I* Sawyer, 1949 Joy, 1949*abde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1950*d* Becker, 1950 Kurth, 1951*I*, *II* Kurth, 1952*Iabd* Lohmann, 1953*b* Deutsch, 1953 Dreyer, 1953 Kholopov, 1953*di* Rosino, 1953 Shapley and McKibben, 1954 Bidelman, 1954 Blamont, 1954 Gingerich, 1954*b* Payne-Gaposchkin, 1954 Perek, 1954*a* Sandage, 1954*I* Zagar, 1955*I*, *II* Arp, 1955 von Hoerner, 1955*II* Reddish, 1955*IIbcd* Sawyer, 1956*ac* Baum, 1956 Kreiken, 1956*ab* Schmidt, 1957 Ferrari d'Occhieppo, 1958 Alter, Ruprecht, Vanýsek, 1958*abej* Arp, 1958 Burbidge and Sandage, 1958*I*, *II* Kinman, 1958*Ie* Sawyer Hogg, 1958 Wallerstein, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIafij* Kinman, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959*Ifip*, *III* Sawyer Hogg, 1959 Struve, 1959 Wallerstein, 1960*c* Burbidge, 1960*abcdefgijkl* Kron and Mayall, 1960*bdh* Roberts, 1960 Sandage and Wallerstein, 1960*acf* Wilkens, 1961 van den

NGC 6254 (cont'd)

Bergh, 1961*b* Haffner, 1961 Hénon, 1961 Lohmann, 1961*I* Sawyer Hogg, 1961 Slettebak, Bahner and Stock, 1962 van den Bergh and Henry, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

See also: 6205 1954 Baum, 5904 1958 Wallerstein, 6656 1959 Arp and Melbourne.

Palomar 15 α 16^h 57^m.6, δ − 00° 28′ l^{II}18°.89, b^{II} + 24°.27

1959 Bowen, I. S. Report of Mount Wilson and Palomar Observatories. *Carnegie Inst. Wash., Year Book* no. 58, p. 60. (Discovery by Zwicky).

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1962*I* Rosino.

NGC 6266 (Messier 62) α 16^h 58^m.1, δ − 30° 03′ l^{II}353°.58, b^{II} + 07°.30

1952 Kholopov, P. N. The ellipticity of globular clusters. *A. J. UdSSR*, v. 29, no. 6, pp. 671–681.

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1935 Walters, 1944 Wallenquist and Lundby, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*abde* Parenago, Kukarkin, Florja, 1949*g* Shapley, 1950*cd* Becker, 1951 Thackeray, 1952 Kholopov, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Kholopov, 1953 Lohmann, 1954 Blamont, 1954 Cimino, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1955*IIb* Struve, 1956 van den Bergh, 1956*b* Morgan, 1956*ab* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*II* Sawyer Hogg, 1959 Dzigvashvili, 1959*Iabd*, *IIbi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acdefik* Kron and Mayall, 1960*acef* Wilkens, 1961 Hénon, 1961*I*, *III* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6273 (Messier 19) α 16^h 59^m.5, δ − 26° 11′ l^{II}356°.88, b^{II} + 09°.40

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1948*I* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1950*cd* Becker, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*g* Rosino, 1954 Blamont, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1955*IIb* Struve, 1956 Kourganoff, 1956*b* Morgan, 1956*ab* Schmidt, 1957 Stohl, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*II* Sawyer Hogg, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959*Icip*, *III* Sawyer Hogg, 1960*acdfikl* Kron and Mayall, 1960*acf* Wilkens, 1961 Hénon, 1961 Lohmann, 1961*III* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

NGC 6284 α 17^h 01^m.5, δ − 24° 41′ l^{II}358°.37, b^{II} + 09°.93

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948 Perek, 1948*I* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954 Blamont, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1955*IIb* Struve, 1956*b* Morgan, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Id*, *IIi*, *III* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acdfik* Kron and Mayall, 1960 Kurth, 1960*acf* Wilkens, 1961 Hénon, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6287 α 17^h 02^m.1, δ − 22° 38′ l^{II}00°.13, b^{II} + 11°.04

1944 Walienquist and Lundby, 1947*abd* Sawyer, 1948*I* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960*acf* Wilkens, 1962 Sawyer Hogg.

NGC 6293 α 17^h 07^m.1, δ − 26° 30′ l^{II}357°.64, b^{II} + 07°.84

1915 Knox Shaw, 1921*I* Gregory, 1928*a* Ludendorff, 1944 Wallenquist and Lundby, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1948*I* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954 Blamont, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1955*IIb* Struve, 1956*b* Morgan, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIi*, *III* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acdfikl* Kron and Mayall, 1960*acf* Wilkens, 1961 Hénon, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6304 α 17^h 11^m.4, δ − 29° 24′ l^{II}355°.84, b^{II} + 05°.37

1962 Rosino, L. Ricerche astronomiche nell' emisfero australe III. Stelle variabili negli ammassi globulari NGC 5986, 6304, 6558, 6569, 6637 (M 69), 6681 (M 70) e zone attigue. *Soc. Astr. Ital. Mem.*, v. XXXIII, no. 4; *Asiago Cont.*, no. 132.

1921*II* Gregory, 1944 Wallenquist and Lundby, 1947 Parenago, 1947 *abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954 Blamont, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1955*IIb* Struve, 1956*b* Baum, 1956*a* Morgan, 1956*b* Schmidt, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*II* Sawyer Hogg, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*c* Morgan, 1959*Igp* Sawyer Hogg, 1960*acdfikl* Kron and Mayall, 1960*ad* Wilkens, 1961*III* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6316 α 17^h 13^m.4, δ − 28° 05′ l^{II}357°.17, b^{II} + 05°.78

1944 Wallenquist and Lundby, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1955*IIb* Struve, 1956*b* Baum, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dufay and Bigay, 1959 Johnson, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*acfikl* Kron and Mayall, 1960*ad* Wilkens, 1962 Fernie.

See also: HP 1954 Dufay, Berthier, Morignet.

NGC 6325 α 17^h 15^m.0, δ − 23° 42′ l^{II}00°.98, b^{II} + 07°.99

1921*II* Gregory, 1944 Wallenquist and Lundby, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Ip* Sawyer, 1960*acfik* Kron and Mayall, 1960*ad* Wilkens.

NGC 6333 (Messier 9) α 17^h 16^m.2, δ − 18° 28′ l^{II}05°.53, b^{II} + 10°.72

1948 Sawyer, H. B. Variable stars in the globular cluster Messier 9. *A. J.*, v. 53, p. 203; Summ., *Sky and Tel.*, v. 7, p. 149, 1948; *B. A. A. Jour.*, v. 58, p. 196, 1948; *Pop. A. Tids.*, v. 29, pp. 169–170, 1948.

1951 Sawyer, H. B. Periods of variable stars in the globular cluster Messier 9. *Dunlap Pub.*, v. 1, no. 24.

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948 Fehrenbach, 1948*b* Perek, 1948*I* Sawyer, 1949*abde* Parenago, Kukarkin, Florja,

NGC 6333 (cont'd)

1949*d* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1954 Blamont, 1954 Gingerich, 1954 Perek, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956 van den Bergh, 1956 Kreiken, 1956*b* Morgan, 1956*ab* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 van Agt and Oosterhoff, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acdfik* Kron and Mayall, 1960*acf* Wilkens, 1961 Hénon, 1961 Lohmann, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6341 (Messier 92) $\alpha\ 17^h\ 15^m.6$, $\delta + 43°\ 12'$ $l^{II} 68°.35$, $b^{II} + 34°.86$

1947 von der Pahlen, E. Ueber die Entstehung der sphärischen Sternhaufen. *Z. f. Ap.*, v. 24, pp. 68–120; *Astrophys. Obs. Potsdam Mitt.*, no. 18.

