

## Conference Retrospective – 2014 Indianapolis

Roger Bailey

The NASS Conference was held at the Hilton Indianapolis North Hotel August 21-24, 2014. Local hosts were Mark and Phyllis Montgomery and George and Betsy Wilson. Forty-six people attended the conference, with thirty-six being full registrants attending the technical presentations.

**Registration and Reception** were held at the Hilton Hotel on Thursday afternoon. We were entertained by Fred Sawyer reading a cautionary tale about one man's decades-long quest to find a tove munching on cheese and nesting beneath a sundial as in Lewis Carroll's Jabberwocky.

Door prizes were won on the basis of each person voting with tickets on the prizes of most value to them. The twenty-three prizes available this year provided excellent chances to win. The winners of the prizes, books and sundials, are listed below.

1. Reproduction "Richard Glynne" Sundial by Fer de Vries, to Phyllis Montgomery
2. "World Time Sundial Kit" by Artec finally to Mark Montgomery
3. "Art & Science of Gnomonics" by Frank W Cousins to Dean Connors
4. "Anno's Sundial" & "Sundials & Timedials" by Jenkins/Bear to Jeff Kretsch
- 5-6. "Sundials: History, Art and People" by M. Lennox-Boyd to Peggy Gunnerson and Corena Alexander
7. "Nocturnal Geocoin" to Will Grant
8. "Sun in the Church, Cathedrals as Solar Observatories" by J. Heilbron to Kate Aubert
- 9-10. "Sundials: An Illustrated History of Portable Dials" By Hester Highton to Fred Gunnerson and Jim Holland
- 10-11. "A Study of the Quadrant" by Mike Cowham to Roger Bailey and Jackie Petrie
13. "Sundowner's Almanac: The Solar Slide Rule" to Warren Thom
14. "Planisphere Geocoin" to Betsy Wilson
- 15-20. "Battle Point Sundial T-Shirts" finally to Bill Thibault, Derald Nye, Ken Clark, Susan Thom, Bill Gottesman and John Schilke
- 21-22. "CD Sundials" by Dave Scott to Paul Ulbrich and Jacque Olin
23. "Skywatch" sundial sculpture by Kate Pond to Susan Haynes

**Sundial Tour Day** was Friday 22 August starting from the hotel at 8:30 am.

1. **Coxhall Garden Analemmatic Sundial, Carmel, IN:** An analemmatic sundial is one of the features of the Children's Garden of Coxhall Park. The sundial is a typical concrete analemmatic. Based on the logo in the circle south of the sundial, this was sponsored by the Rotary Club. Four posts on the periphery of the circle are said to be oriented to the solstices but a rough estimate showed the angle to be about 24° from north east rather than the 31.4° for the solstice sun rise and set. Rain limited the visit duration. 39°57'36.00"N, 86°11'39.48"W
2. **Eagle Elementary School Sundial, Brownsville IN:** We were welcomed at Eagle Elementary School by the Principal Ryan Hoover, the senior high ability class and their teachers, Pam Hutton and Christianne Beebe. In the courtyard they showed us a large horizontal sundial with a triangular gnomon. The sundial is a memorial for a former teacher, Linda Eads. The noon line is set at 1 indicating either central standard or eastern daylight savings time. The dial is used in science instruction for advanced students. 39°49'39.53"N, 86°23'24.62"W



