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A New General Catalogue of Nebulae and Clusters of Stars, being the Catalogue of the late Sir John F. W. Herschel, Bart., revised, corrected, and enlarged. By J. L. E. DREYER, Ph.D.

THE General Catalogue of Nebulae which the late Sir JOHN HERSCHEL published in the *Philosophical Transactions* for 1864 was almost entirely founded on his father's and his own observations. Out of 5,079 objects which it contained only about 450 positions were due to other observers, while the places of the remainder were deduced from all the observations of Sir WILLIAM and Sir JOHN HERSCHEL, those of the former having been reduced independently by CAROLINE HERSCHEL and by AUWERS. But already, before the appearance of this valuable work, several astronomers had commenced determining accurate positions of nebulae. In 1853 LAUGIER made the beginning by publishing the places of fifty-three bright nebulae determined at the Paris Observatory, and in 1856 appeared D'ARREST's first series of micrometric observations of nebulae made at the Leipzig Observatory. These observations having shown how many objects were within the reach of comparatively small instruments, SCHÖNFELD and SCHULTZ devoted themselves for a number of years to the determination of positions of nebulae, each observing about 500 objects. Less extensive series of observations have been made by AUWERS, G. RÜMKER, VOGEL, J. SCHMIDT, and B. VON ENGELHARDT. None of these results were, however, available when HERSCHEL's General Catalogue was compiled (except D'ARREST's first series), and what is more to be regretted, the great work of D'ARREST's, *Siderum Nebulosorum Observationes Havnienses*, founded on zone observations made with the 11-inch Refractor at Copenhagen, was not completed until three years after HERSCHEL'S

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work had appeared. Although the probable errors of D'ARREST's results are not much smaller than those of Sir JOHN HERSCHEL's positions, the former are entirely free from the large accidental errors occasionally met with in the observations of the two HERSCHELS, and which naturally arose from the construction of their instruments and the haste with which the observations often necessarily were made. There are, therefore, many cases where the General Catalogue, although evincing the most scrupulous care both in observing and reducing, is not in accordance with the heavens. And it is not only through D'ARREST's observations that such discrepancies have been revealed, the other works on nebulae which have appeared since 1864 have brought others to light, while a considerable number of new nebulae were also found in the course of years, so that HERSCHEL's excellent work soon appeared to want a supplement.

For these reasons I found it, in 1876, desirable to compile for use in Lord Rosse's observatory a complete list of corrections to the General Catalogue, as well as a catalogue of the new nebulae discovered by D'ARREST, MARTIN, STEPHAN, TEMPEL, and others. This Supplement was published in 1878 in the *Transactions of the Royal Irish Academy*, vol. xxvi., and has, I believe, been found useful. Since then no extensive work on nebulae has appeared, with the exception of the detailed account of the observations made from 1848 to 1878 with Lord Rosse's 6-foot telescope. But still a good deal of work has been done on nebulae, though the results have been published in a less systematic manner. A number of short notes from the pen of M. TEMPEL give a considerable amount of valuable information (particularly of many of Sir WILLIAM HERSCHEL's nebulae which have not been observed by others), and contain places of many new objects. M. STEPHAN has also continued his valuable micrometric observations of new nebulae, while during the last few years Mr. LEWIS SWIFT and Professor ORMOND STONE have placed on record about a thousand new nebulae, most of which, however, are of the last degree of faintness and minuteness, and possessing but little interest.

In December 1886 I submitted to the Council of the Royal Astronomical Society a second supplementary catalogue arranged exactly like the first one. But considering the circumstance that HERSCHEL's work is practically out of print, and that the simultaneous use of three catalogues and two copious lists of corrections would be very inconvenient, the Council proposed to me to

amalgamate the three catalogues into a new General Catalogue. I agreed to do so, and have adopted the following plan in compiling the present work.