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1955 Schwarzschild, M., and Bernstein, S. Note on the mass of M 92. *Ap. J.*, v. 122, pp. 200–202.

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1961 Preston, G. W. Low-dispersion spectra of RR Lyrae stars in globular clusters. *Ap. J.*, v. 134, no. 2, pp. 651–652; *Lick Cont.*, no. 119.

1928*a* Ludendorff, 1946 Vogt, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948 Gamalej, 1948 King, 1948*b* Perek, 1948*I* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1950*dfg* Becker, 1950 Stebbins, 1952 Baade, 1952 Camm, 1952*Iabd*, *IIIa* Lohmann, 1953*a* Deutsch, 1953 Dreyer, 1953 Kholopov, 1953 Lohmann, 1953*dj* Rosino, 1954 Becker, 1954 Blamont, 1954 Gingerich, 1954*a* Payne-Gaposchkin, 1954*b* Rosino, 1954*acd* Sandage, 1954 Schwarzschild, 1954*I* Zagar, 1955*II* Arp, 1955 von Hoerner, 1955 Hoyle and Schwarzschild, 1955*I* Reddish, 1955*IIbcd* Sawyer, 1956*acd* Baum, 1956 van den Bergh, 1956 Kourganoff, 1956*c* Morgan, 1956 Roberts, 1956*ab* Schmidt, 1957 van den Bergh, 1957*I*, *II* von Hoerner, 1957 Roman, 1958 Alter, Ruprecht, Vanýsek, 1958*abdefgil* Arp, 1958*ab* Burbidge and Burbidge, 1958 Burbidge and Sandage, 1958*I*, *II* Kinman, 1958 Náprstková, 1958*I*, *II* Sandage, 1958 Saurer, 1958*Ief*, *II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959*ac* Arp, 1959 Baum, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIafgij* Kinman, 1959 Matsunami *et al.*, 1959*abd* Morgan, 1959*Ifhiklmop*, *III* Sawyer Hogg, 1959 Spinrad, 1960 Bowen, 1960*abc* Burbidge, 1960 Ebert, von Hoerner, Temesváry, 1960 Kron, 1960*abcdfgijkl* Kron and Mayall, 1960 Kurth, 1960 Markarian, 1960*b*

NGC 6341 (cont'd)

Roberts, 1960 Sandage and Eggen, 1960 Sandage and Wallerstein, 1960*acf* Wilkens, 1961 van den Bergh, 1961*ab* Haffner, 1961 Lohmann, 1961 Payne-Gaposchkin, 1961 Poveda, 1961*I, III* Sawyer Hogg, 1961 Slettebak, Bahner and Stock, 1961 Woolley, 1961*I* Woolley and Dickens, 1962*I* Arp, 1962 van den Bergh and Henry, 1962 Eggen and Sandage, 1962 Fernie, 1962 King, 1962*II* Rosino, 1962 Sawyer Hogg.

See also: 5272 1947 Lohmann, 6205 1954 Baum, 6838 1954 Becker, 5272 1954 Sandage, 6205 1954 Savedoff, 6205 1955 Brown, 4147 1955 Sandage and Walker, 5272 1956 Johnson and Sandage, 6205 1956 Savedoff, 104 1957 Gascoigne and Burr, 7078 1957 Izsak, 104 1958 Thackeray, 6356 1959 Sandage and Wallerstein, 104 1960 Feast and Thackeray, 6522 1961 Whitford, 104 1961 Wildey, 6712 1962 Smith and Sandage, 6356 1962 Wallerstein.

NGC 6342 α 17^h 18^m.2, δ − 19° 32′ l^{II}04°.90, b^{II} + 09°.73

1921*II* Gregory, 1944 Wallenquist and Lundby, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960 *acfik* Kron and Mayall, 1960*ad* Wilkens.

NGC 6352 α 17^h 21^m.6, δ − 48° 26′ l^{II}341°.37, b^{II} − 07°.19

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I, II* Kinman, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens, 1962 Fernie.

NGC 6355 α 17^h 20^m.9, δ − 26° 19′ l^{II}359°.58, b^{II} + 05°.42

1915 Knox Shaw, 1921*I* Gregory, 1947*abd* Sawyer, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*b* Baum, 1958 Alter, Ruprecht, Vanýsek, 1959*Ip* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960*ad* Wilkens.

NGC 6356 α 17^h 20^m.7, δ − 17° 46′ l^{II}06°.73, b^{II} + 10°.21

1959 Sandage, A., and Wallerstein, G. The color-magnitude diagram of the nuclear globular cluster NGC 6356 compared with halo clusters. *A. J.*, v. 64, p. 345.

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1944 Wallenquist and Lundby, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948 Fehrenbach, 1948*b* Perek, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Sawyer, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*acd* Morgan, 1956*ab* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958 Burbidge and Sandage, 1958 Heckmann, 1958*I, II* Kinman, 1958*Ifg* Sawyer Hogg, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Id, IIhi, III* Kinman, 1959*a* Larsson-Leander, 1959 Matsunami *et al.*, 1959*abc* Morgan, 1959 Preston, 1959*Ic* (photo) *gip, III* Sawyer Hogg, 1959*b* Thackeray, 1960 Bowen, 1960*I* Hodge, 1960*acdfikn* Kron and Mayall, 1960 Sandage and Eggen, 1960*acf* Wilkens, 1961 van den Bergh, 1961*a* Haffner, 1961 Hénon, 1961 Preston, 1961*I, IIab* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

See also: 104 1961 Wildey, 6712 1962 Smith and Sandage.

Haute Provence 1 α 17^h 24^m.9, δ − 29° 57′ l^{II}357°.06, b^{II} + 02°.65

1954 Dufay, J., Berthier, P., and Morignet, B. Un nouvel amas globulaire dans la région du centre de la Voie Lactée. *C. R. Acad. Sci. Fr.*, v. 239, pp. 478–480; *Haute-Provence Pub.*, v. 3, no. 17.

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1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1959 Dufay and Bigay, 1959*Ip* Sawyer Hogg.

NGC 6362 α 17^h 26^m.6, δ − 67° 01′ l^{II}325°.54, b^{II} − 17°.56

1961 van Agt, S. L. Th. New variable stars in the southern globular cluster NGC 6362. *B. A. N.*, v. 15, no. 508, pp. 329–330.

1961 Van Hoof, A. Elements for fifteen variables in the globular cluster NGC 6362. *Lab. d'Astr. et Géod. Univ. Louvain Pub.*, no. 126, pp. 1–5.

1928*a* Ludendorff, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1951 Thackeray, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956 van den Bergh, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959*Iad*, *IIa* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*bcg* Wilkens, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Rosino and Sawyer Hogg, 1962 Sawyer Hogg.

NGC 6366 α 17^h 25^m.1, δ − 05° 02′ l^{II}18°.42, b^{II} + 16°.03

1959 Dufay, J. Sur la région centrale de la galaxie. *C. R., Acad Sci. Fr.*, v. 248, p. 647; *Haute-Provence Pub.*, v. 4, no. 35.

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1921*I* Gregory, 1947*abd* Sawyer, 1948*I* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Iip*, *III* Sawyer Hogg, 1960*acf* Wilkens, 1962 Sawyer Hogg.

