THE 2023 NASS CONFERENCE ANN ARBOR, MICHIGAN, JUNE 8-11, 2023

Reported by Steve Lelievre using photographs provided by Steve Johnson, Steve Lelievre, Bob Manning, Mike Moghadam, Mark Montgomery, Norbert Vance, and Martha Villegas.

The 2023 NASS Conference – held at the Kensington Hotel, Ann Arbor, MI – was a highly enjoyable and successful event thanks to excellent planning and preparation. The conference was organized by Mark Montgomery (tour and facilities) and Fred Sawyer (schedule and prizes), this time with Richard Isaacs (or was it Susan Haynes?) as local host.

Thursday June 8 – Registration and Reception

The conference's opening reception offered light refreshments and an opportunity to chat with acquaintences, new and old. Winners of door prizes were:

Item	Winner
Reproduction Colonial Pewter Sundial	Susan Haynes
In a rare twist of chance, Susan's tickets were drawn for	
most of the prizes. Fortunately for the rest of us, Susan	
elected to keep (only) this prize. Her numerous other wins	
were redrawn.	
Two modern editions of historical books	Will Grant
Three books from the 1990s and 2000s	Marc Boone
Reproduction Philippi dial	Mike Moghadam
A first edition of Mayall & Mayall	Art Paque
Hester Higton's classic book on portable sundials	Evan Boxer-Cook
The Shadows Know, a recent book by Beverley Orndoff	Mark Montgomery
Hugo Michnik's Contributions To The Theory Of Sundials,	Zoon Nguyen
a new book by Fred Sawyer (Book 8 of his Sciatherics	
series)	
Fred Sawyer's Encyclopaedic Dialing (Book 6 of his	Bob Manning
Sciatherics series)	
'Sun Compass' Bandana	Bo Manning

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Item	Winner
Reproduction Regiomontanus dial, created for NASS by	Richard Isaacs
Ukrainian metalsmith Vsevolod Buravchencko	
Celestial Mirror – The Astronomical Observatories of Jai	Pam Morris
Singh II, by Barry Perlus	
Reproduction of a Glynne sundial, delineated by F. J. de	Madeleine
Vries.	Lelievre
A Study Of The Quadrant, by Mike Cowham	Bob Kellogg

Friday June 9 – Bus Tour



The group admires a horizontal dial at the EMU campus. NASS #346.

The first tour stop was Eastern Michigan University's Sherzer Observatory. Conference attendee Thad Weakley was reunited with a dial he had created some 20 years earlier, and we learned about the observatory's fascinating history from its director, Norbert Vance.



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Thad Weakley pictured by his creation at the Sherzer Observatory. NASS #379.

The next tour stop was a viewing of NASS #1084 at the headquarters of the Domino's Pizza chain, followed by NASS #616 at the Matthaei Botanical Gardens.



The dial face of NASS #1084 is brickwork. The gnomon is patinaed brass.



A short stroll through the Matthaei Botanical Gardens leads to NASS #616.

Near University of Michigan's School of Music, we viewed NASS #335, a brass equatorial featuring a treble clef, the downstroke of which acts as the gnomon.

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Bill Thibault uses his cell phone to check the inclination of NASS #335's gnomon.

The nearby Nuclear Engineering facility known as the Michigan Memorial Phoenix Project. When it was expanded recently, the architects incorporated an altitude dial into a stairwell to produce NASS #1085.



NASS #1085. The nodus (hidden) is formed by the convergence of the struts that support the glass roof of the stairwell. Here we see Mike Moghadam (left) in conversation with José Montes.

Next up was University of Michigan's Detroit Observatory, where we saw a large transit telescope that was used in past times for signaling Standard Time to cities in the region. Our last visit was to the Emmerson School's seasonal sundial and noon mark by local sculptor Michael Kapetan.

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Detroit Observatory's Transit Instrument



Nearby trees provided welcome shade for conference delegates as they admired NASS #1088. Fortunately, this noon mark is positioned so that it is never obstructed by foliage at midday.

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Saturday/Sunday June 10/11 – Conference Presentations

Fred Sawyer distributed Sundial Bingo sheets based on of images from the presentations. Prizes for the first four players to achieve the required line of five matches were: a copy of the Adler catalog, a reproduction universal ring sundial made by Matthaeus Kala, and a book by Achim Loske (with background theory) about a sundial at Universidad Nacional Autónoma de México (2 copies.)

