National Space Science Data Center/
World Data Center A For Rockets and Satellites

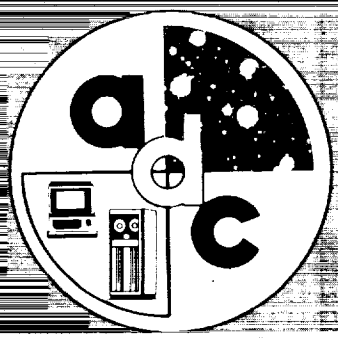
89-15

LOWELL PROPER MOTION SURVEY

SOUTHERN HEMISPHERE

(Giclas, Burnham, and Thomas 1978)

Documentation for the Machine-Readable Version



August 1989

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Wayne H. Warren Jr.

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National Space Science Data Center (NSSDC)/
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National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Abstract

The machine-readable version of the catalog, as it is currently being distributed from the Astronomical Data Center, is described. The catalog is a summary compilation of the *Lowell Proper Motion Survey* for the southern hemisphere, as completed to mid-1978 and published in the *Lowell Observatory Bulletins*. This summary catalog serves as a southern-hemisphere companion to the *Lowell Proper Motion Survey, Northern Hemisphere* published in 1971.

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1.0 Introduction

1.1 Description

The *Lowell Proper Motion Survey, Southern Hemisphere*, as incorporated into the present catalog, was published in a series of *Lowell Observatory Bulletins* between 1959 and 1978. As a result of a number of requests from users of the survey to make the data available in one place, the summary catalog was published in printed form by Giclas, Burnham, and Thomas (1978). The machine-readable catalog described here is essentially identical to the tabular material in the source reference. There are 2758 stars in the summary compilation.

This document describes the machine-readable version of the *Lowell Proper Motion Survey, Southern Hemisphere* as it is currently being distributed from the Astronomical Data Center (ADC). It is intended to enable users to read and process the computerized catalog without problems and guesswork. For additional information concerning the procedures used to determine the primary catalog data, estimates of completeness, and comparison with other observers, the user should consult the source reference and the publications cited therein. **A copy of this document should be transmitted to any recipient of the machine-readable catalog.**

1.2 Source Reference

Giclas, H. L., Burnham, R. Jr., and Thomas, N. G. 1978, *Lowell Proper Motion Survey*, Southern Hemisphere Catalog 1978, *Lowell Obs. Bull.* No. 164.

2.0 Structure

2.1 File Summary

The machine version of the *Lowell Proper Motion Survey, Southern Hemisphere* consists of a single file. Table 1 gives the machine-independent file attributes. All logical records are of fixed length, and, if the catalog is received on magnetic tape, it will contain blocks of fixed length (as noted below), except that the last block may be short.

Lowell Proper Motion Survey, Southern Hemisphere (Giclas, Burnham, and Thomas 1978)				
File	Contents	Record Format	Logical Record Length	Total Number of Logical Records
1	Catalog	FB	98	2758

Table 1. Summary Description of Catalog Files: FB = Fixed length blocks (last may be short)

The information contained in the above table is sufficient for a user to describe the indigenous characteristics of the machine-readable version of the *Lowell Proper Motion Survey, Southern Hemisphere* to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, density, number of tracks, and character coding (ASCII, EBCDIC) for tapes is not included, but should always accompany secondary copies if any are supplied to other users or installations.

2.2 *Catalog (File 1 of 1)*

The summary catalog was compiled from collections of data appearing in earlier *Lowell Observatory Bulletins*. There are no finding charts in the source reference, but they can be found in the original references given in the following table.

Volume	Page	Bulletin Number	Year	G Region
IV	136	102	1959	G1-G50
V	61	112	1961	G51-G100
VI	1	120	1964	G101-G150
VI	105	122	1964	G151-G160
VI	135	124	1964	G161-G170
VII	217	158	1972	G266-G269
VII	273	160	1973	G270-G271
VIII	9	162	1975	G272-G273
VIII	59	163	1978	G274-G275

Table 2. Original Data Sources for Summary Catalog

Table 3 gives a byte-by-byte description of the contents of the data file. A suggested Fortran format specification for reading each data field is included and can be modified depending upon individual programming and processing requirements (Fortran 77 character string-type formats are used). Default (null) values are always blanks in data fields for which primary suggested formats are given as A. All described numerical fields contain valid data except for the color class, where zero can occur, but where the default value for missing data is blank. Therefore, the color class should be read with an "A" format specification and tested for blanks before it is reread in the alternate integer format for searching.