There did not seem to be any reason for changing the epoch from 1860 to a year nearer to the present time, as 1860 has the advantage of being close to the epochs of ARGELANDER'S, SCHÖNFELD'S, and CHACORNAC'S maps, and coincides with that of PETERS' maps, while D'ARREST'S final positions of nebulae are referred to 1860, and nearly all the modern micrometric observations on nebulae to an epoch only five years later. But the positions given in the General Catalogue required a thorough revision. They were first corrected by being compared with all modern published micrometric and meridian observations of nebulae, after which all the positions not thus corrected but occurring in D'ARREST'S great work were improved by means of the latter, either by simply adopting D'ARREST'S places whenever they were based on three or more good observations, or, whenever D'ARREST had only one or two observations, by taking the mean of these and HERSCHEL'S positions. Constant reference was also made to the original papers in the *Philosophical Transactions* for 1786, 1789, 1802, 1833, to the Cape Observations, and to ATWEENS' invaluable reduction of W. HERSCHEL'S observations, in order, if possible, to find the causes of discordant results and other difficulties. It was not possible to indicate the source of each position in the catalogue, nor was it necessary, as a catalogue of this kind can only be a work of reference or an index, but not a systematic catalogue of final positions representing the observations of this or that astronomer. But whenever considerable alterations, amounting to several minutes of arc, were made in one or both coordinates, the authority (or the principal one if there were several) has always been quoted in the column "Other Observers." Of course very many positions had to be left unaltered, chiefly those of objects situated in the southern hemisphere which is still waiting for its D'ARREST. But, though every endeavour was thus made to make the catalogue as accurate as possible, it appeared proper only to give the Right Ascensions to whole seconds of time and the Polar Distances to the tenth part of a minute; not only on account of the character of the work as one of reference only, but also because it would be useless to attempt greater accuracy in the case of clusters or of nebulae not micrometrically observed, while it would even be premature to attempt a final catalogue of the objects observed with

the Micrometer, owing to the yet but imperfectly studied systematic errors in observations of nebulae.* But within the said limits I trust that no opportunity has been lost of making the places as accurate as possible, and it is hardly necessary to point out that this will be found a special advantage wherever a number of objects occur close together.

The Precessions have been given for 1880 as already done by Sir JOHN HERSCHEL; the descriptions have also been revised, though not in the same systematic manner as the positions had been, and whenever any error of importance was detected it was corrected, chiefly by means of D'ARREST's and Lord Rosse's observations. Special care was taken to give the places and descriptions of the new nebulae found at Birr Castle correctly, but here I had little to do except to copy the notes, which I inserted in the Birr Castle Observations when I had the pleasure of preparing them for publication in 1877-79. With regard to the very numerous new nebulae recorded of late years, it was frequently a matter of some difficulty to decide about the identity of objects announced independently by several observers, and differing little as regards place, but often much as to description. The plan always adopted by M. TEMPEL of stating precisely how many objects, new or old, he has seen about the place under observation is very strongly to be recommended, especially when announcing new nebulae which have not been micrometrically observed. In case anyone should feel doubts about an assumed identity he can easily decide for himself by referring to the authorities quoted in the fifth column.

Arrangement of the Catalogue.

This is in general the same as that adopted by Sir JOHN HERSCHEL, except that for obvious reasons the three columns have been omitted which showed the number of results in R.A. and N.P.D. made use of, and the "total number of times observed by *h* and *H*."

The *first column* contains the current numbers of the present catalogue. It was with much regret that I found it necessary to introduce new numbers, and it is greatly to be hoped that these will be *quoted* as little as possible,

* In making use of these I did not lose sight of the systematic differences, which appear to depend to a great extent on the degree of condensation and brightness of the objects, as first pointed out by J. SCHMIDT, and afterwards shown in more detail in my reviews of SCHULTZ's and SCHÖNFELD's observations in the *Vierteljahrsschrift d. a. G.*, vols. x. and xi.

but that old nebulae, as hitherto, will be chiefly mentioned by their *h* number, or failing such by their *H* class and number.

The *second column* gives the number of Sir JOHN HERSCHEL'S General Catalogue (1-5079), or my Supplement (5080-6251).