Group Picture

3. **Armillary Sundial at American Legion Wayne Post 64:** This armillary/equatorial sundial is about 60" in diameter on a circular stone base. The ecliptic and equatorial rings have slots to allow the armillary to act as an equatorial sundial. Plaques showing the zodiac symbols are fixed around the ecliptic ring. The words "God and Country We Forever Honour" are engraved on the plinth. The dial was dedicated 27 May 1951.  $39^{\circ}45'20.10''\text{N}$ ,  $86^{\circ}13'26.31''\text{W}$
4. **Vertical Declining Sundial on the Publix Theatre Building:** On the south facing wall of the Publix Theatre Building in downtown Indianapolis is a large vertical sundial. The noon mark is slightly offset from the vertical gnomon indicating a small longitude correction. All the other lines are skewed in proportion except the two 6 o'clock lines. These impossible lines are symmetrical and well above the horizon lines. On a south facing vertical sundial, the six lines are aligned to the horizon and only show at the equinox. In the fall and winter the sun rises and sets before six. In the spring and summer, the six o'clock line is on the north side of the dial. The lines were likely set for artistic appeal to add symmetry balance and completeness to the dial face. These lines make the dial look like the more familiar horizontal dial with lines to the south of the east west six o'clock lines.  $39^{\circ}46'2.07''\text{N}$ ,  $86^{\circ}9'39.20''\text{W}$
5. **Totem Sculpture, White River Park:** A tall metal sculpture seems to have some sun oriented features like projecting vanes interpreted as gnomons. There are no lines or marks providing utility to the abstract sculpture.
6. **Boy with Spider Sundial, Indiana Museum of Art:** In the garden of the Indianapolis Museum of Art is a sundial sculpture showing a boy with a sundial scroll in his lap. The gnomon is a spider hanging on its web below the boy's stick. Unfortunately the fragile spider gnomon was not present; recent vandalism caused the museum to remove it temporarily from the sculpture. The design by Wilfred Paddock was patented in 1918. The hour lines are analemma shaped to correct to standard time. The inscription is "Mark then the hours that slip away, spin then thy hour of sunshine while you may".  $39^{\circ}49'38.62''\text{N}$ ,  $86^{\circ}11'2.19''\text{W}$
7. **Four Seasons Sundial, Indiana Museum of Art:** Also in the garden of the Indianapolis Museum of Art is the "Four Seasons Sundial" a replica of a traditional bronze horizontal garden dial of an 18<sup>th</sup> century European design. The gnomon is at about  $55^{\circ}$  and the motto is in English.



"I mark not the hours unless they be bright". The hour lines also indicate a high latitude  $\sim 60^\circ$ , Edinburgh Scotland perhaps.  $39^\circ 49' 34.41''\text{N}$ ,  $86^\circ 10' 59.20''\text{W}$

8. **Washington Sundial Replica:** The gardens also have a modern replica of the sundial that George Washington had installed on the grounds of Mount Vernon.
9. **Equatorial Sundial, Crown Hill Cemetery:** A large stone equatorial sundial stands in front of the mausoleum at Crown Hill Cemetery, Indianapolis. David L Rogers sculpted the monument in 1987. The wide noon gap adjusts for the thick stone gnomon. A table provides a combined longitude and Equation of Time correction.  $39^\circ 49' 35.90''\text{N}$ ,  $86^\circ 10' 22.84''\text{W}$
10. **Schmoyer Sundial in Holcomb Botanical Garden, Butler University:** A Sunquest equatorial sundial is mounted on a stone monument in this formal garden. This sundial was originally designed by Richard Schmoyer and published in *Scientific American* in October 1959. The dial corrects to civil time using a complex gnomon shape turned to face the sun at different seasons. Schmoyer made the castings available at a nominal cost to those interested in constructing the dial. Bill Gottesman now has the original sand casting patterns and offers the completed sundial in bronze or aluminum. John Eble ordered a custom version in 2007 for this monument. Bill was pleased to see the dial again and demonstrate its features. Engraved in the stone base are the words by Aristotle "In All Things of Nature There is Something of the Marvellous", John and Jane Eble 2007. Also engraved into the stone base is a diagram taken from Isaac Newton's *Principia*.  $39^\circ 50' 42.42''\text{N}$ ,  $86^\circ 10' 13.62''\text{W}$



Bill Gottesman and Schmoyer dial

**11. Equatorial Sundial, Washington Park Cemetery:** In this cemetery in Indianapolis North is a large equatorial called a 'Helios Chronometer' mounted on a small mausoleum. The dial is cast aluminum about 3 ft in diameter. The markings on the equatorial ring are corrected for longitude. The plaques around the plinth are grave markers.