NGC 6380 α 17^h 31^m.9, δ − 39° 02′ l^{II}350°.28, b^{II} − 03°.56

1847 Herschel, J. F. W. Results of astronomical observations at the Cape of Good Hope. 4°. Chap. 1. Of the nebulae of the southern hemisphere. (JH 3688; drawing, Plate VI, fig. 18.)

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1912 Knox Shaw, 1953 Dreyer, 1955*IIa* Sawyer, 1958 Heckmann, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens.

NGC 6388 α 17^h 32^m.6, δ − 44° 43′ l^{II}345°.54, b^{II} − 06°.74

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I, II* Kinman, 1959*Iad, IIbi* Kinman, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens, 1962 Fernie.

Tonantzintla 2 α 17^h 32^m.7, δ − 38° 32′ l^{II}350°.79, b^{II} − 03°.42

1959 Pismis, P. New southern star clusters. *Tonantzintla and Tacubaya Bull.*, no. 18, pp. 37–38.

1962 Perek, L. *Private communication.* Correction +20′ to declination first published.

NGC 6397 α 17^h 36^m.8, δ − 53° 39′ l^{II}338°.18, b^{II} − 11°.98

1952 Swope, H., and Greenbaum, I. A study of the magnitudes and colors of the globular cluster NGC 6397. *A. J.*, v. 57, pp. 83–91.

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1961 Woolley, R. v.d. R. Globular clusters. *Obs.*, v. 81, no. 924, pp. 161–182.

1928*b* Ludendorff, 1947*abd* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1949*a* Shapley, 1951*d* Payne-Gaposchkin, 1952 Baade, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953*j* Rosino, 1954*a* Payne-Gaposchkin, 1954*a* Rosino, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1956*b* Baum, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1958*I, II* Kinman, 1958*II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959*Iad, IIabdi* Kinman, 1959 Matsunami *et al.*, 1959*Ifip* Sawyer, 1960*bcg* Wilkens, 1961*a* Haffner, 1961*I* Sawyer Hogg, 1962*IIe* Arp, 1962*I* Sandage, 1962 Sawyer Hogg.
See also: 5272 1953 Sandage, 6205 1962 King.

NGC 6401 α 17^h 35^m.6, δ − 23° 53′ l^{II}03°.45, b^{II} + 03°.97

1912 Knox Shaw, 1947*abd* Sawyer, 1948*I* Sawyer, 1953 Dreyer, 1954*I* Zagar, 1955 *IIa* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959*Ip* Sawyer Hogg, 1960*acefhikm* Kron and Mayall, 1960*ad* Wilkens,

NGC 6402 (Messier 14) α 17^h 35^m.0, δ − 03° 15′ l^{II}21°.30, b^{II} + 14°.78

1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948 Fehrenbach, 1948*b* Perek, 1948*I* Sawyer, 1949 Joy, 1949*abde* Parenago, Kukarkin, Florja, 1949*d* Shapley, 1950 Kurth, 1951*II* Kurth, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1953 Shapley and McKibben, 1954 Bidelman, 1954 Gingerich, 1954 Perek, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956 van den Bergh, 1956*ab* Schmidt, 1957 van den Bergh, 1957 Kholopov, 1958 Alter, Ruprecht, Vanýsek, 1958 Kholopov, 1958*I, II* Kinman, 1958*II* Sawyer Hogg, 1959 Dzigvashvili, 1959 Johnson, 1959*Id, IIi* Kinman, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959*Iip* Sawyer Hogg, 1960*abcfikl* Kron and Mayall, 1960*bd* Roberts, 1960*acf* Wilkens, 1961 Hénon, 1961 Lohmann, 1961*I, III* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

Palomar 6 α 17^h 40^m.6, δ − 26° 12′ l^{II}02°.09, b^{II} + 01°.78

1955 Abell, G. O. Globular clusters and planetary nebulae discovered on the National Geographic Society-Palomar Observatory sky survey. *A. S. P. Pub.*, v. 67, pp. 258–261. (Discovery by Abell).

1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1959*Ip* Sawyer Hogg.

NGC 6426 $\alpha\ 17^h\ 42^m.4,\ \delta + 03°\ 12'$ $l^{II}28°.07,\ b^{II} + 16°.28$

1958 Grubissich, C. L'ammasso globulare NGC 6426 e i suoi dintorni. *Asiago Cont.*, no. 94.

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956 van den Bergh, 1958 Alter, Ruprecht, Vanýsek, 1958*II* Sawyer Hogg, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acfhik* Kron and Mayall, 1960*acf* Wilkens, 1961*I*, *III* Sawyer Hogg, 1962 Sawyer Hogg.

NGC 6440 $\alpha\ 17^h\ 45^m.9,\ \delta - 20°\ 21'$ $l^{II}07°.72,\ b^{II} + 03°.80$

1915 Stone, 1921*II* Gregory, 1944 Wallenquist and Lundby, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1950 Stebbins, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1956*ac* Morgan, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958 Burbidge and Sandage, 1958*I*, *II* Kinman, 1958*If* Sawyer Hogg, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*bc* Morgan, 1959*Igp* Sawyer Hogg, 1960 Kron, 1960*acdefik* Kron and Mayall, 1960 Kurth, 1960*ad* Wilkens, 1962 Fernie, 1962*II* Rosino.

NGC 6441 $\alpha\ 17^h\ 46^m.8,\ \delta - 37°\ 02'$ $l^{II}353°.53,\ b^{II} - 05°.00$

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1956*a* Morgan, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*c* Morgan, 1959*Igp* Sawyer Hogg, 1960*d* Kron and Mayall, 1960*bd* Wilkens, 1962 Fernie.

NGC 6453 $\alpha\ 17^h\ 48^m.0,\ \delta - 34°\ 37'$ $l^{II}355°.74,\ b^{II} - 03°.97$

1944 Wallenquist and Lundby, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*b* Baum, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*acefhikm* Kron and Mayall, 1960*bd* Wilkens.

NGC 6496 $\alpha\ 17^h\ 55^m.5,\ \delta - 44°\ 15'$ $l^{II}348°.08,\ b^{II} - 10°.01$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens.

NGC 6517 $\alpha\ 17^h\ 59^m.1,\ \delta - 08°\ 57'$ $l^{II}19°.23,\ b^{II} + 06°.77$

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1950*b* Becker, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959 Dufay and Bigay, 1959 Johnson, 1959 Matsunami *et al.*, 1959*Idp*, *III* Sawyer Hogg, 1960*acfikl* Kron and Mayall, 1960*ad* Wilkens.

NGC 6522 $\alpha\ 18^h\ 00^m.4,\ \delta - 30°\ 02'$ $l^{II}01°.03,\ b^{II} - 03°.93$

1949 Gaposchkin, S. New variables in NGC 6522. *A. J.*, v. 54, no. 7, p. 185.

1951 Baade, W. Galaxies—present day problems. *Univ. Mich. Obs. Pub.*, v. X, pp. 7–17. (Four cluster type variables in 6522).

1954 Nassau, J. J., Blanco, V. M., McCuskey, S. W. M stars in the vicinity of NGC 6522. *A. J.*, v. 59, p. 334 (title only).

1955 Gaposchkin, S. 285 variable stars in the region of the galactic nucleus. *Ast. Circ.* (Russ.), v. 10, pp. 337–381, with print.

NGC 6522 (cont'd)

1958 Nassau, J. J., and Blanco, V. M. M-type stars and red variables in the galactic center. (Plates.) *Ap. J.*, v. 128, pp. 46–56; Summ., *A. J.*, v. 63, p. 383.

