A Catalogue of Star Clusters shown on Franklin-Adams Chart Plates.

By P. J. Melotte. (Plates 16 and 17.)

[Communicated by the Astronomer Royal.]

[Received and read 1915 March 12.]

The scale on which the Franklin-Adams Chart Plates are taken, 20 millimetres to the degree, is one particularly adapted to the examination of star clusters. Of the globular clusters only those less than 3′ in diameter are difficult to classify, whilst the large open clusters have not lost their characteristic appearance through being presented on too large a scale. Further, as the limiting magnitude of the plates lies between the sixteenth and seventeenth magnitudes and is sensibly uniform over the entire sky, a systematic classification of all the clusters shown on the plates provides very valuable material for a consideration of their distribution. For this purpose the clusters have been divided into the following classes :—

I. Globular clusters, condensed at the centre, and of which the following may be considered as examples, N.G.C. 5139 ω Centauri, N.G.C. 6205 Messier 13 Herculis, N.G.C. 6254 Messier 10 Ophiuchi.

II. Loose clusters having a regular, well-defined outline, as for example N.G.C. 1245, and 2287 Messier 14.

III. Loose clusters, often of a few stars only, and of irregular outline. Most of these are to be found in the richer parts of the galaxy, and it is sometimes difficult to decide whether they should be classed as II. or III.

IV. Coarse clusters. These are few in number, and include the Pleiades, Hyades, together with some smaller groups which are not included in the above three classes.

The majority of the clusters are comprised in the first two classes. Since it is impossible to draw a hard-and-fast line between the different classes, it has occasionally been found difficult to decide to which group a cluster should properly belong. It will be seen later, however, that this will not affect the conclusions drawn as to the distribution of star clusters in general.

As a preliminary step the clusters belonging to the first two classes were marked on a globe. It was found that whilst clusters of Class II. are distributed in the plane of the galaxy, those belonging to Class I. are nearly all contained in one hemisphere, the

pole of which is approximately R.A. 16^h30^m, Dec. $-58°$ (galactic longitude 296°, latitude $-8°$). This distribution accords with that found by Mr. Hinks (*Monthly Notices*, lxxi. p. 693). It was noted, however, that there is a marked concentration of globular clusters towards a point in the galaxy about longitude 325°, and it became evident that any discussion regarding the distribution of star clusters would best be made by referring them to the galactic plane. The whole of the clusters noted have therefore been plotted, in galactic co-ordinates, on two charts. In the case of the globular clusters a stereographic projection has been employed, since it is necessary to depict rather more than one complete hemisphere. As practically all the clusters in Classes II., III., and IV. lie within 30° of the galactic plane, they have all been plotted on the same diagram on squared paper.

Considering first the distribution of the globular clusters, Class I. The total number noted is 82. Most are to be found within latitudes $\pm 30°$ and between longitudes 235° and 5°. Forty-two are within 30° of a point in the galactic plane about longitude 325°, and 19 of these are less than 5′ in diameter. Considering next the distribution in latitude, 30 are within $\pm 10°$, 56 within $\pm 20°$, 63 within $\pm 30°$, and 19 beyond this limit. It will be seen that although the globular clusters are found to extend over an entire hemisphere, yet they are evidently concentrated toward a point in the galactic plane. They are distributed according to size as follows:—47 are under 5′ in diameter; 22 are between 5′ and 10′; 11 between 10′ and 20′; and 2 exceed 20′ in diameter.

The clusters which have been included in Classes II. and III., it will be seen from the diagram, are fairly evenly intermingled, and their distribution may therefore be considered as a whole. With two exceptions, they all lie within 30° of the galactic plane, whilst the majority are within 20°. Between longitudes 240° and 40° they form a narrow belt extending between latitudes $\pm 10°$, whilst they tend to spread out in latitude between longitudes 60° and 220°.

Only a few clusters, 14 in all, have been included under Class IV. With the exception of the large cluster in Coma Berenices, which is at latitude $+85°$, they are all within 30° of the galactic plane. Although no stress can be laid on it, it is curious to note that the large clusters—the Hyades, Pleiades, and Perseus cluster—fall not far from longitude 140°.

If the distribution of clusters as a whole be considered, it will be seen that the great majority are distributed over a zone within $\pm 30°$ of the galactic plane, and that only a few, mostly of Class I., are to be found outside these limits. Further, it is to be noted that there is a distinct tendency for the globular clusters (Class I.) to crowd together about longitude 325°, and that opposite this point the clusters appear spread out over a somewhat wider range in latitude and include some of the most extended.

The list of clusters included in the catalogue has been compared with those to be found in *Harvard Annals*, vol. lx., No. 8 (Catalogue of Bright Clusters and Nebulæ —Bailey). Sixty-six clusters catalogued in the N.G.C. and noted by Bailey

are not included in the present catalogue. Most of these, 53 in number, are in the Magellanic clouds. These have all been examined and do not appear as clusters on the Franklin-Adams Plates. N.G.C. 371 is the only cluster (classed as a globular cluster) which falls in either of the two Magellanic clouds. It is not far from N.G.C. 104 and 362, also globular clusters, and it may possibly be unconnected with the cloud itself and merely be seen in the same direction.

The reasons for omitting the remaining 13 clusters will be seen from the following descriptions attached to each :—

"Clusters" noted by Bailey but not included in the Catalogue.