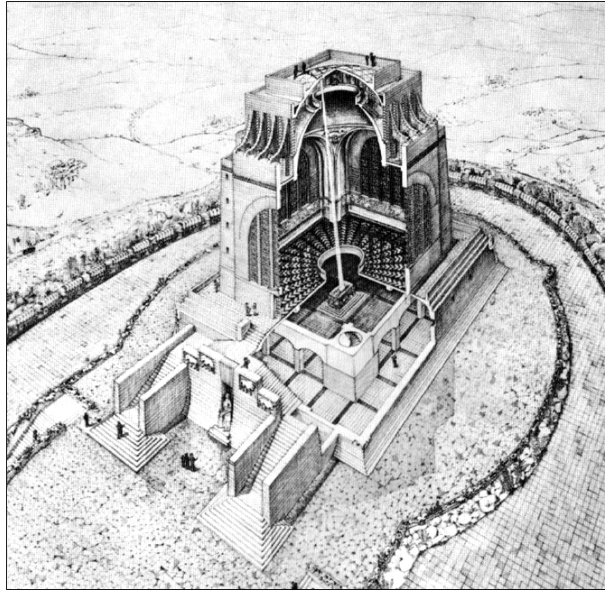
Following the tour we were treated to refreshments at the home of our local hosts, George and Betsy Wilson. Betsy entertained us by demonstrating her “Mountain Zither”. Several sundials enhanced their native garden.



Betsy Wilson and zither

On Saturday 23 August the conference resumed at the hotel at 8:45 with technical talks.

**“Voortrekker Monument Heritage Site”:** Will Grant stated that he is fascinated by monumental sundials. In 2013 he visited an impressive sun oriented monument near Pretoria, South Africa, a memorial for the Voortrekkers and their struggle to settle in South Africa. The key design feature is the noon sun shining on 16 Dec through the aperture in the dome to highlight a cenotaph in the core of the monument. The date commemorates the Blood River Battle in 1838 where the Boors on their Great Trek inland fought off ~ 14,000 Zulu natives. The musket firepower from the protective circle of wagons slaughtered thousands of natives while no Boors were killed in this battle. The monument, designed by Anton Van Wouw, was inaugurated in 1949. Will also showed other sundials he located in South Africa, five historic and three modern.



Voortrekker Monument Alignment

**“Lunacy? An Analemmatic Sundial”** Roger Bailey showed how his new home allows excellent views of rising phenomena. The first challenge was to determine when the sun rose at the peak of Mt Baker, a glaciated volcanic peak over 60 miles to the east. On 1 April when the solar declination was  $4.6^\circ$ , he captured the diamond effect of the rising sun. The moon is more difficult to determine as the declination changes so much, going through a full cycle each month. About this time Alexi Pace was also watching moonrises and asked if his analemmatic sundial could be used as a moondial. The initial response was “no” but the question was worth investigating. The key was determining where to stand on the date table for the correct lunar declination. Roger outlined the following steps to use an analemmatic sundial in moonlight.

1. Set a lunar date for the 28 day lunar declination cycle, 14 days up and 14 days back.
2. Calibrate phase and declination cycle each month.
3. Stand on the appropriate day point for that month and determine the lunar hour point on the hour ellipse.
4. Adjust lunar time to solar time based on the lunar phase cycle, adding 48 minutes per day from the full moon.

The phase and declination calibration techniques included: Full moon alignment using the anti-solar declination, using Seasonal Markers at moonrise or determining the declination at culmination. All techniques are compromised by 18.6 year precession cycle of the declination range. In theory, an analemmatic sundial could be used as a moondial to estimate time. But perhaps the attempts are lunacy.

**“Time Within Parallelepipeds”** Peggy Gunnerson showed how parallelepipeds are attractive three dimensional sculptural shapes useful in sundial design. “Time is made visible with vitality and validity”. The specific design is a vertical east and west facing sundial surrounded by parallelepipeds. The hours are displayed on a brass sheet, morning hours on the east side and afternoon on the west. The point gnomons are the tip of a wedge cut in the upper parallelepiped surface.





Peggy Gunnerson and sundial.

Short informal presentations followed the morning break.

