

H-A-D NEWS

The Newsletter of the Historical Astronomy Division of the American Astronomical Society

Number 100 * October 2022

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New HAD Officers!

Ken Rumstay, Valdosta State University

As you read this issue our nation's 2022 midterm elections loom ahead of us, but the HAD election of new officers has passed into history. Our newlyelected Vice Chair J. Allyn Smith and the new At-Large Committee Members Loretta J. Cannon and Stephen P. Maran will assume office at the end of the HAD Town Hall on January 9th. At that time our current Chair Kevin Krisciunas will pass the gavel to Terry Oswalt.

Kevin will become Past Chair and also Chair of the HAD Prize Committee, which will select the recipient of the 2024 LeRoy E. Doggett Prize for Historical Astronomy and of the 2025 Donald E. Osterbrock Book Prize. As our new Vice Chair, Allyn will be in charge of soliciting and editing obituaries for recently deceased AAS members. He will assume the office of Chair at the January 2025 HAD meeting in National Harbor, MD.



HAD's new officers (from left to right): J. Allyn Smith, Loretta J. Cannon, and Stephen P. Maran.

I would like to personally thank Amy Oliver and Samantha Thompson, who have faithfully served on the HAD Executive Committee during the past two years, for their contributions to the smooth running of our Division. I would also like to offer special thanks to Alan Hirshfeld, who will have completed six years of service as Vice Chair, as Chair, and as Past Chair.

I would like to, in addition, thank the members of our Nominating Subcommittee, Brenda Corbin, Hugh Van Horn, and Virginia Trimble, for their efforts in ensuring a free and fair election. Finally, special thanks to the Diane Frendak, the AAS Director of Membership Services, for supervising the online voting process.

Of course, I would also like to thank everyone who voted! I only wish more members had; out of 520 eligible voters just 175 (33.65%) exercised their franchise.

I would like to take this opportunity to remind our members that the office of Secretary-Treasurer is *not* an elected one. That individual is instead appointed by the Executive Committee. As I near completion of my seventh year in that role, I would like to thank you all for your trust. I am grateful for having had the opportunity to serve our Division; it's been very rewarding!

Having said that, next year will be my last, as the HAD Bylaws state that an individual may not serve a third consecutive term as Secretary-Treasurer. Consequently, we are now soliciting applicants for the job. If you would like to be considered for the position, please let us know!

hadsec@aas.org



The official HAD gavel will be passed on to Terry Oswalt when he assumes the office of Chair at January's Town Hall. On its handle are engraved the initials of all past Chairs, in chronological order: JE, OG, EK, DO, KB, JL, SD, WS, DD, VT, BW TW, DY, SS, TH, JH, JP, MR, PS, AH, and KK.



The 2023 Donald E. Osterbrock Prize Terry Oswalt, Chair, HAD Prize Committee

The Historical Astronomy Division of the American Astronomical Society is pleased to present the 2023 Donald E. Osterbrock Book Prize for Historical Astronomy to R. Peter Broughton for his book *Northern Star: J.S. Plaskett* (University of Toronto Press, 2018).

This insightful and well-researched monograph provides not only a definitive biography of John Stanley Plaskett (Canada's best-known astronomer a century ago) but also a vivid picture of the state of astronomy in Canada in the late 19th and early 20th centuries, and of our understanding of the universe at that time. *Northern Star* relates both Plaskett's personal life story and his substantial contributions to stellar and galactic astronomy. The author feels no qualms in portraying some of his subject's character flaws: the narrative clearly suggests that Plaskett was something of a publicity hound, and intolerant of administrative interference.

While there is a plethora of biographies for American, British, and European astronomers of the early twentieth century, the contributions to astronomy by Canadians has been largely overlooked. In making this award, the Historical Astronomy Division recognizes that Peter Broughton has provided an important addition to the literature of astronomical history.

After specializing in astronomy as an undergraduate at the University of Toronto, Peter Broughton taught mathematics and physics in Toronto high schools for thirty-three years. While pursuing a master's degree he developed a deep appreciation for the history of science and began writing articles for the *Journal of the Royal Astronomical Society of Canada* and the *Journal for the History of Astronomy*. Peter served as the President of the RASC from 1992 to 1994 and was awarded its Chant Medal in 2018. He published *Looking Up: A History of the Royal Astronomical Society of Canada* in 1994. Minor planet 16217 peterbroughton was named in his honor in 2005.

The Donald E. Osterbrock Book Prize is given in odd-numbered years. Books copyrighted in the two to five years before the award year are eligible. HAD originated the prize in 2009 and named it in memory of Donald Osterbrock in 2010. Osterbrock was a longtime HAD member, a contributor to nearly every HAD meeting, HAD Chair from 1987 to 1989, and the recipient of HAD's highest honor, the LeRoy E. Doggett Prize for Historical Astronomy, in 2002. He was also the author of several books and articles on the history of astronomy.

The 2023 Osterbrock Book Prize will be presented to Mr. Broughton at the HAD Town Hall on in Seattle on January 9th.

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We would like to thank the members of the HAD Prize Committee for their efforts in selecting this year's award winner: Marcia Bartusiak, Sethanne Howard, Kevin Krisciunas, Amy Oliver, and Samantha Thompson. A special note of gratitude goes to Terry Oswalt, who assumed the role of Prize Committee Chair in Alan Hirshfeld's absence.

The June 2022 HAD Meeting

Ken Rumstay, Valdosta State University

Following the decision to cancel the planned January meeting in Salt Lake City, the Historical Astronomy Division met in June in Pasadena. Held in conjunction with the 240th meeting of the American Astronomical Society, this was a hybrid meeting, with individuals participating and giving presentations both in person and remotely.

Because our meeting began on Tuesday, June 14th, after the start of the AAS meeting, the first event was the presentation of the 2022 LeRoy E. Doggett Prize to William H. Donahue. In his plenary talk "The Most Fascinating Piece of Paper in the Universe" Bill traced the course of Johannes Kepler's logic, leading ultimately to the realization that Mars' orbit must be elliptical in shape. Though his talk began at 8:10 am and was based upon a single page of Kepler's notes, Bill kept his large and appreciative audience spellbound!

The venue for the remaining HAD sessions was the Cypress Room of the Sheraton Hotel, which (being underground) unfortunately suffered from poor Wi-Fi connectivity. This proved problematical for remote participants, as the session chairs often could not connect to the Slack app to respond to questions.

We began at 10:00 am on Tuesday with a special session ("A New Observatory Is Coming to Your Neighborhood") organized by Steven Gullberg and several colleagues. In this interactive activity the participants listened to arguments for and against a proposed (fictional) enormous telescope to be built on a site of historic and cultural significance.



Peter Broughton, recipient of the 2023 Donald E. Osterbrock Book Prize for Historical Astronomy.