N.G.C. No.	R.A. 1900.	Dec. 1900.	Description.
	h m	° ′	
1291	3 13·7	−41 28	Appears as a diffuse star, or bright nebula, with some surrounding faint nebula.
1380	3 32·6	−35 19	Resembles 1291 but a little larger.
1399	3 34·6	−35 47	Nebula.
1981	5 30·6	− 4 25	A few stars north of Great Nebula in Orion. Not considered a cluster.
2451	7 41·8	−37 44	Falls in a rich region. Not considered a cluster.
2546	8 7·9	−37 6	Falls in a rich region. Not considered a cluster.
...	8 37·5	−52 34	Coarse clustering. Not considered a separate cluster.
...	8 40·0	−47 48	Coarse clustering. Not considered a separate cluster.
2671	8 42·6	−41 31	Coarse clustering. Not considered a separate cluster.
...	9 24·6	−56 32	Does not appear as a cluster.
3572	11 6·2	−59 42	Hardly a separate cluster. The stars may form part of 3532.
4609	12 36·5	−62 25	A few stars only. Not considered a cluster.
6229	16 44·2	+47 42	Appears as a bright nebulous star.

Nine clusters have been included which do not appear either in the N.G.C. or in BAILEY'S Catalogue.

The following clusters, classed as "globular" in the N.G.C., have not been identified :—

136	1436	2004	2164	6316
330	1512	2031	2537	6412
376	1697	2090	3041	6522
628	1711	2098	3603	6528
843	1782	2100	4027	6629
1291	1818	2118	4147	6638
1310	1850	2134	6221	6884
1379	1854	2136	6229	6891
1387	1902	2157	6256	7214

Of these Nos. 628, 1387, 6221, and 6412 are nebulæ; and 18 are in the Magellanic clouds. Numbers 376 (in the small Magellanic cloud), 1512, and 2090 are

noted as not being globular clusters in the list of corrections at the end of the Second Index Catalogue.

Six clusters noted in *Lick Observatory Bulletin*, No. 219 (Descriptions of 132 Nebulæ and Clusters photographed with the Crossley Reflector), are not included in the catalogue. Their appearance on the Franklin-Adams Chart Plates is described in the following table :—

N.G.C. No.	R.A. 1900.	Dec. 1900.	L.	λ.	Description.
	h m	° ′	°	°	
4147	12 5·0	+19 6	223	+78·2	Appears as a nebulous star with traces of faint surrounding nebula. Diameter 1′. Appearance not inconsistent with description in *L.O.B.* but impossible to tell on this scale photograph whether it is a globular cluster or not.
6229	16 44·2	+47 42	41	+39·3	Appears as a bright nebulous star.
6517	17 56·4	− 8 57	347	+ 5·8	Appears as a nebulous star.
7006	20 56·8	+15 48	32	−20·5	Resembles 4147.
7044	21 9·2	+42 5	53	− 5·0	Does not appear as a cluster.
7142	21 43·5	+65 21	73	+ 8·8	Clustering of faint stars in a rich region, not well defined. Diameter 15′. Might possibly be included in Class III.

In the catalogue which follows the R.A. and Dec. of the clusters are taken from DREYER'S New General Catalogue, etc. (*Memoirs, R.A.S.*, vol. xlix., part 1), from the Index Catalogue and Second Index Catalogue by the same author (*Memoirs, R.A.S.*, vols. li., lix.), and from BAILEY'S Catalogue of Bright Clusters and Nebulæ (*Harvard Annals*, vol. lx., No. 8). References to these catalogues will be found in the notes on the clusters. In the cases of those clusters which have not been identified in the above catalogues their positions were obtained from the plates. Columns 5 and 6 give the galactic longitudes and latitudes, the adopted position of the pole of the Milky Way being R.A. $12^h\ 41^m$, Dec. $+27°\ 21'$ (*Uran. Arg.*, p. 371). Column 7 gives the diameter of the cluster, and column 8 the class to which each has been assigned. The description, column 9, has been made as brief as possible.

Plate I. shows the galactic distribution of the globular cluster (Class I.), dots of different sizes being used according to the observed diameters. Plate II. shows the galactic distribution of the clusters belonging to Classes II., III., and IV. Class II. are indicated by dots, varying in size according to the diameter, Class III. by crosses, and Class IV. by circles.

The large cluster in Coma Berenices, No. 111 in the catalogue, has been omitted since, being at galactic latitude $+85°$, it falls outside the diagram. N.G.C. 6539, No. 190, has also been omitted, as it is doubtful whether it should be classed as a globular cluster.

A Catalogue of Star Clusters shown on Franklin-Adams Chart Plates.