With 2023 being the anniversary of Hugo Michnik's paper *Theorie einer Bifilar-Sonnenuhr* that introduced the idea, the conference had bifilar dials as a recurring theme. Our first presentation was by Fred Sawyer and covered the development and principles of bifilars, along with an account of how they remained an obscure idea until the mid-1970s when they gained a higher profile following discussions of them in a paper by Fred and another by Willi Hanke.

Bob Kellogg presented on the design of a universal bifilar which NASS commissioned him to produce 3D-printed dials as conference swag. The design is based on a 2004 dial by Sergio Garcia Doret and relies on a fixed filament crossed by a second that can be adjusted so that its height above the dial face is appropriate for latitude. Bob extended Doret's concept by adding a Pilkington scale for EoT adjustment and a novel second scale for the equation of latitude.



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With Jack Aubert's presentation we turned to practicalities of designing and installing a simple vertical sundial. Jack explained his use of everyday tools and commonplace materials to create the dial that now adorns the side of his home. Jack has demonstrated

that the making of a wall dial does not need to be a difficult or complex process.

Fred Sawyer returned to the podium with a sequel to his 2022 participatory session on Time Boxes, with this year's version being Fred's new design for bifilar Time Boxes. Delegates received templates for two dials – one showing conventional hours and one for Italian/Baylonian Hours – and had the opportunity to assemble either one under Fred's supervision.

The next session, presented by Mark Montgomery, was a historical review of lunar volvelles and their most common features, and an explanation of their operation. In summary, a lunar volvelle is a mechanical calculator for finding information such as the phase of the moon, length of day or night, position of the moon, ocean tides, etc., for a chosen date. Along with his presentation, Mark gave all delegates card templates for making our own lunar volvelle.

A brief history and theory of ceiling dials was covered by Dung 'Zoon' Nguyen in the next presentation. Zoon went on to describe a

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device that can save a lot of time and effort in laying out a ceiling dial. His device consists of a laser beam, such as produced by an ordinary laser pointer, combined with a cylindrical glass rod to produce a fan of light. That fan of light is rendered as a line when it strikes the ceiling and walls of a room. Using the method described by Zoon, the mirror's normal can be established, giving a reference point for marking out the paths of the hour lines.

Chip Cunningham, a guest speaker, reviewed his personal 16-year quest to understand solar time and use of sun in tracking the seasons. It started with the creation of a stone circle inspired by the ancient circles of Europe and culminated with the 'Axial Dial' shown on the right.



Fred Sawyer's third talk of the day was about Hugo Michnik. Earlier researchers

uncovered very little about Michnik's life or family background. By turning to genealogical sources instead of the scientific record, Fred had uncovered information about Michnik's birth (1864), education, marriage (1907), death (1943), and an unmarried daughter who lived with him in his later years. All traces of the family ended with World War II.



Steve Lelievre's childhood memories of watching shadows moving across the landscape were the inspiration for a strangely-shaped dial: sunrays are blocked by a 'hill' in such a way that a vertical hour scale is illuminated according to the hours remaining until sunset.

A second variant shows Local Apparent Time from 6 a.m. to 6 p.m. Plastic 3D-printed instances of the latter version were presented as conference gifts.

The next talk was by Mark Montgomery on the subject of moon dials – dials marked or calibrated so that the time can be read by moonlight if the Age of the moon is known. In essence, the moon's orbit around Earth changes its position relative to the sun, so a sundial illuminated by the moon gains about 48 minutes per day. Many interesting examples of moon dials have been produced, including designs by Oronce Fine, Jacques Ozanam, and others. Nocturnals, calculations involving Right Ascension, and Lunar Volvelles are other mechanisms for overnight time measurement.

Frank King delved into the layout of antique hour lines on the famous Queens Dial in Cambridge – for a given antique hour, does the shadow of a nodus track along a straight line as solar declination changes? This *appears* to be case for dials at low latitudes and solar declinations limited to -23° to $+23^{\circ}$. However, Frank demonstrated that as the latitude approaches 67°, the lines develop a noticeable bend. Likewise, a bend appears if one extends the lines by using solar declinations with magnitudes greater than 23°. Frank went on to consider the shape of hour lines on two ancient sundials and what they tell us about the hours system in use.