The *third column* gives the numbers of Sir JOHN HERSCHEL'S Slough Observations in the *Phil. Trans.* 1833 (1-2306) and his Cape Observations (2308-4021). Numbers in round and square brackets refer to the special lists of objects in the two nebulae in the Cape Observations, pp. 151-164. A few objects (*h* 4016-4021) accidentally omitted from the regular catalogue of observations, but given among errata in the Cape Observations, are designated *h. o. n.* in the fifth column. A synoptic table of the dates of the observations is given in the Cape Observations, pp. 129-131.

The *fourth column* contains the classes and numbers of Sir WILLIAM HERSCHEL, by which the objects are designated in his unreduced observations in the *Phil. Trans.* for 1786, 1789, 1802. Eight nebulae found in September 1802 (*H. O. N.* in the fifth column) are published in the Cape Observations, p. 128. A most important list of errata in the three catalogues is given in the *Phil. Trans.*, 1864, pp. 44, 45. The only published reduced catalogue of Sir W. HERSCHEL'S nebulae and clusters is that of AUWERS, printed in vol. xxxiv. of the Königsberg Observations (in the present work simply quoted as "AUWERS"), where a chronological table of the sweeps, an index of the classes and numbers with their approximate R.A., and a list of fifty-two very widely diffused nebulosities will also be found.

The *fifth column* contains references to other observers. For the sake of the historical interest attached to early observations of nebulae and clusters, I have here inserted the names of observers before MESSIER (HIPPARCHUS, SÜFI, CYSAT, FLAMSTEED, MÉCHAIN, &c.). Whenever the name of an observer later than the two HERSCHELS is given at an object observed by *h* or *H*, it means that the place given in the General Catalogue was considerably in error, and has been corrected by means of the observations of the astronomer mentioned in this column. Objects not observed by *H* or *h* have been discovered by the observer whose name is given here. References to the list of new nebulae found before 1862, given by AUWERS in his above-mentioned work (*Auw.* with a number), will be found in the

column *Description*, but the name of their discoverer has been given in the fifth column. Only names which occur very frequently have been abbreviated, and in the following manner :—

d'A.	...	...	...	D'ARREST.
Auw.	...	...	...	AUWERS.
C. H.	...	...	...	CAROLINE HERSCHEL.
Δ	...	...	...	DUNLOP.
H.	...	...	...	SIR WILLIAM HERSCHEL.
h	...	...	...	SIR JOHN HERSCHEL.
G. C.	...	...	...	General Catalogue of 1864.
L.	...	...	...	LEAVENWORTH.
Lac.	...	...	...	LACAILLE.
M.	...	...	...	MESSIER.
Mu.	...	...	...	MULLER.
m	...	...	...	MARTH.
Ld. R.	...	...	...	The late Lord Rosse (and his assistants).
Ld. R.*	...	...	...	The present Lord Rosse.
(R)	...	...	...	Found with Lord Rosse's telescope.
St.	...	...	...	STEPHAN.
O. St.	...	...	...	ORMOND STONE.
Sw.	...	...	...	SWIFT.
T.	...	...	...	TEMPEL.

I now proceed to indicate the sources where the observations referred to in this column will be found.

D'ARREST. A few references (chiefly in the notes at the end of the catalogue) are to D'ARREST'S *Erste Reihe* (Leipzig, 1856), but nearly all are to his work *Siderum Nebulosorum Observationes Havnienses* (Copenhagen, 1867), and it is to that thesaurus, more than to the exertions of any other observer, that the credit should be given for whatever superiority as to accuracy the present work may possess in comparison with HERSCHEL'S.

AUSTIN. See Harvard College.

AUWERS. *Königsberger Beobachtungen*, Band xxxiv.; positions of forty nebulae in the *Astr. Nachr.*, vol. lviii., No. 1392, from observations made with the Königsberg Heliometer.

BALL. See Lord Rosse.