No.	No. in N.G.C.	R.A. 1900.	Dec. 1900.	L.	λ.	Diam.	Class.	Description.
		h m	° ′	°	°	′		
1	104	0 19·6	−72 38	272	−44·4	42	I.	A typical globular cluster. Bright. Well condensed at centre.
2	188	0 35·1	+84 47	90	+21·9	15	II.	A somewhat ill-defined cluster mostly 14th to 16th magnitude stars.
3	288	0 47·8	−27 8	214	−87·9	12	I.	Globular cluster, rather loose at centre.
4	362	0 58·9	−71 23	268	−45·8	10	I.	Globular cluster. Similar to N.G.C. 104 but smaller. Bright.
5	371	1 0·2	−72 36	268	−44·4	8	I.	Globular cluster. Falls in smaller Magellanic cloud, and has every appearance of being a globular cluster.
6	436	1 9·4	+58 17	93	− 4·4	4	III.	A few stars clustering together. Resembles N.G.C. 581, 654, 659. Difficult to decide whether these should not be classed II. All the clusters here resemble one another though differing in extent.
7	457	1 12·8	+57 48	93	− 4·9	10	II.	A small cluster in a rich region.
8	581	1 26·6	+60 11	95	− 2·3	5	III.	M. 103. A few stars forming a loose cluster.
9	654	1 37·2	+61 23	97	− 0·8	5	III.	A few stars clustered together in a rich region.
10	659	1 37·4	+60 12	97	− 1·9	5	III.	A few stars clustered together.
11	663	1 39·2	+60 44	97	− 1·4	11	II.	Fairly well-defined, loose cluster.
12	752	1 51·8	+37 11	105	−23·7	45	II.	A very open cluster, but quite distinct from the surrounding stars.
13	869	2 12·0	+56 41	102	− 4·1	36	II.	Double cluster in Perseus. The other clusters about this region resemble these but are smaller.
14	884	2 15·4	+56 39	103	− 3·8	36	II.	
15		2 25·2	+61 0	102	+ 0·8	20	III.	A very loose cluster. Somewhat similar to N.G.C. 1027, but stars not so numerous and generally brighter.
16	1027	2 35·0	+61 7	103	+ 1·4	18	III.	A loose cluster, not very well defined.
17	1039	2 35·6	+42 21	111	−16·0	7	II.	M. 34. A small, well-defined cluster near the large double cluster in Perseus.
18	1245	3 7·8	+46 52	114	− 9·1	30	II	A fine open cluster.
19	1261	3 9·5	−55 36	238	−51·4	5	I.	Globular cluster, well condensed at centre, faint stars.
20		3 15	+48 15	115	− 7·0		IV.	The large extended cluster in Perseus, covering an area 5° square.
21	1342	3 25·2	+36 59	122	−15·1	15	III.	A loose cluster. Not well defined.
22		3 41	+23 48	134	−22·9		IV.	Pleiades.
23	1528	4 7·8	+50 59	119	0·0	25	II.	An open cluster, includes some fairly bright stars.
24	I.C. 361	4 10·7	+58 3	115	+ 5·5	6	II.	A cluster of very faint stars. Difficult to class; possibly a globular cluster, but it is so faint on the plate that it is impossible to tell. Described in I.C. as ? neb. cluster. Its galactic position makes this uncertainty particularly striking.
25		4 14	+15 23	147	−22·8		IV.	Hyades–Taurus cluster.
26	1647	4 40·2	+18 53	148	−16·4	40	II.	Well-defined, loose cluster of bright stars.
27	1664	4 43·9	+43 31	129	− 0·5	15	II.	A distinct cluster of stars in a rich region.
28	1746	4 57·6	+23 40	147	− 9·8	45	II.	A loose cluster covering a large area. Not well defined.

A Catalogue of Star Clusters shown on Franklin-Adams Chart Plates—continued.

No.	No. in N.G.C.	R.A. 1900.	Dec. 1900.	L.	λ.	Diam.	Class.	Description.
		h m	° ′	°	•	′		
29	1807	5 4·9	+16 24	154	−13·0	15	II.	A distinct cluster in a dense region. The two brightest stars may probably belong to the Taurus cluster.
30	1851	5 10·8	−40 9	211	−34·2	8	I.	Globular cluster. Shows little condensation towards centre.
31		5 11·6	+33 16	141	− 1·7		IV.	A few bright stars forming an extended cluster scattered over an area 1° square. 14, 16, 19 Aurigæ are included. The place given is that of 16 Aurigæ, which is about centre of group.
32	1857	5 13·2	+39 14	136	+ 1·3	9	III.	A loose clustering in a dense region.
33	1893	5 19·2	+33 18	141	− 1·0	12	III.	A loose, irregular cluster.
34	1904	5 20·1	−24 37	195	−28·5	4½	I.	M. 79. Globular cluster. Fairly bright. Shows little condensation towards centre.
35	1907	5 21·4	+35 14	140	+ 0·7	5	II.	A small, but well-defined, loose cluster. Forms a pair with N.G.C. 1912.
36	1912	5 22·0	+35 45	139	+ 1·0	20	II.	M. 38. A large cluster, condensing well towards the centre.
37	1960	5 29·5	+34 4	142	+ 1·3	12	II.	M. 36. Well-defined cluster of rather bright stars.
38	2099	5 45·8	+32 31	145	+ 3·2	20	II.	M. 37. A fine example of Class II. Condenses well towards centre.
39	2126	5 55·2	+49 54	130	+12·9	5	III.	Small open cluster. Falls alongside B.D. +48°·1333. Might possibly be classed II.
40	2158	6 1·3	+24 6	154	+ 2·4	4	II.	? Very small Class II. or globular cluster. Somewhat similar to N.G C. 2266.
41	2168	6 2·7	+24 21	154	+ 2·6	40	II.	M. 35. Large open cluster, well defined and condensed towards centre.
42	2192	6 8·2	+39 53	141	+11·4	6	II.	A small open cluster of faint stars. Not well shown on plate.
43	2194	6 8·2	+12 50	164	− 1·9	5	II.	A small cluster of faint stars.
44	2204	6 11·3	−18 37	194	−15·1	9	II.	A loose clustering in a dense region.
45	2215	6 16·0	− 7 15	183	− 9·1	8	III.	A small, loose cluster.
46	2243	6 25·7	−31 13	207	−17·1	4	II.	A very faint, small cluster. Not well shown on plate. Possibly a globular cluster.
47	2244	6 27·0	+ 4 56	174	− 1·2	40	IV.	An open cluster of bright stars, with surrounding nebula extending over a field 1° square.
48	2259	6 33·0	+10 58	169	+ 2·8	3	III.	A small, loose cluster of faint stars. Not well shown on plate.
49	2264	6 35·5	+ 9 59	171	+ 3·2	30	IV.	A few stars forming a cluster, with some nebula. S Monocerotis is one of the group. Doubtful whether it should be included.
50	2266	6 37·0	+27 4	154	+10·6	5	II.	A small, well-defined cluster.
51	2281	6 42·3	+41 10	142	+17·3	15	II.	An open cluster of fairly bright stars.
52	2287	6 42·7	−20 38	199	− 9·3	30	II.	M. 14. Large open cluster. Fine example of Class II.
53	2298	6 45·4	−35 54	213	−14·8	2	I.	Globular cluster, small, well condensed.
54	2301	6 46·6	+ 0 35	180	+ 1·0	15	III.	Loose clustering of bright stars.
55	2304	6 49·2	+18 8	164	+ 9·7	4	III.	A small loose cluster, in a rich region.
56	2309	6 51·2	− 7 4	187	− 1·3	3	III.	A few stars clustered together, in a very rich region.
57	2314	6 57·1	+75 23	107	+27·0	6	II.	A loose cluster in a dense region. Not very well defined.
58	2323	6 58·2	− 8 12	189	− 0·5	16	II.	M. 50. A large, open cluster of fairly bright stars. Similar to N.G.C 2287.
59	2324	6 59·0	+ 1 12	181	+ 4·0	9	II.	A cluster in a dense region.
60	2335	7 1·8	− 9 56	191	0·0	10	III.	A loose cluster in a dense region.
61	2345	7 3·7	−13 1	194	− 1·0	10	III.	A loose clustering, not very distinct.

