The Second Reference Dictionary of the Nomenclature of Celestial Objects (Solar System excluded)

Volume II

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Contents

This is a self-contained, revised and updated version of the *First Dictionary* and its Supplements, except for the Parts devoted to Individual Names and the Nomenclature based on Constellation Names which are not developed here.

How to use this Dictionary

The present work has been described by the authors in A&AS 1994 (in press). The present printed version is subdivided into two volumes: the *Table of Acronyms* in landscape format constitutes Vol. I; the introduction, and chapters 2 to 6 constitute Vol. II.

Most astronomical objects are named by an entry in some catalogue. These names generally consist of a word or *acronym* and a *numbering* which structure is called the *format*. To identify any object which is so named, the reader is referred to the main dictionary in Chapter 1 (Vol. I): Col.1 lists the *acronym*, Col.3 the *format*; Col.7 and 8 provide a key to the original references for each catalogue, as listed in Chapter 3. Papers are listed chronologically by year and alphabetically by first author's first letter within each year. For any catalogue which was published as a series of papers, the first paper with catalogue entries appears in its apropriate chronological place in the table and all subsequent papers in the series follow immediately after the first. Thus all papers of a given catalogue appear together and the reader can refer to them for specific information on a given source.

The computerized Dictionary allows several facilities which are described at the end of the Introduction and in Chapter 5. Auxiliary tables and Annexes are collected in Chapter 6.

The nomenclature based on constellation names (*e.g.* Cas A, Mon OB2, etc...) and individual names as opposed to catalogue names are not described here; we refer the reader to Parts V and VI of the previous version (First Dictionary, Fernandez et al., 1983; Lortet & Spite, 1986) and to a few other general references (Table 6.8 of the present edition). The 3-letter abbreviations recommended for constellation names are given in Table 6.9.

The following Table compares the present edition of the *Second Reference Dictionary of the Nomenclature of Celestial Objects* with its description in A&AS 1994 (in press):

	Second Reference Dictionary		A&AS paper	On-line (*)
Chap. 1	Table of Acronyms	(Vol.I)	Fig. 4	`cati`
	Introduction	(Vol.II)		
Chap. 2	Table of Comprehensive Catalogues		Fig. 5	`compil`
Chap. 3	Coded references		Fig. 6	`ref`
Chap. 4	Author Index		Fig. 7	`cata`
Chap. 5	The On–line Dictionary		Sec. 4	
Chap. 6	Auxiliary Tables & Annexes:			
Table 6.1	Wavelengths, Abbreviations, Types of Objects		—	(`cato`)
Table 6.2	Inventory of the Formats		Table 2	(`catf`)
Table 6.3	Recommended Formats		—	
Table 6.4	Misleading Formats		Table 3	
Table 6.5	Abbreviations for journals, translitteration		—	(`journal`)
Table 6.6	Very short usual designations		Table 4	
Table 6.7	A sample of misleading designations		Table 5	
Table 6.8	Individual names and Nomenclature based on Constellations		Table 6	
Table 6.9	Abbreviations for Constellation names		—	
Table 6.10	Abbreviations for Greek letters		—	

(*) See Chapter 5 on how to get started with the On-line version of the Dictionary. The parentheses in the last column indicate that the on-line information is different in its aim or presentation: `cato` used alone gives a census of of the types of objects; `journal` gives the whole set of abbreviations used for journals in *SIMBAD*.

Please report any error, comment or omission to one of the authors:

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Introduction

0.1 The Nomenclature of Celestial Objects

0.1.1 The IAU approach and the Dictionary as the reference work

The problem of the Nomenclature of Celestial Objects has repeatedly been dealt with by the relevant IAU Commissions and especially the Working group on *Designations* of IAU Commission 5 (Documentation and Astronomical Data).

The idea of a systematic census of the "names" created or quoted in the literature, developed at IAU General Assembly 1979, resulted in the publication of the First Dictionary (Fernandez et al. 1983), its Supplements (Lortet & Spite 1986, Borde & Lortet 1990b) and specialized documents for the Magellanic Clouds (Lortet 1986a) and M33 (Lortet 1986b). The Dictionary has since been computerized (the first step is described in Borde & Lortet 1990a) and updated. The present edition is the update as of January 1994.

For convenience, it is divided into two volumes: one in landscape format is devoted to the Table of Acronyms ; Vol.II (including this Introduction) describes the References, the Author Index, the On–line Dictionary, auxiliary Tables and Annexes.

On the other hand, the IAU Commissions gradually developed rules and recommendations: 1985 IAU Trans. XIXB *pp* 48, 49 and 40-42 (Memorandum on Designations, New Delhi 1985); 1988 IAU Trans. XXB IAU Style Book S46-47: recommendations to be published by the Editors as a complement of their instructions to authors, as in A&A Annual Index 1993 (A&A 280, A12-A14; useful illustrations are given there on page A15).

These guidelines also have to be continuously updated, as the nomenclature field is always changing, generating always new aspects: new weeds, new flowers and new ensnaring vines for the unsuspecting. Indeed it is becoming increasingly difficult to create a short, clear and unambiguous name, now that the development of high-sensitivity or high-resolution instruments make the definition of a source more difficult and that the number of detected objects increases almost indefinitely. Conversely, as a result of a desire to save time and space, many variations of the same name for the same object can be found in the literature: shortening or expanding the source abbreviation or the digits initially defined from the position, or interchanging the order of the numbers, etc..., all practices which add yet more confusion to the nomenclature problem: illustrations are given in Tables 6.4 and 6.7.

0.1.2 Definition of the vocabulary

A name may be short, long, structured or not: examples are the *Orion Nebula*, the *Superantennae*, *DR21 (OH)*, *NGC 1866*, *6C B100814.8+745109*, *Geminga*, etc...

A *designation* is a structured name basically made of an *acronym* (elsewhere named "origin") and a *numbering* (elsewhere named "sequence") which are both a string of alphanumeric characters. The structure of the numbering is called the *format*, as first introduced by Kesteven & Bridle 1977 (in their Table II), and detailed in Table 6.2. Examples of *format* are *NNNN* for a running number as in

NGC, *±DD NNNN* for a running number in a declination zone as in BD, *JHHMMSS.ss+DDMMSS.s* for J2000 coordinates as in 6C (5th paper), *FFF-NNN* for a running number in a field as in ESO, etc... A *specifier* can be added, as *NGC 1866 (LMC)*, but should not normally be necessary for the identification. There should be one object per designation, or, stated in other words, a designation should be able to identify an object without any ambiguity. Unfortunately, many exceptions to this rule can be found, *e.g. S147*; other examples may be found in Table 6.6 and Table 6.7.

0.1.3 Open Problems

Definition of an object

The definition looks straightforward for stars — however many Radcliffe (R) or HD stars in the Magellanic Clouds are clusters or compact nebulae.

The definition has never been simple for radiosources, for which the basic material is maps, from which different lists of sources can be drawn depending on the software and the parameters (background, spatial resolution): see for instance: *8C* (Rees 1988, Sect. 7.3); or compare the lists drawn from the same set of maps for *BWE* (Becker et al. 1991) and 87GB (Gregory & Condon 1991).

Other difficulties come from line of sight effects (discriminate one or several stellar clusters or associations), or from the definition of groups or clusters of galaxies, or of voids which depend on the completeness or deepness of the surveys, and on the clustering algorithms used. For instance Zucca et al. studied how different sets of superclusters can be defined depending on the density enhancement considered (from $f = 1.5$ to $f = 400$): see the remark for the acronym [ZZS93] in Chap. 1.

An object may look completely different at different wavelengths or at different spatial resolutions. Its type is therefore never definitive, as e.g. suspected planetary nebulae which were later found to be galaxies.

Number of digits in the numbering

Another difficulty is related to the number of digits used to designate unambiguously the source: it must be large enough to avoid any ambiguity,but not too large otherwise it will likely be truncated.

Examples of too few digits is SBS (Table 6.4C); and many QSOs in refs. 1993HB: there the context, *but not the designation*, makes which source is referred to.

Examples of many digits are found e.g. in 6C last catalogues: there the same source may receive two slightly different designations in the overlapping parts of two surveys.

Subcomponents

The problem of subcomponents in an extended source has not yet been given a satisfactory approach — nor solution .

Cross-identifications

There is no *a priori* limitation to the number of discovery lists so that the same object may be given an unlimited number of designations.

The problem of cross-identifications is not trivial: the different designations are rarely strictly synonymous. A reliable cross-identification should in principle be checked by specialists, but this task is time-consuming and perhaps not proportionnally rewarding. We emphasize the importance of such a work by collecting Comprehensive Catalogs in a separate Chapter (Chap. 2).

0.1.4 Current trends in the Nomenclature

There have been no drastic changes in the methods or habits during the past decade, except for *(a)* a major development of the numbering based on equatorial coordinates which makes up 12% to 16% of the *formats*, the more usual still being a running number very convenient for short lists, and *(b)* an increasing tendancy to shorten the designations (acronyms and numbering)

Concerning the numbering based on equatorial coordinates, be aware that these may refer to the equinoxes 1900 in exceptional cases (IDS, WDS), 1950 (the most common case as of 1993), or 2000 (more and more frequent, PSR, 6C). In this latter case, *it is mandatory to precede the 2000 truncated coordinates by the letter* **J** so that the same source may be quoted as

QSO 0001+478 = QSO B0001+478 = QSO J0003+481.

This system is also now systematically used for PSR: three new formats have been introduced by Taylor & Manchester (ref. 1993TM), namely BHHMM±DDA, JHHMM±DDA (provisory), and JHHMM±DDMM (as soon as the positional accuracy warrants the number of digits).

Shortening names most likely introduces an *ambiguity*, but may lead to disastrous results: does the designation *BD11901* refer to +11° or +01° ? Other examples may be found in Table 6.7; see also Dubois & Lortet 1993, Dickel et al. 1993; more are in the comments or remarks of Chapters 1 and 3 of the Second Dictionary.

Ambiguities are not always the result of a bad usage, they sometimes exist in the catalog since its creation: the entry SBS 1210+537 (Markarian et al. 1985) exists in both Table 1 (galaxies) and Table 2 (blue stars) of that paper, and refer to two quite distinct objects.

