# Appendix 4 - STAR NAMES

The conventional system for naming variable stars is archaic, but has served us for over 150 years.

In order not to get variables confused with stars assigned Bayer lower case letters 'a' through 'q', Friedrich Argelander began naming variables with the letters 'R' through 'Z', followed by the three-letter constellation abbreviation (see Table 4.1 on page 20 for a list of all the official constellation abbreviations). After those were used up, 'RR' through 'RZ', 'SS' through 'SZ', etc. were assigned. Then they start over with 'AA' through 'AZ', 'BB' through 'BZ', etc. all the way to 'QZ' (skipping the J's). This allows for 334 names. After the letters are used up the stars are simply named V335, V336, V337 and on and on.

As if that weren't confusing enough, there are now a host of other prefixes and numbers assigned to variable stars and objects. The following is a guide to help the reader understand what these names mean and where they came from.

**NSV xxxxx** - These are stars in the *New Catalogue of Suspected Variable Stars*, produced as a companion to the Moscow *General Catalog of Variable Stars* (GCVS) by B.V. Kukarkin et al. All stars in the NSV have reported but unconfirmed variability, in particular, lacking complete lightcurves. Some NSV stars will eventually prove truly variable; others will be spurious. Information about this and the *General Catalog of Variable Stars* can be found at: http://www.sai.msu.su/gcvs/gcvs/intr.htm.

Many stars and variable objects are assigned prefixes based on astronomer, survey or project names. Many are temporary designations until they are assigned a conventional name in the GCVS.

**3C xxx** - These are objects from the Third Cambridge (3C) catalog (Edge et al. 1959), based on radio-wavelength observations at 158 MHz. There are 471 3C sources, numbered sequentially by right ascension. All 3C sources are north of -22 declination. The 3C objects of interest to variable star observers are all active galaxies (quasars, BL Lacs, etc.).

**Antipin xx**- Variable stars discovered by Sergej V. Antipin, a junior researcher working for the General Catalogue of Variable Stars Group.

**HadVxxx** - This represents variables discovered by Katsumi Haseda. One of Haseda's discoveries was Nova 2002 in Ophiuchus, V2540 Oph.

**He-3 xxxx** - Variables from Henize, K. G. 1976, "Observations of Southern Emission-Line Stars", Ap.J. Suppl. 30, 491.

**HVxxxxx** - Preliminary designations of variables discovered at Harvard Observatory.

**Lanning xx** - Discoveries of UV-bright stellar objects by H. H. Lanning from Schmidt plates centered primarily on the galactic plane. In all, seven papers entitled "A finding list of faint UV-bright stars in the galactic plane" were published.

**LD xxx** - Variables discovered by Lennart Dahlmark, a Swedish retiree living in southern France are given this prefix. Dahlmark has been conducting a photographic search for new variable stars; discovering several hundred to date.

**Markarian xxxx** - TThe widely used abbreviation for Markarian objects is Mrk. These are active galaxies from lists published by the Soviet Armenian astrophysicist B.E. Markarian (1913-1985). Markarian looked for galaxies that emit unusually strong UV radiation, which comes from either pervasive star-formation HII regions or from active nuclei. In 1966, Markarian published 'Galaxies With UV Continua'. Around that time, he started the First Byurakan Spectral Sky Survey (FBS), which is now completed. In 1975, Markarian initiated a Second Byurkan Survey (SBS). The SBS was continued by his collaborators after his death. For more information see 'Active Galactic Nuclei', by Don Osterbrock.

**MisVxxxx** - The stars are named MisV after MISAO Project Variable stars. The MISAO Project makes use of images taken from all over the world, searching for and tracking astronomically

remarkable objects. The number of variables discovered so far reached 1449 on May 18, 2014. Few of these stars have lightcurves, and the type and range of many are still undetermined. The project website url is: http://www.aerith.net/misao/

**MDV xxx** - Preliminary names MDV (Moscow Digital Variable) are given to variable stars discovered semi-automatically using scans of photographic plates from the collection of Sternberg Astronomical Institute, Lomonosov Moscow University. By 2014, studies were published for 595 stars of the MDV series.

**OX xxx** - Another group of objects is labeled with the prefix O, then a letter, then a number (OJ 287 for example). These objects were detected by the Ohio StateUniversity radio telescope "Big Ear" in a series of surveys known as the Ohio Surveys.

**S xxxxx** - These are preliminary designations of variables discovered at Sonneberg Observatory.

**SVS xxxx** - Soviet Variable Stars, indicates preliminary designations of 2887 Soviet-discovered variables. This series was discontinued in 1991.

Many variables are named with prefixes associated with surveys or satellites, combined with the coordinates of the object. Here are some examples:

**2QZ Jhhmmss.s-ddmmss** - Objects discovered by the 2-degree field QSO Redshift Survey. The aim is to obtain spectra of QSOs out to redshifts so high the visible light emitted by these objects has shifted into the far infrared. The observations are actually of the ultra-violet part of the spectrum that has been redshifted into the visible. As with most QSO surveys, a serendipitous byproduct is the discovery of CVs and other blue stars. A description and awesome pictures of the equipment can be found here: http://www.2dfquasar.org/Spec_Cat/basic.html Home site: http://www.2dfquasar.org/index.html

**ASAS hhmmss+ddmm.m** - This is the acronym for All Sky Automated Survey, which is an ongoing survey monitoring millions of stars down to magnitude 14. The survey cameras are located at the Las Campanas Observatory in Chile, so it covers the southern sky from the pole to about +28 degrees declination.