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No.	No. in N.G.C.	R.A. 1900. h m	Dec. 1900. ° ′	L. °	λ. °	Diam. ′	Class.	Description.
62	2353	7 9·8	−10 8	192	+1·7	20	III.	A loose cluster of bright stars.
63	2355	7 11·3	+13 57	170	+12·7	6	II.	A small open cluster.
64	2360	7 13·2	−15 27	197	−0·7	12	II.	A cluster in a very rich region.
65	2362	7 14·6	−24 46	205	−4·3	6	III.	A curious cluster. Falls on τ Canis Majoris.
66		7 23·4	−47 32	227	−13·3	10	II.	A distinct cluster of faint stars. Not in N.G.C. or Bailey.
67	2421	7 31·9	−20 23	204	+0·9	8	II.	Small, loose cluster in a dense region.
68	2422	7 32·0	−14 16	199	+3·9	25	II.	A loose cluster, includes some bright stars.
69	2420	7 32·5	+21 48	165	+20·1	7	II.	Small, well-defined cluster. Condenses gradually towards centre. Almost globular in appearance.
70	2423	7 32·5	−13 38	199	+4·5	20	III.	A loose cluster, not very well defined.
71		7 32·9	−11 50	197	+5·8	8	II.	A small, well-defined cluster of faint stars. Condensed towards centre.
72		7 33·7	−10 27	196	+6·7	5	III.	A small, loose clustering of faint stars. Not well defined.
73	2432	7 36·5	−18 51	204	+2·9	4	III.	Small clustering in a rich region.
74	2439	7 37·0	−31 25	214	−3·6	9	II.	A distinct cluster; includes some bright stars.
75	2437	7 37·2	−14 35	200	+4·8	24	II.	M. 46. Fine open cluster; well defined.
76	2447	7 40·4	−23 38	208	+1·3	25	II.	M. 93. Well-defined cluster in a very rich region.
77	2455	7 44·6	−21 3	206	+3·2	5	III.	Small clustering of stars in a rich region. Not well defined.
78	2477	7 48·7	−38 17	221	−5·0	25	II.	Very fine example of Class II. On a smaller-scale photograph it would appear as a globular cluster condensed at centre.
79	2489	7 52·2	−29 48	214	+0·2	7	II.	Well-defined cluster in a dense region.
80	2506	7 55·2	−10 21	198	+10·8	10	II.	Cluster of faint stars, condensing well towards centre. Almost Class I.
81	2509	7 56·3	−18 48	205	+6·6	4	II.	A small clustering in a rich region. Not well defined.
82	2516	7 56·7	−60 36	241	−15·0	60	II.	Fine open cluster of bright stars, extending over a field quite 1° square.
83	2539	8 6·0	−12 32	201	+12·2	21	II.	An open cluster.
84	2547	8 7·7	−48 58	232	−7·6	15	III.	An irregular cluster of stars; many bright.
85	2548	8 8·8	−5 30	195	+16·2	30	II.	A very open cluster of irregular outline.
86	2567	8 14·6	−30 20	217	+3·8	10	II.	Distinct cluster in a rich region. Resembles N.G.C. 2489 and 2627.
87	2627	8 33·1	−29 36	219	+7·7	8	II.	Well-defined cluster in a dense region.
88	2632	8 34·3	+20 20	172	+33·2		II.	M. 44. Præsepe. Extends over a field quite 2° square.
89	2635	8 34·5	−34 25	224	+4·8	3	III.	A small cluster, not very well defined.
90	2658	8 39·4	−32 18	222	+7·3	9	II.	A cluster in a dense region.
91	2659	8 39·2	−44 36	232	−0·8	10	III.	A loose cluster in a rich region.
92	2660	8 39·3	−46 51	234	−2·1	1½	I.	Appears to be a very small globular cluster.
93	2670	8 42·4	−48 25	235	−2·7	15	III.	A loose clustering of fairly bright stars in a rich region.
94	2682	8 45·8	+12 11	183	+32·9	15	II.	M. 67. Fine open cluster, typical of Class II.
95	2808	9 10·0	−64 27	249	−10·6	5	I.	Globular cluster. Very bright centre. Not much falling off towards edge.
96	2818	9 12·0	−36 12	229	+9·4	9	II.	Open cluster in a dense region. Classed as "globular" in N.G.C.
97		9 24·1	−56 36	245	−3·6		III.	A loose clustering of fairly bright stars.
98	3114	9 59·5	−59 38	250	−3·1	30	II.	Well-defined, loose cluster in a rich region.
99	3201	10 13·5	−45 54	244	+9·5	15	I.	Globular cluster. Stars faint. Centre not very condensed.