Byte(s)	Units	Suggested Format	Default Value	Data
1-8	---	A8	---	Star identification (G number)
9	---	A1	---	Note code
10	---	1X	---	Blank
11-12	hours	I2	---	Right ascension, α
13	---	1X	---	Blank
14-15	min	I2	---	α
16	---	1X	---	Blank
17-18	sec	I2	---	α
19-20	---	2X	---	Blank
21-23	°	I3	---	Declination, δ
24	---	1X	---	Blank
25-28	′	F4.1	---	δ
29-30	---	2X	---	Blank
31-34	″	F4.2	---	Annual proper motion, μ
35-36	---	2X	---	Blank
37-39	°	I3	---	μ position angle
40-41	---	2X	---	Blank
42-45	mag	F4.1	---	Photographic magnitude
46-47	---	2X	---	Blank
48-49	---	A2 (I2)	---	Color class
50-51	---	2X	---	Blank
52-95	---	A44	---	References
96-98	---	I3	---	Identification chart reference

Table 3. Catalog Record Format

Star identification

Original "G" number assigned to the star on the plate region where it was first found. Stars that were subsequently found on later plates were assigned new G numbers; however, in this catalog all duplicate observations have been combined and averaged with the original G numbers retained. In cases where a close companion has been found on a later plate, the source of a finding chart prepared from that plate may be found in the identification chart field. When the catalog entry is a mean formed from two or more observations, the additional stars making up the mean are listed first in the "References" field. Byte 1 of the field always contains a "G" and byte 5 always contains a "-". The number in bytes 2-4 is the plate number, while that in bytes 6-8 is the star number on the plate.

Note code

An asterisk (*) indicates that a note concerning the star appears in the *Bulletin* in which it was first published.

Equatorial coordinates

Equinox 1950. The epoch of observation is given for each plate region in the original publication, the reference for which is found in the "Reference" field.

Annual proper motion

The annual proper motion in seconds of arc. The proper-motion vector is defined by the equation:

$$\mu = (\mu_\alpha^2 \cos^2\delta + \mu_\delta^2)^{1/2}.$$

μ position angle

The position angle of the reported motion in the usual notation from the north point through east, 0° to 360°. The position angle of μ is defined by the following set of equations:

$$\mu_\alpha = \mu \cos\theta \;\; ; \;\; \mu_\delta = \mu \sin\theta.$$

Photographic magnitude

The estimated photographic (blue) magnitude.

Color class

The estimated color class on a scale from -2 (bluest) to $+4$ (the very reddest). Almost all stars of color classes -2 and -1 have been subsequently identified from photometry or spectra as white dwarfs. According to the source reference, the wide variety of different types of objects among the motion stars makes it impossible to define a narrow relationship between the estimated color class and the conventional $B-V$ and $U-B$ colors. $B-V$ and $U-B$ values of $+1$ and $+2$ are distributed over a 1.5-magnitude range and represent every type of object from metal-deficient subdwarfs with large ultraviolet excesses, horizontal-branch stars, to red-dwarf degenerates. Approximate mean color values are given in the table below, but the user is cautioned that the true color of any one individual object may deviate from the mean value in the table by as much as half a magnitude for stars redder than color class 0. The small number of *UBV* observations for color classes -2 and $+4$ precludes the assignment of means for those classes.

Color Class	$B-V$	$U-B$
-1	$+0.11$	-0.74
0	$+0.26$	-0.57
$+1$	$+0.80$	$+0.33$
$+2$	$+1.30$	$+1.09$
$+3$	$+1.61$	$+1.18$

Table 4. Mean Values for Color Classes

References

Catalog entries are, in many cases, the combined means of measurements on two or more plate regions; in these cases, the additional G number(s) appear as the first entry(ies) in the "Reference" field. If a G number in the references carries an asterisk, but the field following the identification field (byte 9) does not, then the note on that star appears only in the *Lowell Observatory Bulletin* where the latter number was published. Following the G numbers, references to other proper-motion lists and catalogs are given, as identified in the reference key in the appendix of this document.