**“Promoting Sundials and NASS while Geocaching”:** Ken Clark showed the small copper disk sundials he left in geocaches to get people interested in sundials. He added NASS website URL and the invitation “Learn about a fascinating hobby and with a little math, design and make your own sundial.”

**“Quitsato”** Dean Connors told of his recent trip to Quitsato, an “Ecuadorian Equatorial Equinoctial Excursion” to observe the pillar sundials casting no shadow at noon on the equinox.

**“Quadrant in Foyle’s War”:** In the BBC TV program “Foyle’s War” Don Petrie observed the use of a quadrant. Episode 3-3 “They Fought in the Fields” describes preparations by the home guard to defend against NAZI invasion. Quadrants are astronomical and navigation instruments sometimes used as sundials. In this case the quadrant was being used in the forest to measure the heights of tall trees. The quadrant measured the angle subtended by the tree. Pacing of a base line allowed the height to be measured as the base divided by the tangent of the angle subtended. The appropriate trees could then be felled to be used for roadblocks to impede invading forces.

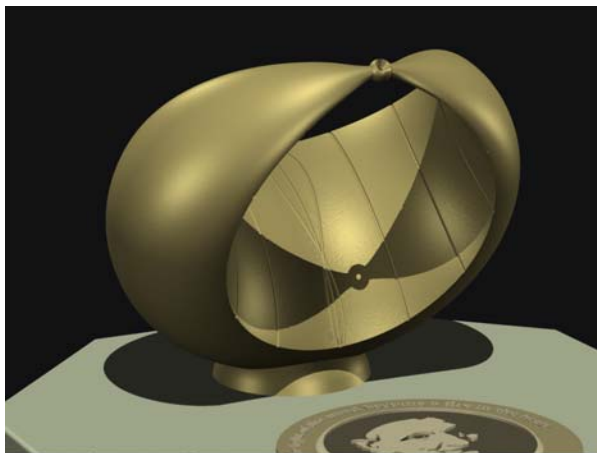
**“Resurrecting Canon Pierre George”** Fred Sawyer described his latest research on the history of analemmatic sundials. An obscure publication “Horologe Magnétique Elliptique ou Ovale” by Canon Pierre George in 1660 was referenced in Analemmatic Sundial Sourcebook. Recently Fred was able to get a copy of this text and learn that Pierre George invented a magnetic elliptical sundial and co-discovered the analemmatic sundial, an elliptical sundial with a movable vertical gnomon. The key difference with the George design is the magnetic needle points to the time when the dial is aligned to the

azimuth of the sun. A magnetic compass is mounted on the pivot of an ellipse trammel. This pivot point moves along the ellipse's minor axis when the arm of the trammel is set to the date. Not only is this unique design self-aligning and adjustable for magnetic declination but it can be universal with multiple hour ellipses for different latitudes. Fred also showed how George's magnetic analemmatic dial also could be used as a moondial to determine time at night. George used the age of the moon, the days since the new moon, to determine what date to set the dial and what correction to add to convert lunar to solar time. Fred used  $\text{Age} \times 12$  for number of days to advance the date and  $\text{Age} \times 0.8$  hours for the lunar to solar correction. George described how to use this dial to tell time by the stars. Fred outlined George's three methods depending on how close the stars were to the ecliptic. Sundials based on George's design are rare but Fred showed pictures of a few examples.



Top face of a universal George dial showing the elliptical hour lines and ellipse trammel cross.

**Sundial Interpretation:** Mark Montgomery started the afternoon session describing his volunteer activity at the Adler Planetarium in a special program to show how to make stained glass sundials. This fits with the purpose of NASS to promote interest and education in sundials. The talk focused the Adler's



DePaul Light of Faith Cyclide Sundial

concepts on interpretation, "the personal experience that builds an emotional and intellectual connection between the interest of the audience and the object, artifact, events, or concepts through first-hand involvement".