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No.	No. in N.G.C.	R.A. 1900. h	m	Dec. 1900. °	′	L. °	λ. °	Diam. ′	Class.	Description.
100	3293	10	32·0	−57	43	253	+ 0·7	8	III.	A few bright stars forming a small cluster.
101		10	38·6	−64	34	257	− 4·8	15	II.	A distinct cluster of somewhat faint stars. Not in N.G.C. or Bailey. Falls south of loose cluster around θ Carinæ. Resembles N.G.C. 4349.
102		10	39·4	−63	52	257	− 4·3	70	IV.	A group of bright stars round θ Carinæ. Noted by Bailey.
103	3532	11	2·2	−58	8	257	+ 2·1	60	II.	A fine, loose cluster extending over a field at least 1° square.
104		11	13·6	−62	10	259	− 1·2	12	II.	A well-defined cluster, condensing towards centre. Noted by Bailey.
105		11	15·2	−62	58	260	− 1·9	4	II.	A well-defined small cluster. Stars fairly bright. Not in N.G.C. or Bailey.
106	3680	11	20·9	−42	41	255	+17·7	12	III.	A very loose clustering of stars in a dense region.
107	3766	11	31·5	−61	3	262	+ 0·5	10	II.	Fairly dense cluster of bright stars.
108		11	45·9	−55	8	262	+ 6·6	6	II.	A distinct cluster of faint stars.
109	4103	12	1·5	−60	41	265	+ 1·7	9	III.	Cluster of bright stars. Might possibly be included in Class II.
110	4349	12	19·0	−61	20	267	+ 1·4	15	II.	A cluster of stars in a dense region.
111		12	20	+26	40	187	+84·8		IV.	The large extended cluster in Coma Berenices. Appears to extend over an area 6° square.
112	4372	12	20·1	−72	7	269	− 9·3	12	I.	Globular cluster. Rather faint at centre. Falls alongside a dark lane.
113	4590	12	34·2	−26	12	268	+36·6	8	I.	M. 68. Globular cluster, somewhat loose at centre.
114	4755	12	47·7	−59	48	271	+ 2·9	10	II.	κ Crucis.
115	4833	12	52·7	−70	20	271	− 7·5	6	I.	Globular cluster. Rather more condensed at centre than N.G.C. 4372.
116	4852	12	54·1	−59	4	271	+ 3·6	10	III.	A oose cluster in a rich region.
117	5024	13	8·0	+18	42	307	+79·4	5	I	M. 53. Globular cluster. Well condensed at centre. Outlying stars few in number and faint.
118	5139	13	20·8	−46	47	277	+15·5	45	I.	ω Centauri.
119	5272	13	37·6	+28	53	12	+77·7	18	I.	M. 3. Globular cluster. Outlying stars faint and few in number; bright centre.
120	5281	13	39·7	−62	24	277	− 0·2	3	III.	A few stars forming a small cluster.
121	5286	13	40·1	−50	52	279	+10·9	6	I.	Globular cluster, well condensed.
122	5316	13	46·9	−61	22	278	+ 0·5	12	II.	Very loose cluster in a dense region. Not well defined.
123	5460	14	1·2	−47	50	283	+13·0	30	III.	A very loose cluster extending over a field 30′ square.
124	5466	14	1·0	+29	0	10	+72·5	8	I.	Globular cluster of faint stars.
125	5617	14	22·3	−60	16	282	+ 0·3	15	II.	Loose cluster in a dense region. Some bright stars at centre.
126	5634	14	24·4	− 5	32	309	+49·1	1½	I.	Globular cluster, very small, condensed.
127	5662	14	28·0	−56	7	285	+ 3·9	8	III.	A somewhat irregular, loose cluster in a dense region.
128	5715	14	36·1	−57	7	286	+ 2·0	6	II.	A few stars forming a loose cluster.
129	I.C. 4499	14	45·0	−81	49	274	−20·0	3	I.	Globular cluster of very faint stars. Falls near a dark lane.
130	5822	14	57·9	−53	57	290	+ 3·9	40	III.	A very loose cluster of stars not very well defined.
131	5823	14	58·3	−55	12	289	+ 2·8	9	II.	Loose cluster; resembles N.G.C. 5316.
132	5897	15	11·7	−20	39	311	+30·1	6	I.	Globular cluster of rather faint stars.
133	5904	15	13·5	+ 2	27	332	+46·2	15	I.	M. 5. Globular cluster. Bright centre, very gradually condensed.
134	5927	15	20·8	− 50	19	294	+ 5·0	4½	I.	Globular cluster. Well condensed, bright centre.

A Catalogue of Star Clusters shown on Franklin-Adams Chart Plates—continued.