Chart reference

The *Lowell Bulletin* number in which an identification chart of size 18 minutes of arc on a side is given for the star.

3.0 History

3.1 Remarks and Modifications

The machine-readable version of the *Lowell Proper Motion Survey, Southern Hemisphere* was received from the Centre de Données Astronomiques de Strasbourg on 25 July 1985. As received, the data table contained column headings in text, with special characters to represent degree signs and character data in certain numerical fields. The following modifications were made to the file at the Astronomical Data Center in order to effect a more homogeneous structure that can be processed with a single format specification:

1. Six records containing column headings were removed to make a fully uniform numerical file.

2. The asterisks that code the presence of a note in the original publication were located in byte 5 (*i.e.*, in the middle of the star identification, where they replaced the hyphens between the G region number and the star identifier. They were moved to follow the identification number (byte 9) as they occur in the published catalog.

3. Preceding zeros were removed from the position angles and magnitude data.

4. The color class field contained hyphens when data were missing, sometimes in byte 48 and sometimes in byte 49. These were changed to blanks so that the field can be read with an integer format if desired.

5. A position angle of 360° was found for star G275-081 at $23^h\ 37^m\ 50^s$. The value was changed to 0°.

6. The file was run through the ADC General Verification Program, which checks data ranges and all numerical fields for invalid data. In this way, two incorrect chart reference numbers were discovered and corrected.

4.0 References

Giclas, H. L., Burnham, R. Jr., and Thomas, N. G. 1971, *Lowell Proper Motion Survey, Northern Hemisphere, The G Numbered Stars* (Flagstaff: Lowell Observatory).

Giclas, H. L., Burnham, R. Jr., and Thomas, N. G. 1978, *Lowell Proper Motion Survey*, Southern Hemisphere Catalog 1978, *Lowell Obs. Bull.* No. 164.

Appendix A. Reference Sources

The bibliographical sources that provided information for the catalog consist of references for the star designations in other catalogs and lists, plus references for general information. The general references are combined with some supplementary identification references in the source publications and that order has not been changed in the following sections. The information given below appears in the source reference and is repeated here for users who do not have ready access to that publication.

A.1 Key to References

The references to other proper-motion catalogs and lists are identified by character prefixes, followed by the numerical designations of the objects in a catalog or list, according to standard astronomical usage. The prefixes are identified with their corresponding references below. (**Note**: Not all of the identifiers listed actually appear in the catalog. The key is repeated from the *Lowell Proper Motion Survey, Northern Hemisphere* (Giclas, Burnham, and Thomas 1971) and some identifiers may only appear in that catalog.)

Key to References

Code	*Reference*
AVK	Alden, H. L., van de Kamp, P. 1924, *Astron. J.* **35**, 165.
blank	Argelander, F. W. A. 1859-1862, *Bonner Sternverzeichniss*, erste bis dritte Sektion, *Astronomischen Beobachtungen auf der Sternwarte der Königlichen Rhein.*, Friedrich-Wilhelms-Universität zu Bonn, Bände **3-5**. Küstner, F. 1903, *Bonner Durchmusterung des Nördlichen Himmels*, zweite berichtigte Auflage, Bonn Universitäts Sternwarte (Bonn: A. Marcus und E. Weber's Verlag). Schönfeld, E. 1886, *Bonner Sternverzeichniss*, vierte Sektion, *Astronomische Beobachtungen auf der Sternwarte der Königlichen Rheinischen Friedrich-Wilhelms-Universität zu Bonn* **8**, Part IV (Bonn: Adolph Marcus).
BD *	*Bergedorfer Eigenbewegungs-Lexikon* 1936, Hamburger-Sternwarte in Bergedorf; or *the continuation* published by Heidi, J. 1950, *Astron. Nach.* **279**, 273.
BPM	Luyten, W. J. 1963, *Bruce Proper Motion Survey: The General Catalogue* **I-II**, University of Minnesota.
CD	Thome, J. M. 1892-1932, *Córdoba Durchmusterung, Resultados del Observatorio Nacional Argentino* **16** (1892, Part I: −22° to −32°); **17** (1894, Part II: −32° to −42°); **18** (1900, Part III: −42° to −52°); **21** (Part I) (1914, Part IV, −52° to −62°); **21** (Part II) (1932, Part V: −62° to −90°).
CD (L)	Luyten, W. J. 1942, *Publ. Astron. Obs. Univ. of Minnesota* **II**, No. 12; 1944, **III**, No. 4.
CI	Porter, J. G., Yowell, E. J., Smith, E. S. 1918, 1930, *Publ. Cincinnati Obs.* Nos. 18, 20.