HAD Chair Kevin Krisciunas (on the left) presents the 2022 Doggett Prize certificate to Bill Donahue.

After lunch we continued with a special session organized by Jay Pasachoff. "Centennial of an Eclipse: The 1922 Expedition that Clinched the Case for General Relativity" featured six speakers who reported not only on observations of the 21 September 1922 eclipse, but of more recent ones made by some of the speakers themselves! It is quite remarkable that the delicate observations required to test of Einstein's General Theory of Relativity, which were barely obtainable by professionals a century ago, are now being made by skilled individuals with relatively modest equipment! The session ended with everyone looking forward to the eclipse of 8 April 2024.

Our meeting continued Wednesday morning with a session of oral presentations at 10:00 am and an iPoster session in the afternoon. A schedule of the HAD meeting sessions, including abstracts, may be downloaded from the HAD website at https://had.aas.org/membership/had_meetings.

As this was a completely hybrid meeting for both the AAS and for HAD neither traditional ("print") posters nor iPosterPlus (iPosters presented live to an audience) presentations were accepted. While the AAS has yet to make a definite commitment, we expect that future meetings will be hybrid or (in a worst-case scenario) fully remote. I for one will be sorry to see the demise of print posters; it was fun watching students maneuver their poster tubes into the overhead luggage compartments!

Two additional events occurred on Wednesday the 15th. The HAD Town Hall, our annual business meeting, convened at 12:45 pm. Eleven members (including the Chair and Secretary-Treasurer) were in the room, with another ten (including Vice Chair Terry Oswalt) participating via Zoom. The usual statistics regarding HAD membership and financial state (see page 8), along with a status report on AAS obituaries, were presented. A moment of silence recognized those AAS members who had passed away during the past year. We recognized those individuals whose generous financial contributions in 2021 and 2022 have enabled HAD to continue its mission. And we entertained suggestions from the membership, including a quite reasonable proposal that the annual reports which HAD prepares for the AAS be posted on our website. We shall act on that.

On Wednesday evening we continued our tradition of meeting for dinner (the HAD "minibanquet"), this time at a nearby Mexican restaurant.

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Our meeting started on Tuesday with the interactive session "A New Observatory is Coming to Your Neighborhood" organized by Steven Gullberg. Participants gathered into groups to debate the pros and cons of the proposed OGRE radio telescope.



Jay Pasachoff welcomes attendees to his special session "Centennial of an Eclipse: The 1922 Expedition that Clinched the Case for General Relativity."



On Wednesday evening about twenty HAD members met for dinner at the lovely Mijares Mexican Restaurant on Palmetto Drive, about a mile from the convention center. They were joined by Doggett Prize winner Bill Donahue and his wife.



From the Chair *Kevin Krisciunas, Texas A&M University*

This will be my last short essay for the HAD Newsletter as HAD Chair. In January I hand over the reins to our very capable Vice Chair Terry Oswalt.

Given my lifelong interest in the Struve family of astronomers, more than 30 years ago I was very pleased to acquire a copy of Etudes d'Astronomie Stellaire [Studies of Stellar Astronomy], which was published in 1847 by Wilhelm Struve (1793-1864). He was one of the most important astronomers of the nineteenth century. Wilhelm Bessel, Wilhelm Struve, and Thomas Henderson were the first three astronomers to measure and publish trigonometric parallaxes of stars. This was the ultimate proof that Copernicus was right – the Earth does revolve around the Sun. Struve was also the founder and first director (1839) of Pulkovo Observatory near St. Petersburg, Russia, which was referred to in the nineteenth century as the "astronomical capital of the world."

Struve's 165-page book endeavored to summarize and expand on William Herschel's work on the structure of the Milky Way, and to present statistically based evidence for the existence of interstellar dust. Much of the *Etudes* is dedicated to Herschel's "star gauges" (the number of stars in different directions visible in his 18-inch telescope of focal length 20 feet, using a standard eyepiece) and the falloff of stellar density perpendicular to the plane of the Milky Way.

Pages 83 to 93 of *Etudes* is entitled "On the Absorption of the Light of Fixed Stars during Its Transmission across Interstellar Space." William Herschel had deduced that his 20-ft focal length telescope could reach about 61 times further than the faintest stars visible with the unaided eye. This was based on the assumption that the pupil of the eye is exactly one-fifth of an inch in diameter. Wilhelm Struve made an achromatic telescope of

just over 0.2 inches in diameter, which formed clearer images than an observer's eye might have. He found that with it he could detect 1.83 times as many stars as were listed in Friedrich Argelander's catalogue of naked eye stars. He deduced that Herschel's telescope had a "penetrating power" of roughly the cube root of 1.83 times 61, or about 75 times the average distance of sixth magnitude stars. But the relative numbers of stars observed by Herschel with the 20-ft telescope indicated that the telescope only reached 25.7 times as far as the average distance of sixth magnitude stars. [*Etudes*, p. 80]

Struve arrived at the conclusion: "The range of Herschel's telescope, as defined by his observations of the heavens, barely exceeds one-third of the range corresponding to its optical power. How can this fact be explained? I can see no alternative to the supposition that *the intensity of light decreases* at a faster rate than the inverse square of the distance, that is, that there is a diminution of light, a weakening during the transmission of light through interstellar space." [Etudes, p. 86; translation from Russian version by Michael Meo] This is regarded as the first strong evidence for the existence of interstellar dust. After Robert Trumpler's comparison of distances of star clusters using photometric and geometric methods (1930), the case for dust convinced any skeptics.

I thank Serene Hammond and Michael Meo for useful discussions.

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From the Vice Chair Terry Oswalt, Embry-Riddle Aeronautical University

In my last Newsletter column, I "tempted fate" by being enthusiastic about attending the June AAS meeting in Pasadena, my first in-person AAS meeting since the pandemic began. I did attend from my hotel room in Pasadena, via Zoom—after testing positive for COVID. Traveling all the way from Florida to California only to sit for five days in a hotel room staring at a laptop wasn't much fun, but I participated in sessions every day, presented a talk and represented HAD at the AAS Strategic Assembly (SA) on June 12th.

The following are a couple of highlights from the AAS SA that I think are likely to be of most interest to HAD members. AAS Secretary Alice Monet reminded us that each division needs to provide a summary of their most recent annual activities and priorities for the coming year. It was suggested that they be due after the annual meetings, as is currently practiced by some divisions. These annual reports will be posted as an AAS Digest, to enhance transparency and communication between divisions, committees, and the membership. All divisions are also expected to submit a "standard operating procedure" (SOP) statement to the AAS Board, the purpose of which is to provide a "corporate memory" that facilitates smooth transitions of leadership. Both of these documents may also be posted on division websites, at their discretion. Kudos to HAD Secretary Ken Rumstay for ensuring we have an up-to-date SOP!