No.	No. in N.G.C.	R.A. 1900. h m	Dec. 1900. ° ′	L. °	λ. °	Diam. ′	Class.	Description.
135	5946	15 28·2	−50 19	295	+ 4·0	1	I.	Very small. Difficult to decide, but consider a globular cluster. Very condensed and has nebulous appearance. Becomes much brighter towards centre.
136	5986	15 39·5	−37 27	305	+13·3	5	I.	Globular cluster, bright, not much falling off towards edge.
137	5999	15 44·3	−56 10	293	− 2·0	4	II.	A few stars forming a small cluster. Similar to other clusters about this region. Falls in a very rich region.
138	6005	15 47·8	−57 8	293	− 3·2	3	II.	A small, but distinct, cluster of faint stars.
139	6025	15 55·2	−60 13	292	− 5·9	10	III.	A few bright stars forming an irregular cluster.
140	6067	16 5·4	−53 57	297	− 2·2	15	II.	Well-defined cluster in a rich region.
141	6087	16 10·6	−57 39	295	− 5·4	20	III.	A few bright stars forming an irregular cluster.
142	6093	16 11·1	−22 44	320	+19·3	5	I.	M. 80. Globular cluster, bright, not much falling off towards edge.
143	6101	16 14·4	−71 58	284	−15·4	5	I.	Globular cluster, faint, condensation not very marked.
144	6121	16 17·5	−26 17	318	+15·9	20	I	M. 4. Globular cluster, loose, gradually brighter at centre.
145	6124	16 18·8	−40 26	308	+ 5·9	25	II.	Fine open cluster, gradually condensing towards centre.
146	6134	16 20·3	−48 55	302	− 0·1	9	II.	An open cluster in a dense region.
147	6144	16 21·2	−25 49	319	+15·1	5	I.	Loose globular cluster, faint. Falls alongside vacant space.
148	6171	16 26·9	−12 50	331	+22·1	7	I.	Globular cluster, somewhat open, condensed towards centre.
149	6192	16 33·3	−43 10	308	+ 2·2	7	II.	An open cluster in a dense region. Resembles N.G.C. 6134.
150	6205	16 38·1	+36 39	27	+40·0	12	I.	M. 13. Globular cluster in Hercules; well condensed. Very fine example.
151	6218	16 42·0	− 1 46	343	+25·2	9	I.	M. 12. Globular cluster, bright. Becomes very gradually brighter towards centre. This and N.G.C. 6254 form a remarkable pair.
152	6222	16 43·5	−44 33	309	− 0·2	3	III.	A small, loose cluster of faint stars in a rich region.
153	6231	16 47·0	−41 38	311	+ 0·7		IV.	Cluster of bright stars forming part of a larger irregular cluster extending over a field 2° square. There is also some extended nebula.
154	6235	16 47·4	−22 1	326	+13·2	1½	I.	Globular cluster, resembles N.G.C. 6171 but is much smaller.
155	6242	16 48·8	−39 20	313	+ 2·3	10	II.	Somewhat irregular cluster of fairly bright stars.
156	6253	16 51·2	−52 33	302	− 6·2	6	II.	Small, well-defined cluster of faint stars. Possibly larger than indicated by diameter given. Resembles N.G.C. 6397, 6584, and 6362, but is not condensed towards centre.
157	6254	16 51·9	− 3 57	342	+22·5	10	I.	M. 10. Very fine, bright, globular cluster. Becomes gradually brighter towards centre. Slightly brighter than N.G.C. 6218.
158	6259	16 53·5	−44 31	310	− 1·6	15	II.	A distinct cluster of faint stars in a rich region.
159	6266	16 54·8	−29 5	320	+ 7·1	8	I.	M. 62. Globular cluster, well condensed.
160	6273	16 56·4	−26 7	324	+ 9·1	5	I.	M. 19. Globular cluster. Not much falling off towards edge. Does not appear circular. $5\frac{1}{2}' \times 4'$.
161	6281	16 58·0	−37 45	315	+ 1·9	9	III.	An irregular clustering of bright stars.
162	6284	16 58·4	−24 37	325	+ 9·9	1½	I.	Globular cluster, well condensed. Has a nebulous appearance.
163	6287	16 59·1	−22 34	327	+10·8	1½	I.	Globular cluster, very small, well condensed. Compare with N.G.C. 6235.

A Catalogue of Star Clusters shown on Franklin-Adams Chart Plates—continued.

