

Sundials make a comeback in St. Louis region



By Jo Seltzer, special to the Beacon

Up to three centuries ago, at the time of Galileo, there was no clock worthy of the name. The most technically sophisticated instruments used to measure time were sundials.

Sundials date back to about 1500 BC. And today, most are out of sight and out of mind.

But they made a comeback of sorts here earlier this month when the North American Sundial Society (NASS), a group devoted to the study and creation of sundials, met in St. Louis for its 2008 Annual Conference. About 45 sundial aficionados from the far reaches of the continent met to appreciate the relationship between time, the Earth and the sun. By the end of their conference, they left permanent additions to the culture and aesthetics of St. Louis.

A short primer on sundials: All rely on the fact that shadows are long when the sun is low in the sky, are shortest at noon when the sun is highest. Calculations for making an accurate sundial are extensive and rely on trigonometry. Designers must take into account such factors as the tilt of the Earth's axis, the elliptical orbit of the Earth round the sun, true (not magnetic) north, and the latitude where the dial is to be located.

Three new and very different sundials ornament the Missouri Botanical Garden

A NEW TIMEPIECE



JO SELTZER

Peter Raven, Ph. D., director of the Missouri Botanical Garden officially accepts the NASS gift of a sundial to commemorate the Garden's upcoming 150th anniversary.

as lasting mementos from the Sundial Society annual meeting. Furthermore, in honor of the NASS conference, the History Museum inaugurated a series of special exhibits by putting a seldom-viewed sundial designed by Thomas Jefferson on display.

A tour organized by Donald L. Snyder, Ph. D., of Washington University School of Engineering led the NASS members and members of the St. Louis Academy of Science to 13 area sundials with unique characteristics. For example, sculpture created for the Korean War Memorial at the Jewel Box in Forest Park is actually a sundial.

The Jefferson Sundial at the History Museum

Thomas Jefferson designed the sundial on display at the Missouri History Museum. It is the conventional type of sundial we often see in gardens. However, it is significant because the calculations used to create the dial are documented in a published letter from Jefferson. Snyder checked Jefferson's calculations and found them to be quite accurate. The sundial was taken out of storage and put on display so members of the NASS could view it.

The sundial was given to the museum (then called the Jefferson Memorial) in 1906 by a St. Louis group devoted to the study of Jeffersonian history. Members of that organization made a pilgrimage to Monticello, and erected a marble column there with a time capsule commemorating the trip. Upon their return, the group heard about the sundial's availability and purchased it. Later, William Bixby donated the artifact to the museum.

A FOUNDING FATHER'S DESIGN



Jo SELTZER

This brass sundial, about 8 inches square, was made according to Thomas Jefferson's design and with his calculated specifications.

The Scientific Sundial: A Gift from NASS to the Missouri Botanical Garden

Located north of the Linnean greenhouse, the sundial given to the Missouri Botanical Garden in honor of its upcoming 150th birthday is quite different, and the casual passer-by might think it a small sculpture.

Designed and fabricated by Ronald Rinehart, Ph. D., of Nevada, Mo., this photoengraved aluminum sundial is quite modern. As shown in the photo, the precise time is indicated by the intersection of the shadows of the two crossed wires that face the sun. During the dedication, NASS president Fred Sawyer noted that the organization is always happy to leave a tangible sign of its passing through.

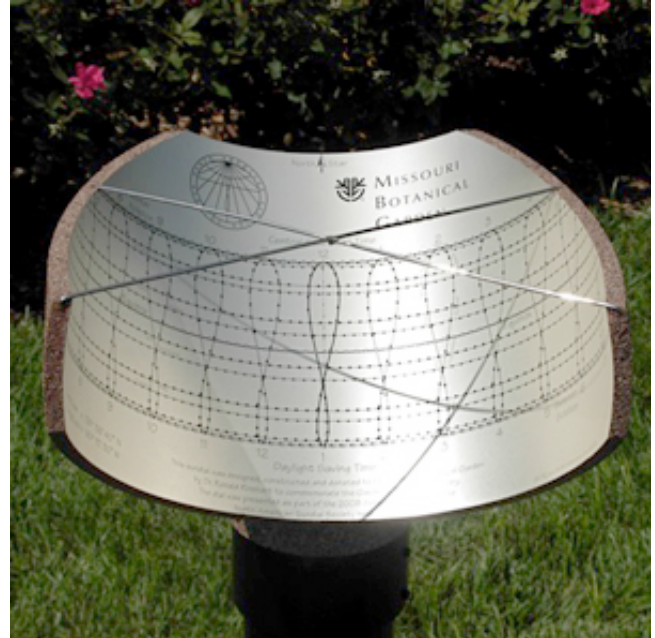
The Schmoyer Sunquest Sundial

It seems fitting that the Linnean greenhouse, the oldest operating greenhouse west of the Mississippi, is now surrounded by three of these timepieces.