This year I had the pleasure of chairing a HAD committee alongside Marcia Bartusiak, Sethanne Howard, Kevin Krisciunas, Amy Oliver, Ken Rumstay and Samantha Thompson. From a very competitive field of eleven nominations, Peter Broughton's book *Northern Star – J.S. Plaskett*

was selected to receive the 2023 Donald E. Osterbrock Book Prize for Historical Astronomy. The award will be presented during the AAS 241 meeting in Seattle at the HAD Town Hall during the afternoon of January 9, 2023. HAD members are encouraged to begin reading and identifying books worthy of nominations for the next round of this biannual award.

I've been working very hard to shorten the AAS list of needed obituaries. Since taking on the chore about a year and a half ago, almost 100 obituaries have been published. About 20 more are in various stages of preparation. If these all come in before the end of 2022, we will have almost doubled the average annual rate over the last decade. About 75 obituaries are still needed (about 50 for astronomers who died three or more years ago!). HAD currently has well over 500 members; we could easily clear the list of needed obituaries AND keep up with new requests if you do your part to help the AAS give proper tributes to our former colleagues. Your draft can be a simple MS Word, email or text file. The turn-around time between approval of your draft and publication is usually just a matter of days. Note also that AAS obituaries are referenced in the NASA ADS-they comprise historical references for the future.

As HAD Secretary Ken Rumstay announced a few days ago, the election results are in. Allyn Smith is our new Vice Chair / Chair Elect. Loretta Cannon and Stephen Maran are our new At-Large members on the HAD Executive Committee. Congratulations, and welcome aboard! All will assume their duties at the close of the annual HAD Town Hall in Seattle on January 9th. And, thanks to those of you who voted!

The January AAS meeting will also be when current HAD Chair Kevin Krisciunas turns the gavel over to me. Let me be the first to thank Kevin for his hard work these past several years. Don't worry, we'll keep him busy as Past Chair!

See you in Seattle!

terry.oswalt@erau.edu



From the Secretary-Treasurer Ken Rumstay, Valdosta State University

Greetings, and welcome to the 100th issue of *HAD News*! With thirty-four pages this is our biggest one to date; I hope you'll find it interesting.

Actually, one might argue that our 100th issue appeared some years ago. The first newsletters of our division were mimeographed letters of a few pages mailed to our members; the first appeared in December 1980. The next few appear to have been lost to posterity; the next one to appear on the HAD website (https://had.aas.org/news/had news) is dated April 1984, but there must have been several issues in the preceding three years. The first one to be numbered was the issue of April 1988; it was billed as issue #8, but eleven earlier ones appear on our website! At any rate, this is "officially" HAD News #100, If you have in your possession any print issues of newsletters issued in 1981, 1982, or 1983, please let us know; they're missing from our archive.

It was great to see so many of you at the Pasadena meeting in June! It had been a long time since our last in-person gathering in Honolulu. At the HAD Town Hall on June 15th we presented the usual data regarding HAD's membership and financial

status; this is summarized in the tables on the following page. At the end of 2021 we had a total of 537 members. A month later that number had dropped to 331! But Diane Frendak (the AAS Director of Membership Services) reassured me that our numbers would return to normal as time progressed and individuals remembered (in many cases after some friendly persuasion) to renew their memberships. She was correct; as of October 1st we have 530 members (see Table 1).

An audited summary of our finances for the 2021 calendar year appears in Table 2. We're in good financial shape; but (as was noted in the May newsletter) the increases in our accounts resulted, to a large extent, from many HAD activities having been curtailed during the pandemic. But we are slowly returning to some semblance of normalcy. It actually felt rather good, after June's meeting, to request reimbursement from Kelly Clark (the AAS Chief Financial and Operating Officer) for some of our invited speakers!

As much as I enjoyed having an in-person (well, hybrid) HAD meeting and seeing old friends, I must confess that the highlight of my Pasadena excursion was getting to visit the famous Mt. Wilson Observatory. Though I'm an optical astronomer by trade I had never been there, and of course I'd always wanted to see such an historic facility. So I was delighted to learn that the AAS had arranged an excursion for Friday, after the formal end to their meeting on Thursday afternoon. About thirty people participated and the weather on the mountain was delightful. I've included a few photographs of the observatory in various places in this issue of *HAD News*.

We now look forward to meeting in Seattle on January 8-9, and hope to see you there!

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The 150-foot solar tower at the Mt. Wilson Observatory.

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| # | | Member Classification |
|-----|-------|--|
| 166 | F | AAS Full Member |
| 138 | Е | AAS Full Emeritus Member |
| 75 | GR | AAS Graduate Student Member |
| 62 | JR | AAS Undergraduate Student Member |
| 35 | AM | AAS Amateur Affiliate |
| 20 | HAD | HAD Division Affiliate only |
| 23 | ED | AAS Educator Affiliate |
| 2 | DA | Division Affiliate (two or more divisions) |
| 4 | IA | AAS International Affiliate |
| 4 | Staff | AAS staff member |
| 1 | Р | AAS Patron Member |

| His | torical Astrono | my Division | | |
|---------------------------------------|-----------------|---------------|--------------|--------------|
| For the Twelve M | Ionths Ending I | Friday, Decem | ber 31, 2021 | |
| | Operating | Doggett | Osterbrock | Totals |
| | Budget | Prize | Prize | Totals |
| Revenue | | | | |
| Individual Dues | 3,698.68 | | | 3,698.68 |
| Contributions | 2,450.00 | 486.00 | 1,547.51 | 4,483.51 |
| Interest | 797.02 | 1,127.76 | 889.17 | 2,813.95 |
| Investment Expense Offset | (62.21) | (88.02) | (69.41) | (219.64) |
| Distributed Market Value | 3,076.30 | 4,352.82 | 3,431.95 | 10,861.07 |
| Total Revenue and Transfers | \$9,959.79 | \$5,878.56 | \$5,799.22 | \$21,637.57 |
| Expenses and Transfers | | | | |
| Bank Fees | 153.72 | 12.15 | 38.69 | 204.56 |
| Grant Awards | | | 750.00 | 750.00 |
| Prize Certificates | | | 221.27 | 221.27 |
| Transfer (Division Affiliate)* | 105.00 | | | 105.00 |
| Transfer to General Fund [§] | | | 58.28 | 58.28 |
| Total Expenses and Transfers | \$258.72 | \$12.15 | \$1,068.24 | \$1,339.11 |
| Surplus/(Deficit) | \$9,701.07 | \$5,866.41 | \$4,730.98 | \$20,298.46 |
| Begining Balance (Yr.) | \$36,952.63 | \$51,385.62 | \$41,224.53 | \$129,562.78 |
| Ending Balance (Yr.) | \$46,653.70 | \$57,252.03 | \$45,955.51 | \$149,861.24 |
| * \$5 per Division Affiliate Member | | | | |
| § 6 percent of expenses | | | | |

Table 2 - HAD financial report for 2021

I would like to close by echoing Terry's pleas for assistance in catching up on the backlog of needed AAS member obituaries. Recently I was reminded just how important these documents are.