No.	No. in N.G.C.	R.A 1900. h m	Dec. 1900. ° ′	L. °	λ. °	Diam. ′	Class.	Description.
164	6293	17 4·0	−26 26	325	+ 7·6	2½	I.	Globular cluster, small, well condensed.
165	6304	17 8·2	−29 20	323	+ 5·2	1½	I.	Globular cluster, small, well condensed, bright centre.
166	6318	17 10·8	−39 20	316	− 1·1	5	II.	Small clustering in a rich region.
167	6333	17 13·3	−18 25	333	+10·3	3	I.	M. 9. Globular cluster, well condensed, nebulous appearance, not much falling off towards edge. Typical of clusters about here.
168	6341	17 14·1	+43 15	36	+34·0	8	I.	M. 92. Very fine example of a globular cluster. Very gradually condensed to a bright centre.
169	I.C. 4651	17 16·9	−49 50	308	− 8·1	14	II.	Loose cluster in a rich region. Resembles N.G.C. 6259.
170	6352	17 17·8	−48 19	308	− 7·2	2	I.	Globular cluster of very faint stars.
171	6356	17 17·8	−17 43	334	+ 9·9	1½	I.	Globular cluster, very condensed. Similar to N.G.C. 6333 but smaller.
172	6362	17 21·5	−66 58	293	−17·4	10	I.	Globular cluster of faint stars.
173	6366	17 22·4	− 4 59	346	+15·6	6	I.	Apparently a globular cluster of very faint stars, rather loosely clustered Curious.
174	6388	17 29·0	−44 40	312	− 6·7	3	I.	Globular cluster, very bright and condensed. Looks like a star image. Compare with N.G.C. 6441.
175	6402	17 32·4	− 3 11	349	+14·3	6	I.	M. 14. Globular cluster, gradually condensing to a diffused nebulous centre.
176	6397	17 32·5	−53 37	304	−12·0	18	I.	Globular cluster, stars rather scattered, bright centre 3′ diameter.
177	6400	17 32·7	−36 53	320	− 3·4	6	III.	A small open cluster. Not very well defined.
178	6405	17 33·5	−32 9	324	− 1·0	25	II.	M. 6. Open cluster of bright stars.
179		17 41·4	+ 5 45	359	+15·9	60	IV.	A few bright stars forming a very open cluster. Not in N.G.C., but noted by Bailey.
180	6441	17 43 4	−37 1	321	− 5·1	1½	I.	Globular cluster, bright and strongly condensed. Looks almost like a star image. Compare with N G.C. 6388.
181	6451	17 44·3	−30 11	327	− 2·0	6	II.	A distinct clustering of faint stars in the Sagittarius cloud.
182	6469	17 46·9	−22 19	334	+ 1·4	12	II.	Loose clustering of stars in a dense region.
183	6475	17 47·3	−34 47	323	− 4·8	60	II.	M. 7. Large open cluster of bright stars extending over a field at least 1° square.
184	6494	17 51·0	−19 0	338	+ 2·1	25	II.	M. 23. Open cluster, resembles No. 204, but stars more numerous and somewhat fainter.
185	6496	17 51·8	−44 14	315	−10·6	1½	I.	Globular cluster, very faint stars. Has a nebulous appearance.
186		17 55·6	+ 2 56	357	+11 7		IV.	A large scattered group of bright stars around 67 Ophiuchi, covering an area about 6° square.
187	6520	17 57·1	−27 54	330	− 3 2	5	II.	A small cluster of bright stars in the brightest part of Sagittarius cloud. Quite distinct, and might be considered as centre of a group of bright stars scattered over a large area.
188	6531	17 58·6	−22 30	335	− 1·2	10	III.	M. 21. A few bright stars forming a cluster in a rich region.
189	6535	17 58·7	− 0 18	354	+ 9·7	¾	I.	A small cluster of a few faint stars. Has the appearance of being a very small globular cluster.
190	6539	17 59·4	− 7 35	348	+ 5·8		I.	Appears on same plate as N.G.C. 6535 and may also be a globular cluster. It is too faint to tell with certainty and has not been included in the diagram showing distribution of clusters.
191	6541	18 0 8	−43 44	316	−11·4	7	I.	Globular cluster, well condensed, bright centre. Typical of clusters about here. Centre very dense, almost like a bright nebula.

A Catalogue of Star Clusters shown on Franklin-Adams Chart Plates—continued.

No.	No. in N.G.C.	R.A. 1900.	Dec. 1900.	L.	λ.	Diam.	Class.	Description.
		h m	° ′	°	°	′		
192	6544	18 1·2	−25 1	333	− 2·7	1	I.	A bright nebulous knot in the great star cloud in Sagittarius. Probably a globular cluster, but doubtful on this scale photograph, as there is a clustering of small stars here. Classed as a nebula in N.G.C.
193	6553	18 3·2	−25 56	332	− 3·4	1½	I.	Probably a globular cluster, but doubtful. Somewhat like N.G.C. 6544, but not so bright and condensed. Classed as a globular cluster in N.G.C.
194	6558	18 3·8	−31 47	327	− 6·3	¾	I.	Very small. In richest part of Sagittarius star cloud, and hardly looks like a globular cluster. Difficult to decide on this scale photograph. Classed as a globular cluster in N.G.C.
195	6569	18 7·2	−31 51	328	− 7·0	1½	I.	Certainly a globular cluster, well condensed, small. N.G.C. 6544, 6553, and 6558 are similar in appearance, but smaller.
196	6584	18 10·6	−52 15	309	−16·4	2	I.	A small globular cluster.
197	6603	18 12·6	−18 27	340	− 1·7	4	II.	M. 24. A distinct cluster, almost globular, in the star cloud. Curious.
198	6611	18 13·2	−13 49	345	− 0·3	25	IV.	M. 16. A few stars surrounded by nebula. Doubtful if it should be included.
199	6624	18 17·3	−30 24	330	− 8·3	2	I.	Globular cluster, well condensed, bright centre. Similar to N.G.C. 6569, but a little larger.
200	6626	18 18·4	−24 55	335	− 5·9	5	I.	M. 28. Globular cluster, well condensed.
201	6633	18 22·7	+ 6 30	3	+ 7·4	20	III.	An irregular clustering.
202	6637	18 24·8	−32 25	329	−10·6	2	I.	M. 69. Globular cluster, bright, not much falling off towards edge.
203	6642	18 25·8	−23 32	337	− 6·8	1	I.	Appears to be a globular cluster, but difficult to decide. Strongly condensed. Resembles other small globular clusters in star cloud in Sagittarius and surrounding region. Classed as a globular cluster in N.G.C.
204		18 25·8	−19 19	341	− 5·4	40	II.	An open cluster of fairly bright stars. Resembles N.G.C. 6494. Not in N.G.C.; noted by Bailey. Possibly this is 6647.
205	6645	18 26·8	−16 58	343	− 4·3	10	II.	Cluster in a very dense region.
206	6649	18 27·9	−10 28	349	− 1·4	8	II.	Very curious cluster falling in a vacant region. The diameter given is the minimum. A number of faint stars near would, if included, make the diameter 15′.
207	6652	18 29·2	−33 4	328	−12·1	1	I.	Apparently a globular cluster, but difficult to decide. Strongly condensed and very bright. Similar to other small globular clusters about here. Doubtful.
208	6656	18 30·3	−23 59	337	− 8·0	20	I.	M. 22. Globular cluster, bright, gradually condensed. One of the most remarkable of the globular clusters.
209	6664	18 31·3	− 8 18	352	− 1·4	18	III.	Open cluster in a rich region; not very well defined.
210		18 34·0	+ 5 22	4	+ 4·0	45	III.	An open cluster in a rich region. Not very well defined. Not in N.G.C., but noted by Bailey.
211	6681	18 36·7	−32 23	329	−12·9	2½	I.	M. 70. Globular cluster, bright, very little falling off towards edge.
212	6694	18 39·8	− 9 30	351	− 3·7	9	II.	M. 26. Loose cluster; not very well defined.
213	6705	18 45·7	− 6 23	355	− 3·4	10	I.	M. 11. Globular cluster, rather loose, fairly bright stars.
214	6709	18 46·8	+10 14	10	+ 3·9	12	III.	A distinct, loose cluster. Somewhat irregular outline.
215	6712	18 47·6	− 8 50	353	− 5·6	2½	I.	Probably a globular cluster, though difficult to decide on plates; has a nebulous appearance with central condensation. Classed as a globular cluster in N.G.C.; marked ? by Bailey.