**ASASSN-yyxx** - The All Sky Automated Survey for SuperNovae is an automated program to search for new supernovae. It has robotic telescopes in both the northern and southern hemispheres and can survey the entire sky every two days. The main goal of the project is to look for bright supernovae, however other transient objects including variable stars are frequently discovered

**CRTS Jhhmmss.s-ddmmss -** The Catalina Real-Time Transient Survey is a synoptic survey that covers thirty three thousand square degrees of the sky in order discover rare and interesting transient phenomina. The survey utilizes data taken by the three dedicated telescopes of the highly successful Catalina Sky Survey (CSS) NEO project. CRTS detects and openly publishes all transients within minutes of observation so that all astronomers may follow ongoing events.

**FBS hhmm+dd.d** - Stands for First Byurakan Survey and the coordinates of the object. The First Byurakan Survey (FBS), also known as the Markarian survey, covers about 17,000 square degrees.

**EUVE Jhhmm+ddmm** - These are objects detected by NASA's Extreme Ultraviolet Explorer, a satellite dedicated to studying objects in far ultraviolet wavelengths. The first part of the mission was dedicated to an all-sky survey using the imaging instruments that cataloged 801 objects. Phase two involved pointed observations, mainly with the spectroscopic instruments. One of the highlights of the mission was the detection of Quasi Periodic Oscillations (QPOs) in SS Cyg.

**FSVS Jhhmm+ddmm** - Discoveries from the Faint Sky Variability Survey, the first deep wide-field, multi-color, time-sampled CCD photometry survey. It was specifically aimed at detecting point sources as faint as 25th magnitude in V and I and 24.2 in B. Targets were faint CVs, other interacting binaries, brown dwarfs and low mass stars and Kuiper Belt Objects.

**HS hhmm+ddmm**- The Hamburg Quasar Survey is a wide-angle objective prism survey searching for quasars in the northern sky, avoiding the Milky Way. The limiting magnitude is approximately 17.5B. The taking of the plates was completed in 1997.

**PG hhmm+DDd** - Palomar Green Survey conducted to search for blue objects covering 10714 square degrees from 266 fields taken on the Palomar 18-inch Schmidt telescope. Limiting magnitudes vary from field to field, ranging from 15.49 to 16.67. The blue objects detected tend to be quasars and cataclysmic variables. The CVs were documented in Green, R. F., et al. 1986, "Cataclysmic Variable Candidates from the Palomar Green Survey", Ap. J. Suppl. 61, 305.

**PKS hhmm+ddd** - This was an extensive radio survey (Ekers 1969) of the southern sky undertaken at Parkes (PKS), Australia, originally at 408 MHz and later at 1410 MHz and 2650 MHz. These sources are designated by their truncated 1950 position. For example 3C 273 = PKS 1226+023. This is still the most common, and useful, system of naming quasars.

**ROTSE1 thru 3 Jhhmmss.ss+ddmmss.s** - The Robotic Optical Transient Search Experiment (ROTSE) is dedicated to the observation and detection of optical transients on time scales of seconds to days. The emphasis is on gamma-ray bursts (GRBs). Objects detected by this survey are designated with positions to 0".1 precision.

**ROSAT** is an acronym for the ROentgen SATellite. ROSAT was an X-ray observatory developed through a cooperative program between Germany, the United States, and the United Kingdom. The satellite was designed and operated by Germany, and was launched by the United States on June 1, 1990. It was turned off on February 12, 1999.

Prefixes for x-ray sources detected by ROSAT include, **1RXS**, **RXS** and **RX**. The J2000 coordinates for the source are then stated according to the accuracy of the X-ray position and the density of stars in the field.

arcsecond accuracy ---> RX J012345.6-765432
tenth-arcmin accuracy ---> RX J012345-7654.6
arcmin accuracy ---> RX J0123.7-7654

Distressingly, these can all refer to a single object!

**Rosino xxx or N xx** - Variables discovered by Italian astronomer L. Rosino, primarily in clusters and galaxies through photographic surveys.

**SBS hhmm+dd.d** - Indicates objects discovered by the Second Byurakan Sky Survey, plus the coordinates of the object.

**SDSSp Jhhmmss.ss+ddmmss.s** - These are discoveries from the Sloan Digital Sky Survey. The positions of the objects are given in the names. SDSS- (Sloan Digital Sky Survey), p- (preliminary astrometry), Jhhmmss.ss+ddmmss.s (the equinox J2000 coordinates). In subsequent papers on CVs detected by SDSS (Szkody et al) the p was dropped and the names became simply SDSS Jhhmmss.ss+ddmmss.s.

**TAV hhmm+dd** - The Astronomer Magazine, in England, has a program that monitors variable stars and suspected variable stars. TAV stands for The Astronomer Variable, plus the 1950 coordinates.

**TASV hhmm+dd** - TASV stands for The Astronomer Suspected Variable, plus the 1950 coordinates. The Astronomer Variable star page can be found at this url: http://www.theastronomer.org/variables.html

**XTE Jhhmm+dd** - These are objects detected by the Rossi X-Ray Timing Explorer Mission. The primary objective of the mission is the study of stellar and galactic systems containing compact objects. These systems include white dwarfs, neutron stars, and possibly black holes.

With more and more surveys being conducted, and more new variables being discovered, this list of non-conventional names will undoubtedly grow. I hope this explanation has helped to demystify the existing names and prepares you for the onslaught of names yet to come.

There is a CDS webpage (http://cdsarc.u-strasbg.fr/viz-bin/Cat) where you can find details about specific acronyms. The GCVS also has a list of catalog abbreviations.