0.1.5 A few basic (permanent) rules

In order to help avoid the traps described above, the following rules should be kept in mind when using or creating designations:

1. Always give *two* identifications, one can be the accurate positions. Redundancy helps for detecting errors.

2. Don't shorten or change in any way a designation, once introduced. For instance don't change the numbering even if it is subsequently found to be inadequate, except for clarification by adding B or J flag letters to specify the equinox. This recommendation applies also to individual names, and the *Irish Nebula* should not replace the *Crab Nebula* as proposed by Somerville (1988) with a definite sense of fun.

3. Choose the appropriate format (Table 6.2). If the numbering is based on equatorial coordinates, use **B** (for 1950) or **J** (for 2000) flag letters just before the coordinates to avoid the traps described in Table 6.4.

4. Give an acronym yourself, if possible in the *first* (not the 3rd!) paper of a series. Check for a free slot, by consulting the (updated) Table of acronyms (see Chap. 5). Don't reuse an acronym previously introduced, even if it has become obsolete.

0.2 The Edition of the Second Dictionary

0.2.1 Overview of the Second Dictionary

The Dictionary basically includes discovery lists, but also those follow-up papers which give accurate positions, better clues to the structure (sub-components) or the type of object, new maps or photographs. It is to be emphasized that the present version does not make use of pieces of information only described on magnetic tapes: all the lists or catalogues described have been published on paper or at least their detailed description was published as a paper.

Priority is given to those papers in which a clear acronym, numbering system and description (position and identification chart) are given. We put some emphasis on comprehensive catalogs which compile different discovery lists into one catalogue: the existence of such compilations (e.g. Brey ref. 1981BR for WR stars in the LMC) allowed us to be very brief in the description of old or short lists (see the explanations for the *Table of Comprehensive Catalogues* in Chap. 2).

In the comments on the references (Chap. 3), emphasis has been put on the region explored, the numbering system, the existence (or absence) of identification charts and cross-identifications with previous lists.

Note however that the Dictionary is very incomplete in regards to astrometric lists, standard stars and stars inside clusters.

The following features are new compared to the First Dictionary:

- Catalog or survey names have been collected (e.g. TMSS Catalog : use the acronym IRC).
- Synonymous acronyms are collected, corresponding to the entry for the "main" acronym. e.g. Brey = (B) = BR = Br = BREY = Breys = Breysacher = JB.
- *SIMBAD* (Egret et al. 1991) acronyms and 19-figure reference codes are listed.
- X- and γ-ray sources, instead of being considered separately, are now included in the main tables.
- For lack of space, we did not prepare an update of the *Nomenclature based on constellation names* and of *Individual names*: refer to Parts V and VI of the First Dictionary and its First Supplement, and to other references listed in Table 6.8.

Otherwise, most of the elements of the former presentation have been retained. The major change is in the "landscape" presentation for the Table of acronyms which allowed the inclusion therein of *SIMBAD* (Egret et al. 1991) pieces of information, short notes, remarks and the lists of synonymous acronyms; this Table makes up Vol.I .

0.2.2 Getting Electronic Copies of the Second Dictionary

An electronic version of the Dictionary has existed for several years, as described by Borde and Lortet (1990a). The set of files described there has been converted into a more flexible structure which is used as the master source for the various presentations of this Second Edition: the present version making use of *LaTeX*, an *ascii* version close to the 1990 files described by Borde and Lortet (1990a), and an on-line version detailed below in Chap. 5.

The computer files in their various presentations: ready-to-print postscript files or latex source files; ascii files also designated **.dic* files; and the master files; may be copied freely from the CDS via *anonymous ftp* at Internet node *cdsarc.u-strasbg.fr*, following the procedure described in the Editorial note in *A&A Annual Index* 1993 (A&A 280, E1–E2), in the directory `/pub/dic2`.

0.2.3 Getting Extracts of the Second Dictionary

We propose to build up and make available files — or printed documents for small lists — containing the excerpts from the Dictionary related to a "specialized" field, such as the *Nomenclature in the Magellanic Clouds* (Dubois & Lortet 1993) or the list of radio sources (Dickel et al. 1993), or the Supplements (entries added after a given date). Such documents can be generated on request; the request can be sent by mail or e-mail to one of the authors, or to the e-mail Internet address *question@simbad.u-strasbg.fr* or span address *SIMBAD::QUESTION*

0.2.4 Improving the Second Dictionary

- Notes or comments, especially remarks about possible errors or omissions in the on–line Dictionary, are welcome; these are better sent to the e-mail address

  info@simbad.u-strasbg.fr or *SIMBAD::INFO*

- Puzzling or definitely anomalous cases may also be reported to the chair of the *Designation IAU Task Group* in Commission 5, or any member of the *"Clearing House"* (the list of its members can be found in the *IAU Trans.*)

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Towell, J.E. Acronyms, Initialisms & Abbreviations Dictionary. 13th ed. 1989, Gale Research INC., Book Tower, Detroit, Michigan 48226., Ed. Julie E. Towell. Vol.1. "A Guide to more than 450 000 Acronyms. Initialisms, Abbreviations, Contractions, Alphabetic Symbols and Similar Condensed Appellations"

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Chapter 1

Table of Acronyms

The items entered into the Dictionary of Acronyms are as follows:

- Col. 1: Acronyms, in alphabetical order; note that a new kind of acronyms made of one to three authors' initials and the year of publication *between brackets* (e.g. [BS92]) has been introduced in *NED* (Helou & al. 1991) and more recently in *SIMBAD* when no suitable acronym could be found; the brackets should not be dropped in such designations.

  The "alphabetical order" is to be understood as follows: arabic or roman numerals before an acronym or just behind it have the same function as a serial number. The roman numerals before an acronym occupy one to four places and would lead to an unsuitable ordering of the acronyms, e.g. *IV Zw* with the letter I, *VIII Zw* with the letter V. Thus we wrote 4Zw , 8Zw instead of IVZw , VIIIZw, and classified *e.g.* PS VI (roman numeral) before PSC (three letters). For the ordering,we ignored the brackets.The following examples illustrate how the years, blanks or lowercase letters were taken into account:

  1H
  H
  [H28]
  [H80]
  H88
  [H92]
  H1-
  H2-
  H 1-
  H 2-
  H2O
  HA
  Ha

- Col. 2: A comment on the usage of the acronym; it is
  - a blank for the main acronym;
  - *use* ... (a main acronym follows) e.g. *B use Brey* means that B is a bad acronym which should never be used because it would generate confusions
  - *eq.* ... (a main acronym follows) eq. stands for *equivalent to* e.g. *BREY eq. Brey* means that we have chosen *Brey* as the main acronym for full information, refer to this throughout the book
  - *Catalog* this is an abbreviation for a catalogue (not an acronym for a source), this catalogue has no systematic acronym.

  - *Catalog: use* ... (a main acronym follows) e.g. *SSSC* *Catalog: use IRAS* . This means that the sources studied in this catalogue have the acronym IRAS

- Col. 3: Format (see Tables 6.2, 6.3, 6.4 in Vol.II)
- Col. 4: Number of objects
  This is the number corresponding to the coded reference (col. 7 or 9). It is the total number if more than one reference is given in col.7 (or 9). This number may not take into account duplications.

  A + sign may separate the object counts when only one entry is given though it may correspond to different formats and/or types of objects, as for *BWI* (112 RR Lyr stars and 9 eclipsing binaries), or *SYHG* (139 stars and 23 variable stars).

  A / sign may separate the *actual* number of objects and the *highest* object number, as in *LMC AGB*.

  There is no entry in this column in case of surveys or systematic designations, overlapping lists etc...
- Col. 5: Type of object
- Col. 6: Acronym used in *SIMBAD*
- Col. 7: Coded reference, refers to Chap.3 in Vol.II (Table of references), where the adopted scheme for these codes is detailed. In case of an acronym defined in a series of papers, note that the year refers to the *first appearance of the acronym* rather than to the year of actual publication: for instance, 1954H1 S which is the 18th reference, issued in 1984.

  As a rule no coded reference has been affected to most acronyms collected in compilations (e.g. PK Nomenclature), to most of the acronyms between brackets, or to acronyms qualified as *obsolete* in Col.11.
- Col. 8: First author
- Col. 9: 19 digits reference code in *SIMBAD* ; the last digit is the first author's initial, not a numeral! The abbreviations used for Journals in this code are given in Tables 6.5 in Vol.II .
- Col.10: Meaning of the acronym: acronyms are based on different ideas, namely: author's initials or names (rarely first name); instrument or observatory; geographical place on the earth; localization in the sky; type of object; year of observations (87GB) or of publication; several uninformative words such as catalogues, of, etc.; numeral (roman or arabic) corresponding to a table, the rank of a survey etc. (ex. 6C).
- Col.11: Short note , or reference to a remark or to synonymous acronyms given in the lower part of the page.

  The notes are usually : a qualifier for the acronym (discovery list, obsolete, systematic); a reference to a systematic nomenclature described in a Comprehensive Catalogue (PN Nomenclature refers to 1967PK and 1992AO); an explicit name when there is only one to three objects ; also the year of publication and the information about the availability of identification charts, for acronyms without coded reference; the relevant table number(s) of the papers quoted in Col.7 or 9 if necessary.

At the bottom of each page, synonymous acronyms corresponding to a main acronym and remarks are displayed; ambiguous synonyms (to be avoided) are enclosed in parentheses.

Chapter 2

Comprehensive Catalogues

Each of the catalogues listed below provides a wealth of discovery lists, acronyms, references, cross-identifications, identification charts and/or improved parameters (positions, physical nature etc...).

All of the acronyms proposed there are not included in the Table of Acronyms. For instance, we rely on the regularly updated lists of QSO, QSO candidates, BL Lac objects (ref. 1980HB, 1987HB A and B, 1993HB; 1984VV to 1991VV) to provide lists or acronyms more or less widely used (see for instance the Remark for 1984VV A).