BARNARD. Nebulae found with a 6-inch Refractor at Nashville, Tennessee. The *Sidereel Messenger*, vols. i.—iii., and private communications.

BIGOURDAN. About 100 nebulae found with the west Equatorial of the Paris Observatory (of 310 mm. aperture), and kindly communicated in May 1887.

BOND. *List of New Nebulae and Star-Clusters found at Harvard College Observatory.* Cambridge, 1863, 8vo. This contains objects found by G. P. BOND, S. COOLIDGE, and J. H. SAFFORD, nearly all occurring in the Harvard Equatorial Zones.

BORELLY. *Astr. Nachr.*, vol. lxxix., No. 1885, and *Monthly Notices*, xxxii. p. 248. Six nebulae found at the Marseilles Observatory, and microscopically observed.

BURNHAM. *Memoirs R.A.S.*, vol. xlv. pp. 169 and 216; *Astr. Nachr.*, vol. cvii., No. 2524.

COMMON. List of about 32 new nebulae found with a 3-foot Reflector, in *Copernicus*, vol. i. p. 50.

COOLIDGE. See BOND.

COPELAND. Wherever (R) is added, the object in question was found with Lord Rosse's 6-foot telescope. Other nebulae were discovered by means of the spectroscope, partly in Peru (*Copernicus* iii. p. 206), partly at Dun Echt (*Monthly Notices*, xlv. p. 91).

DREYER. See Lord Rosse.

DUNLOP. Catalogue of 629 southern nebulae in the *Phil. Trans.* for 1828. As Sir JOHN HERSCHEL failed to find about two-thirds of these objects, he came to the conclusion "that a want of sufficient light or defining power in the instrument used by Mr. DUNLOP has been the cause of his setting down objects as nebulae where none really exist." For this reason none of the objects were inserted in the General Catalogue unless confirmed at the Cape, and I have, of course, followed HERSCHEL implicitly in this particular.

ENGELHARDT. *Observations Astronomiques faites par B. d'Engelhardt dans son Observatoire à Dresde*, vol. i., Dresden, 1886, contains micrometric observations of 100 nebulae. I am further indebted to M. D'ENGELHARDT for 90 positions of nebulae recently observed by him.

ENGELMANN. Meridian observations of nebulae made at the Leipzig Observatory, *Astr. Nachr.* vol. civ., No. 2485.

HARTWIG. A few nebulae found with the 18-inch Refractor at Strasburg, *Astr. Nachr.*, vol. cv., No. 2507; vol. cvii., No. 2544; and vol. cxii., No. 2688.

HARVARD COLLEGE. Vol. xiii., Part I. of the *Observations*, contains a series of observations of nebulae, among which are some new ones found by AUSTIN, LANGLEY, PEIRCE, SEARLE, WENDELL, and WINLOCK.

HOLDEN. New nebulae found with the 15½-inch Refractor at Madison, *Publications of the Washburn Observatory*, vol. i. p. 73, and vol. ii. p. 101.

LACAILLE. Catalogue of 42 southern nebulae reduced by AUWERS (*l.c.* p. 223). The Roman numerals indicate his three classes: I. Nebulae without stars; II. Clusters; III. Stars with nebulosity.

LANGLEY. *See* HARVARD.

LEAVENWORTH. *See* ORMOND STONE.

LOHSE, J. G. List of about 20 new nebulae found with the 15½-inch Refractor at Mr. WIGGLESWORTH'S Observatory, Scarborough. Kindly communicated by letters.

MARTH'S Catalogue of 600 new nebulae, found at Malta with Mr. LASSELL'S 4-foot Reflector, is published in the *Mem. R.A.S.*, vol. xxxvi. A good many of them were found independently by D'ARREST and STEPHAN, whereby the accuracy of Mr. MARTH'S positions has been proved to be very satisfactory.

MELBOURNE. In the first part of the Melbourne observations of southern nebulae there are a few *novae*.

MESSIER'S Catalogue as reduced by AUWERS (*l.c.* p. 218).