CPD	Gill, D. and Kapteyn, J. C. 1895-1900, *Cape Photographic Durchmusterung, Ann. Cape Obs.* **3** (1895, Part I: zones $-18°$ to $-37°$); **4** (1897, Part II: zones $-38°$ to $-52°$); **5** (1900, Part III: zones $-53°$ to $-89°$).
E	Ebbighausen, E. G. 1938, *Astron. J.* **47**, 112.
FI,FII,FIII	Furuhjelm, R. 1916, *Acta Soc. Fennicae* **48**, No. 1; 1926 **50**, No. 7; 1947, Ser. A, **3**, No. 12.
GL	Gliese, W. 1969, *Catalogue of Nearby Stars, Veröff. Astron. Rechen-Inst. Heidelberg* Nr. 22.
GOYAL	Indicates that the star appears in the list published by Goyal, A. N. 1962, *Astron. Nach.* **286**, 196.
GRN	van Rhijn, P. J., Plaut, L. 1955, *Publ. Kapteyn Astron. Lab. Groningen* No. 56.
H	Hertzsprung, E. 1918, *Astron. Nach.* **207**, 171.
HL	Haro, G., Luyten, W. J. 1960, *Bol. Obs. Tonantzintla y Tacubaya* No. 19, p. 16.
HUB	Hubble, E. P. 1916, *Astron. J.* **29**, 168.
HYD	Indicates that the star appears in one of the lists published by the Hyderabad observers in *Astron. Nach., Mon. Not. Royal Astron. Soc.*, or *Astron. Nach. B. Z.*.
JO	Indicates that the star is listed in one of the many lists of proper-motion stars in Astrographic Zones published in the *Journ. Observateurs*, principally by the Nizamiah and Bordeaux Observatories.
K1	Karpov, B. G. 1937, *Publ. Astron. Soc. Pac.* **49**, 146.
K2	Karpov, B. G. 1937, *Astron. J.* **46**, 201.
KONIG	König, A. 1953, *Astron. Nach.* **281**, 107.
Kopal No.	Kopal, Z. 1939, *Harvard Bull.* No. 911, p. 28.
L	L____-____, Luyten, W. J. 1942, *Publ. Astron. Obs. Univ. Minnesota* **II**, No. 12; 1944, **III**, No. 4.
LE	Luyten, W. J., Ebbighausen, E. G. 1937, *Astron. J.* **45**, 188.
LFT	Luyten, W. J. 1955, *A Catalogue of 1849 Stars with Proper Motions Exceeding 0".5 Annually* (Minneapolis: Lund Press).
LO	Klemola, A. R., Vasilevskis, S., Shane, C. D., Wirtanan, C. A. 1971, *Catalogue of Proper Motions of 8790 Stars with Reference to Galaxies, Publ. Lick Obs.* **XXII**, Part II.
LP	Luyten, W. J. 1961-67, *Publ. Astron. Obs. Univ. Minnesota* **III**, Nos. 8, 10, 11, 13, 14, 15, 16, 17, 18, 20.
	_____, Luyten, W. J. 1963-71, *Proper Motion Survey with the Forty-eight Inch Schmidt Telescope* (Minneapolis: Univ. Minnesota Obs.).
	Luyten, W. J., LaBonte, A. E. 1973, *The South Galactic Pole* (Minneapolis: Univ. Minnesota).
LPM	Luyten, W. J. 1941, *Publ. Astron. Obs. Univ. Minnesota* **III**, No. 1.
LTT	Luyten, W. J. 1957, *A Catalogue of 9867 Stars in the Southern Hemisphere with Proper Motions Exceeding 0".2 Annually* (Minneapolis: Lund Press).
	10,001-17,127: Luyten, W. J. 1961, *A Catalogue of 7127 Stars in the Northern Hemisphere with Proper Motions Exceeding 0".2 Annually* (Minneapolis: Lund Press).