A new version of a catalogue (say for a given type of object) may be *(a)* a revision, superseding the numbering but not the previously published identification charts or cross-identifications ; *(b)* a continuation (new references issued since the last edition) *(c)* a completely new self-contained work, superseding the previous versions.

The comprehensive Catalogues have been given a special reference code with two letters (from author's name or author's initials) e.g. *1981BR* where BR are from the author's name Breysacher.

The Table is ordered as follows: Catalogues, Stars, star systems (clusters, associations), non-stellar objects (H II regions, Herbig-Haro objects, Galaxies, QSO ...), Atlas and Surveys. Inside each section, the ordering follows the alphabetical order of the type of object.

The columns of this Table are as follows:

Col.1 :	Type of object
Col. 2 and 3 :	Date of publication and code number (as in the Table of References)
Col. 4 :	First author
Col. 5 and 6:	Systematic acronym used in the Catalogue if any, and its format (the most general one, if more than one format)
Col. 7 :	Note: continued, revised, updated, superseded by or continues ... (see above)

A *Catalogues of Catalogues*

(1)	(2)	(3)	(4)	(5)	(6)	(7)
-	1977	1977CO	COLLINS M.			
Non stellar optical obj.	1980	1980DI	DIXON R.S.			
Radio sources	1970	1970DI	DIXON R.S.			
Stars positions	1978	1978ST	SEVARLIC B.M.+			
Stars positions	1982	1982ST A	SEVARLIC B.M.+			
	1982	1982ST B	SEVARLIC B.M.+			

B *Stars*

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Am stars	1992	1992HA	HAUCK B.			
Ap stars	1984	1984CR A	CATALANO F.A.+			
	1988	1984CR B	CATALANO F.A.+			
	1991	1984CR C	CATALANO F.A.+			
	1993	1984CR D	CATALANO F.A.+			
Ap stars	1991	1991RG A	RENSON P.+			
Ap stars: database	1991	1991RG B	RENSON P.+			
Ap, Am stars	1974	1974BF	BERTAUD C.+			
Ap, Am stars: errors	1988	1988RE A	RENSON P.			
Ap, Am stars: in OCL	1988	1988RE B	RENSON P.			
B stars	1992	1992GS	GRILLO F.+			
Barium stars	1983	1983LD	LU P.K.+	`LDUW`	NNN	
Bright stars	1964	1964HF A	HOFFLEIT D.	`BS`	NNNN	updated by 1982HJ
	1979	1964HF B	HOFFLEIT D.	`BS`	NNNN	
Bright stars	1982	1982HJ A	HOFFLEIT D.+	`BS`	NNNN	updates 1964HF
	1984	1982HJ B	HOFFLEIT D.	`BS`	NNNN	
	1992	1982HJ C	PETERS A.R.+			
Carbon stars	1989	1989ST	STEPHENSON C.B.	`CGCS`	NNNN	
Cataclysmic bin.	1984	1984RI A	RITTER H.			
	1987	1984RI B	RITTER H.			
	1990	1984RI C	RITTER H.			
Cataclysmic Variables	1993	1993DS	DOWNES R.A.+			
Central stars of PN	1982	1982AC A	ACKER A.+	`FC`	NNN	
	1982	1982AC B	ACKER A.+	`FC`	NNN	
	1983	1982AC C	ACKER A.+	`FC`	NNN	
	1984	1982AC D	ACKER A.+	`FC`	NNNbis	
Del Sct stars	1990	1990LR	LOPEZ DE COCA P.+			
Double stars	1963	1963JV	JEFFERS H.M.+	`IDS`	HHMM.mNDDMMA	
Double stars	1984	1984WD	WORLEY C.E.+	`WDS`	HHMM.mNDDMM (1900)	
Dwarf novae: atlas	1982	1982VB A	VOGT N.+			
Dwarf novae: astrom.	1992	1982VB B	BRUCH A.+			

B *Stars (cont.)*					
(1)	(2)	(3)	(4)	(5) (6)	(7)
Dwarf novae: north	1987	1987BF	BRUCH A.+		
Em. stars	1970	1970WA A	WACKERLING L.R.		
	1977	1970WA B	STEPHENSON C.B.+		
Em. stars	1972	1972HR	HERBIG G.H.+	`HRC` NNN	replaced by 1988HB
Em. stars	1988	1988HB A	HERBIG G.H.+	`HBC` NNN	replaces 1972HR
	1992	1988HB B	WEAVER Wm.+	`HBC` NNN	
General	1973	1973JB A	JUNG J.+	`CSI` +DD NNNNN NN	updated by CDS (Centre de Donnees de Strasbourg)
	1981	1973JB B	OCHSENBEIN F.+	`CSI` +DD NNNNN NN	
General	1990	1990LS A	LASKER B.M.+	`GSC` FFFFF-NNNNN	
	1990	1990LS B	RUSSELL J.L.+	`GSC` FFFFF-NNNNN	
	1990	1990LS C	JENKNER H.+	`GSC` FFFFF-NNNNN	
General: Hipparcos	1992	1992ED	EGRET D.+		
General: Hipparcos	1992	1992TC A	TURON C.+	`HIC` NNNNNNA	
	1992	1992TC B	TURON C.+	`HIC` NNNNNNA	
LBV cand. in LMC	1988	1988LO	LORTET M.-C.		
Masers: 1612 MHz	1989	1989TL	TE LINTEL HEKKERT P.+		
Masers: stellar	1990	1990BL	BENSON P.J.+		
Masers: stellar, SiO	1989	1989EH	ENGELS D.+		
Masers: stellar	1988	1988CP	CESARONI R.+	`H2O` LLL.$\ell\ell\ell$+BB.bbb	
Novae: galactic	1987	1987DU	DUERBECK H.W.		
OH/IR stars	1979	1979EN	ENGELS D.		
Photometry: DDO phe	1989	1989MN	MERMILLIOD J.-C.+		
Photometry: Eggen	1990	1990NM B	NITSCHELM C.+		
Photometry: Geneva	1981	1981RU	RUFENER F.		updated by 1989RU
Photometry: Geneva	1989	1989RU	RUFENER F.		updates 1981RU
Photometry: UBV	1977	1977MN A	MERMILLIOD J.-C+		
	1983	1977MN B	MERMILLIOD J.-C.		
Photometry: UBV, stars in OCl	1984	1984ME	MERMILLIOD J.-C.		
Photometry: Walraven	1990	1990NM A	NITSCHELM C.+		
Photometry: ubvyBeta	1985	1985HM	HAUCK B.+		
Proper Motion stars	1979	1979LU	LUYTEN W.J.	`LP` FFF-NNNN	
Pulsars	1976	1976TD	TERZIAN Y.+	`PSR` HHMM+DD	
Pulsars	1981	1981MT	MANCHESTER R.N.+	`PSR` HHMM+DD	updates 1976TD, updated by 1993TM
Pulsars	1993	1993TM	TAYLOR J.H.+	`PSR` JHHMM+DDMMA	updates 1981MT
RR Lyr stars	1988	1988HE	HECK A.		

B *Stars (cont.)*						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Radial vel.: biblio	1986	1986BP	BARBIER-BROSSAT M.+			continued by 1990BP
Radial vel.: biblio	1990	1990BP	BARBIER-BROSSAT M.+			continues 1986BP
Radial vel.	1972	1972AB A	ABT H.A.+			continued by 1989BA
	1975	1972AB B	BARBIER M.			
	1977	1972AB C	BARBIER M.+			
Radial vel.	1989	1989BA	BARBIER-BROSSAT M.			continues 1972AB
S stars	1976	1976ST	STEPHENS0N C.B.	`Stephenson`	NNN	updated by 1984ST A
S stars	1984	1984ST A	STEPHENSON C.B.	`CSS`	NNNN	updates 1976ST
	1990	1984ST B	STEPHENSON C.B.	`CSS2-`	NN	
Spectroscopic bin.	1967	1967BA	BATTEN A.H.	`SB`	NNN	superseded by 1978BF
Spectroscopic bin.	1978	1978BF	BATTEN A.H.+	`Batten`	NNN	supersedes 1967BA, updated by 1989BF
Spectroscopic bin.	1989	1989BF	BATTEN A.H.+			updates 1978BF
Stars	1974	1974EC	EICHHORN H.	`AC`	+DD NNNN	
Stars in LMC	1978	1978RM	ROUSSEAU J.+			
Stars in SMC	1982	1982AZ	AZZOPARDI M.+	`AzV`	NNNa	
Stars, compact Obj.	1977	1977BF A	BERGER J.+	`PB`	NNNN	
	1980	1977BF B	BERGER J.+	`PB`	NNNN	
	1984	1977BF C	BERGER J.+	`PB`	NNNN	
Supernovae	1974	1974SS	SARGENT W.L.W.+	`SN`	YYYYA	superseded by 1984BC
Supernovae	1984	1984BC	BARBON R.+	`SN`	YYYYA	updates and revises 1974SS, superseded by 1989BC
Supernovae	1989	1989BC	BARBON R.+	`SN`	YYYYA	supersedes 1984BC
Susp. Var. stars	1951	1951KP A	KUKARKIN B.V.+	`CSV`	NNNNNN	superseded by 1982KH
	1965	1951KP B	KUKARKIN B.V.+	`CSV`	NNNNNN	
Susp. Var. stars	1982	1982KH	KHOLOPOV P.N.	`NSV`	NNNNN	supersedes 1951KP
Symbiotic stars	1984	1984AL	ALLEN D.A.			
Var. stars	1969	1969KK A	KUKARKIN B.V.+	`V`	AA CCC	3rd edition: superseded by 1985KS
	1971	1969KK B	KUKARKIN B.V.+	`V`	AA CCC	
	1972	1969KK C	KUKARKIN B.V.+	`V`	AA CCC	
	1972	1969KK D	KUKARKIN B.V.+	`V`	AA CCC	
	1974	1969KK E	KUKARKIN B.V.+	`V`	AA CCC	
	1976	1969KK F	KUKARKIN B.V.+	`V`	AA CCC	
Var. stars	1985	1985KS A	KHOLOPOV P.N.+	`V`	AA CCC	4th edition: supersedes 1969KK
	1985	1985KS B	KHOLOPOV P.N.+	`V`	AA CCC	
	1987	1985KS C	KHOLOPOV P.N.+	`V`	AA CCC	
	1990	1985KS D	KHOLOPOV P.N.+	`V`	AA CCC	
WD	1977	1977MS A	McCOOK G.P.+	`WD`	HHMM+DDA	superseded by 1984MS
	1980	1977MS B	LIEBERT J.+	`WD`	HHMM+DDA	
WD	1984	1984MS	McCOOK G.P.+	`WD`	HHMM+DDdA	supersedes 1977MS