MULLER. *See* ORMOND STONE.

PALISA. Nebulae discovered or observed with the 27 and 12-inch Refractors of the Vienna Observatory, *Wiener Beobachtungen*, vierte Folge, vols. ii, iii, iv., and *Astr. Nachr.*, Nos. 2520, 2544, 2732, and 2782.

PEIRCE. *See* HARVARD.

PETERS, C. H. F. Positions of nebulae (including a few *novae*) read off from his maps or micrometrically observed. *Copernicus*, vol. i. p. 51, and vol. ii. p. 54.

PICKERING'S star-like planetary nebulae, detected by means of spectroscopic sweeps, *The Observatory*, vol. v. p. 294, and private letter of July 1885.

Lord ROSSE. For detailed information about the nebulae found at Birr Castle (nearly all in the neighbourhood of brighter nebulae), see "Observations of Nebulae and Clusters of Stars made with the 6-foot and 3-foot

Reflectors at Birr Castle from 1848 to 1878," Dublin 1880 (from the *Scient. Trans. R. Dubl. Soc.*, vol. ii.). This publication embodies all observations of nebulae of any value made at Birr Castle (except of the *Orion* nebula), and quite supersedes the abstracts given in the *Phil. Trans.* for 1850 and 1861, except that the engravings have not been republished. The new nebulae found before 1861 (chiefly by G. J. STONEY, B. STONEY, and R. J. MITCHELL) have been marked Ld. R.; many of them were re-observed and measured in 1874-78 by the present Earl of Rosse and myself. Those found by the present Earl have been marked Ld. R*, and those found by BALL, COPELAND, and DREYER are indicated by the name of the observer with an (R) added.

G. RÜMKE's Ring-Micrometer observations of 135 nebulae are published in the *Astr. Nachr.*, vols. lxiii.-lxviii., Nos. 1508, 1531, 1566, 1599, and 1631. Several of the objects have not been observed by anybody else after Sir W. HERSCHEL. In many cases the comparison stars have not been observed on the Meridian.

SAFFORD. See BOND.

SCHMIDT, J. Ring-Micrometer observations, *Astr. Nachr.*, Nos. 1678 and 2097.

SCHÖNFELD. The very valuable Ring-Micrometer observations of 489 nebulae are published in the *Astr. Beobachtungen auf der Grossherzoglichen Sternwarte zu Mannheim*, vols. i., ii., 1862-75.

SCHULTZ's equally important *Micrometrical Observations of 500 Nebulae* were published at Upsala in 1874. A "Preliminary Catalogue" of the resulting positions was given in the *Monthly Notices*, vol. xxxv. p. 135. Next to D'ARREST's work this publication and those of SCHÖNFELD have furnished most corrections to the General Catalogue.

SEARLE. See HARVARD.

SECCHI. Fourteen new nebulae, *Astr. Nachr.*, vol. lxvi., No. 1571.

STEPHAN. The new nebulae found with the 0^m.8 silvered glass Reflector at Marseilles have all been micrometrically observed, and the positions are therefore extremely reliable. All the lists published in two places have been compared *inter se* to guard against misprints, and the eight first lists were, besides, compared with a MS. copy which M. STEPHAN kindly sent me in 1877. The various lists are referred to by Roman numerals in the following manner:—

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St. I.	<i>Astr. Nachr.</i> , vol. lxxvi. No. 1810	} <i>Monthly Notices</i> , xxxii. p. 23.	
II.	" " lxxviii. " 1867		
III.	" " lxxix. " 1876		" " p. 231.
IV.	" " lxxxi. " 1939		" xxxiii. p. 433.
V.	" " lxxxiii. " 1972		" xxxiv. p. 75.
VI.	" " lxxxiii. " 1977.		
VII.	<i>Comptes Rendus</i> , vol. lxxxiii. p. 328.		
VIII.	<i>Monthly Notices</i> , xxxvii. pp. 334-39.		
IX.	<i>Comptes Rendus</i> , vol. lxxxvii. p. 869.		
X.	" " xc. p. 837.		
XI.	" " xcii. pp. 1128, 1183, 1260; <i>Astr. Nachr.</i> vol. c. No. 2390.		
XII.	" " xcvi. pp. 546, 609	" " cv. " 2502.	
XIII.	" " c. pp. 1043, 1107	" " cxl. " 2661.	