In honor of the NASS meeting, Professor Snyder gave the garden a Schmoyer Sunquest sundial, installed at the west end of the greenhouse. This sundial must be adjusted by the user to get the correct time.

Here is how it works: Two nested crescents at right angles embrace the indicator, (called the gnomon). In this sundial, the gnomon does not cast a shadow, but

MODERN AND PRECISE



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The scientific sundial given by NASS to the Missouri Botanical Garden in honor of its upcoming 150th birthday.

SUNQUEST



WITH PERMISSION OF
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indicates the time with a shaft of light passing through a slit. One of the wavy plates on each side of the slit is turned toward the sun depending upon the time of year -- on Aug. 8, the side labeled "Turn this face toward sun June 22 to December 21." The gnomon is rotated until the light coming through the slit narrows to a hairline on the engraved dial.

PRECISION SUNDIALS,
LLC

This hairline of line indicates the correct "clock" time. "Clock" time differs from solar time. All clocks within a time zone are set to the same time, but the sun's zenith continually moves across the sky. St. Louis is close to the center of our time zone, so our solar noon is only about 7 minutes after noon on the clock. This sundial is adjusted to exact longitude and latitude, and adjusts to account for daylight savings time.

The Islamic Sundial

The only public Islamic sundial in this country sits near the entrance to the new Ottoman garden, east of the Linnean greenhouse. Its main function is to set precisely the time for prayers. It has two gnomons, and deals with four time systems. Shadows cast by the short peg gnomon are read in Turkish Ezanic hours. In the Ezanic time system, the day begins and ends at sunset; prayers are scheduled according to Ezanic time. The long polar gnomon that rests on top of the 7 circles in the photo indicates western time, where the day begins at midnight.

This sundial is modeled after one in the grounds of Topkapi palace in Istanbul. That garden has a sundial dating from the time of Mahmet the Conqueror (1463-1481.)

When the decision was made to install an Islamic sundial, the garden contacted

ONE DIAL, FOUR TIME SYSTEMS



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The Islamic sundial was finished just in time for the NASS group's visit.

NASS and found member Roger Bailey from Canada, who agreed to design an instrument for St. Louis. They engaged a local sculptor, Abraham Mohler. The estate of Edward L. Bakewell donated the funds for the project.

The calculations began. The goal was to install the sundial in time for the NASS meeting. Work was completed on Aug. 1.

However, installation brought some unforeseen difficulties. The rectangular marble sundial was set up with the polar gnomon pointing true north. However, the north-south axis of the Ottoman garden is not true north, and the sides of the sundial were angled with respect to the walkway -- not an aesthetically pleasing arrangement according to some. The sundial was "straightened," making it nine degrees off of true north.

Now the entire purpose of an Islamic sundial was subverted, because prayers must be said at the precise solar time.

At this point, Bailey and the garden designers reached a compromise. The sundial itself would remain aligned with the walkways, and the outer dial scale would not change. Snyder made some time measurements and found the observed error to be somewhat less than the calculated error. But the Ezanic scale, that gives the time for prayer had to be carved again for accuracy. (A close examination of the photo shows the curved scales in the middle to be tilted.) Mohler the sculptor removed the old lines, and using a micropneumatic chisel, originally designed to take the rock off of fossils, incised the new one. He laid gold leaf in the lines to define contrast -- and finished the sundial's face on the morning of Friday, Aug. 8, just hours before the NASS visit.

Roger Bailey related that cliffhanger as the NASS conference concluded with a series of lectures all day Saturday. Included in the talks was a description of Woodhenge at Cahokia by Michael Friedlander, Ph. D., of Washington University. Woodhenge is analogous to Stonehenge in England, in that it predicts solar events. But Woodhenge is a subject for another story.

Those interested in following the sundial trail may want to click on [Don Snyder's webpage](#) .

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