During my freshman year (1971–1972) at MIT I took a two-semester introductory astronomy course, taught by William Pinson. Dr. Pinson was a geologist by trade, but his astronomy course was excellent. The graduate teaching assistant for our class was Earle Whipple, Fred Whipple's son.

Last June I found myself wondering what had become of him. He was rather elderly fifty years ago, so I knew he was no longer with us, but I wanted to learn more about him. I located his online obituary in the *Boston Globe* and learned that he had indeed passed away on 30 October 2008, at the age of 89.

I also discovered that he had had a life-long commitment to civil rights and had marched with Dr. Martin Luther King Jr. in Selma in 1965. He had also been a B17 pilot during World War II, and spent two years in a prisoner-of-war camp.

When I knew him, he was a kind, gentle soul. I now wish, too late, that I had spent more time in conversation with him.

Summary of the AAS Strategic Assembly at the Pasadena meeting, June 12, 2022 Terry Oswalt, Embry-Riddle

Aeronautical University

The Strategic Assembly (SA) is a key advisory group that guides the AAS and helps set its priorities. The SA consists of 12 Board of Trustees members, 6 Division Chairs, 17 Committee Chairs, 5 Working Group Chairs and 4 Task Force Chairs. HAD Vice Chair Terry Oswalt represented our Division at this meeting.

President Paula Skody opened the Sunday session at 9:00 a.m. PDT. Following her opening remarks and welcome, she turned the session over to AAS Secretary Alice Monet.

Sec. Monet reminded us that each division needs to provide a summary of their most recent annual activities and priorities for the coming year. The timing of these reports has not always been clear and it was suggested that they be due after the annual meetings, as is currently practiced by some divisions. These annual reports will be posted as an AAS Digest and are intended to enhance transparency and communication between divisions, committees, and the membership. All divisions are also expected to submit a "standard operating procedure" statement to the AAS Board, the purpose of which is to provide a "corporate memory" that facilitates smooth transitions of leadership. Both of these documents may also be posted on division websites, at their discretion. On a related topic, it was suggested that an "onboarding meeting" be provided to incoming division officers, which would cover basic procedures, policies and budgeting.

Sec. Monet continued by reminding us that the AAS Board of Trustees and AAS President are responsible for appointing liaisons to divisions, committees and working groups. Usually, but not necessarily, these are the respective chairs. It was requested that a short list of expectations be provided to such liaisons by the group that they are expected to represent. Pres. Skody said that we are free to present to the Board at any of their monthly meetings, which normally occur in the second week of each month. To be included on the agenda, requests must be submitted at least two weeks in advance. The AAS Board usually meets annually in Washington DC, but it will next meet in Boston in October at the corporate offices of Sky & Telescope. Division representatives will attend virtually.

Regarding funding requests to the Board, a new policy has been adopted. Such requests must be received by June 15th for the next calendar year (i.e., at least six months in advance). In this transition year, requests received by August 15th will be considered. Such requests may not include overhead expenses, administrative fees and stipends are currently limited to \$3K. Total requests must not exceed \$20K

The meeting was then turned over to Executive Officer Kevin Marvel, who began with a brief outline of the AAS Strategic Plan, which was finalized last fall. Part of this plan was addressed by the recent hire of Tom Rice, who will monitor progress on the plan, manage AAS education activities and will handle Diversity, Equity and Inclusion matters until a full-time DEI officer is hired. EO Marvel then provided a status report on Sky and Telescope, which was recently taken over by the AAS. At the moment subscription income does not cover publication costs, but plans are to grow the subscriber base by 5 percent per year through aggressive marketing. A new initiative is planned in which educational and institutional subscribers could bundle a subscription to S&T with astronomy-related textbooks at very little cost. Also, a "Beginner's Corner" column will be added in the coming year. Marvel went on to summarize the status of AAS refereed journals, which comprise the majority of AAS income. The recent decision to make all AAS journals open access has not decreased manuscript submissions despite the increase in page charges. The tiered system involves lower page charges for short papers and discounted charges for authors who cannot pay full cost. Marvel concluded his report by saying that, despite the adverse financial impacts of COVID, the costs of AAS meetings have been well-controlled. Expectations are that the January 2023 AAS meeting in Seattle will be the largest in recent years. The cancelled January 2022 Salt Lake City meeting has been rescheduled for 2027.

The meeting continued with short reports from various committees and working groups. The Committee on Astronomy and Public Policy is actively advocating the Decadal Survey recommendations and concerns to Congress over satellite constellations, light pollution, radio interference, space debris, etc. AAS members are encouraged to contact the CAPP for advice on how they can become involved in advocacy. It is not too soon to begin discussions on similar issues that will eventually affect astronomy conducted from the surface of the Moon and Mars. A "Communicating with Washington" project is available and policy talks at member institutions can be requested. It was suggested that an 'advocacy guidelines' page might be created for the AAS web site. The AAS meeting planning committee asked for feedback on the hybrid meeting format. So far it is clear, though more expensive for the AAS, virtual access has enhanced attendance by members. The FAMOUS program also provides support for members without the financial resources to attend an AAS meeting (significant recent donations have been received to support this program). A special initiative to more fully engage amateur astronomers is planned. In addition, the AAS may request special funding from the NSF and/or NASA for support to enhance DEI-related meeting participation.

Discussion next centered on the issue of how the AAS and its organizational units communicate with the outside world. In principle, all letters of endorsement, policy statements, etc. should be shared with the national office prior to release, so as to ensure the AAS communicates to the outside world with "one voice." This also gives an opportunity for the AAS to poll the membership on particular issues. Proposed public statements should be presented to the Board for review prior to release, though it is permissible to represent statements as personal opinions, not necessarily endorsed by the AAS. Each AAS unit's standard operating procedure should address the issue.

The Demographics Committee is preparing an executive summary of their workforce survey. Responses collected comprise a cross section of about one fourth of the AAS membership. Early career women comprise the fastest growing proportion of AAS members. The survey found no significant gender-based differences in salary and respondents were generally satisfied with their doctoral advisor and career path. The pandemic appears to have had a more adverse effect on the academic progress of graduate students than of undergraduates. Most AAS members who responded to the question said that they had encouraged someone to pursue a career in astronomy. The proportion of AAS members supported by NASA has fallen significantly since the previous survey was conducted three years

ago. The results of this survey and three prior surveys can be found on the Committee's website.