1959 Dufay, J. Sur la région centrale de la galaxie. *C. R., Acad. Sci. Fr.*, v. 248, p. 647; *Haute-Provence Pub.*, v. 4, no. 35.

1960 Dufay, J. La condensation centrale de la galaxie. *Ann. d'Ap.*, v. 23, pp. 451–464; *Haute-Provence Pub.*, v. V, no. 5.

1960 Pavlovskaya, E. D. The periods of short-period Cepheids in the direction to the galactic nucleus. *Var. Stars* (Russ.), v. 13, no. 1, pp. 8–25.

1961 Pavlovskaya, E. D. RR Lyrae variables in the direction of the galactic centre. *Obs.*, v. 81, no. 922, p. 107.

1961 Weaver, H. The scale of the galaxy: a symposium. I. Introduction. *A. S. P. Pub.*, v. 73, pp. 88–94.

1961 Whitford, A. E. The distance to the galactic center from the photometry of objects in the nuclear region. *A. S. P. Pub.*, v. 73, pp. 94–98.

1921*I* Gregory, 1944 Wallenquist and Lundby, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabcd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1956*b* Baum, 1956*bc* Morgan, 1958 Alter, Ruprecht, Vanýsek, 1958 Burbidge and Sandage, 1958*I*, *II* Kinman, 1959 van Agt and Oosterhoff, 1959 Dufay and Bigay, 1959 Johnson, 1959 Kron and Mayall, 1959*a* Larsson-Leander, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959 Preston, 1959*Iip* Sawyer Hogg, 1960*acefiklmn* Kron and Mayall, 1960 Morgan, 1960*bcg* Wilkens, 1961*a* Haffner, 1961 *I*, *III* Sawyer Hogg, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

See also: 6656 1959 Arp.

NGC 6528 $\alpha\ 18^h\ 01^m.6$, $\delta\ -30°\ 04'$ $l^{II}01°.13$, $b^{II}\ -04°.17$

1955 Gaposchkin, S. 285 variable stars in the region of the galactic nucleus. *Ast. Circ.* (Russ.), v. 10, pp. 337–381, with print.

1921*I* Gregory, 1944 Wallenquist and Lundby, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*I*, *IIbd* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959 Dufay and Bigay, 1959 Matsunami *et al.*, 1959*abc* Morgan, 1959*Iip* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960 Morgan, 1960*bcg* Wilkens, 1961*b* Haffner, 1961*I*, *IIb*, *III* Sawyer Hogg, 1962*II* Rosino, 1962 Sawyer Hogg.

NGC 6535 $\alpha\ 18^h\ 01^m.3$, $\delta\ -00°\ 18'$ $l^{II}27°.18$, $b^{II}\ +10°.43$

1921*I* Gregory, 1947*d* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1952 Johnson, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Sawyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959 Dufay and Bigay, 1959 Johnson, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*ad* Wilkens, 1962 Sawyer Hogg.

NGC 6539 $\alpha\ 18^h\ 02^m.1$, $\delta\ -07°\ 35'$ $l^{II}20°.80$, $b^{II}\ +06°.78$

1921*I* Gregory, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabcd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960*ad* Wilkens, 1962 Sawyer Hogg.

NGC 6541 $\alpha\ 18^h\ 04^m.4$, $\delta\ -43°\ 44'$ $l^{II}349°.28$, $b^{II}\ -11°.19$

1928*ab* Ludendorff, 1947*abd* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953*f* Rosino, 1954*I* Zagar, 1955*IIbcd* Sawyer,

NGC 6541 (cont'd)

1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*II* Sawyer Hogg, 1959*Iad*, *IIbei* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*bcg* Wilkens, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6544 α 18^h 04^{m}3, δ − 25° 01′ l^{II}05°.83, b^{II} − 02°.22

1953 Svolopoulos, S. N. A photographic survey of galactic clusters. NGC 6531, 6646, 6469, 6544, 7127, 7128. *M. N.*, v. 113, pp. 758–768.

1921*I* Gregory, 1947 Parenago, 1947*abd* Sawyer, 1948*a* Perek, 1953 Dreyer, 1954 Perek, 1954*I* Zagar, 1955*IIa* Sawyer (omitted in error), 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958 Maffei (photo), 1958*II* Sawyer Hogg, 1959*Id*, *IIi* Kinman, 1959*Ip* Sawyer Hogg, 1960*acfhik* Kron and Mayall, 1960*bd* Wilkens.

NGC 6553 α 18^h 06^{m}3, δ − 25° 56′ l^{II}05°.25, b^{II} − 03°.06

1949 Mayall, M. W. Six novae, one with a late-type spectrum. *A. J.*, v. 54, p. 191 (misprint in cluster number).

1956 Thackeray, A. D. *Private communication.* Shapley's variables 1 and 2 doubtful.

1921*I* Gregory, 1928*a* Ludendorff, 1944 Wallenquist and Lundby, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1950 Stebbins, 1951 Thackeray, 1952*Iabcd*, *IIIc* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1956*a* Schmidt, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1959 van Agt and Oosterhoff, 1959 Dufay and Bigay, 1959 Johnson, 1959 Matsunami *et al.*, 1959*abcd* Morgan, 1959*Idip*, *IId* Sawyer Hogg, 1959*b* Thackeray, 1960 Kron, 1960*acefikl* Kron and Mayall, 1960 Morgan, 1960*bcg* Wilkens, 1961*b* Haffner, 1961*I*, *IIb* Sawyer Hogg, 1962*II* Rosino, 1962 Sawyer Hogg.

NGC 6558 α 18^h 07^{m}0, δ − 31° 47′ l^{II}00°.19, b^{II} − 06°.02

1847 Herschel, J. F. W. Results of astronomical observations at the Cape of Good Hope. 4°. (Discovery).

1864 Herschel, J. F. W., 1888 Dreyer, J. L. E. See Section B, *Dunlap Pub.*, v. 1, no. 20.

1954 Rosino, L. XI. Su alcuni ammassi stellari di dubbia classificazione. *Asiago Cont.*, no. 52, *La Ricerca Scientifica*, Aug. 1954 (photo).

1954 Thackeray, A. D. *Private communication.* Radcliffe photos confirm globular cluster classification by Gregory in *Helwan Bull.*, nos. 21, 22, 1921.

1962 Rosino, L. Ricerche astronomiche nell' emisfero australe. III. Stelle variabili negli ammassi globulari NGC 5986, 6304, 6558, 6569, 6637 (M 69), 6681 (M 70) e zone attigue. *Soc. Astr. Ital. Mem.*, v. 33, no. 4; *Asiago Cont.*, no. 132, pp. 1–12, with plates.

1921*I*, *II* Gregory, 1953 Dreyer, 1955*IIa* Sawyer, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958 Maffei (photo), 1958*II* Sawyer Hogg, 1959*Iip* Sawyer Hogg, 1960*bcg* Wilkens, 1961*III* Sawyer Hogg, 1962 Sawyer Hogg.

IC 1276 α 18^h 08^{m}0, δ − 07° 14′ l^{II}21°.82, b^{II} + 05°.67

1889 Swift, L. Catalogue No. 8 of nebulae discovered at the Warner Observatory. *A. N.*, v. 122, no. 2918, pp. 240–246. (Discovery, no. 95).