STONE, ORMOND. A remarkable contrast to M. STEPHAN's results is offered by the extremely rough places of 476 new southern nebulae, found by Messrs. ORMOND STONE, LEAVENWORTH, and MÜLLER, with the 26-inch Refractor at the L. McCormick Observatory at Charlottesville, Virginia, and published in two lists in the *Astronomical Journal*, vol. vii., Nos. 146 and 152 (designated by the numbers i. and ii.). In the first list the Right Ascensions are given to whole minutes of time only, in the second one mostly to the tenth part of a minute. If one may judge from the descriptions, many of the objects are not unlikely to turn out to be nothing but very small stars, and it is much to be hoped that the observers in future will verify the objects before proceeding to publication, and aim at greater accuracy in the positions. Wherever a bright star is stated to be near one of these objects, I have tried to identify the star in the *Durchmusterung*, but rarely with success, so that either the positions or the magnitudes (most probably the former) must be greatly in error.

STRUVE, O. *Observations de quelques Nébuleuses; Entdeckung einiger schwacher Nebelflecken; Wiedererscheinen des Winnecke'schen Cometen und Entdeckung einiger neuer Nebelflecken; Mélanges Math. et Astron.* t. iii. p. 569; *ibid.* p. 689, and t. iv. p. 395.

SWIFT. Since 1883 Mr. LEWIS SWIFT has searched most assiduously for nebulae with the 16-inch Refractor at the Warner Observatory, and has in four years found about 600, mostly extremely faint objects. The positions are very good. I am under great obligations to Mr. SWIFT for his kindness in copying for me in advance several of his published lists, and supplying me

with the places of all objects found by him up to June 1887. The rapid discovery of so many faint nebulae in a few years by one observer furnishes a confirmation of the opinion expressed by D'ARREST: "nebulae esse numero omnino infinitas." The following is a list of the references to the six catalogues:—

Sw. I.	<i>Astr. Nachr.</i>	vol. exii.	No. 2683.
II.	"	"	exiii. " 2707.
III.	"	"	cxv. " 2746.
IV.	"	"	cxv. " 2752.
V.	"	"	cxvi. " 2763.
VI.	communicated by degrees in MS.		

TEMPEL. The observations of nebulae made at Arcetri with an 11-inch Refractor since 1875 are unfortunately only partly published in a number of scattered articles in the *Astr. Nachr.* Of particular value for the present work have been a great many observations of, and notes on, nebulae, observed by nobody after W. HERSCHEL, except by M. TEMPEL. Many new nebulae have also been found at Arcetri. I have to express my best thanks for the kindness with which M. TEMPEL has answered my inquiries about many objects, old and new, by which I have been enabled to give the accurate positions of many *novae* merely alluded to in the published notes. The Roman numerals indicate the sources of the results as follow:—

T. I.	<i>Astr. Nachr.</i>	No. 2212.	T. VI.	<i>Astr. Nachr.</i>	No. 2511.
II.	"	" 2253.	VII.	"	" 2522.
III.	"	" 2284.	VIII.	"	" 2527.
IV.	"	" 2347.	IX.	"	" 2660.
V.	"	" 2439.	X.	"	" 2691.

TODD. A number of nebulous-looking objects were found by Professor D. P. TODD during his search for an ultra-Neptunian planet (*Astr. Nachr.*, No. 2698), but I have only inserted eight of them. Of the rest, some were near the places of nebulae already catalogued, while the nebular character of others seemed very doubtful.