The Membership Task Force reported that they are working with the AIP Statistical Center on a proposal to develop ways of engaging astronomers pursuing nonacademic ("industry") careers. A report and recommendations are expected by the end of 2022.

Travis Rector reported on efforts to evaluate the carbon footprint of AAS meetings, similar to what has been done by the RAS. Virtual conferencing has about 1 percent the carbon footprint of inperson meetings. On the other hand, many people cannot attend in-person meetings due to time and/or fiscal constraints. A survey has been prepared to quantify AAS members' opinions on climate change issues like this and how the AAS should be involved. One question will likely ask whether the AAS should create educational material on climate change. Expect a report on this at the January 2023 AAS meeting.

Sec. Monet summarized the AAS Prize selection process. She went on to emphasize that all 12 AAS committees need new volunteers. The membership renewal website now contains a simple means of volunteering. The prize nomination process has been simplified; nominators no longer need to collect all the information on a nominee; that is now the responsibility of the nominee. Except for early career astronomers, nominations are valid for three years. In the future nominations will be accepted at any time, subject to an annual cut-off date (June 30th this year). A brochure outlining the new process has been created.

Afternoon break out discussion sessions focused on details of some of the above topics. The Decadal Survey Committee discussed the need to compare the Astro 2020 recommendations to the new Planetary Decadal Survey and engage the new Congressional calendar. The DEI Committee seeks input community on how to improve communication channels, better track community culture, broaden leadership, and instill DEI issues in AAS meetings. It was suggested that the AAS might consider seeking funds to support a "Bridge Program" for graduate study in astronomy similar to those hosted by the APS and AGU. The Education Committee is considering how to improve and more efficiently to share K-12 and college-level astronomy teaching resources. A "best practices for mentors" program may also be considered. The Amateur Affiliate Task Force is

working to identify the best ways to engage amateurs in the AAS and how to support research collaborations. They have prepared a list of 42 recommendations; examples include adding more pro-am sessions at regular AAS meetings, creating a page on the AAS website explaining ways amateurs can engage and hosting more "joint" meetings between the AAS and other organizations with a large number of amateurs such as the AAVSO, ALPO, ASP, etc.

The meeting ended about 5:00 p.m. PDT, with several recommendations: SA meetings should continue to be hybrid; more breakout discussion time would be desirable; shorter but more frequent meetings would make it easier to focus on key issues; the respective chairs should remain the primary means of interaction between divisions, committees, and task forces.

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The 60-inch telescope at the Mt. Wilson Observatory. This was the largest operational telescope in the world when it was completed in 1908. Today it used for public observing, and is in fact the second largest telescope in the world devoted to that purpose.



A Stirring Evening of William Herschel Compositions

Woody Sullivan (University of Washington)

On the occasion of the bicentenary/bicentennial of William Herschel's death, a concert of some of his best instrumental and vocal pieces took place on 19 June 2022, hosted by the Department of Music of the University of York, UK. The concert was the capstone to a one-day symposium entitled "Cosmic Harmonies," which consisted of a wide variety of talks on the life, science, music, and legacy of Herschel, also covering aspects of the contributions of his sister Caroline and son John. Professor Rachel Cowgill is to be congratulated as the "Producer" for both symposium and concert plus more; in the late afternoon public activities connecting science and music were available as part of the annual city-wide "Festival of Ideas."

For the evening concert Claire Holden was the impresario (and director/first violinist) who rounded up twenty-one instrumentalists and four vocalists from the Department of Music plus several (including herself) from the renowned, London-Based Orchestra of the Age of Enlightenment. All instruments were faithful reconstructions to the period of Herschel's music (including some actually built during the 18th century). Professor Sarah Waltz (Conservatory, U. of the Pacific) interspersed insightful narration throughout the evening, melding the music with Herschel's life during his pre-astronomy days in London, Yorkshire, and Bath (i.e., to age 43!)¹.

I am not a music critic, but I have listened to many recordings of Herschel's music. I found this live concert, sounding much as it would have in Herschel's day, absolutely thrilling. There was a liveliness and dynamism in many of the pieces, unknown to me before. The highlight of the entire concert for me was the Oboe Concerto No. 1 in E flat, which Herschel wrote in 1759 at the tender age of 21. Soloist Rachel Chaplin was magnificent and the concerto's interplay between her and the orchestra was brilliant.

Three of Herschel's 24 symphonies (No.'s 8, 9, and 14) were represented, all written in 1761-62 as he wandered around Yorkshire; I found No. 8 especially appealing with its exciting opening.

The concert was further enhanced with pieces from two contemporaries of Herschel, namely his brother Jacob (who remained in Hanover for most of his life), and Charles Avison (at the time the leading composer in the North of England).

Singers also performed several catches and glees: formats popular at the time for three or four vocalists, often humorous, the "pop music" of the day. Herschel's "Eccho Catch," his only published song, involves a singer hidden off stage (echoing the onstage performers) and was also performed at the 2015 HAD meeting in Seattle.

Sir William would have been delighted to hear his music performed and enthusiastically appreciated a full two and one half centuries later!^{2,3}

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- 1 Sullivan & Waltz are currently writing a biography of Herschel for the first half of his life before he became Astronomer in the court of George III in 1782 (upon discovering Uranus). During this time he made a living as a prominent musician, but in its final decade he metamorphosed into an astronomer through telescopemaking, extensive observations, and producing his first nine astronomy publications.
- 2 For good measure, the entire concert was sandwiched between two short pieces involving animations. For example, "Hydrogen" by flutist Naomi Perera involved a scale based on the energy levels in the Rydberg atom weird and thought-provoking.
- 3 With the exception of Symphony No. 9, all of the Herschel instrumental pieces in this concert have been recorded on CD's or can be found on YouTube (greatly varying in quality).

MR. HERSCHEL;

T AKES this Opportunity of returning Thanks to his Friends for the great and many Favours he has met with, fince he came to Leedes, and is particularly obligid to them for their kind Approbation of his Conduct of the SUBSCRIPTION-CONCERT.

He hopes to have the Continuance of their Kindnefs, and flatters himfelf that those fuperior Connoiffeurs who have difcovered any Imperfections in the Musical Part of the Concert, will eafily excuse them when they reflect on the Cheapnefs of the Terms and Number of the Concerts; at the fame Time believes that those Imperfections might eafily be remedied another Season, by fome finall Alteration in the Proposals.

He also takes the Liberty of acquainting them, that he intends to teach the Harpficord, the Guittar, and the Violin, to the best of his Capacity, and on the most reasonable Terms.

An announcement in the *Leeds Intelligencer* for 12 Apr 1763 during the middle of his most active years of composing while living in Yorkshire. Herschel had organized a series of concerts the previous winter, but the evidence here indicates that they hadn't gone well with his customers!