LTT	17,128-18,635: Luyten, W. J. 1962, *First Supplement to the LTT Catalogues* (Minneapolis: Univ. Minnesota Obs.).
MC	van de Kamp, P., Vyssotsky, A. N. 1937, *Publ. Leander McCormick Obs.* **VII**.
ML	McLeod, N. W. 1939, *Pop. Astron.* **47**, 455.
OST	Oosterhoff, P. Th. 1936, *Astrophys. J.* **83**, 340.
PUL	Deutsch, A. N. 1940, *Publ. de L'Obs. Central Poulkovo*, Serie II, **LV**.
R	Ross, F. E. 1925-39, *Astron. J.* **36-48**.
RAD	Knox-Shaw, H., Barrett, H. G. Scott 1934, *Radcliffe Catalogue of Proper Motions in the Selected Areas 1 to 115* (London).
S	Strand, K. Aa., Lenham, A., Owen, T. 1958, *Astron. J.* **63**, 337.
T	Toulouse 1955, *Ann. L'Obs. Astron.* **XXIII**.
VM	van Maanen, A. 1915, *Astrophys. J.* **41**, 187.
VM1	van Maanen, A. 1938, *Astrophys. J.* **88**, 27 (Table 1).
VM2	van Maanen, A. 1938, *Astrophys. J.* **88**, 27 (Table 2).
VMW	van Maanen, A., Willis, H. C. 1930, *Contrib. Mt. Wilson Obs.* No. 412.
W	Wolf, M. 1919, *Veröff. Sternwarte zu Heidelberg* **7**, No. 10; 1919-29, *Astron. Nach.* **209-236**.
Y___-___	Schlesinger, F., Barney, I., Hoffleit, D., van Woerkom, A. J. J. 1939-70, *Trans. Astron. Obs. Yale Univ.* **11-14, 16-30**.

A.2 Key to Supplementary References

The supplementary references include sources of some identifiers used in the catalog, plus general reference sources consulted during preparation of the catalog.

Key to Supplementary References Consulted

Code	*Reference*
PHL	Haro, G, Luyten, W. J. 1962, "Faint Blue Stars in the Region Near the South Galactic Pole," *Bol. Obs. Tonantzintla y Tacubaya* **3**, No. 22.
SB	Slettebak, A., Brundage, R. K. 1971, "A Finding List of Early-Type Stars Near the South Galactic Pole," *Astron. J.* **76**, 338.
TC	Chavira, E. 1958, "Estrellas Azules en el Casquete Galactico Sur," *Bol. Obs. Tonantzintla y Tacubaya* No. 17.
TPS	Philip, A. G. D., Sanduleak, N. 1968, "A Finding List of Stars of Spectral Types A7 and Earlier in Regions at High Galactic Latitudes. II. South Galactic Pole," *Bol. Obs. Tonantzintla y Tacubaya* **4**, No. 30.
V	Vyssotsky, A. N. 1943, "Dwarf M Stars Found Spectrophotometrically, First List," *Astrophys. J.* **97**, 381.
	Vyssotsky, A. N., Janssen, E. M., Miller, W. J., Walther, S. J., Walther, M. E. 1946, "Dwarf M Stars Found Spectrophotometrically, Second List," *Astrophys. J.* **104**, 234.

V Vyssotsky, A. N., Mateer, B. A. 1952, "Dwarf M Stars Found Spectrophotometrically, Third List," *Astrophys. J.* **116**, 117.