B *Stars (cont.)*					
(1)	(2)	(3)	(4)	(5) (6)	(7)
WD	1987	1987MS	McCOOK G.P.+	WD HHMM+DDd	complements 1984MS
WR	1981	1981VH A	VAN DER HUCHT K.A.+	WR NNN	
	1988	1981VH B	VAN DER HUCHT K.A.+	WR NNNa	
	1991	1981VH C	CRAWFORD I.A.+	WR NNNa	
	1991	1991S1	SHARA M.M.+	WR NNNa	
WR in LMC	1981	1981BR A	BREYSACHER J.	BREY NNNa	
	1991	1981BR B	LORTET M.-C.	BREY NNNa	
	1990	1981BR C	HEYDARI-MALAYERI M.+	BREY NNNa	
	1991	1981BR D	MOFFAT A.F.J.	BREY NNNa	

C *Stellar Systems*					
(1)	(2)	(3)	(4)	(5) (6)	(7)
Globular clusters	1970	1970AR A	ALTER G.+	GCl- NNN.N	
	1981	1970AR B	RUPRECHT J.+	GCl- NNN.N	
Globular clusters	1985	1985WE	WEBBINK R.F.	C HHMM+DDd	
Open clusters	1970	1970AR A	ALTER G.+	OCl- NNNN.N	
	1981	1970AR B	RUPRECHT J.+	OCl- NNNN.N	
Open clusters	1979	1979LY A	LYNGA G.	C HHMM+DDd	
	1982	1979LY B	LYNGA G.	C HHMM+DDd	
	1983	1979LY C	LYNGA G.	C HHMM+DDd	
Open clusters	1987	1987LY A	LYNGA G.	C HHMM+DDd	updates 1979LY+
	1988	1987LY B	JANES K.A.+	C HHMM+DDd	
Open clusters	1988	1988LE	LEISAWITZ D.	OCl- NNN.N	
Stellar ass.	1970	1970AR A	ALTER G.+	Ass- NN.N	
	1981	1970AR B	RUPRECHT J.+	Ass- NN.N	

D *Non-stellar objects (galactic or extra-galactic)*					
(1)	(2)	(3)	(4)	(5) (6)	(7)
BL Lac	1987	1987HB A	HEWITT A.+	BL HHMM+DDd	revised and updated by
	1989	1987HB B	HEWITT A.+	BL HHMM+DDd	1993HB
BL Lac	1993	1993HB	HEWITT A.+	BL HHMM+DDd	revises and updates 1987HB
Bipolar nebulae	1978	1978CC	CALVET N.+		
Clusters of galaxies	1982	1982FM	FERNANDEZ A.+		
Clusters of galaxies	1984	1984KU	KOWALSKI M.P.+		
Clusters of galaxies	1989	1989AC	ABELL G.O.+	ACO NNNN ACOS NNNN	extension to the South and revision of 1958A1
Clusters of galaxies	1992	1992LN	LUMSDEN S.L.+	EDCC NNN	
Cometary nebulae	1979	1979PP	PARSAMIAN E.S.+	PP NNN	
Galactic nebulae	1985	1985NV	NECKEL Th.+	GN HH.MM.m.NN	

D *Non-stellar objects (galactic or extra-galactic) (cont.)*

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Galaxies	1989	1989PF A	PATUREL G.+	`PGC`	NNNNN	
	1989	1989PF B	PATUREL G.+	`PGC`	NNNNN	
	1990	1989PF C	PATUREL G.+	`PGC`	NNNNN	
	1990	1989PF D	BOTTINELLI L.+	`PGC`	NNNNN	
	1991	1989PF E	PATUREL G.	`PGC`	NNNNN	
	1992	1989PF F	BOTTINELLI L.+	`PGC`	NNNNN	
Galaxies: atlas	1987	1987TU A	TULLY R.B.+	`NBG`	FN-NN N	
Galaxies: bright	1981	1981ST	SANDAGE A.+			
Galaxies: bright	1991	1991DV	DE VAUCOULEURS G.+			RC3 catalogue; updates the RC2 catalogue, ref. 1976D3.
Galaxies: catalog	1987	1987TU B	TULLY R.B.	`NBG`	FN-NN N	
Galaxies: catalog	1992	1992FK	FABBIANO G.+			
Galaxies: Markarian	1986	1986MB	MAZZARELLA J.M.+	`MRK`	NNNN	
Galaxies: Markarian	1989	1989ML	MARKARIAN B.E.+	`MRK`	NNNN	
Galaxies: pec.	1987	1987AM	ARP H.C.+	`AM`	HHMM-DDM	
Groups of galaxies	1987	1987TU C	TULLY R.B.	`NBGCG`	FN-NN	
H II regions	1974	1974MA	MARSALKOVA P.	`Marsalkova`	NNN	
Herbig-Haro obj.	1988	1988VH	VON HIPPEL T.+	`HH`	NNN	
High-vel. clouds	1991	1991WV	WAKKER B.P.+	`WV`	NNN	
Masers: non stellar	1979	1979TU	TURNER B.E.	`OH`	LLL.ℓ+BB.b	
Masers: non stellar	1983	1983BE	BRAZ M.A.+			
Masers: non stellar	1988	1988CP	CESARONI R.+	`H2O`	HHMM+DD	
Planetary nebulae	1967	1967PK A	PEREK L.+	`PK`	LLL+BB N	
	1977	1967PK B	ACKER A.+	`PK`	LLL+BB N	
	1977	1967PK C	WEINBERGER R.	`PK`	LLL+BB N	
	1981	1967PK D	ACKER A.+	`PK`	LLL+BB N	
	1976	1967PK E	SANDULEAK N.	`PK`	LLL+BB N	
	1983	1967PK F	ACKER A.+	`PK`	LLL+BB N	
	1978	1967PK G	KOHOUTEK L.	`PK`	LLL+BB N	
	1983	1967PK H	KOHOUTEK L.	`PK`	LLL+BB N	
	1983	1967PK I	LUTZ J.H.+	`PK`	LLL+BB N	
	1985	1967PK J	KOHOUTEK L.+	`PK`	LLL+BB N	
	1985	1967PK K	WEST R.M.+	`PK`	LLL+BB N	
	1989	1967PK L	KOHOUTEK L.	`PK`	LLL+BB N	
	1990	1967PK M	ACKER A.+	`PK`	LLL+BB N	
Planetary nebulae	1992	1992AO	ACKER A.+	`PN`	GLLL.ℓ+BB.b	updates 1967PK+
QSO	1980	1980HB	HEWITT A.+	`QSO`	HHMM+DDdA	updated by 1987HB
QSO	1982	1982BC	BARBIERI C.+	`QSO`	HHMM.m+DDMM	
QSO	1987	1987HB A	HEWITT A.+	`QSO`	HHMM+DDdA	updates 1980HB, revised and updated by 1993HB
	1989	1987HB B	HEWITT A.+	`QSO`	HHMM+DDdA	

D *Non-stellar objects (galactic or extra-galactic) (cont.)*

(1)	(2)	(3)	(4)	(5)	(6)	(7)
QSO	1993	1993HB	HEWITT A.+	QSO	HHMM+DDdA	revises and updates 1987HB
QSO, BL Lac	1984	1984VV	VERON-CETTY M.-P.+			superseded by 1985VV
QSO, BL Lac	1985	1985VV	VERON-CETTY M.-P.+			supersedes 1984VV
QSO, BL Lac	1987	1987VV	VERON-CETTY M.-P.+			supersedes 1985VV
QSO, BL Lac	1989	1989VV	VERON-CETTY M.-P.+			supersedes 1987VV
QSO, BL Lac	1991	1991VV	VERON-CETTY M.-P.+			supersedes 1989VV
QSO, BL Lac	1993	1993VV	VERON-CETTY M.-P.+			supersedes 1991VV
SNR: galactic	1973 1978	1973VM A 1973VM B	VAN DEN BERGH S.+ VAN DEN BERGH S.			
SNR: galactic	1984	1984GR	GREEN D.A.	SNR	LLL.ℓ+BB.b	revised and updated by 1988GR
SNR: galactic	1988 1989	1988GR A 1988GR B	GREEN D.A. ARENDT R.G.	SNR SNR	LLL.ℓ+BB.b LLL.ℓ+BB.b	revises and updates 1984GR
SNR: radio	1976	1976CC	CLARK D.H.+			superseded by 1979ML
SNR: radio	1979	1979ML	MILNE D.K.			supersedes 1976CC
Stars forming regions	1991	1991RE	REIPURTH B.+			

E *Atlases and Surveys*

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(IR)	1982 1982	1982GS A 1982GS B	GEZARI D.Y.+ GEZARI D.Y.+			preliminary edition: superseded by 1984GS
(IR)	1984 1987	1984GS A 1984GS B	GEZARI D.Y.+ SCHMITZ M.+			1st edition: supersedes 1982GS, updated by 1987GS
(IR)	1987 1988	1987GS A 1987GS B	GEZARI D.Y.+ GEZARI D.Y.+			2nd edition: updates 1984GS, updated by 1993GS
(IR)	1993 1993	1993GS A 1993GS B	GEZARI D.Y.+ GEZARI D.Y.+			3nd edition: updates 1987GS
(IR)	1985	1985IR A	-	IRAS	HHMM+DDdPNN	obsoleted by 1988BN
(IR)	1985	1985IR B	-	IRAS	HHMMm+DDMMA	PSC catalog; superseded by 1988IR
(IR)	1986	1985IR C	KLEINMANN S.G.+	IRAS	HHMMm+DDMMA	SSC catalog
(IR)	1985	1985IR D	HELOU G.+	IRAS	HHMMm+DDMMA	SSSC catalog; obsoleted by 1988HW
(IR)	1985	1985IR E	LONSDALE C.J.+	IRAS	HHMMm+DDMMA	obsoleted by 1989FL
(IR)	1986	1985IR F	OLNON F.M.+	IRAS	HHMMm+DDMMA	LRS catalog
(IR)	1988	1985IR G	DE MUIZON M.+	IRAS	HHMMm+DDMMA	
(IR)	1989	1985IR H	DEUL E.R.+	IRAS	HHMMm+DDMMA	