1895 Dreyer, J. L. E. Index catalogue of nebulae found in the years 1888–1894. *Roy. Astr. Soc. Mem.*, v. 51.

IC 1276 (cont'd)

1948 Baade, W. *Private correspondence.* Considered globular by Baade and N. U. Mayall.

1955 Abell, G. O. Globular clusters and planetary nebulae discovered on the National Geographic Society–Palomar Observatory sky survey. *A. S. P. Pub.*, v. 67, pp. 258–261. (No. 7 in Abell's catalogue).

1962 Kinman, T. D., and Rosino, L. Notes on faint star clusters. *A. S. P. Pub.*, v. 74, pp. 499–506, with print.

1953 Dreyer, 1955*IIa* Sawyer, 1958*Ia* Sawyer Hogg, 1959*Ip*, *IIb* Sawyer Hogg (photo), 1960*ad* Wilkens, 1962 Rosino, 1962*I* Rosino and Sawyer Hogg, 1962 Sawyer Hogg.

NGC 6569 α 18^h 10^{m}4, δ − 31° 50′ l^{II}00°.49, b^{II} − 06°.68

1962 Rosino, L. Ricerche astronomiche nell' emisfero australe. III. Stelle variabili negli ammassi globulari NGC 5986, 6304, 6558, 6569, 6637 (M 69), 6681 (M 70) e zone attigue. *Soc. Astr. Ital. Mem.*, v. 33, no. 4; *Asiago Cont.*, no. 132, pp. 1–12, with plates.

1921*I*, *II* Gregory, 1944 Wallenquist and Lundby, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*IIa* Sawyer, 1956*a* Schmidt, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958*II* Sawyer Hogg, 1959 Johnson, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*acfikl* Kron and Mayall, 1960*bd* Wilkens, 1961*III* Sawyer Hogg.

NGC 6584 α 18^h 14^{m}6, δ − 52° 14′ l^{II}342°.14, b^{II} − 16°.41

1928*b* Ludendorff, 1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955*I*, *IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1959*Icd*, *IIci* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*bcg* Wilkens, 1961*I* Sawyer Hogg, 1962 Sawyer Hogg.

NGC 6624 α 18^h 20^{m}5, δ − 30° 23′ l^{II}02°.80, b^{II} − 07°.92

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1956*a* Morgan, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*c* Morgan, 1959*Igp* Sawyer Hogg, 1960*acdfikl* Kron and Mayall, 1960*bd* Wilkens, 1962 Fernie.

NGC 6626 (Messier 28) α 18^h 21^{m}5, δ − 24° 54′ l^{II}07°.80, b^{II} − 05°.59

1949 Sawyer, H. B. The variable stars in the globular cluster Messier 28. *A. J.*, v. 54, p. 193.

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1949 Joy, 1949*abde* Parenago, Kukarkin, Florja, 1949*a* Shapley, 1950*d* Becker, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*b* Morgan, 1956*ab* Schmidt, 1957 van den Bergh, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acdfikl* Kron and Mayall, 1960*bcg* Wilkens, 1961 Hénon, 1961*I* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6637 (Messier 69) α 18^h 28^m.1, δ − 32° 23′ l^{II}01°.72, b^{II} − 10°.26

1962 Rosino, L. Ricerche astronomiche nell' emisfero australe. III. Stelle variabili negli ammassi globulari NGC 5986, 6304, 6558, 6569, 6637 (M 69), 6681 (M 70) e zone attigue. *Soc. Astr. Ital. Mem.*, v. 33, no. 4; *Asiago Cont.*, no. 132, pp. 1–12, with plates.

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1956*ac* Morgan, 1956*ab* Schmidt, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958 Burbidge and Sandage, 1958*I*, *II* Kinman, 1958 Maffei (photo), 1958*If* Sawyer Hogg, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*bc* Morgan, 1959*Igp* Sawyer Hogg, 1960 Gingerich, 1960*acdfik* Kron and Mayall, 1960*bd* Wilkens, 1961*a* Haffner, 1961*III* Sawyer Hogg, 1962 Fernie, 1962*II* Rosino.

NGC 6638 α 18^h 27^m.9, δ − 25° 32′ l^{II}07°.90, b^{II} − 07°.16

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker 1948*b* Perek, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*c* Rosino, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1956*a* Morgan, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*c* Morgan, 1959*Igp* Sawyer Hogg, 1960*acdfhikl* Kron and Mayall, 1960 Kurth, 1960*bd* Wilkens, 1961 Hénon, 1962 Fernie.

NGC 6642 α 18^h 28^m.4, δ − 23° 30′ l^{II}09°.78, b^{II} − 06°.34

1789 Herschel, W. Catalogue of a second thousand of new nebulae and clusters of stars. *Roy. Soc. Phil. Trans.*, v. 79, pp. 212–255. (Discovery).

1833 Herschel, J. F. W., 1847 Herschel, J. F. W., 1864 Herschel, J. F. W. See Section B, *Dunlap Pub.*, v. 1, no. 20.

1948 Baade, W. *Private communication.* Identified as globular.

1953 Dreyer, 1955*IIa* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1959*b* Morgan, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens.

NGC 6652 α 18^h 32^m.5, δ − 33° 02′ l^{II}01°.53, b^{II} − 11°.38

1944 Wallenquist and Lundby, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1956*a* Morgan, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*c* Morgan, 1959*Igp* Sawyer Hogg, 1960*acdefik* Kron and Mayall, 1960 Kurth, 1960*bd* Wilkens, 1962 Fernie.

NGC 6656 (Messier 22) α 18^h 33^m.3, δ − 23° 58′ l^{II}09°.87, b^{II} − 07°.55

1959 Arp, H. C. Stars in the direction of the galactic center. *A. J.*, v. 64, pp. 33–34.

1959 Arp, H. C., and Melbourne, W. G. Color-magnitude diagram for the globular cluster M 22. *A. J.*, v. 64, pp. 28–32, with plate.

1928*a* Ludendorff, 1936 Kuiper, 1947 Parenago, 1947*abcd* Sawyer, 1948 BAAJ, 1948 Becker, 1948 Joy, 1948*b* Perek, 1948*I* Sawyer, 1949 Joy, 1949*abde* Parenago, Kukarkin, Florja, 1949*g* Shapley, 1950*cde* Becker, 1950 Kurth, 1951*I*, *II* Kurth, 1951*b* Payne-Gaposchkin, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Kholopov, 1953 Lohmann, 1953*gh* Rosino, 1953 Shapley and McKibben, 1954 Bidelman, 1954 Blamont, 1954 Gingerich, 1954*Iab* Payne-Gaposchkin, 1954*I* Zagar, 1955 von

NGC 6656 (cont'd)

Hoerner, 1955*IIbcd* Sawyer, 1955*IIa* Struve, 1956*b* Baum, 1956 van den Bergh, 1956 Kourganoff, 1956 Kreiken, 1956*ab* Schmidt, 1957 van den Bergh, 1957 Stohl, 1958 Alter, Ruprecht, Vanýsek, 1958*abe* Arp, 1958*I*, *II* Kinman, 1958 Maffei (photo), 1958*I* Sandage, 1958*II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959 Dzigvashvili, 1959 Johnson, 1959*Iabd*, *IIai* Kinman, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959 Preston, 1959*Iakp*, *III* Sawyer Hogg, 1960 Gingerich, 1960*acfgijkl* Kron and Mayall, 1960 Kurth, 1960*h* Roberts, 1960 Sandage and Wallerstein, 1960*bcg* Wilkens, 1961 van den Bergh, 1961 Hénon, 1961*a* Haffner, 1961 Lohmann, 1961 Payne-Gaposchkin, 1961*I* Sawyer Hogg, 1961*I* Woolley and Dickens, 1962 van den Bergh and Henry, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

See also: 5053 1949 Rosino.