Vyssotsky, A. N. 1956, "Dwarf M Stars Found Spectrophotometrically, Fourth List," *Astron. J.* **61**, 201.

Blanco, V. M., Demers, S., Douglass, G. G., and FitzGerald, M. P. 1968, "Photoelectric Catalogue," *Publ. U. S. Nav. Obs.*, Second Ser., **21**

Bok, B. J. and Basinski, J. 1964, "Stellar Distribution Near the South Galactic Pole," *Mem. Mt. Stromlo Obs.* **4**, No. 16.

Double Star data from Jeffers, H. M., van den Bos, W. H., and Greeby, F. M. 1963, *Index Catalogue of Visual Double Stars, Publ. Lick Obs.* XXI.

Eggen, O. J. 1968, "Narrow- and Broad-Band Photometry of Red Stars. II. Dwarfs," *Astrophys. J. Suppl.* **16**, 49.

Eggen, O. J. 1968, "Luminosities, Colors, Motions, and Distribution of Faint Blue Stars," *Astrophys. J. Suppl.* **16**, 97.

Eggen, O. J. 1969, "Subluminous Stars. V. Photoelectric (*UBV*) Photometry of Southern Proper Motion Stars," *Astrophys. J. Suppl.* **19**, 31.

Eggen, O. J. 1968, "Stellar-Population Samples at the Galactic Poles. I. Proper Motion Stars, Blue Objects, and Eclipsing Binaries Near the South Pole," *Astrophys. J.* **153**, 723.

Eggen, O. J. 1970, "Stellar-Population Samples at the Galactic Poles. II. *UBVRI* Photometry of M Stars Near the South Pole," *Astrophys. J. Suppl.* **22**, 289.

Wayman, P. A. 1961, "Fundamental Data for Southern Stars," *R. Obs. Bull.* No. 36.

Westerlund, B. E. 1963, "Three-Colour Photometry of Early-Type Stars Near the Galactic Poles," *Mon. Not. Royal Astron. Soc.* **127**, 83.

Woolley, R., Epps, E. A., Penston, M. J., and Pocock, S. B. 1970, *Catalogue of Stars within twenty-five parsecs of the Sun, R. Obs. Ann.* No. 5.

Appendix B. Sample Listing

The sample listing given on the following pages shows logical records exactly as they are recorded in the machine-readable version of the multiplet table. Groups of records from the beginning and end of each file are illustrated. The beginning of each record and the bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

L I S T I N G   O F   R E C O R D S   F R O M   D A T A   F I L E

Data File Name: Lowell Survey South

Records 1 To 20

Data File 24

Record Length 98 bytes

Input VOLSER ADC016

```
C O L U M N                                                                                                                111111111111111
H E A D I N G          1111111111222222222233333333334444444444555555555566666666667777777777888888888899999999990000000000111111
I N D E X     123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
```

Record	1	G267-017	00 00 03	-39 35.9	0.20	76	15.1	+2	LTT 1	158
Record	2	G158-022	00 00 04	-11 40.1	0.61	226	14.6	+2	G273-207	122
Record	3	G267-018*	00 00 06	-34 30.0	0.77	169	15.6	0	LFT 1	158
Record	4	G267-019	00 00 16	-31 27.2	0.31	111	14.4	+3	LTT 2	158
Record	5	G267-020	00 00 39	-30 21.8	0.25	229	13.8	+3	LTT 5	158
Record	6	G158-023	00 00 46	-04 50.7	0.27	228	16.1	+3		122
Record	7	G266-031*	00 00 52	-24 45.8	0.26	110	15.1	+2	LTT 10	158
Record	8	G266-032*	00 00 58	-17 00.8	0.26	90	14.6	-1	G273-208 LTT 11	158
Record	9	G266-033	00 01 08	-28 40.4	0.30	122	10.0	+2	G267-21 LTT 12 Y13-15189 CD-29 18946*	158
Record	10	G266-034*	00 01 16	-24 02.7	0.26	130	15.7	+2	LP824-91	158
Record	11	G266-035	00 01 43	-26 11.5	0.23	221	11.6	+2	G267-22 LTT 15 Y14-15973 CD-26 16890	158
Record	12	G158-024	00 01 48	-06 38.4	0.36	135	16.6	+2		122
Record	13	G158-025	00 02 07	-10 09.3	0.27	184	14.8	+3		122
Record	14	G266-036	00 02 10	-23 36.6	0.57	148	15.9	+3	LP824-106	158
Record	15	G267-023	00 02 14	-30 18.2	0.77	206	16.2	+4	LP880-344	158
Record	16	G267-024	00 02 29	-36 17.7	0.21	76	9.2	+2	LTT 22 Y29-16 CD-36 16162*	158
Record	17	G267-025*	00 02 38	-37 37.0	6.15	113	11.3	+3	LFT 5 Y29-15 CI20-3 CI18-3161 GL-1	158
Record	18	G267-026	00 02 38	-38 03.5	0.36	94	15.5	+3	LTT 24	158
Record	19	G267-027	00 02 40	-30 12.4	0.20	73	16.4	+3		158
Record	20	G267-028	00 02 47	-35 45.2	0.26	194	14.5	+2	LTT 25	158