E *Atlases and Surveys (cont.)*

(1)	(2)	(3)	(4)	(5) (6)	(7)
(IR)	1989	1985IR I	CHEESEMAN P.+	IRAS HHMMm+DDMMA	
(IR)	1988	1988BN	BEICHMAN C.A.+	IRAS HHMMm+DDMMA	obsoletes 1985IR A
(IR)	1988	1988HW	HELOU G.+	IRAS HHMMm+DDMMA	SSSC catalog; obsoletes 1985IR D
(IR)	1988	1988IR	-	IRAS HHMMm+DDMMA	PSC catalog; obsoletes 1985IR B
(IR)	1989	1989FL	LONDSALE C.J.+	IRAS HHMMm+DDMMA	obsoletes 1985IR E
(IR)	1989	1989MK	MOSHIR M.+	IRAS HHMMm+DDMMA	FSS catalog
(IR) in the MC	1990	1990SI	SCHWERING P.B.W.+		
(Opt)	1982	1982LA	LAUBERTS A.	ESO HHMMSS+DDMM.m	
(Rad)	1990	1990WH	WALTER H.G.+		
(X)	1982	1982AM	AMNUEL P.R.+	2XRS HHMM+DDd	
(X)	1983	1983BM	BRADT H.V.D.+	X HHMM+DDd	
(X)	1984	1984WM	WOOD K.S.+	H HHMM+DDd	
(Soft X)	1983	1983NJ	NUGENT J.J.+	H HHMM+DD	
Atlas = identif. charts	1981	1981DG	DIXON R.S.+		contains all objects of 1980DI
Atlas of LMC	1967	1967HW	HODGE P.W.+		
Atlas of LMC	1983	1983MO	MOREL M.		
Atlas of Orion nebula	1981	1981AG	ANDREWS A.D.+		
Atlas of SMC	1977	1977HW	HODGE P.W.+		
Atlas of SMC	1989	1989MO	MOREL M.		

Chapter 3

Coded References

This is the description of the References given in Col. 7 of the *Table of Acronyms* (Chap. 1) and Col. 3 of the *Table of Comprehensive Catalogues.*

The references are ordered by year and, inside the same year, by the first author's initial followed by a serial number (or by a second letter for the Comprehensive Catalogue collected above; this letter is ordered before the serial number, e.g. *1974BF* is followed by *1974B1*, *1974B2*...).

The year is generally the year of first introduction of the corresponding acronym. Thus, the acronym LKHA (= LkHα) was introduced in 1954 and continued in several publications; the corresponding references are coded 1954H1 A (1st publication, issued in 1954), *1954H1 B*,..., *1954H1 S* (issued in 1984). For the acronym HH introduced in 1974, the reference issued in 1992 is the 27^{th} and is numbered *1974H2AA*.

In the right column only the main acronym(s) ("main" as explained for the Table of Acronyms) is given. In the case of several acronyms introduced in different Tables of the same paper, the acronyms are written on the line where the relevant Table is described, instead of the first line(s).

In the comments, since about 1987, special emphasis has been given on quoting the existence (year) of coordinates, the presence (or absence) of identification charts.

Remark: the reference codes published in the previous versions (Fernandez et al. 1983; Lortet & Spite 1986), have not been modified, *except in a few cases* (mostly the references related to the Comprehensive Catalogues).

Chapter 4

Author Index

The Author Index is similar to the index of the First Dictionary (1983 and 1986). For each author (col.1), it gives the corresponding reference codes (col.2 and 3) and the main acronyms (if any) (col.4).

The Author names are arranged alphabetically taking into account only the first letter of the first name (e.g. P. for Hodge P.W.). The symbol + is used when there is more than one author, as in Col.8 of the Table of Acronyms. The ordering is explained by the following example:

Hodge P. (or P.W.) (one author) or Hodge P.+ (or P.W.+) (first author)
+Hodge P. (or P.W.) (one of two or several authors, not the first).

Within these two groupings, the references are ordered by year. (Notice that van der Hucht, ... de Vaucouleurs ..., are classified with V, ...D... letters).

The reference is characterized by its 8-digit code number, as explained in Chap. 3, and/or its *SIMBAD* 19-figure code.

The acronyms quoted here are the "main" ones as defined for the Table of Acronyms: no synonyous acronyms are given here. On the other hand, when a reference contains two or more "main acronyms", all are quoted, separated by a comma.

Chapter 5

The On–line Dictionary

For the convenience of the user, we have provided open access to an "On-line" version of the Dictionary. Although currently not quite as complete nor as thoroughly checked as the full presentation in the hard-copy Reference Dictionary, the On-line Dictionary does have the advantage of being "up-to-date" and has the flexibility to include future improvements in content and style of presentation as they become available. The On-line facility is available on the Internet node **simbad.u-strasbg.fr** (130.79.128.4), or SPAN node **SIMBAD** (29588 = 28.916), and **info** is the key to enter into the On-line Dictionary.

5.1 How to Query

The query facility which is started immediately after a successive login into this *info* account (no password is required) and a first introductive screen currently allows six modes detailed below; the results of the queries can be displayed either in full mode (*–l* option), or in a short tabular form, as in Fig. cati. The tabular form is more convenient to get an overview on a bunch of acronyms, while the full mode displays everything connected to the selected item (e.g. acronym, author), including full title and remarks of all source papers.

The columns of the tabular form (example of Fig. cati) include 6 out of the 11 items described in the Table of Acronyms (Chap. 1, Vol.I), namely:

- Col.1: `Acronym`: the acronym is enclosed between parentheses when its usage would generate confusions; it is then followed by the recommended acronym.
- Col.2: `Use Format`: the left part of this column contains the recommended acronym when the one in column 1 is ambiguous (then between parentheses) or not recommended . The right part indicates the format (see Table 6.2)
- Col.3: `Ref.` is the coded reference (see Chap. 3); it is followed by a + sign when if refers to more than one publications.
- Col.4: `1st Author`; a + sign indicates the existence of co-authors
- Col.5: `Type Obj.` indicate the type of objects in the catalogue

In the full mode (with the *–l* option), all details related to the selected items are displayed, including the authors and full titles of the related papers, and also the associated comments.

The different possible query modes are to be specified after the `info` prompt are given below. The square brackets indicate permitted options. Including the option *–l* yields a more detailed response.

1. [*–l*] `cati` *acro*
   allows the retrieval of all referenced acronyms starting with *acro*. Fig. cati illustrates the output resulting from the question `cati br` : in the first column the acronym is enclosed between parentheses when its usage would generate confusion, and is then followed by the recommended acronym. The other columns (Format, Ref., etc..) are similar to the corresponding columns in Chap. 1; however, a `+` sign added at the end of the reference code means that the code refers to several references.

   Fig. cati-1 shows the result of the query with the *–l* option applied to the `ACO` acronym.

2. `ref` *reference_code*
   details any of the references mentioned in the `Ref.` column of Fig. cati or in Column 7 of the printed Dictionary (see Chap. 1): author, title, comments. Fig. 1981BR shows the result when details about the reference `1981BR` are requested.

3. [*–l*] `cata` *author*
   allows the retrieval of all referenced papers where the *first author's name* starts with what is typed.

4. [*–l*] `cato` *object_type*
   allows the retrieval of all referenced acronyms where the *object type* is specified; without *object_type* argument, the command lists the existing types.

5. [*–l*] `catf` *format*
   allows the retrieval of all referenced acronyms where the typed-in word *format* is a combination of the formats listed in Table 6.2.

6. [*–l*] `cat` *word [word...]*
   gives information connected to the combination of the user-specified *words*. Those papers which contain the combination of the *words*, in the title or remarks to the corresponding source papers, are displayed. It should be noticed however that a *word* is at least three characters, and that only the first six characters of a word are taken into account.

The querying facilities will most likely evolve in the future; additions and modification of these facilities will be announced in the introductory screen of the **info** account.

5.2 Other facilities

As proposed in (section 0.2.3) of the Introduction, excerpts from the Dictionary related to a "specialized" field may be created on request sent to one of the authors, or to the e-mail Internet address *question@simbad.u-strasbg.fr*. The resulting electronic files would be made available on the network on the same location as the *Second Dictionary* (section 0.2.2),

A *Mosaic* access to the "On-line" version of the Second Dictionary is presently investigated; its access will be announced in the Mosaic pages of the *Centre de Données de Strasbourg* (CDS) at the URL address:

```
http://cdsweb.u-strasbg.fr/CDS.html
```