Palomar 8 α 18^h 38^m.5, δ − 19° 52′ l^{II}14°.11, b^{II} −06°.79

1955 Abell, G. O. Globular clusters and planetary nebulae discovered on the National Geographic Society–Palomar Observatory sky survey. *A. S. P. Pub.*, v. 67, pp. 258–261. (Discovery by Abell).

1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1959*Ip* Sawyer Hogg.

NGC 6681 (Messier 70) α 18^h 40^m.0, δ − 32° 21′ l^{II}02°.85, b^{II} − 12°.52

1962 Rosino, L. Ricerche astronomiche nell' emisfero australe. III. Stelle variabili negli ammassi globulari NGC 5986, 6304, 6558, 6569, 6637 (M 69), 6681 (M 70) e zone attigue. *Soc. Astr. Ital. Mem.*, v. 33, no. 4; *Asiago Cont.*, no. 132, pp. 1–12, with plates.

1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd*, *II* Lohmann, 1953 Dreyer, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIa* Sawyer, 1956*b* Schmidt, 1958*I*, *II* Kinman, 1958 Alter, Ruprecht, Vanýsek, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*Ip* Sawyer Hogg, 1960*acdefik* Kron and Mayall, 1960 Kurth, 1960*bd* Wilkens, 1961*III* Sawyer Hogg, 1962 Fernie.

NGC 6712 α 18^h 50^m.3, δ − 08° 47′ l^{II}25°.34, b^{II} − 04°.32

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1928 Harwood, M. A survey of the variable stars in the Scutum Cloud; preliminary results. *Harv. Bull.*, no. 880, pp. 10–16.

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1928*a* Ludendorff, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1948*I* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Sawyer, 1954 Blamont, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956*a* Morgan, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958 Maffei (photo), 1958*II* Sawyer Hogg, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Id*, *IIi*, *III* Kinman, 1959*a* Larsson-Leander, 1959 Matsunami *et al.*, 1959*bc* Morgan, 1959 Preston, 1959*Igip* Sawyer Hogg, 1960*acdfik* Kron and Mayall, 1960*bcg* Wilkens, 1961 Lohmann, 1961*I*, *III* Sawyer Hogg, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

NGC 6715 (Messier 54) α 18^h 52^m.0, δ − 30° 32′ l^{II}05°.63, b^{II} − 14°.11

1952 Rosino, L. Ricerche sugli ammassi globulari VII. Ventotto nuove variabili nell'ammasso globulare M 54 = NGC 6715. *Univ. Bologna Oss. Pub.*, v. V, no. 18.

1959 Rosino, L., and Nobili, F. Ricerche astronomiche nell' emisfero australe 1. Scoperta e studio preliminare di ettantadue stelle variabili nell'ammasso globulare Messier 54 = NGC 6715. *Asiago Cont.*, no. 97, with plates.

1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*f* Rosino, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956*ab* Schmidt, 1957 Rosino, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958 Maffei (photo), 1958*II* Sawyer Hogg, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Iabd*, *IIbi* Kinman, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959*Iip*, *IIa* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960*bcg* Wilkens, 1961 Hénon, 1961*I*, *III* Sawyer Hogg, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

NGC 6717 α 18^h 52^m.1, δ − 22° 47′ l^{II}12°.86, b^{II} − 10°.91

1802 Herschel, W. Catalogue of 500 new nebulae and clusters, with remarks on the construction of the heavens. *Roy. Soc. Phil. Trans.*, v. 92, pp. 477–528. (Discovery by Herschel).

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1953 Dreyer, 1955*IIa* Sawyer, 1958 Alter, Ruprecht, Vanýsek, 1958*II* Sawyer Hogg, 1959*Ip* Sawyer Hogg, 1960*bd* Wilkens, 1961*III* Sawyer Hogg.

NGC 6723 α 18^h 56^m.2, δ − 36° 42′ l^{II}00°.07, b^{II} − 17°.30

1912 Knox Shaw, 1928*a* Ludendorff, 1938*b* Payne-Gaposchkin and Gaposchkin, 1946 Miczaika, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*abde* Parenago, Kukarkin, Florja, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956 van den Bergh, 1956*ab* Schmidt, 1957 van den Bergh, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*I* Sandage, 1959 van Agt and Oosterhoff, 1959 Dzigvashvili, 1959*Id*, *IIi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acdefik* Kron and Mayall, 1960*bcg* Wilkens, 1961 Hénon, 1961 Lohmann, 1961 Payne-Gaposchkin, 1961*I* Sawyer Hogg, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6752 α 19^h 06^m.4, δ − 60° 04′ l^{II}336°.49, b^{II} − 25°.62

1947*abd* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1949*ace* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*d* Rosino, 1954*I* Zagar, 1955 *IIbd* Sawyer, 1956*c* Baum, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958*II* Sawyer Hogg, 1959*Iad*, *IIabi* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1959*a* Thackeray, 1960*bcg* Wilkens, 1962 Aller, 1962 Fernie, 1962 Sawyer Hogg.

See also: 5139 1962 Fehrenbach and Duflot.

NGC 6760 α 19^h 08^m.6, δ + 00° 57′ l^{II}36°.10, b^{II} − 03°.91

1947*abd* Sawyer, 1949*ade* Parenago, Kukarkin, Florja, 1950 Stebbins, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953 Sawyer, 1954 Blamont, 1954*I* Zagar, 1955*IIbd* Sawyer, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1959 Dufay and Bigay, 1959 Matsunami *et al.*, 1959*bc* Morgan, 1959*Iip* Sawyer Hogg, 1960 Kron, 1960*acfik* Kron and Mayall, 1960*bd* Wilkens, 1962*II* Rosino, 1962 Sawyer Hogg.

NGC 6779 (Messier 56) α 19^h 14^m.6, δ + 30° 05′ l^{II}62°.65, b^{II} + 08°.34

1949 Sawyer, H. B. Two RV Tauri-type variables in globular clusters. *R. A. S. C. Jour.*, v. 43, pp. 38–44; *Dunlap Comm.*, no. 18.

1950 Rosino, L. Ricerche sugli ammassi globulari III. Su alcune interessanti stelle variabili appartenenti o vicine all'ammasso globulare M 56 della Lira. *Univ. Bologna Oss. Pub.*, v. V, no. 12; *Soc. Astr. Ital. Mem.*, v. XXI, no. 1.

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1928*a* Ludendorff, 1943 Payne-Gaposchkin, Brenton, Gaposchkin, 1947 Fricke, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1948*I* Sawyer, 1949 Joy, 1949*abde* Parenago, Kukarkin, Florja, 1950 Kurth, 1951*II* Kurth, 1952*Iabcd* Lohmann, 1953 Dreyer, 1953 Kholopov, 1953 *ei* Rosino, 1953 Sawyer, 1953 Shapley and McKibben, 1954 Bidelman, 1954 Blamont, 1954 Gingerich, 1954 Perek, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956*b* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958 Maffei (photo), 1958*II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Id*, *IIai* Kinman, 1959 Matsunami *et al.*, 1959*Iip* Sawyer Hogg, 1960*acfik* Kron and Mayall, 1960 Kurth, 1960*acf* Wilkens, 1961*b* Haffner, 1961 Hénon, 1961*I*, *IIa* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962 Sawyer Hogg.

See also: 7078 1957 Izsak.