L I S T I N G   O F   R E C O R D S   F R O M   D A T A   F I L E

Data File Name: Lowell Survey South

Records 2739 To 2758

Data File 24

Record Length 98 bytes

Input VOLSER ADC016

```
C O L U M N                                                                                                                      111111111111111
H E A D I N G          1111111111222222222233333333334444444444555555555566666666667777777777888888888899999999990000000000111111
I N D E X     12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
```

Record	2739	G266-023	23 57 56	-26 30.7	0.26	62	15.2	+3	G267-12 LTT 9835	158
Record	2740	G031-022	23 58 04	-06 47.3	0.30	228	14.8	+2	G158-19 LTT 9842	102
Record	2741	G273-199	23 58 07	-17 09.7	0.22	214	12.8	+1		162
Record	2742	G266-024	23 58 10	-27 16.8	0.20	158	15.0	+3		158
Record	2743	G267-013	23 58 12	-35 26.7	0.40	106	13.6	+3	LTT 9844	158
Record	2744	G267-014*	23 58 14	-31 48.4	0.21	189	13.3	+1	LTT 9843	158
Record	2745	G273-200	23 58 19	-13 06.5	0.24	121	10.5	+1	LTT 9846 Y11-8321 CI18-3151 -13 6504*	162
Record	2746	G158-020	23 58 23	-12 06.1	0.46	98	9.4	+1	G273-201 LTT 9849 Y11-8322 CI20-1471	122
Record	2747	G158-021	23 58 25	-05 12.6	0.27	228	10.1	+1	LTT 9848 Y17-8191 CI18-3153	122
Record	2748	G031-023	23 58 40	-00 33.6	0.29	112	16.9	+2		102
Record	2749	G266-025	23 58 48	-23 26.9	0.22	75	16.7	+3		158
Record	2750	G266-026	23 58 51	-17 13.4	0.39	134	12.5	+2	G273-202 LTT 9850 HYD73 -17 6862	158
Record	2751	G267-015	23 59 04	-33 15.4	0.31	100	13.9	+3	LTT 9852	158
Record	2752	G266-027	23 59 05	-19 57.0	0.20	86	13.0	+2	BPM 68915	158
Record	2753	G267-016	23 59 09	-35 45.2	0.50	93	15.0	+3	LFT 1846	158
Record	2754	G266-028	23 59 14	-20 08.2	0.21	94	12.4	+2	G273-203 BPM 68918 -20 6694	158
Record	2755	G266-029*	23 59 16	-26 04.5	0.38	210	11.0	+2	LTT 9854 Y14-15953 CI18-3156 CD-26 16876*	158
Record	2756	G273-204*	23 59 22	-10 08.4	0.20	160	15.9	+2	LP704-31,32	162
Record	2757	G273-205	23 59 29	-13 07.4	0.20	60	15.4	+3	BPM 83181	162
Record	2758	G266-030	23 59 58	-20 28.0	0.23	94	13.0	+1	G273-206 LTT 9864	158