A representation of the young Herschel reading a book while riding his horse from town to town, giving music lessons and sometimes performing. Based on a brief diary that he kept, I have calculated that he travelled ~2100 miles by horse for the year 1766! (The face is taken from a miniature portrait of Herschel in his twenties.)



The group which toured the Mt. Wilson Observatory after the June AAS meeting in Pasadena. (Photograph courtesy of Paul Ellingwood).



East (Almost) Meets West: Astronomers 0-2 in 1869

Thomas Hockey, University of Northern Iowa

A number of far-flung total eclipses of the Sun occur this decade, and umbraphiles prepare to meet them *in situ.*¹ Given modern transportation, it is easy to imagine two observers traveling great distance, one east and one west, only to meet up near the point of maximum totality. That this nearly happened more than 150 years ago is more surprising.

Starting out on 21 May 1869, The United States Naval Observatory's Asaph Hall III (1929-1907) departed by sea from Washington, crossed the isthmus of Panama by rail, caught another commercial ship, and then transferred to the Navy's sloop-of-war, USS *Mohican*. The steamer put into port at Providence/Plover Bay, *Russia*. [Бу́хта Провиде́ния²].

The Russo-American Treaty of 1824 allowed American shipping to call at Russian ports. Hall does not communicate whether permission was solicited from the Russian government to moor an American *warship* off that nation's shores.

Siberian locals pointed out anchorage at Emma/ Komsomolskaya [Комсомольской] Harbor. And so, the Washingtonian, a desk-bound sailor at best, found himself deposited on a beach a quarter of the way around the world. He set up at a whaling station (nearly on the Arctic Circle). It was one week before the 7 August 1869 total eclipse of the Sun, which he would try to observe. Hall's superintendent writes that Hall volunteered for the assignment, Hall tells us that he was ordered.

Unbeknownst to Hall, another astronomer was preparing to observe the same total eclipse of the Sun only several hundred kilometers to Hall's west. He was the Estonian Karl Neiman [or Neumann] (1830s-1887; Russian Geographical Society [Русское географическое общество]), who was a member of the Chukotka [Чуко́тка] Expedition to explore far-eastern Siberia. Neiman made his way to the, ". . . upper reaches of the Nerpichya [now Kanchalan = Канчалан] River . . . flowing into the Anadyr [Анадырский] Bay." He makes only brief reference to his exact whereabouts on Eclipse Day: He records that, during the solar eclipse, the local Chukchi [lyg'oravetl'a] hid in their yurts.

Back on the coast . . . clouds. "Light, ashy" clouds. The fear of every eclipse enthusiast came true. Hall got a peek of eclipsed Sun, and then more clouds. The man who had ventured farthest to see it was crestfallen. The remainder of the day was warm and sunny.

Hall's Old-World counterpart just missed his mark! Neiman was ready with his 3-inch-aperture Fraunhofer refractor that he had lugged across a continent. However, while Neiman knew *when* the total eclipse was to occur, his problem was that he did not know exactly where he was in relation to its path. Unfortunately, he only saw a partial eclipse of magnitude 0.996. So close! The difference, though, was literally that between night and day. Alas, it appears that Neiman would have been the first astronomer to see the 1869 total eclipse of the Sun. His is the farthest solar-eclipse report west or north of which I know.

Hall left the next day. He eventually would discover the two satellites of Mars.

Neiman continued to explore Siberia and only returned to Estonia after two decades in the Far East. Back home, he married his fiancé; she had waited twenty years for him.

I wish to acknowledge the help of, and my concern for, my colleague Sergei Maslikov, who news media report is under house arrest in Russia.

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Author Thomas Hockey is a former Chair, Vice-Chair, Secretary-Treasurer, and At-Large member of the HAD Executive committee.

¹I am sure that our fellow member Jay Pasachoff already is preparing for the 2029 partial in Nunavut!

² Thanks go to my wife Yuliana Ivakh for help with the Cyrillic.



Asaph Hall aboard ship on his way to the total-eclipse path in Russia (1869). Dr. Hockey states "I believe that Hall is in civilian dress, standing at the extreme left upon the upper deck." (Photograph courtesy of the United States Naval Observatory)

EINSTEIN AND THE SOLAR ECLIPSE From The Times, September 21,1922

HAD Member Jay Pasachoff recently received this interesting article from Sheridan Williams, who operates the <u>Clock Tower</u> website. *The Times* (of London) occasionally publishes articles from their archive which appeared 100 years ago. The following is very interesting because it tells us what was actually thought at the time, without benefit of hindsight.

EINSTEIN AND THE SOLAR ECLIPSE

From The Times, September 21,1922

The Astronomer Royal describes in our columns the arrangements made over two years to observe the solar eclipse of this morning, an event lasting only a few minutes which may have been obscured by drifting clouds. Skilled astronomers in charge of costly instruments have gone to West Australia and remote islands in the Indian Ocean where there was the best chance of settled weather. When the moon draws a curtain across the sun, observations of different kinds may be made. But this morning all efforts were to be devoted to one purpose, verification or otherwise of Einstein's prediction that the path of a ray of light will be bent in its passage through the gravitational held of the sun. The method seems simple. Photographs of stars whose rays pass close to the sun's disc, taken this morning, will be compared with

photographs taken when the sun was in another part of the sky. Einstein predicted not only that the apparent position of the stars would have shifted, but the amount of the shift. At the eclipse of 1919 photographs taken in the island of Principe and in North Brazil supported Einstein's prediction, but there was a possible error due to distortion of the mirror used to reflect the light rays from the stars into the telescope camera. In most instruments to be used this morning the mirror has been dispensed with, and the results, so far as skill can secure, will be decisive. But decisive as to what? Hitherto not only has there been no bridge between gravitation and the electro-magnetic theory, but observations interpreted on the theory of gravitation are in certain respects impossible to reconcile with observations based on the theory which has grouped light, electricity, magnetism, and the aether in one coherent system. Einstein's provide relativity does the necessary reconciliation. If it be true, the shifting of the stars taken on the photographs this morning will be exactly twice what it could possibly be on the electro-magnetic theory. But if the expected verification has been made this morning, it will have to be admitted that human observations of the universe can be reconciled with a theory from which absolute space and absolute time have been excluded, although at present they are not reconcilable with a theory based on these.





Carl Lampland's Untapped Radiometry

Joseph N. Marcus¹, Karen Kitt², John Spahn², Linda Spahn², and Lauren Amundson³, Lowell Observatory

¹Advisory Board; ²Staff Volunteers, Putnam Collection Center; ³Archivist and Librarian

For four decades after his death in 1916, Percival Lowell's three loyal staff astronomers carried forth the scientific work of the Observatory he founded. Vesto M. Slipher would be most famous for his discovery of the recession of galaxies ("spiral nebulae" then), and quite arguably, the expansion of the Universe. His brother Earl would be known for his planetary photography, especially of Mars. The chief legacy of Carl Otto Lampland (1873-1951, **Figure 1**) would be the radiometry of the planets – the measurement of their light and heat.