**Proposals for the Light of Faith Dial:** Steve Luecking reviewed a series of concepts for commemorative sundials for DePaul University. These proposals included a number of mathematical surfaces including toroids. The choice depended on the specific location and sun exposure of the proposed sundial. For the Math and Science location the design was based on an eccentric toroid, the Dupin Cyclide. Alternatives included a winged cylindrical dial and a sun

scaphe. For the Central Campus location designs included an Axis Mundi dial, a polar post and a polar tablet. For the SAC location designs included “Sun Darts” on the vertical walls of the raised court and toroidal or ring meridians where sun exposure was limited. All the dials bear the motto by St Vincent DePaul “Let the light in the mind become the fire in the heart”.

**Gnomonic Tales of the Founding Fathers:** Fred Sawyer presented “Stories/Anecdotes in some way related to sundials and the founding fathers”. Thomas Jefferson is often associated with sundials but Fred added gnomonic tales for Benjamin Franklin and George Washington. The first story described Washington’s silver universal pocket dial, a gift from Lafayette. Next was the horizontal dial at Mt Vernon from 1780 until 1858. Replicas of this dial are common, including one on the Indianapolis sundial tour. A sandstone sundial found in 1899 at Washington House, Little Brington, Northamptonshire, England is ascribed to one of Washington’s forbearers six generations back. This dial dated 1671 is



Jefferson Spherical Sundial

engraved with the initials RW for Robert Washington and the Washington family coat of arms with 3 mullets and 2 bars, the original stars and stripes.

Ben Franklin often wrote of sundials and included a sundial on US currency. The motto is “Fugio” and “Mind your business.” Various versions of the Fugio sundial design exist, including 1/6 dollar notes, the Continental dollar, the Fugio cent and a six cent note issued by New York City in 1814. A 2006 commemorative silver dollar has the Fugio Continental design on the obverse.

Thomas Jefferson actually designed sundials, calculating the hour angles with trigonometry tables of logarithms. Two sundials have been ascribed to Jefferson, one bought by the Adler Museum the other by the Missouri Historical Society. Metal analysis indicates these dials were likely crafted in the 20<sup>th</sup> century. Jefferson also designed a spherical dial with a rotatable gnomon. A replica is mounted at the original location at Jefferson’s estate, Monticello.

**An Oxford Sundial Mystery:** Frank King’s talk was presented by Fred Sawyer as Frank was unfortunately unable to attend the conference. The sundial mystery is the history of the window dials in Convocation House, one of the Old Bodleian Library buildings. Two similar window dials exist, one facing south, the other facing west. Both are in need of conservation and restoration. The mystery is why historical references by mention the west-facing dial but are silent on the south facing dial. Frank traced the history of these dials and the discovery that the south-facing dial had been installed backwards with the scales reversed. Perhaps the south dial had been removed and the pieces replaced in error after Mrs. Gatty and Robert Gunter wrote their reports. In any case Frank has analyzed the dials and proposed steps to be taken in a Conservation Plan.

**Video Cache:** Fred Sawyer presented a series of videos of interest. These included:

- Sundial Conservation at the Adler Planetarium,
- “Discernment” Fred Sawyer’s talk on the design of his 35<sup>th</sup> anniversary sundial
- “Sundial Reverse Engineering” on the Jamestown Rediscovery Project,
- “Cultivating Life” by Fred Sawyer and
- “Sending a Sundial to Mars, Bill Nye’s TED talk