VOGEL. *Beobachtungen von Nebelflecken und Sternhaufen*: Leipzig, 1867, 8vo; and *Positionsbestimmungen von Nebelflecken und Sternhaufen zwischen + 9° 30' und + 15° 30' Declination*: Leipzig, 1876, 4to (*Leipziger Beobachtungen*, Bd. i.). All filar Micrometer observations.

WENDELL. See HARVARD.

WINEOCK. See HARVARD.

WINNECKE. Places of a few new nebulae communicated by letter in 1876.

The sixth and following columns require no explanation. In the last column will be found references to the notes at the end of the catalogue (*), and to the list of figured nebulae (†). The "Summary Description" of objects not occurring in the General Catalogue represents the observer's own words as nearly as possible, except that I have always changed M. STEPHAN'S *ee'* into *e'*, and his *el'* into *el'*, as such of his *novae* which have been found independently by other observers have always by these been described as somewhat brighter than by M. STEPHAN. The system of abbreviated description used in the observations of the two HERSCHELS has been in use so long that it is unnecessary to enter into a lengthy explanation of it, except to call attention to the progressive scale of brightness, size, and form adopted by Sir JOHN HERSCHEL.

1. excessively faint	excessively small, 3" to 4" diam.
2. very faint	very small, 10" to 12" diam.
3. faint	small
4. considerably faint	considerably small } 20" to 30" diam.
5. pretty faint	pretty small } 50" to 60" diam.
6. pretty bright	pretty large }
7. considerably bright	considerably large } 3' to 4' diam.
8. bright	large
9. very bright	very large, 8' to 10' diam.
10. excessively bright	excessively large, 20' and upwards.*

In the case of form, the scale was supposed arranged in the order: round, very little extended, elliptic or oval, considerably extended, pretty much extended, much extended, very much extended, extremely extended.

The following is a complete list of the abbreviations:—

ab	about	app	appended
alm	almost	att	attached
am	among	b	brighter

* In estimating clusters of well-separated and scattered stars a wider acceptance must be understood, so that, e.g., a cluster of 1' in extent would be very small, and one of 15' or 20' large.

bet	between	nr	near
biN	binuclear	N	Nucleus, or to a Nucleus
bn	brightest towards the north side	p	preceding
bs	brightest towards the south side	p	pretty (before F, B, L, S)
bp	brightest towards the preceding side	pg	pretty gradually
bf	brightest towards the following side	pm	pretty much
B	bright	ps	pretty suddenly
e	considerably	P	poor
ch	chevelure	quad	quadrilateral
co	coarse, coarsely	quar	quartile
com	cometic	r	resolvable (mottled, <i>not</i> resolved)
cont	in contact	rr	partially resolved, some stars seen
C	compressed	rrr	well resolved, clearly consisting of stars
C.G.H.	Results of observations, &c., at the Cape of Good Hope	R	round
Cl	cluster	RR	exactly round
d	diameter	Ri	rich
def	defined	s	suddenly
dif	diffused	s	south
diffic	difficult	sp	south preceding
dist	distance, or distant	sf	south following
D	double	sc	scattered
e	extremely, excessively	st	stars
ee	most extremely	sev	several
er	easily resolvable	susp	suspected
exc	excentric	sh	shaped
E	extended	stell	stellar
f	following	S	small
F	faint	sm	smaller
g	gradually	triN	trinuclear
gr	group	trap	trapezium
i	irregular	v	very
inv	involved, involving	vv	an intensive of v
iF	irregular figure	var	variable
l	little (adv.), long (adj.)	*	a star; *10, a star of 10th magnitude
L	large	*	double star; ** triple star
m	much	!	remarkable, !! very much so, !!! a magnificent or otherwise interesting object
mm	mixed magnitudes	Δ	triangle, forms a triangle with
mn	milky nebulosity	⊕	globular cluster of stars
M	middle, or in the middle	○	planetary nebula
n	north	◎	annular nebula
neb	nebula	st 9 ...	stars from the 9th mag. downwards
nf	north following	st 9 ... 13	stars from the 9th to 13th mag.
np	north preceding		