Figure 5.1: Result of Query `cati br` on the *On–line Dictionary*

```
--------------------------------------------------------------------------
Acronym      Use Format             Ref.     1st Author       Type Obj.
--------------------------------------------------------------------------
BR          Brun FFF-NNNN           1957B1   BRUN A.          *
(BR)        Brey NNNa               1981BR+  BREYSACHER J.    WR in LMC
(Br)   Brodskaja NNN                1953B1   BRODSKAJA Eh.S.  OB *
(Br)   Brodskaja NNNN               1955B3   BRODSKAJA Eh.S.  *
Br          Brun FFF-NNNN           1957B1   BRUN A.          *
(Br)        Brey NNNa               1981BR+  BREYSACHER J.    WR in LMC
BRABCMS-         N                  -        VAN DEN BERGH S. PN
Braes            NNNN               1967B3   BRAES L.L.E.     *
BRAID            NNN                1978B2   BRAID M.K.+      Cluster of G
BRAN             NNNA               1986B1   BRAND J.+        Neb. Obj.
BREY        Brey NNNa               1981BR+  BREYSACHER J.    WR in LMC
Brey             NNNa               1981BR+  BREYSACHER J.    WR in LMC
Breys       Brey NNNa               1981BR+  BREYSACHER J.    WR in LMC
Breysacher  Brey NNNa               1981BR+  BREYSACHER J.    WR in LMC
BRHT             NNa                1991B1   BHATIA R.K.+     Binary Cl* in LMC
Brodskaja        NNN                1953B1   BRODSKAJA Eh.S.  OB *
Brodskaja        NNNN               1955B3   BRODSKAJA Eh.S.  *
Bru           BI NNN                1975B1   BRUNET J.P.+     O-B2 * in LMC
BRUC       Bruck NNN                1976B1   BRUCK M.T.       Cluster in SMC
Bruck            NNN                1976B1   BRUCK M.T.       Cluster in SMC
Bruggemann       NNN                1935B1   BRUGGEMANN H.    * in Cluster
Brun             FFF-NNNN           1957B1   BRUN A.          *
```

Figure 5.2: Result of Query `ref 1989AC` on the *On–line Dictionary*

```
============================================================================
1989AC = 1989ApJS...70....1A
     by ABELL G.O., CORWIN H.G.Jr, OLOWIN R.P.
        Ap.J.Suppl. 70, 1-138 (1989)
        >> A catalog of rich clusters of galaxies
     -- All-sky ACO catalog: revision of Abell's northern catalog (ref.
                             1958A1) and new southern catalogs.
        Table 3 :(Nos 1-2712)     revised northern clusters
      = Acronym <ACO>
        Table 4 :(Nos 2713-4076)  southern clusters
      = Acronym <ACO>
        Table 5 :(Nos 1-1174)     supplementary southern clusters
      = Acronym <ACOS>
        1950 and 2000 coordinates
============================================================================
```

Figure 5.3: Result of Query `-l cati aco` on the *On–line Dictionary*

```
ACO    = A = ABCG = Abel = Abell = ABGC = AC (Authors initials)
 Write: <<ACO NNNN>>    N=4076
 Simbad <<ACO ...>>
 Class: [Cluster of G]
   Rem. Revision of ref. 1958A1 (ABCG) and extension to the southern hemisphere
   Ref: 1989AC = 1989ApJS...70....1A
     by ABELL G.O., CORWIN H.G.Jr, OLOWIN R.P.
        Ap.J.Suppl. 70, 1-138 (1989)
        >> A catalog of rich clusters of galaxies
     -- All-sky ACO catalog: revision of Abell's northern catalog (ref.
                             1958A1) and new southern catalogs.
        Table 3 :(Nos 1-2712)     revised northern clusters .............. ACO
        Table 4 :(Nos 2713-4076)  southern clusters ...................... ACO
        Table 5 :(Nos 1-1174)     supplementary southern clusters ....... ACOS
        1950 and 2000 coordinates
======================================================================
ACOS   = ABCG S = ACO S = (S) (Authors initials, Suppl. southern)
 Write: <<ACOS NNNN>>   N=1174
 Simbad <<ACO S ...>>
 Class: [Cluster of G]
   Ref: 1989AC = 1989ApJS...70....1A
     by ABELL G.O., CORWIN H.G.Jr, OLOWIN R.P.
        Ap.J.Suppl. 70, 1-138 (1989)
        >> A catalog of rich clusters of galaxies
     -- All-sky ACO catalog: revision of Abell's northern catalog (ref.
                             1958A1) and new southern catalogs.
        Table 3 :(Nos 1-2712)     revised northern clusters .............. ACO
        Table 4 :(Nos 2713-4076)  southern clusters ...................... ACO
        Table 5 :(Nos 1-1174)     supplementary southern clusters ....... ACOS
        1950 and 2000 coordinates
======================================================================
ACO S  (Authors initials, Suppl. southern)
 Write: <<ACOS NNNN>>
 Simbad <<ACO S ...>>
 Class: [Cluster of G]
   Ref: 1989AC = 1989ApJS...70....1A
     by ABELL G.O., CORWIN H.G.Jr, OLOWIN R.P.
        Ap.J.Suppl. 70, 1-138 (1989)
        >> A catalog of rich clusters of galaxies
======================================================================
```

Chapter 6

Auxiliary tables and Annexes

This chapter collects a few auxiliary tables accompanying Chapters 1 to 5, and a few Annexes.

Table 6.1 details the abbreviations used in Col. 5 of Chap. 1.

Tables 6.2 to 6.4 describe the formats used in Col. 3 of Chap. 1 and elsewhere: inventory of the symbols used (Table 6.2); typical formats (Table 6.3); misleading formats (Table 6.4).

Throughout this Second Dictionary, the `+` symbol in a format means $\pm$ — both `+` or `-` may be found — while `-` means a minus sign or a dash. Notice that in some old catalogues, the letters *N* (northern) and *S* (southern) were used for the declination instead of the signs $+$ or $-$.

A dot in a format generally stands for a decimal point, but there are exceptions, *e.g.* OCl or GJ. Notice also the correct usage of decimal or sexagesimal divisions: in a three-digit format `+DDd` the last figure `d` should always represent a *decimal fraction of a degree* and never tens of arc minutes; in a four-digit format `+DDMM` the last two figures should always represent *arc minutes*, never hundredths of a degree.

Table 6.5 lists the abbreviations used in Col. 9 of Chap. 1 to designate the journal name in the "coded reference" as used both by *SIMBAD* and *NED* ; the second column gives the abbreviation used in Chap. 3 (References) when it differs from its title given in the third column.

The 19-figure *SIMBAD* code (*e.g.* Col. 9 of Chap. 1 or Col. 3 of Table 6.7) has the following structure:

YYYYJJJJJVVVVMPPPPA

where:

YYYY	year of the publication
JJJJJ	standard abbreviation for the journal (Table 6.5)
VVVV	volume number
M	specific qualifier as:
	L *Letter* page
	P *Pink* page
	$1 \cdots 9$, $A \cdots K$ fascicule number
PPPP	page number
A	first author's first initial

Table 6.6 lists the shortest acronyms which are ambiguous but of very common usage.

Table 6.7 illustrates with a few examples the confusion generated by inappropriate designations or quotations of astronomical objects.

Table 6.8 provides references for constellation-based names.

Table 6.9 describes the three-letter abbreviations recommended by IAU for Constellation Names, and Table 6.10 is devoted to Greek letters. The running numbers in the first column of these tables is sometimes used in the electronic versions of the catalogues, *e.g.* the General Catalogue of Variable Stars ref. 1985KS.

Table 6.1: Wavelengths, Abbreviations, Types of Objects (col. 5 in Chap. 1)

(Rad)	
(Submm)	
(Far IR)	
(IR)	
(Opt)	
(UV)	
(Extreme UV)	
(Soft X)	
(X)	
(Hard X)	
(Gamma)	
*	Star
* ring	Stellar ring
A *	Stellar spectral type
AGN	Active galaxy nucleus
Ass.	Stellar association
Ass. *	Star in association
Ba *	Barium star
Backgrd	Background
Betw.	Between
BL	BL Lac type object
Bright *	Bright star
Bright N	Bright Nebula
BSG	Blue supergiant
BSO	Bright stellar object
CG	Cometary globule
Cl	Cluster
Cl *	Star in a Cluster
Cld	Cloud
Cluster	Stellar cluster
Cluster of G	Cluster of galaxies
CO	CO molecule
Cometary N	Cometary nebula
Compact G	Compact galaxy
Dark N	Dark nebula
DCld	Dark cloud
Double *	Double star
Dw.	Dwarf
EB	Eclipsing binary
Em. *	Emission-line star
Em. G	Emission-line galaxy
Em. Obj.	Emission-line object
Exc.	Excess
Exgl. N	Extragalactic nebula
Exgl. V *	Extragalactic variable star
exp.	Experiment
f.	Field
Faint G	Faint galaxy
Flaring (X) PSR	Flaring X-Ray Pulsar
Foregd	Foreground
G	A galaxy
G in Cluster of G	Galaxy in a cluster of galaxies
G in Group of G	Galaxy in a group of galaxies
G in pair	Galaxy in a pair of galaxies
Gal. OH	Galactic OH source
Gal. SNR	Galactic Supernova Remnant
GCl	Globular cluster
GF	Globular filament
H II	H II region
H-alpha Em. *	H-α Emission-line star
HH	Herbig-Haro object
HH-like	Herbig-Haro like
High V *	High-velocity star

HVC	High-velocity cloud
IG	Interacting galaxies
IR Cld	Infrared Cloud
IVC	Intermediate-velocity cloud
K,M *	Stellar spectral types
Late *	Late spectral type star
LBV	Luminous Blue Variable
LMC	Large Magellanic Cloud
LPV	Long Period Variable
LVC	Low-velocity Cloud
Magn. WD	Magnetic white dwarf
MC	Magellanic Clouds
MCld	Molecular cloud
Misc.	Miscellaneous
MVC	Medium-velocity cloud
N	Nebula
N *	Stellar spectral type
Neb. Obj.	Nebulous object
NGP	North galactic pole
Northern *	Northern hemisphere star
O *	Stellar spectral type
O-B2 *	Stellar spectral types
OB *	Stellar spectral type
OB Ass.	OB stellar Association
Obj.	Object
OCl	Open Cluster
OH	OH molecule
Pec.	Peculiar
Phe Seq. *	Photoelectric sequence star
Phe Std. *	Photoelectric standard star
Phot. Std. *	Photometric standard star
PM *	Proper motion star
PN	Planetary nebula
PNN	Planetary nebula nucleus
Position *	Position star
Poss. Cluster	Possible Cluster
PSR	Pulsar
QSO	Quasi-stellar object
R *	Stellar spectral type
Rad. cont.	Radio continuum
Red Stel. Obj.	Red stellar object
Red Superg.	Red supergiant also RSG
Red V *	Red variable star
Refl. N	Reflection nebula also RFN
RFN	Reflection nebula
RSF	Region of star formation
RSG	Red supergiant
S *	Stellar spectral type
Seyf. G	Seyfert galaxy
SGP	South galactic pole
SMC	Small Magellanic Cloud
SN	Supernova
SNR	Supernova remnant
Southern *	Southern hemisphere star
Std. *	Photometric standard star
SuperCl. of G	Supercluster of galaxies
Superg.	Supergiant (for a star, a shell...)
Susp.	Suspected
Symb. *	Symbiotic star
UV or UV Exc.	UV excess
V *	Variable star
WD	White dwarf
WR	Wolf-Rayet star

