

# The Harned Hall Sundial and Analemma

A mirror under the skylight reflects a spot of sunlight onto the sundial and analemma during the midday hours. The location of the spot allows an observer to determine quite a number of things connected with the daily and annual motions of the sun. Because of the scale of the display, for certain observations it can be helpful to move up or downstairs or even to use binoculars to read the scales on the highest parts of the instrument.

**Clock Noon.** The sun is not a uniform keeper of time, but runs alternately fast and slow in different parts of the year. The figure-8 of the analemma displays this dramatically and also functions as a noon mark. At exactly 12 o'clock, (or 1 p.m. when we are on daylight savings time), the spot should fall exactly on the appropriate branch of the analemma.

**Sun Time.** Sun noon (when the sun is at its highest for the day) is indicated when the sun spot crosses the central meridian line, labeled "Sun Noon." The long slanted lines mark one hour before or after sun noon. Finer divisions of time before and after sun noon can be told by means of the black screw heads that are spaced at half-hour intervals on the winter solstice curve and the equinox bar. The marks are at 12-minute intervals along the summer solstice curve.

**Equinoxes and Solstices.** During the day of the summer solstice (roughly June 21) the spot of light follows the lower curve, labeled "Summer Solstice." On winter solstice (December 22) the spot of light follows the upper curve. On the equinoxes (around March 21 and September 23), the sun spot follows the horizontal bar labeled "Equinox." The day, and even the time, of equinox or solstice can be observed by noting when the spot of light reaches the appropriate curve.

**Declination of the Sun.** The declination is the sun's angular distance (in degrees) above or below the plane of the equator. It is indicated by marks at one-degree intervals on the meridian.

**Zodiac Sign of the Sun.** The zodiac (the path of the sun's annual motion) is divided into twelve signs, each 30° long. You can tell which sign the sun is in by watching where the spot of light crosses over the slanted hour lines. These hour lines are divided into zodiac signs by the small areas of contrasting texture. The signs are labeled with their conventional symbols:

♈ Aries   ♉ Taurus   ♊ Gemini   ♋ Cancer   ♌ Leo   ♍ Virgo  
♎ Libra   ♏ Scorpio   ♐ Sagittarius   ♑ Capricorn   ♒ Aquarius   ♓ Pisces

In Gemini and Cancer the Sun has the same declinations (which is why this segment of the hour line is labeled with both signs), so you do have to know whether the date is before or after the solstice to remove the ambiguity. Finer divisions of the zodiac signs are indicated by the black screw heads along the hour lines. These black markers correspond to intervals of 10° along the zodiac. The boundaries between the signs and finer divisions also appear on the meridian.

**Day of the Year.** The day of the year can be told by means of the back markers on the analemma curve. For most months, these are placed at 6-day intervals, and indicate the 4<sup>th</sup>, 10<sup>th</sup>, 16<sup>th</sup>, 22<sup>nd</sup>, and 28<sup>th</sup> of the month. (See the July segment, where these are labeled.) On the shorter month segments near the top of the analemma (November, December, January, and February), the marks are at longer intervals and indicate the 4<sup>th</sup>, 16<sup>th</sup>, and 28<sup>th</sup>. (See November.)

**Miscellaneous Facts.** The mirror is 39 feet above the floor, and is 15½ feet from the wall onto which the light is reflected. The analemma measures 30 feet from top to bottom and was installed in the spring of 2006. Design of sundial and analemma: James Evans (UPS). Design of skylight: Bryan Higgins (SRG Partnership, Inc.). Computer drafting: Bob Boulware (Autoscan, Seattle). Assistance with mirror alignment: Isaac Kelly and Ted (Sellen Construction, Seattle) and Al Vallecorsa (UPS). Fabrication and installation: Hanset Stainless (Portland). Mirror mask: Alan Thorndike (UPS). Coordination of the project: Jim Bosisto and Bob Ebert (UPS). The project was made possible by a gift from Frederick and Margaret Grimm.