To do radiometry, Lampland collaborated with William Weber Coblentz (1873-1962, **Figure 1**), the pioneering infrared physicist at the U. S. Bureau of Standards in Washington, D. C. Coblentz built exquisitely sensitive "stellar radiometers" which he had deployed on the 36-inch Crossley reflector at Lick Observatory to measure the heat of the stars in 1914 (Coblentz 1915). He brought these inventions to Lowell Observatory, which offered better observing conditions with its higher altitude and drier air, and Lampland hooked them to the 40-inch reflector. Together they took radiometric measures of the planets during Coblentz's visits in 1921, 1922, 1924, and 1926.

Their results were pathbreaking. They determined that Jupiter was not a star (up to then many astronomers thought that Jupiter was incandescent). They found that Venus unexpectedly radiated heat equally from its day and night sides. They determined that Mars was clement for life, with noontime equatorial temperatures up to 21°C (70°F). But the huge dawn-to-dusk temperature swings they found meant that the Martian atmosphere must be very thin. Their numerous high-impact publications in the 1920s (e.g., Coblentz & Lampland 1923, 1925, 1927) burnished the reputation of the Observatory. By 1929 Lampland's sabbatical visit to Princeton earned coverage in The New York Times (1929). During this decade, he and Coblentz were in friendly competition with Edison Pettit and Seth B. Nicholson, who deployed similar radiometers on the 60-inch and 100-inch reflectors at Mt. Wilson Observatory, with generally concordant results (Sinton 1986).

Their last significant publication on planetary radiometry was on the 1926 apparition of Mars (Coblentz & Lampland 1927). Lampland, assisted by his wife Verna, continued radiometry into the early 1940s, filling sixteen logbooks (Sinton 1986), the subject of this article. But, paralyzed by perfectionism, he never published further results despite Coblentz's nagging. The year after Lampland died Frank Gifford, Jr., a meteorologist working under an Air Force contract at Lowell Observatory, reduced Lampland's Mars observations (Gifford 1952). Lampland made the first infrared observations ever of a comet in 1927, but only published an abstract (Lampland 1928) and never a full paper, causing the achievement to fall into obscurity. In 1984 Lowell Observatory Director Art Hoag fished the observations out of the Archives and found them to be eminently usable (Hoag 1984), as has the first author (Marcus 2013). An overarching problem was the reluctance of all three of Lowell's aging protégés to publish, but most of all, Lampland (Marcus 2013).

Lampland's unpublished radiometry has moldered in our Archives for decades, essentially untapped and unavailable – until now. Recently the second author scanned the sixteen logbooks, and they have been placed online at a website provided at the end of this article. To provide a context for this material, this article describes the radiometer, how the radiometry was done, and the logbook data format. With descriptive statistics, we inventory the logbook contents, and discuss the present scientific value of Lampland's radiometry and how it might be enhanced.

Number 100



Figure 1. Carl O. Lampland (left) holding a stellar radiometer and William W. Coblentz (right). Photographs courtesy Lowell Observatory Archives and National Institute of Standards and Technology.

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Figure 2. The upper part of a logbook page illustrating how the radiometric data were recorded.



Lampland's Solar System Radiometry (% Contributions)

Figure 3. Venus and Mars were the lead targets in Lampland's radiometry program.

The Radiometer and the Radiometry

A Coblentz radiometer is nicely pictured in Figures 1 and 2 from Coblentz & Lampland (1923), linked in our References. At its heart were paired thermocouples in evacuated glass containers - the vacuum greatly enhanced their efficiency. A planet's visible and infrared radiation passed through a rock salt window to impinge one member of a closely-spaced pair of tiny submillimeter tin receivers in the telescope's focal plane. The receivers were coated with a thin layer of lampblack paint to absorb the radiation, which heated the lampblack slightly. This generated a miniscule thermoelectric current in the two ultrathin wires, made of two dissimilar metals, which connected the receivers at their junctions in the circuit. The current was amplified by a Thompson galvanometer. It was so sensitive that it had to be housed remotely in the dome's adjacent silvering room, and clad in iron, to shield it from interference from the telescope's electric motors and the Earth's magnetic field. The needle deflection, measured in cm to two decimal places, was read through a small telescope at a 6-foot distance to further minimize disturbances.

To make an observation, one receiver was placed on the planet, while the other resided on the adjacent sky. This was the "on" position. Both receivers placed on the sky was the zero, or "off" position. The difference represented the planetary signal. Radiometry was a two-person job. Typically Lampland operated the telescope, while Coblentz recorded the galvanometer reading in the adjacent room.

Lampland's 40-inch reflecting telescope was ideally suited for radiometry (Marcus 2022). Its silvered mirrors reflected light over a wide span of wavelengths, from the UV/visible (0.3 to 0.7 μ m) to deep in the infrared beyond the 20 μ m cutoff of the radiometer's rock salt window. Refractors are ill-suited because their glass lenses do not transmit radiation beyond 8 μ m. The planets of our solar system radiate much of their heat beyond 8 μ m.

The planetary radiation was parsed by "transmission screens," filters that cut off radiation beyond certain wavelengths. They could be interposed in the light path using levers on the radiometer backplate. The transmission curves for some of them are shown in Figures 3 and 4 of Coblentz & Lampland (1923). The "water cell" screen -1 cm of distilled water enclosed by two thin quartz plates - cut off all radiation greater

than 1.4 μ m. The other screens – Pyrex glass, quartz, microscope coverslip glasses ("m1" or "m2"), and fluorite – had cutoffs beyond 2.7 µm, 4.1 µm, 8 µm, and 14.5 µm, respectively. The basic datum in the radiometry was the ratio of the radiation flux transmitted by the screen, sometimes corrected for reflection from its surfaces, to the total flux without an interposed screen ("no cell" = "NC"). Because it is a flux ratio, it requires no calibration. When subtracted from the total (unfiltered) flux (= 100%), one obtains the flux of radiation longward of the screen cutoff. By subtracting the fluxes through various filter screens from each other, one can obtain the fractional fluxes within their defining wavebands. The water cell was the one most commonly used screen. In most applications, it best, and most simply, parsed the sunlight scattered by the planet from that portion which was absorbed and reemitted as heat.