Palomar 10 α 19^h 16^m.0, δ + 18° 28′ l^{II}52°.44, b^{II} + 02°.68

1955 Abell, G. O. Globular clusters and planetary nebulae discovered on the National Geographic Society–Palomar Observatory sky survey. *A. S. P. Pub.*, v. 67, pp. 258–261. (Discovery by A. G. Wilson).

1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1958 Rosino, 1959*Ip* Sawyer Hogg, 1961*III* Sawyer Hogg, 1962*I* Rosino.

NGC 6809 (Messier 55) α 19^h 36^m.9, δ − 31° 03′ l^{II}08°.83, b^{II} − 23°.28

1951 King, I. New variables and periods in the globular cluster Messier 55. *Harv. Bull.*, no. 920.

1928*b* Ludendorff, 1935 Walters, 1947*abcd* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1950*d* Becker, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Gingerich, 1953 Kholopov, 1953*d* Rosino, 1954 Cimino, 1954 Gingerich, 1954 Markarian, 1954*I* Zagar, 1955*IIbd* Sawyer, 1955*IIa* Struve, 1956*c* Baum, 1956 van

NGC 6809 (cont'd)

den Bergh, 1956*a* Schmidt, 1957 van den Bergh, 1957 Stohl, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958 Náprstková, 1959 van Agt and Oosterhoff, 1959 Johnson, 1959*Iad*, *IIad* Kinman, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959*Iip* Sawyer Hogg, 1960 Gingerich, 1960*acfikl* Kron and Mayall, 1960*bcg* Wilkens, 1961 Hénon, 1961*I*, *III* Sawyer Hogg, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

Palomar 11 α 19^h 42^{m}6, δ − 08° 09′ l^{II}31°.79, b^{II} − 15°.60

1955 Abell, G. O. Globular clusters and planetary nebulae discovered on the National Geographic Society–Palomar Observatory sky survey. *A. S. P. Pub.*, v. 67, pp. 258–261. (Discovery by A. G. Wilson).

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1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1959*Ip* Sawyer Hogg, 1961*III* Sawyer Hogg, 1962*I* Rosino.

NGC 6838 (Messier 71) α 19^h 51^{m}5, δ + 18° 39′ l^{II}56°.74, b^{II} − 04°.55

1928 Baade, W. Untersuchung von zwei Milchstrassenfeldern auf Veränderliche (124 neue Veränderliche). *A. N.*, v. 232, pp. 65–70.

1941 Cuffey, J. The galactic cluster NGC 6838. *Am. A. S. Pub.*, v. 10, p. 122.

1952 Sawyer, H. B. Variable stars in the globular cluster NGC 6838. *A. J.*, v. 57, p. 26.

1954 Becker, W. Bemerkung zum Farben-Helligkeits-Diagramm des Kugelhaufens M 71 = NGC 6838. *Z. f. Ap.*, v. 34, pp. 107–109; *Ast.-Met. Anstalt Univ. Basel Mitt., Astr. Reihe*, no. 1.

1954 Rosino, L. Ricerche sugli ammassi globulari XI. Su alcuni ammassi stellari di dubbia classificazione. *Asiago Cont.*, no. 52, with photo.

1956 Artjuchina, N. M. Die Eigenbewegungen von Sternen in der Umgebung der Haufen M 71 und H 20. *Astr. Sternberg-Inst. Pub.*, v. 27, pp. 3–35. (Catalogue of 1372 stars).

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1960 Der ungewöhnliche Sternhaufen M 71. *Nachrichtenblatt der Vereinigung der Sternfreunde, Berlin*, v. 9, pp. 134–135.

1960 Messier 71. *Urania, København*, v. 17, pp. 15–16.

1961 Stephenson, C. B. Possible M-star members of NGC 6838. *A. J.*, v. 66, pp. 85–87, with plate.

1947 Parenago, 1947*abcd* (photo, error in cluster no.) Sawyer, 1948*a* Perek, 1953 Dreyer, 1953 Sawyer, 1954 Gingerich, 1954 Perek, 1954*I* Zagar, 1955*IIbcd* Sawyer, 1956*a* Morgan, 1956*a* Schmidt, 1958 Alter, Ruprecht, Vanýsek, 1958*I*, *II* Kinman, 1958 Maffei (photo), 1958*Ia*, *II* Sawyer Hogg, 1959*Id*, *IIi*, *III* Kinman, 1959*a* Larsson-Leander, 1959*bc* Morgan, 1959 Sandage, 1959*Igip* Sawyer Hogg, 1960 Bowen, 1960 Ikhsanov, 1960*acdfik* Kron and Mayall, 1960 Sandage and Wallerstein, 1960*bcg* Wilkens, 1961*a* Haffner, 1961 Lohmann, 1961 Preston, 1961*I*, *III* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

See also: 5272 1953 Sandage.

NGC 6864 (Messier 75) $\alpha\ 20^h\ 03^m2,\ \delta\ -22°\ 04'$ $l^{II}20°.31,\ b^{II}\ -25°.76$

1928*a* Ludendorff, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*ade* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953*ad* Rosino, 1954 Blamont, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956 Baum, 1956 van den Bergh, 1956*b* Schmidt, 1957 Rosino, 1957 Shapley, 1958 Alter, Ruprecht, Vaný́sek, 1958*I, II* Kinman, 1958*II* Sawyer Hogg, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Iabd, IIbi* Kinman, 1959 Matsunami *et al.*, 1959*Icip* Sawyer Hogg, 1960*acdefik* Kron and Mayall, 1960 Kurth, 1960*b* Roberts, 1960*bcg* Wilkens, 1961 Hénon, 1961*I, III* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6934 $\alpha\ 20^h\ 31^m7,\ \delta\ +07°\ 14'$ $l^{II}52°.10,\ b^{II}\ -18°.88$

1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948 Fehrenbach (error in no.), 1948*b* Perek, 1948*I* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1953*d* Rosino, 1954 Blamont, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*c* Baum, 1956 van den Bergh, 1956*b* Schmidt, 1957 van den Bergh, 1958 Alter, Ruprecht, Vaný́sek, 1958*I, II* Kinman, 1958*II* Sawyer Hogg, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Id, IIi* Kinman, 1959 Matsunami *et al.*, 1959*Iip, III* Sawyer, 1960*acfik* Kron and Mayall, 1960 Kurth, 1960*bcg* Wilkens, 1961*I, III* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962 Sawyer Hogg.

NGC 6981 (Messier 72) $\alpha\ 20^h\ 50^m7,\ \delta\ -12°\ 44'$ $l^{II}35°.15,\ b^{II}\ -32°.68$

1953 Rosino, L. Ricerche sugli ammassi globulari IX. Osservazioni fotografiche di variabili e determinazione dei periodi e curve di luce di 16 cefeidi appartenenti all'ammasso globulare M 72. *Univ. Bologna Oss. Pub.*, v. VI, no. 2, pp. 49–64.

1953 Sawyer, H. B. Thirty-eight new variable stars in eleven globular clusters. *R. A. S. C. Jour.*, v. 47, pp. 229–236; *Dunlap Comm.*, no. 34.

1957 Nobili, F. Elementi e curve di luce di tre stelle variabili nell'ammasso globulare M 72. *Soc. Astr. Ital. Mem.*, v. 28, no. 1–2, pp. 141–145; *Asiago Cont.*, no. 83.