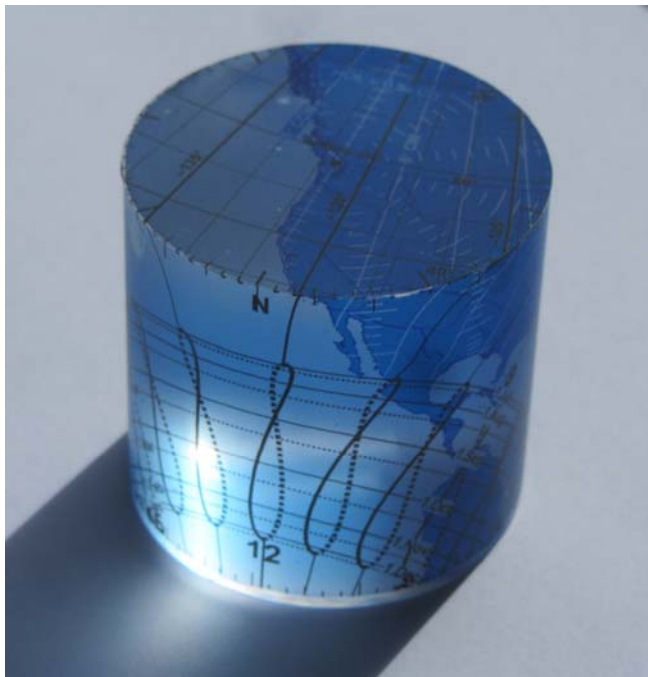


**NASS Flash edition 7:** Fred distributed a flash drive that contained not only all the presentations for the conference but a great collection of e-books, utilities, programs and dialing software.

**Sawyer Dialing Prize:** NASS presented the 2014 Sawyer Dialing Prize to **Robert L. Kellogg**, “who through his constant outreach, his unflagging support of NASS and his technical ingenuity as evidenced by his invention of the digital sundial has helped to usher dialing into the modern age.”



Sawyer Prize presentation to Bob Kellogg



Kretschmann Cylinder sundial with Total Internal Reflection

**The Digital Sundial - A Short History:** Bob’s presentation outlined the various forms of digital sundials devised over the centuries starting with the equatorial band with numbers projected on the on the center, (Bizot 1758, Thew 1960, Adzema 1986). Hines used a cylindrical encoder fiber optics to generate digits. Bob’s design is based on parallel slit masks and thin vertical slits to pass light to form digits. He demonstrated a prototype at the NASS conference in 1995 and published details in the Compendium in Sept 1995. Scharstein in Germany developed similar concepts. Both received US patents, Scharstein in 31 Dec 1996 and Kellogg 21 Jan 1997.

On Saturday the conference dinner was held at the conference hotel. Each full participant received a gift of a custom cylinder sundial by Sonnenuhren – Ästhetik, Dr. Erwin Kretschmann and Dr. Peter Zacharias. Sunlight shining through a clear gap at the base of the acrylic cylinder is refracted and totally reflected to focus a spot of light on the map and hour

scale around the cylinder.

On Sunday the technical presentations started at 8:30 am with Barry Duell's talk.

**A Japanese Shrine That Can Mark The Solstices:** In a recurring theme, Barry Duell speculated on solstice alignments at the Sunakubo Inari Shrine, founded 1645 in Kawagoe, Saitama, Japan. A modern road extends from the shrine for about 1 km at an azimuth of  $300^\circ$ , the azimuth of the summer solstice sunrise and the winter solstice sunset. Is this alignment planned or a fluke? There was no supporting evidence in written or oral records or Shinto religious traditions.

**The Enigma of Ai Khanum:** Jack Aubert described the sundial recovered at an archaeological dig at Ai



Ai Khanum Sundial

Khanum, an ancient Greek city in Afghanistan. The sundial is a block of stone with a circular hole. Jack concluded that this dial is a “plinthium sive lacunar”, a hollowed out building block as described by Vitruvius. The base is cut so the block stands parallel to the equatorial plane. The circular hole had a polar gnomon in the center and hour lines are carved on the circumference, slanted to show 12 unequal hours like most Greek sundials. The angle of the lines are incorrect, designed for the obliquity  $\sim 23.6^\circ$  rather than the latitude  $\sim 39^\circ$ . Why? Was it moved from a southern location or is this a construction error? Jack concludes the latter after considering the tools likely used at the time the dial was carved. Jack proposed that two triangles were used to set the correct angles, one for the latitude and the other for the obliquity. Perhaps the wrong triangle was used to set the unequal hour lines in the dial.

**Solar Alignments Instill Meaning in Public Sculptures:** Steve Luecking reviewed public sculptures with scientific themes that he had

created over his career. The common themes were mathematical shapes and solar alignments such as solstices and meridians. Steve described thirteen such sculptures constructed from 1978 to 1999.