A Catalogue of Star Clusters shown on Franklin-Adams Chart Plates—continued.

No.	No. in N.G.C.	R.A. 1900. h m	Dec. 1900. ° ′	L. °	λ. °	Diam. ′	Class.	Description.
216	6715	18 48·7	−30 36	332	−14·4	3	I.	M. 54. Globular cluster, bright, very condensed, little falling off towards edge.
217	6723	18 52·8	−36 46	327	−17·5	8	I.	Globular cluster, bright, fine example though small.
218	6752	19 2·0	−60 8	303	−25·9	18	I.	Very fine globular cluster, gradually brighter towards centre.
219	6760	19 6·1	+0 52	3	−4·6	1	I.	Would appear to be a very small globular cluster, but is on so small a scale that it is difficult to decide. Has a nebulous appearance with central condensation. There is a great resemblance between this, N.G.C. 6535, and 6539 (shown on plate 110). N.G.C. 6712, on the same plate as 6760, is similar in appearance, but larger.
220	6779	19 12·7	+30 0	30	+7·4	1½	I.	M. 56. Possibly a globular cluster, but doubtful. Very faint and diffuse. Classed as a globular cluster in N.G.C. ; marked ? by Bailey.
221	6809	19 33·7	−31 10	335	−23·7	14	I.	M. 55. Very fine globular cluster, gradually brighter towards centre. Large, bright.
222	6811	19 35·2	+46 20	47	+11·1	15	III.	An open cluster.
223	6819	19 37·9	+39 57	42	+7·6	6	III.	A clustering of faint stars in a rich region.
224	6830	19 46·8	+22 50	28	−2·6	8	III.	An open cluster in a rich region.
225	6834	19 48·2	+29 9	33	+0·4	4	II.	Small cluster in a rich region.
226	6838	19 49·3	+18 31	24	−5·5	4	I.	M. 71. Appears to be a globular cluster, stars faint, not very condensed at centre, nebulous. Falls in a very rich region.
227		19 59	−79 36	281	−30·4		IV.	A few bright stars forming a coarse cluster scattered over an area 1° square.
228	6864	20 0·2	−22 12	347	−26·8	2	I.	M. 75. Globular cluster, very bright, strongly condensed centre, with rapid falling off towards edge.
229	6866	20 0·5	+43 43	47	+5·8	6	III.	A clustering of stars in a rich region.
230	6934	20 29·3	+7 4	20	−19·9	1½	I.	Appears to be a globular cluster, but difficult to decide. Very bright, condensed.
231	6939	20 29·4	+60 18	63	+11·3	5	II.	A cluster of faint stars. Not well shown on plate.
232	6940	20 30·4	+27 58	38	−8·3	20	II.	Somewhat irregular cluster, loose, but distinct.
233	6981	20 48·0	−12 55	3	−33·8	2	I.	M. 72. Globular cluster, small, fairly bright.
234	7078	21 25·2	+11 44	33	−27·8	6	I.	M 15. Globular cluster. Well condensed at centre, outlying stars few and faint.
235	7089	21 28·3	−1 16	21	−36·6	8	I.	M. 2. Globular cluster, very bright, not much falling off towards edge.
236	7092	21 28·6	+48 0	61	−3·2	30	IV.	M. 39. A few bright stars forming a coarse cluster.
237	7099	21 34·7	−23 38	354	−47·9	6	I.	M. 30. Globular cluster, bright, strongly condensed at centre, with rapid falling off towards edge.
238	7209	22 1·2	+46 0	63	−8·2	20	III.	An open clustering of stars in a rich region.
239		22 6·7	+52 20	67	−3·0	6	III.	A loose cluster of faint stars. Not in N.G.C. or Bailey.
240	7243	22 11·3	+49 23	66	−6·4	20	III.	A loose clustering in a rich region.
241	7245	22 11 5	+53 50	69	−2·6	3	III.	A small cluster. Not well shown on plate.
242	7492	23 3·1	−16 10	21	−64·3	3	I.	Globular cluster, very loose, almost Class II., well-defined outline.
243	7654	23 19·8	+61 3	80	−0·2	12	II.	M. 52. Cluster in a rich region. There is a falling off in the star density to the north of the cluster.
244	7762	23 45·0	+67 28	84	+5·2	10	III.	A loose cluster of faint stars. Not well shown on plate.
245	7789	23 52·0	+56 10	83	−5·7	30	II.	A fine open cluster of faint stars. Condensed towards centre.