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LIST OF OPEN STAR CLUSTERS IN EMISSION NEBULAE

SEZNAM OTEVŘENÝCH HVĚZDOKUP V EMISNÍCH MLHOVINÁCH

СПИСОК ОТКРЫТЫХ ЗВЕЗДНЫХ СКОПЛЕНИЙ В ЭМИССИОННЫХ
ТУМАННОСТЯХ

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It is well known that star clusters which contains stars of the early types of high luminosity, particularly early sub-types O, are often surrounded by emission nebulae. Such objects are then often nuclei of O-associations; they not infrequently contain also stars with emission lines and variable stars of the type RW Aur. The existence of such objects is very important, particularly for studying the process of the formation of stars but also for studying the structure of the Milky Way etc.

A number of open star clusters with emission nebulae was studied in detail and the genetic connection between the two formations was indisputably proved. Of course, there exists a series of other cases of the coincidence of an open star cluster and an emission nebula; undoubtedly, here too, there is usually a genetic connection. The following table gives a list of all the cases when the connection between a star cluster and a nebula is certain or more or less probable, elaborated from the published lists of emission nebulae and open star clusters; primarily the papers by Sharpless (1959), Bok, Bester and Wade (1955), Gum (1955), Gase and Shain (1955) and the catalogue of Alter Ruprecht and Vanýsek (1958), supplemented in 1959—63, were used. The list was of course verified by a series of other sources.

Many of the star clusters appearing in our list are very unpronounced formations and the existence of several of them is refuted in the literature. On the other hand, in many nebulae there exist weakly concentrated and sparse groups of stars, not yet listed. The lists of star clusters give a number of other unpronounced concentrations, probably connected with nebulae — see e. g. Dolidze (1961a, b). Further, in many nebulae there exist weakly concentrated and sparse groups of stars not yet given in lists of star clusters. Without a more detailed survey in such cases one cannot decide whether one is justified in using the term star cluster. As a rule, of course, one is dealing with the physical connection between stars themselves and between stars and a nebula, but such groups of stars are quite far removed from the classical