1928*a* Ludendorff, 1946 Miczaika, 1947 Parenago, 1947*abcd* Sawyer, 1948 Becker, 1948*b* Perek, 1949*abde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabd* Lohmann, 1953 Dreyer, 1953 Lohmann, 1953*defi* Rosino, 1953 Sawyer, 1954 Gingerich, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbd* Sawyer, 1956*c* Baum, 1956 van den Bergh, 1956*b* Schmidt, 1957 van den Bergh, 1958 Alter, Ruprecht, Vaný́sek, 1958*e* Arp, 1958*I, II* Kinman, 1958 Maffei (photo), 1958*I* Sandage, 1958*II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959*Id, IIi* Kinman, 1959 Kurochkin, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959 Preston, 1959*Iip* Sawyer Hogg, 1960*acdefik* Kron and Mayall, 1960 Kurth, 1960*bceg* Wilkens, 1961*b* Haffner, 1961 Hénon, 1961 Payne-Gaposchkin, 1961*I* Sawyer Hogg, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

NGC 7006 $\alpha\ 20^h\ 59^m1,\ \delta\ +16°\ 00'$ $l^{II}63°.77,\ b^{II}\ -19°.39$

1954 Sandage, A. R. Variable stars found by Edwin Hubble in the globular cluster NGC 7006. *A. S. P. Pub.*, v. 66, pp. 324–326; *Die Sterne*, v. 31, p. 187.

1955 Rosino, L., and Mannino, G. Ricerche sugli ammassi globulari XII. Distanza e stelle variabili d'un remotissimo ammasso globulare: NGC 7006. *Asiago Cont.*, no. 59, with plate.

1956 Lidt om Kuglehoben N.G.C. 7006. *Urania, København*, v. 13, pp. 57–58.

1957 Mannino, G. Periodi e curve di luce di 19 stelle variabili del tipo RR Lyrae dell'ammasso globulare NGC 7006. *Soc. Astr. Ital. Mem.*, v. 28, no. 3; *Asiago Cont.*, no. 84.

NGC 7006 (cont'd)

1928*a* Ludendorff, 1947 Parenago, 1947*abd* Sawyer, 1948 Becker, 1948*b* Perek, 1948*I* Sawyer, 1949*abde* Parenago, Kukarkin, Florja, 1949*ce* Shapley, 1952*Iabd*, *II* Lohmann, 1953 Dreyer, 1953 Lohmann, 1953*cd* Rosino, 1954*I* Zagar, 1955 von Hoerner, 1955*IIbcd* Sawyer, 1956*c* Baum, 1956 van den Bergh, 1956*b* Schmidt, 1957 Shapley, 1958 Alter, Ruprecht, Vanýsek, 1958 Heckmann, 1958*I*, *II* Kinman, 1958 Rosino, 1958*II* Sawyer Hogg, 1959 van Agt and Oosterhoff, 1959 Dufay and Bigay, 1959 Dzigvashvili, 1959 Johnson, 1959*Id*, *IIi*, *III* Kinman, 1959 Matsunami *et al.*, 1959*b* Morgan, 1959*Icip*, *IIc* Sawyer Hogg, 1960*acfikl* Kron and Mayall, 1960 Kurth, 1960*bceg* Wilkens, 1961*a* Haffner, 1961 Kurochkin, 1961*I*, *III* Sawyer Hogg, 1962 van den Bergh and Henry, 1962 Fernie, 1962*II* Rosino, 1962 Sawyer Hogg.

NGC 7078 (Messier 15) $\alpha\ 21^h\ 27^m.6$, $\delta + 11°\ 57'$ $l^{II} 65°.02$, $b^{II} - 27°.32$

1949 Sawyer, H. B. The early discovery of four globular clusters. *R. A. S. C. Jour.*, v. 43, p. 45.

1950 Rosino, L. Twenty-nine new variable stars in the globular cluster M 15. *Ap. J.*, v. 112, p. 221, with plate.

1951 Brown, A. The color magnitude array for stars in the globular cluster M 15. *Ap. J.*, v. 113, pp. 344–366; Abs., *A. J.*, v. 55, p. 165.

1951 Johnson, H. L., and Schwarzschild, M. On the color-magnitude diagram for M 15. *Ap. J.*, v. 113, pp. 630-636.

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1955 Arp, H. C. Cepheids of period greater than one day in globular clusters. *A. J.*, v. 60, pp. 1–17.

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1956 Mannino, G. Le stelle variabili dell'ammasso globulare M 15. I. Studio di 14 cefeidi del tipo RR Lyrae (N. 2–15). *Soc. Astr. Ital. Mem.*, v. 27, no. 2; *Asiago Cont.*, no. 74.

1956 Mannino, G. Le stelle variabili dell'ammasso globulare M 15. II. Studio di 10 note cefeide del tipo RR Lyrae (N. 17, 18, 22, 24, 30, 32, 35, 38, 39, 40) e di una nuova variabilie (N. 99). *Soc. Astr. Ital. Mem.*, v. 27, no. 3; *Asiago Cont.*, no. 75.

1956 Grubissich, C. Le stelle variabili dell'ammasso globulare M 15. III. Studio delle dieci variabili No. 19, 23, 25–29, 31, 42, 43. *Soc. Astr. Ital. Mem.*, v. 27, p. 3; *Asiago Cont.*, no. 76.

1956 Pallas and M 15. *Sky and Tel.*, v. 15, p. 444.

1957 Izsak, I. Untersuchungen über die Periodänderungen der Veränderlichen im Kugelsternhaufen M 15. Konferenz über Veranderliche Sterne, Budapest, 1956, 63–69; *Stern. Ungar. Akad. Wiss. Mitt.*, no. 42.

1957 Nobili, F. Le stelle variabili dell'ammasso globulare M 15. IV. Studio delle otto variabili N. 1, 44, 50–54, 66. *Soc. Astr. Ital. Mem.*, v. 28, nos. 1–2, pp. 105–120; *Asiago Cont.*, no. 81.

1958 Bachmann, G. Die Periode des Veränderlichen Nr. 19 im Kugelhaufen M 15. *A. N.*, v. 284, p. 191; *Berlin-Babelsberg Mitt.*, no. 7.

1958 Notni, P., and Oleak, H. Der Lichtwechsel von 25 Veränderlichen des Kugelhaufens M 15. *A. N.*, v. 284, pp. 49–56.

NGC 7078 (cont'd)

1959 Bronkalla, W. Periodenänderungen von RR Lyrae-Sterne in Kugelhaufen. *Remeis-Sternw. Bamberg Kl. Veröff.*, no. 27, p. 28.

1959 Mannino, G. Sulla variabile N. 99 dell'ammasso globulare M 15. *Soc. Astr. Ital. Mem.*, v. 30, no. 3–4; *Asiago Cont.*, no. 110.

1960 Bronkalla, W. Die Periodenänderungen von 27 Veränderlichen des Kugelhaufens M 15. *Berlin-Babelsberg Mitt.*, no. 10; *A. N.*, v. 285, pp. 181–190, 1960.

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NGC 7089 (Messier 2) α 21^h 30^{m}9, δ − 01° 03′ l^{II}53°.37, b^{II} − 35°.78

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Palomar 12 α 21^h 43^m.7, δ − 21° 28′ l^{II}30°.52, b^{II} − 47°.64

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See also: Pal 1 1962 Kinman and Rosino.

NGC 7492 $\alpha\ 23^h\ 05^m7,\ \delta - 15°\ 54'$ $l^{II}53°.32,\ b^{II} - 63°.46$

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e. Page 599. Colour excess and absorption.
f. Page 601. Table X. Revised spectral types, colour excesses, and absorptions.
g. Page 604. Table XI. Comparison of colour excesses.
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j. Page 606. Table XIV. Comparison of total abs. vis. magnitudes.
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