**Nodus Analysis – The Eye of Kala:** After the morning break Bob Kellogg outlined why an annular nodus can provide better contrast projecting a spot of light. The objective was to project a spot of light onto a specific point in the Amazing Maize Maze. He went through the convoluted math and graphs showing that a central obstruction creating a clear ring may reduce the intensity but it improves the contrast, effectively focusing the beam. The Eye of Kala was aligned for Labor Day and the sun came out enough to spotlight the 5:30 pm marker.

A series of short informal presentations followed:

**The Vinyard Map and the Tartar Relation: Revealed Text:** Jacque Olin outlined her involvement in authenticating the Vinland Map as a medieval document based on carbon dating of the parchment to 1435 and the chemical analysis of the ink containing iron, carbon and titanium dioxide. Her presentation was based on her 2003 paper in Analytical Chemistry, Nov 2003, “Evidence That the Vinland Map Is Medieval”. See <http://www.webexhibits.org/vinland/paper-olin03.html>

**Hours to Sunset Sundial:** Bill Gottesman outlined a “camera obscura” technique using double reflection to orient and direct a spot of light onto a semi-transparent surface with hour lines. Here the setting sun would be projected onto a dial showing the date and hours until sunset.

**Ascent Analysis:** Ascent is the name for a spectacular picture offered as wallpaper in Microsoft XP operating system. This shows the waxing moon rising beside a glaciated mountain peak. Roger Bailey identified the mountain as Mt Rainier as seen from Seattle. His investigation of moondials provided the science to show that the image was false, a photomontage. The moon at that phase and altitude could not be at that azimuth near Mt Rainier.

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### **Final Report of the Nominating Committee for 2014**

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The 2014 Nominating Committee of the North American Sundial Society is very pleased to present members Fred Sawyer and Mark Montgomery to fill the offices of President and Treasurer, respectively. Having received no other nominations from the membership by the July 1 date, we hereby declare the nominations closed. As per the By-Laws, the committee declares the election final and we offer congratulations to President Fred Sawyer and Treasurer Mark Montgomery on their re-election.

Respectfully submitted by the Nominating Committee for 2014, Dudley Warner, Chair; Mac Oglesby;  
Len Berggren

#### **Biography of Fred Sawyer**

Fred Sawyer is a cofounder and the current president of NASS, and a vice president of the British Sundial Society. He is also the editor of *The Compendium*, having been responsible for each of the 82 issues to date. He has authored over 85 articles on gnomonics, written numerous programs, and edited or designed the majority of the items NASS has for sale. Fred has also planned and coordinated 17 of the NASS conferences and is a regular speaker at both NASS and BSS conferences. His interests lie primarily in theory, new dial forms (including his own equant, compressed gnomonic, Ptolemaic coordinate, Foster point, Wandering Gnomon, and other varieties), historical techniques for drawing dials, and the work of Samuel Foster, a 17th century dialist. Fred was educated at Yale and the University of Pittsburgh, where he earned degrees in Mathematics & Philosophy, Philosophy, and History & Philosophy of Science. An actuary by profession, Fred worked as a senior officer at a Fortune 500 company until he opted for early retirement in May 2000 to pursue his true interests. Fred and his family instituted the Sawyer Dialing Prize awarded each year at the NASS conference.

#### **Biography of Mark Montgomery**

Mark Montgomery has been a member of NASS for the past 10 years and is the current NASS treasurer. He became captivated by sundials while on assignment in Rome and has appreciated them ever since. Mark enjoys hunting for unique dials across the Midwest. He has contributed articles to *The Compendium* and developed a Houston sundial trail for “Sundials on the Internet”. Mark is the co-chair and a presenter for the current NASS conference. His primary interest is making stained glass sundials and volunteering at Adler Planetarium and local art events, where he interprets the art of both sundials and stained glass. Mark graduated from Rose-Hulman Institute of Technology in 1975 with a BS in Chemical Engineering. He retired in 2010 after working 35 years with Amoco and BP. Mark currently works seasonally at Indiana Dunes National Lakeshore. For the past four years, Mark has been the treasurer for the Association of Artists and Craftsmen of Porter County, a local artist alliance, where he also teaches beginning stained glass classes. The annual meeting followed including a discussion of plans for next year’s conference including the site and format. The key requirements are an interesting site with local sundials, good transportation logistics and a willing local host. This year’s conference in Indianapolis was successful as these key requirements were met. For this we thanked our local hosts, Mark and Phyllis Montgomery and George and Betsy Wilson.