Cluster	α_{1950}	δ_{1950}	Nebula	Diameter	Brightness	Star	Type	Note
Berkeley 59	00 00.0	+67 06	S 171	180	3	+66°1675	O7	
Anon.	00 19.2	+61 28	S 173	30	2	+60°39	O9 V	1
NGC 281	00 49.9	+58 21	S 184	40	3	5 005	O6	C
IC 1805	02 28.9	+61 14	S 190	150	3	15 570	O5 f	C
IC 1848	02 47.3	+60 14	GS 25	55	3	17 505	O7	C
Cr 33	02 55.3	+60 13	GS 26	35	2	18 326	O8	C
Anon.	04 15.6	+53 05	S 207	4	2			2
NGC 1624	04 36.6	+50 21	S 212	5	3		Oe5	3
NGC 1893	05 19.4	+33 21	S 236	55	3	242 908	O5	C
Stock 8	05 24.3	+34 23	S 234	12	3			C
NGC 1931	05 28.1	+34 13	S 237	7	3			
λ Ori (Cr 69)	05 32.3	+09 54	S 264	390	2	36 861	O8	C
Trapezium	05 32.9	-05 25	S 281	60	3	37 022	O6	C
Ori Belt (Cr 70)	05 33	-01 08	S 277	120	3	37 742-3	O9.5 Ib	
NGC 2175	06 06.8	+20 20	S 252	40	3	42 088	O6	
Cr 89	06 15	+23 39	S 249	80	2	254 755	O9 V:p†	B
NGC 2244	06 29.7	+04 54	S 275	100	3	46 223	O5	C
NGC 2264	06 38.3	+09 56	S 273	250	3	47 839	O7	C
Dolidze 25	06 42.5	+00 21	S 284	80	2			
NGC 2362	07 16.7	-24 51	S 310	480	2	57 061	O9	C
Anon.	07 27.2	-18 25	S 305	4	3			4
NGC 2467	07 50.5	-26 15	S 311	45	3	64 315	O6:nne	5
Cr 173	08 02	-46 08	G 12a	1000	2	66 811	O5 f	B
NGC 2579	08 19.2	-36 01	G 11	2				
Pismis 4	08 32.8	-44 06	G 16	180				
Cr 197	08 42.9	-41 11	G 15	20	2			A
NGC 3293	10 33.9	-57 58	G 30	40	2	91 824	O7	
NGC 3324	10 35.4	-58 22	G 31	20	3	92 206	O6.5	
Trumpler 16	10 43.2	-59 27	G 33	150	3	93 250	O5	C; 6
Pismis 17	10 59.0	-59 33	G 34a, b	60	2			
NGC 3572	11 08.3	-59 58	G 37	20	3	97 253	O6	
NGC 3603	11 12.9	-60 59	G 38b	10	3	97 950	WN5 + O	
IC 2944, 2948	11 35.4	-63 00	G 42	60	3	101 190	O7	
NGC 5281	13 43.1	-62 39	BBW 27700	20	2			A
NGC 6193	16 37.5	-48 40	G 33	150	3	150 135	O6	C
NGC 6231	16 50.5	-41 43	G 55	240	2	152 233	O6	C
Trumpler 24	16 53.5	-40 35	G 56	75	3	152 723	O6	
NGC 6281	17 01.4	-37 50	S 2	60	2			
Pismis 24	17 22.0	-34 18	S 11	90	3			
NGC 6383	17 31.5	-32 32	S 12	120	2	159 176	O7	
Cr 347	17 45.2	-29 17	S 16	20	2			
Ruprecht 139	17 58.1	-23 33	S 28	40	1			
NGC 6514	17 59.3	-23 02	S 30	20	3	164 492	O7	C
NGC 6530	18 01.7	-24 20	S 25	90	3	164 794	O5	
Cr 367	18 06.5	-24 00	S 29	40	2	165 921	O7.5 nn (V)	B
NGC 6595	18 14.0	-19 54	S 37	20	2			B
NGC 6596	18 14.6	-16 41	S 44	60	2	167 633	O6	B
NGC 6604	18 15.3	-12 15	S 54	140	3	-12°4979	O7 (f)	C
NGC 6611	18 16.0	-13 48	S 49	90	3	168 076	O5	
NGC 6618	18 17.9	-16 12	S 45	60	3	-16°4826	O5	
NGC 6823	19 41.0	+23 11	S 86	40	2	+22°3782	O7	C
NGC 6871	20 04.0	+35 38	GS 179	160	2	190 864	O6	C
Dolidze 4	20 15.9	+36 32	S 104	7	2			B
Cr 419	20 16.3	+40 34	GS 192	65	2	193 322	O8	B
Dolidze 6	20 19.0	+41 13	GS 198	18	2			
NGC 6910	20 21.3	+40 37	S 108	180	3	229 196	O5	C
Berkeley 90	20 33.7	+46 38	S 115	50	2			
IC 1396	21 37.5	+57 16	S 131	170	2	206 267	O6	C
IC 5146	21 51.5	+47 02	S 125	9	3	+46°3474	B1 V	
NGC 7380	22 45.0	+57 50	S 142	30	3	215 835	O6 n	
Markarian 50	23 13.1	+60 12	S 157	90	3	219 460	WR	C
Stock 18	23 59.0	+64 22	S 170	20	2	+63°2093		C

conception of a star cluster. In our list only those clusters are given for which the connection with a nebula can now be regarded as proved.

The list thus represents an enlargement of a similar list published by Markarian (1957).

The table contains:

the name of the star cluster according to the catalogue of Alter et al. (1958) and its additions (1959—63), with the exception of two as yet anonymous clusters;

the coordinates of the star cluster (1950);
 the name of the nebula, primarily from Sharpless' catalogue (1959); the nebula is denoted by the initials of the authors of the catalogue and the corresponding number (the numbers of the catalogue of Gase and Shain are given only if the nebula is described in greater detail in this catalogue than in Sharpless' catalogue);
 the diameter of the nebula in minutes;
 the brightness of the nebula in Sharpless' scale (1 — weak, 2 — medium bright, 3 — very bright);
 HD or BD number of earliest star in cluster;
 MK type of earliest star in cluster;
 remark, stating:

- A — connection between star cluster and nebula not proved,
- B — star cluster is unpronounced,
- C — star cluster contains multiple system;
- 1. Hardorp et al. (1959) give at least 4 OB stars in neighbourhood of star BD + 60°39; diameter of group 7';
- 2. A small cluster of faint stars;
- 3. Spectrum of star after Hubble (1922);
- 4. Nebula is identical with nebula No. 11 in Münch's paper (1955); this author speaks of group of 15 stars in nebula;
- 5. Haffner 18abc and 19 clusters are also in nebula;
- 6. Trumpler 14, 15 and Cr 232, 233 and 234 clusters are also in nebula.

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SUMMARY

A list is given of open star clusters surrounded by emission nebulae.

SOUHRN

Je předložen seznam otevřených hvězdokup obklopených emisními mlhovinami.

РЕЗЮМЕ

Приводится список открытых звездных скоплений, окруженных эмиссионными туманностями.