Table 6.2: Inventory of the formats

+	Stands for a sign (*plus* or *minus*)
–	May be a minus sign, dash or hyphen
NNN	Ordinal numbers within source catalogue (no positional information)
NN.N	May be, either subdivision of the object numbered NN, or an object inserted between 2 adjacent ones.
	Ex.: OCℓ 157.1 is inserted between OCℓ 157 and OCℓ 158 (ref. *1970AR B*, ordering by ℓ, b)
±DD.dd	Degrees of declination and decimals
HH.hh	Hours of right ascension and decimals
MM.m	Minutes of right ascension or of declination, and decimals
SS.s	Seconds of arc or time and decimals (right ascension or declination)
D or $\underline{\text{D}}$	There D stands for tens of degrees of declination
HHMM±DDd	Parkes format, coordinates for 1950 equinox and *truncated*
B	Introduces equatorial coordinates for 1950 (optional)
J	Introduces equatorial coordinates for 2000 (MANDATORY)
LLL.$\ell\ell$	Degrees of galactic longitude (and decimals)
±BB.bb	Degrees of galactic latitude (and decimals)
LLLℓ	Degrees of galactic longitude (and one decimal)
±BBb	Degrees of galactic latitude (and one decimal)
	The galactic coordinates are (ℓ^{II}, b^{II}) as defined in 1960
G	Introduces galactic coordinates (optional)
CCC	Constellation 3 letter abbreviation
F	For field or plate number
R	Roman numeral
T	Type of objects
V	Velocity or Volume
DD	May be a numeral for the day in a month
MM	May be a numeral for the month
MMM	May be letters for the month (3 letters abbreviation)
YY or YYYY	Year (2 or 4 digits)
A,B,...,a,b, AB...	Subdivisions or suffixes; or insertion in right ascension
	Ex.: HD 48915 B = Sirius B, R 136:a3 (components)
	Ex.: Brey 65b is a WR star in the same cluster (HD 269828) as Brey 65, while Brey 65a is 98' to the North in declination
W	Orientation (East, West, South, North)

Table 6.3: Typical formats (usual or recommended)

Format	Example	Reference	1st Author	Remarks
Running number				
NNN...	HD	1918C1		
Declination zone				
±DD NNN	BD-28 2411	1886A1		
	Sk-69 72	1970S1	Sanduleak	Not Sk72-69
Equatorial coordinates				
HHMM±DD	PKS	1969B1		
HHMM±DDd	PKS	1979B1	Bolton	
BHHMM±DD	PSR	1993TM	Taylor+	
BHHMM±DDd	PKS	1991W4	Wright	
JHHMM±DDMM	PSR	1993TM	Taylor+	
	PKS	1991W4	Wright	
HHMMm±DDMM	IRAS			Point Source Cat.
HHMM.m±DDMM	1E			(IPC)
HHMMSS±DDMMSS	6C	1985B1 A	Baldwin	
HHMMSS.s±DDMMSS	1E			(HRI)
BHHMMSS.s±DDMMSS	6C	1985B1+	Hales	
Galactic coordinates				
LLL.ℓ±BB.b±VVV	HVC	1975H1	Hulsbosch	
GLLL.ℓ±BB.b	PN	1992AO	Acker+	
Field				
FFF-NNNN	LP			hyphens are recommended
	ESO			
Constellation				
CCC YYYY	Nova			
Year or Date				
YYYYA	SN 1987A			
YYYYaa	SN 1993aj			
YYMMDDA	GB	1982K1	Klebesadel+	γ-ray burst
YYYY MMM DDA	GB 1979 Nov 05A	1987A1	Atteia+	

Table 6.4: Misleading formats (obsolete or disasterous•)

•NN±DD	Sk 72-69 instead of Sk-69 72
HHNDA	Pawsey (1955P1), First use of the coordinates in the format
±DD.NN	as in *OB* to *OZ* (1967S1)
±DNN.N	any combination where the point does not mean a decimal point or the declination is in tens of degrees
•HH.MM.m.NN	GN by Neckel (1985NV), any combination where the point does not mean a decimal point
•HHMM±DD.N	where the point does not mean a decimal point (*e.g.* Glazar)
•HHMM±DDM	truncating to tens of arc minutes in declination is strongly discouraged, use ±DDd or ±DD.d instead.
•HHMM±DDdd	Don't use hundredths of degrees, but the sexagesimal division ±DDMM

Table 6.5: Abbreviations of the names of Journals

SIMBAD	Abbreviation	Journal Title
`A&A...`	Astr. Astrophys.	Astron. Astrophys.
`A&AS..`	Astr. Astrophys. Suppl.	Astron. Astrophys., Suppl. Ser.
`A&ASS.`		Astron. Astrophys., Special Suppl. Ser.
`AAHam.`		Astron. Abh. Hamburger Sternw.
`AbaOB.`		Byull. Abastumanskaya Astrofiz. Obs.
`AcA...`	Acta Astr.	Acta Astron.
`AcApS.`		Acta Astrophys. Sinica
`ACiCh.`	Astr. Cirk.	Astron. Cirkular
`Afz...`		Astrofizika
`AISAO.`		Astrofiz. Issledovanija
`AJ....`	A.J.	Astron. J.
`AN....`	A.N.	Astron. Nachr.
`AnAp..`		Ann. Astrophysique
`AnDea.`		Ann. Dearborn Obs.
`AnHar.`		Ann. Astron. Obs. Harvard College
`AnORB.`		Ann. Obs. R. Belgique
`AnTok.`		Ann. Tokyo Astron. Obs.
`Ap....`		Astrophysics
`Ap&SS.`		Astrophys. Space Sci.
`ApJ...`	Ap.J.	Astrophys. J.
`ApJ...`	Ap.J.Lett.	Astrophys. J. (L–pages)
`ApJS..`	Ap.J.Suppl.	Astrophys. J., Suppl. Ser.
`ApL...`		Astrophys. Lett.
`ArA...`	Ark. Astr.	Arkiv for Astron.
`ARA&A.`		Annual Rev. Astron. Astrophys.
`ATsir.`		Astron. Tsirk.
`AuJPA.`		Austral. J. Phys. Astrophys. Suppl.
`AuJPh.`		Austral. J. Phys.
`AuJPS.`		Austral. J. Phys. Suppl.
`AZh...`	Astr. Zh.	Astron. Zhurnal
`BAAS..`	B.A.A.S.	Bull. American Astron. Soc.
`BAICz.`	B.A.C.	Bull. Astron. Inst. Czech.
`BAN...`	B.A.N.	Bull. Astron. Inst. Netherlands
`BANS..`	B.A.N.Suppl.	Bull. Astron. Inst. Netherlands, Suppl. Ser.
`BHarO.`	Harvard Bull.	Bull. Harvard Obs.
`BICDS.`	Bull. Inf. CDS	Bull. Inf. Centre Données Strasbourg
`BITon.`		Bol. Inst. Tonantzintla y Tacubaya
`BOTT..`		Bol. Obs. Tonantz. Tacub.
`CoAsi.`		Contr. Oss. Astrofis. Padova in Asiago
`CoBos.`		Contr. Bosscha Obs.
`CoKwa.`		Contr. Astroph. Kwasan Obs. Univ. Kyoto
`CoSte.`		Contr. Univ. Arizona, Steward Obs.
`CoTol.`		Contr. Cerro-Tololo Obs.
`IAUCo.`		IAU Colloq.
`IAUS..`		IAU Symp.
`IBVS..`	I.B.V.S.	IAU Inform. Bull. Var. Stars
`IrAJ..`	Irish A.J.	Irish Astron. J.
`IzKry.`		Izv. Krym. Astrofiz. Obs.
`IzPul.`		Izv. Glav. Astron. Obs.
`JApA..`		J. Astrophys. Astron.
`JO....`		J. Observateurs
`JRASC.`		J. R. Astron. Soc. Can.
`LicOB.`		Lick Obs. Bull.
`LowOB.`		Lowell Obs. Bull.