A fourth presentation from Fred Sawyer related the story of a giant shiny granite ball at Columbia University in New York. Conceived in 1910 purely as an ornament, Prof. Harold Jacoby suggested that the plaza on which the ball was placed should be marked out for the ball to act as a gnomon. By 1946 the sphere was cracked and, seen as not worth repairing, it was removed and forgotten (ironically, with no dial

present 80 years later, the location is still known as 'The Sundial' to Columbia students.) The giant ball, although cracked, eventually found its way west and in 1961 was placed at a family home not far from Ann Arbor, our conference venue, where it remains to this day.



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The last session on Saturday was the presentation of the 2023 Sawyer Dialing Prize to François Blateyron, in recognition of his outstanding contribution to the sundial community as author of the *Shadows* software, widely used for delineation of many types of sundial and related devices. Unfortunately, it was not practical for François to attend the conference in person so in lieu of the usual presentation, we watched a video of a Zoom conversation between François, Fred Sawyer, and Steve Lelievre, on the subject of the award and about *Shadows*. The winner's certificate and prize sundial (by Jim Tallman) have been shipped to François. The award was also marked by an announcement from the Commission des Cadrans Solaires, our sister organization in France.

Conference presentations resumed on Sunday morning with Frank King discussing what happens if a highly polished gnomon is used for a planar dial. Depending on latitude and time of day, the usual shadows of a gnomon are accompanied by symmetrically-positioned bright equivalents. When the sun is low, one may see the outline of the gnomon reflected back on onto nearby walls or even, as greater distances, distorting into a circular light spot.

Fred Sawyer returned once again, this time to present on Hugo Michnik's other design – a sidereal dial. Sidereal hours are indicated by lines running obliquely across the face of the dial. The sideral time is indicated by the position of the shadow of a nodus in the net of sidereal and solar declination lines that make up the dial face.



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Although Micknik is credited as the initiator of sidereal sundials, about a century earlier a sideral component had been included by Fr. Giovanni Inghirami on a dial in Florence. Using Inghirami's innovation involves reading a declination-dependent daily constant by means of an angled line that cuts across the face of the dial. Subtracting this value from the current solar time yields sidereal time.



Paul Ulrich's talk returned us to the practicalities of making sundials. Paul presented a photo-catalog of a wonderfully diverse collection of usual and unusual dials in ceramic, metal, wood, string, card and other media. His emphasis is to "have fun with discovery," resisting any

intimidation arising from the need for accuracy.

Steve Lelievre describing his use of vector algebra in treating the outline of a (rectangular) window as a kind of bifilar sundial. The resulting dial face is used a bit like a protractor and is the same diagram needed for a basic azimuthal dial. Steve went on to apply the vector method to the case where one filament is parallel to the polar axis and the other parallel to the meridian. In this case, the resulting diagram is again familiar – it's the face of a garden-type Horizontal Dial. Indeed, an actual Horizontal Dial is simply the special case in which the filaments (now known as the style and the substile line) and the dial face all intersect at one point (the center of the dial).



Our final talk was presented by Bob Kellogg and covered his work, in progress, to design and construct a tellurion (a mechanical model of the sun-earth-moon system). Bob's biggest challenge has been in choosing the best gear ratios, and in the sheer number of parts needed.

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Conference Dinner – Saturday June 10.

The conference dinner provided ample opportunity for delegates to socialize and chat about gnomonics. For other entertainment, we enjoyed the recitation of dialing-related limericks which all attendees had been ask to compose. A good number of us took up the challenge!



And there was cake...



The decoration of NASS' 30th Birthday Cake featured a pair of Toves near their nest under a sundial.

As we opened our dinner gifts we discovered packs of sundial-themed greeting cards and bags of chocolate-coated Michigan cherries from a local maker. For part-time registrants there was a piece of jewelry made from petosky, Michigan's State Stone. For Full Registrants there was also a 3D-printed Universal Bifilar Dial designed by Bob Kellogg to mark the 30th anniversary of NASS, and a 3D-printed 'Wings of Time', a latitude-specific Envelope Dial by Steve Lelievre.

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One of the pendants presented to parttime delegates.



Bob Kellogg (right) discusses the NASS Universal Bifilar with Pam Morris (left), Mike Moghadam (top), and Frank King (center). Bob covered the design in a conference talk.



Left to right: Martha Villegas, Steve Lelievre, and José Montes. Steve is holding an example of the 'Wings of Time' design that was the subject of his Saturday afternoon presentation.



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Group Photo, 2023 NASS Conference.

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