## Minutes of the NASS Annual General Meeting, August 2014

Roger Bailey, Secretary

President Fred Sawyer called the Annual General Meeting to order at 12:00, August 24th at NASS Conference in Indianapolis. Directors and Officers Present: Fred Sawyer (President and Editor), Mark Montgomery (Treasurer), and Roger Bailey (Secretary).

Roger Bailey reviewed the minutes of the previous annual meeting (August 2013). The minutes were accepted as distributed in the conference package and *The Compendium*, in Dec 2013.

Roger continued with a secretary's report as distributed in the conference package. This report outlined the role of the secretary including the email archive of board discussions and decisions. Also included in the report was a summary the NASS Board Minutes for the period since the last conference. Decisions included a \$1000 grant to the Battle Point Astronomical Society as a contribution for their crowd funded project to construct a large equatorial sundial at their site on Bainbridge Island WA. The NASS Board developed and approved Governance Policies on Conflict of Interest, Conduct Review, Document retention and Logo Use. These are reviewed and approved annually and posted on the NASS website. The NASS Sawyer Dialing Prize Funding was approved with NASS matching the funds contributed by the Sawyer family on an ongoing basis starting with \$1000 in October 2013. The long-standing practice of sharing information with other sundial societies was approved. The NASS board also approved a contribution of \$100 towards Kate Pond's "World Sculpture Project".

Mark Montgomery reviewed the financial statements to June 30, 2014. The bank balance remains healthy, as the Unrestricted Net Assets were \$31,630.35, a minor increase (\$537.39) from \$31,092.96 at year-end 2013.

Mark also distributed a pie chart showing the distribution of NASS Expenses for 2009 to 2014. Services to members dominated the expenses with business costs being only 4%. The Compendium was the major cost and benefit, 82% of the expenses, the web site 5%, outreach 4%, awards 3% and donations 2%.

Fred Sawyer presented the report of the Nominating Committee (Dudley Warner, Mac Oglesby and Len Berggren). The nominees, Fred Sawyer as President and Mark Montgomery as Treasurer were declared elected as no further nominations were received by July 1, 2014.

As Art Paque, Vice President and Membership Committee Chairman was unable to attend, Fred Sawyer also presented the membership report in the form of a bar chart. Although the retention rate remains high, the total number is now to below 300 with only 6 new members to date in 2014.

Larry McDavid outlined the status of the NASS Sundial Registry. The current number of sundials registered is 785 with only 9 new dials and 7 updates in the past year. Registry entries and updates are wholly dependent on submissions from NASS members and others, particularly owners or designers of new sundials. The registry backup file has increased to over 8 GB due to the number of high quality photos. Larry mentioned one significant dial registered, Mac Oglesby's monumental horizontal time to sunset dial (475) at Greenfield MA. A complete listing of all registered sundials is now available at the NASS website with links to pictures and descriptions. Registry PDF Reports are also available to download by geographical area. These can be displayed on tablet computers or even smart phones.

Bob Kellogg presented the webmaster's report, stating that the NASS website gets 25,000 to 30,000 hits per month. News items provide fresh content. The site is the main portal for memberships and registrations. Bob is working on a new website with improved formatting for various screens.

The NASS Conference in 2015 was discussed but the location remains in question. The requirements are a local host, convenient transportation links and sufficient interesting sundials for a tour. Locations discussed included the West Coast, Los Angeles, Victoria, Rochester, Toronto, Minneapolis. St Louis was suggested for 2017 to coincide with the total solar eclipse crossing the US on Aug 21, 2017. Should we change the date or format, dropping the tour and adding workshops on design techniques? Suggested topics included participants describing their favourite dial. The NASS Board will resolve the options after the conference.