Table 6.5: Abbreviations of the names of Journals *(continued)*

SIMBAD	Abbreviation	Journal Title
`MeLu2.`	Medd. Lunds Ser. II	Lund Medd. Astron. Obs. Ser. II
`MmMtS.`		Mem. Mount Stromlo Obs.
`MmRAS.`	Mem.R.A.S.	Mem. R. Astron. Soc.
`MmSAI.`		Mem. Soc. Astron. Ital.
`MNRAS.`	M.N.R.A.S.	Mon. Not. R. Astron. Soc.
`MNSSA.`	M.N.A.S.S.A.	Mon. Notes Astron. Soc. South Afr.
`Msngr.`		The Messenger
`Natur.`		Nature
`Obs...`		The Observatory
`PASAu.`		Proc. Astron. Soc. Australia
`PASJ..`	P.A.S.J.	Publ. Astron. Soc. Jap.
`PASP..`	P.A.S.P.	Publ. Astron. Soc. Pac.
`PAZh..`		Pis'ma Astron. Zh.
`PCinO.`		Publ. Cincinnati Obs.
`PDAO..`		Publ. Dominion Astrophys. Obs. Victoria
`PDAUC.`		Publ. Dep. Astron. Univ. Chile
`PDDO..`		Publ. David Dunlap Obs.
`PLicO.`		Publ. Lick Obs.
`PNAOJ.`		Publ. Nat. Astron. Obs. Japan
`PNAS..`		Proc. Nat. Acad. Sci.
`POBeo.`		Publ. Obs. Astron. Beograd
`POMic.`		Publ. Michigan Obs.
`POMin.`		Publ. Astron. Obs. Univ. Minnesota
`POPad.`		Publ. Oss. Astron. Padova
`POPot.`		Publ. Astrophys. Obs. Potsdam
`POStr.`		Publ. Obs. Strasbourg
`POVRO.`		Publ. Owens Valley Radio Obs.
`PROE..`		Publ. R. Obs. Edinburgh
`PSCDS.`		Publ. Spéciale C.D.S., Strasbourg
`PUSNO.`		Publ. U.S. Naval Obs. Second Serie
`PW&SO.`		Publ. Warner & Swasey Obs.
`QJRAS.`		Quart. J. R. Astron. Soc.
`RA....`		Ric. Astron. Specola Vaticana
`RMxAA.`		Rev. Mex. Astron. Astrofis.
`SAAOC.`		South African Astron. Obs. Circ.
`SoByu.`		Soob. Byurakan Obs.
`SSRv..`		Space Sci. Rev.
`StoAn.`		Stockholm Obs. Ann.
`SvA...`		Sov. Astron.
`SvAL..`		Sov. Astron. Lett.
`TarOT.`		Tartu Astrof. Obs. Teated
`TOYal.`		Trans. Astron. Obs. Yale Univ.
`TrKaz.`		Trudy Kazan Gorod. Astron. Obs.
`TrPul.`		Trudy Glav. Astron. Obs. Pulkovo, ser.2
`TrSht.`		Trudy Gos. Astron. Inst. Shternberga
`UppAn.`		Uppsala Astron. Obs. Ann.
`VatOP.`		Vatican Obs. Publ.
`VeARI.`		Veroeff. Astron. Rechen-Inst. Heidelberg
`VeBoc.`		Veroeff. Astron. Inst. Ruhr-Univ. Bochum
`VeHei.`		Veroeff. Sternw. Heidelberg (Koenigstuhl)
`VilCo.`		Villanova Univ. Obs. Contr.
`ZA....`	Z. Astrophys.	Zeitschr. Astrophys.

Table 6.6: Simplified Acronyms which are now common

Acronym	Object type	Ref	Author	Unshortened acronym	Format
A	Cluster of G	1958A1	Abell	ACO *or* ABCG	NNNN
		1989AC	Abell+	ACO	NNNN
B	Dark Cloud	1927B1	Barnard	Barnard	NNN
L	Dark Nebulae	1962L1	Lynds	LDN	NNNN
R	$*$ in MC	1960F1	Feast+	RMC	NNN
S	Cluster of G	1989AC	Abell+	ACOS	NNNN
S n $(n \neq 147)$	HII	1959S	Sharpless	Sh2-	NNN
S 147	"well-known SNR"	1950S1 D	Shajn+	Simeis	NNN
SS 433	Em. obj	1977S2	Stephenson+	SS77-	NNN
			not Sanduleak+	SS73-	NNN

Refrain from using I for *IC*, *N* for NGC, and *U* for UGC

Table 6.7: Examples of Misleading Designations

Acronym	Object type	Ref	Author	Remarks
A) Ambiguity of the acronym when created				
SMC1	one PN in LMC	1978S2 C	Sanduleak	is SMP1-104A . This acronym was proposed later, from 3 discoverers' initials
SMC1	one HII supergiant shell in SMC	1980M2	Meaburn	SGS-SMC
SMC	symbiotic stars in SMC	1992MNRAS.258.639M	Morgan	N=3
A') Bad format when created				
MG 1131+0456	(Rad)	1986B2	Bennett+	should be MG J1131+0456 (= Einstein Ring), format **J**HHMM±DDMM (Equinox J2000)
B) Shortening of the numbering, or anomalies				
BD11901	Star			skipping the sign and the blank saved two characters... but is it BD+11 901 or BD+1 1901? who knows?
3A 0557	(X)			the full name is 3A 0557-383 elsewhere written 3A 05-383
MCG 6-30-15	G			skipping the minus sign at the beginning of the format resulted in mixing the properties of a Seyfert 1 (MCG-6-30-15) and a Seyfert 2 (MCG+6-30-15) galaxies, see Ward 1987 *The tale of two Seyferts*
H 1847	G	1992MNRAS.256.125K	Kotilainen+	stands for H J1847-7831
ESO 198	G	1992MNRAS.256.125K	Kotilainen+	stands for ESO 198-24 = ESO 198-G24
PKS 2155	G	1993MNRAS.263.655K	Kotilainen+	stands for PKS 2155-304
Sk69-72	Star in LMC	1970S1	Sanduleak	written instead of Sk-72 69 (correct format *-DD NNN*) here written with format *NNN-DD* for historical reasons (avoid confusion with CPD), thus Sk-72 69 has been quoted as Sk72-69 (this saves two digits!) which can at best be understood as Sk-69 72, another star!
1415-2632	Dw.G	1993A&A..277..53T	Tresse+	in Table 3, 6 objects with no coordinate are quoted; the name 1415-2632 is not based on 1950 equatorial coordinates, but means object No.2632 in field 1415 !
C) Same designation for two distinct objects given by the same author in the same paper				
SBS 1210+537		1983M1 E	Markarian+	is found both in Table 1 (galaxies) and in Table 2 (blue stars); we advise to use different acronyms for these two different objects, SBSG and SBSS
LDSS		1990MNRAS.244.408C	Colless+	The same numbering (*e.g.* 10.4.01) corresponds to two different sources
		1991MNRAS.253.686C	Colless+	in Paper I and Paper II.

Table 6.8: Nomenclature based on constellation names and individual names (References)

The First Dictionary, 1983 and 1986, Parts V, V(Suppl.), VI and VI (Suppl.)

The Becvar Atlas

Alter and Ruprecht p.75 (1970AR A)

Collins (1977CO)

Dixon, Appendix A p. 829-833 (1980DI) (non stellar optical astron. objects)

de Vaucouleurs, RC3 catalogue, Vol.1 Appendix 8 (1991DV)

Hoffleit+, 4th ed. Appendix II p. 462-468 (1982HJ)

Sinnott, NGC 2000.0, p.XX (1988S3)

SIMBAD data base, identifiers beginning by `Name` or `ASS` e.g.. Name Butterfly, ASS Cyg OB 2

Additional references:

Allen R.H., 1963, "Star names, their lore and meaning"; a corrected republication of the work by G.E. Stechert in 1899 *Star Names and their Meanings*, Dover Publ.

Roman N.G., 1987, PASP 99, 695-699 Identification of a constellation from the 1875.0 position

Table 6.9: Three-letter abbreviations recommended for Constellation names

1	And	Andromeda	31	Cyg	Cygnus	61	Pav	Pavo
2	Ant	Antlia	32	Del	Delphinus	62	Peg	Pegasus
3	Aps	Apus	33	Dor	Dorado	63	Per	Perseus
4	Aqr	Aquarius	34	Dra	Draco	64	Phe	Phoenix
5	Aql	Aquila	35	Equ	Equuleus	65	Pic	Pictor
6	Ara	Ara	36	Eri	Eridanus	66	Psc	Pisces
7	Ari	Aries	37	For	Fornax	67	PsA	Piscis Austrinis
8	Aur	Auriga	38	Gem	Gemini	68	Pup	Puppis
9	Boo	Bootes	39	Gru	Grus	69	Pyx	Pyxis
10	Cae	Caelum	40	Her	Hercules	70	Ret	Reticulum
11	Cam	Camelopardalis	41	Hor	Horologium	71	Sge	Sagitta
12	Cnc	Cancer	42	Hya	Hydra	72	Sgr	Sagittarius
13	CVn	Canes Venatici	43	Hyi	Hydrus (∗)	73	Sco	Scorpius
14	CMa	Canis Major	44	Ind	Indus	74	Scl	Sculptor (∗)
15	CMi	Canis Minor	45	Lac	Lacerta	75	Sct	Scutum (∗)
16	Cap	Capricornus	46	Leo	Leo	76	Ser	Serpens
17	Car	Carina	47	LMi	Leo Minor	77	Sex	Sextans
18	Cas	Cassiopeia	48	Lep	Lepus	78	Tau	Taurus
19	Cen	Centaurus	49	Lib	Libra	79	Tel	Telescopium
20	Cep	Cepheus	50	Lup	Lupus	80	Tri	Triangulum
21	Cet	Cetus	51	Lyn	Lynx	81	TrA	Triangulum Australe
22	Cha	Chamaeleon	52	Lyr	Lyra	82	Tuc	Tucana
23	Cir	Circinus	53	Men	Mensa	83	UMa	Ursa Major
24	Col	Columba	54	Mic	Microscopium	84	UMi	Ursa Minor
25	Com	Coma Berenices	55	Mon	Monoceros	85	Vel	Vela
26	CrA	Corona Austrina	56	Mus	Musca	86	Vir	Virgo
27	CrB	Corona Borealis	57	Nor	Norma	87	Vol	Volans
28	Crv	Corvus (∗)	58	Oct	Octans	88	Vul	Vulpecula
29	Crt	Crater	59	Oph	Ophiucus	89	LMC	Large Magellanic Cloud
30	Cru	Crux	60	Ori	Orion	90	SMC	Small Magellanic Cloud

(∗) *Hys* is used instead of Hyi in Becvar, 1964;
Cor is used instead of Crv in Hoffleit, 1982, ref. 1982HF
Special care should be taken about *Sculptor* and *Scutum* (resp. *Scl* and *Sct*), never *Scu*

Table 6.10: Greek letters

		Name	Abbr.			Name	Abbr.
1	α	alpha	alp	13	ν	nu	nu
2	β	beta	bet	14	ξ	xi	xi
3	γ	gamma	gam	15	o	omicron	omi
4	δ	delta	del	16	π	pi	pi
5	ε	epsilon	eps	17	ρ	rho	rho
6	ζ	zeta	zet	18	σ	sigma	sig
7	η	eta	eta	19	τ	tau	tau
8	θ	theta	the	20	υ	upsilon	ups
9	ι	iota	iot	21	ϕ	phi	phi
10	κ	kappa	kap	22	χ	chi	chi
11	λ	lambda	lam	23	ψ	psi	psi
12	μ	mu	mu	24	ω	omega	ome