Figure 2 illustrates how data were typically entered in the radiometry logbooks. This example is the beginning of the historic observations of comet C/1927 X1 (Skjellerup-Maristany) in daylight on 1927 Dec. 16. The left column gives the time of day in hours and minutes Standard Time; the next column gives the filter screen ("H₂O" = water cell; "Glass m1" = microscope cover glass; "NC" = no filter). Then comes a "set" of between four and seven galvanometer needle deflections, measured in centimeters to two decimal places. Further rightward is the computed average, and, for the 3:21 and 3:25 "H₂O" sets, the computed percent transmissions.

Inventory of the Logbooks

In the summer of 2020, the contents of the sixteen radiometry logbooks were inventoried and tabulated in a Microsoft Excel[®] spreadsheet by the

third and fourth authors. The first author processed and extended their file, and derived some descriptive statistics. There are 1845.1 cumulated logbook pages over the period 1924 September 17 to 1943 November 30, which corresponds to about 33,000 observation "sets" as defined above. Using cumulated logbook pages per target object as the metric, we see from Figure 3 that Venus was observed the most (35.8% of the observations), followed closely by Mars (32.5%). Figure 4 plots the distribution of radiometric observations over time. They were at their peak in the 1920s, but like the stock market, plunged in 1929, which Lampland (1932) attributed to his sabbatical "visit to Princeton and especially... the appearance of Pluto" in 1930. The drought persisted until 1937.

It is interesting to compare the volume of radiometry in these sixteen logbooks with the volume that we can deduce was used in the tables of the papers which Coblentz and Lampland published in the 1920s, based on data that predated the logbooks (Coblentz kept these data, accrued during his 1921, 1922 and 1924 visits; they now reside in a notebook in the Library of Congress [2022]). From the tables, we estimate these data represent only roughly 1.8% of the volume in the sixteen Lampland logbooks at Lowell Observatory. When Coblentz visited in 1926, Lampland this time copied the data they accrued into Logbook 1. Totaling 36.3 cumulated logbook pages, it comprises only 2.0% of the total data volume in the 16 logbooks. The vast majority of Lampland's data, therefore, languished unutilized during his lifetime. Even with Gifford's (1952) reduction of the water cell subset of the two-thirds Martian radiometry. over of Lampland's radiometry remains unpublished and untapped (Figure 3).

Lampland Solar System Radiometry, 1922-1943



Figure 4. The distribution of Lampland's radiometry over time.

Outlook and the Current Scientific Value of Lampland's Radiometry

Our placement of the Lampland radiometry logbook scans online (see below) is only a preliminary step in bringing these old data back to life. Much remains to be done. To be scientifically useful, the data need to be properly tabulated and supplemented with additional information required in data reduction models. For example, wavelength-dependent atmospheric absorption by the Earth's atmosphere must be accounted for, which depends on the zenith angle at the time of an observation. This angle is easy to obtain through ephemeris programs such as JPL HORIZONS and should accompany each observation set so that the airmass in the light path can be computed. Less straightforward is accounting for the varying water vapor content in the Earth's atmosphere. Water vapor absorbs significantly in the infrared and is the bane of astronomy. Historical infrared twice-daily dewpoint (wet-bulb) temperatures, from which the surface vapor pressures can be derived, are available from the National Oceanic and Atmospheric administration for the Flagstaff weather station. Through a conversion equation, surface vapor pressures can be a proxy, although a poor one, for atmospheric column precipitable water content, which relates most directly to absorption. But they are better than nothing, and might at least adjust for the systematic differences between winter (dry) and summer (less dry) seasonal atmospheres.



Figure 5. Decadal-scale changes in the UV/blue albedo in the Venusian atmosphere. Fig. 5b from Lee *et al.* (2019), courtesy the author and the *Astronomical Journal*.

Of greatest concern is the blackener coating on the thermocouple receivers. Lampland (1932) and Coblentz both fretted about its potential inadequate thickness, which would decrease its absorption efficiency in the infrared more compared to visible wavelengths. Indeed, the surface temperatures which they deduced for Mars were systematically greater than 10°C higher than found by radiometers on the NASA Mariner 7 flyby spacecraft (Neugebauer et al. 1971), for the same spots at similar solar insolations, consistent with an unduly thin blackener. From Lampland's radiometry of comet C/1927 X1 (Figure 2), the first author derived $R = f_{scat}/f_{emit}$, a modeled ratio of the flux of sunlight scattered by the coma dust grains to that absorbed and then re-emitted as heat (Marcus 2013). R should have been the same whether derived from transmissions through the water cell or the quartz filter screens, but it was not. The discordant values could be reconciled, however, if the effective blackener thickness, a free parameter in the model, was over ten times less than optimal. Fortunately, Lampland frequently also took radiometric measures of bright stars. Because their spectral energy distributions are known, these stars can be used independently as calibrators to uncover and correct for a blackener deficiency in data reduction models for Lampland's planetary radiometry.

To conclude, we note the coming renaissance in Venus science with the approvals last year of NASA's VERITAS and DAVINCI+ and ESA's EnVision space missions to that planet. Of particular interest is the recent discovery of huge, decadal-scale swings in the UV and blue albedo of the planet's cloud-top atmosphere (Lee et al. 2019; **Figure 5**), caused by an "unknown absorber," and possibly related to surface vulcanism. Such wide



Figure 6. The distribution of Lampland's Venus radiometry over time.

albedo excursions would cause the fluxes shortward and longward of 1.4 μ m in Lampland's water cell Venus radiometry to change in opposite directions, and be potentially detectable. The distribution of Venus radiometry over time, although blemished by a large gap, could be adequate for making such a detection (**Figure 6**).

Online Availability of the Radiometry Logbooks

The digitized collection is available at <u>https://bit.ly/3QPxu1m</u>. Any reproduction for public use of the logbook pages, or of data extracted from them, must credit the Lowell Observatory Archives.

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REFERENCES

Coblentz, W. W. (1915). "Radiometric measurements on 110 stars with the Crossley reflector." *Lick Observatory Bulletin* No. 266, 8:104-123.

https://www.researchgate.net/publication/234495222_R adiometric_measurements_on_110_stars_with_the_Cro ssley_reflector

Coblentz, W. W., Lampland C. O. (1923). "Measurements of planetary radiation." *Lowell Observatory Bulletin* No. 85, 3:91-134.

https://articles.adsabs.harvard.edu/pdf/1923LowOB...3.. .91C

Coblentz, W. W., Lampland C. O. (1925). "Some measurements of the spectral components of planetary radiation and planetary temperatures." *J. Franklin Inst.* 199:785-841.

https://www.sciencedirect.com/science/article/abs/pii/S 0016003225911581

Coblentz, W. W., Lampland C. O. (1927). "Further radiometric measurements and temperature estimates of the planet Mars, 1926." *Sci. Papers Bur. Standards* No. 553, 22:237-276.

https://books.google.com/books?id=nPUNvvN8kzkC& printsec=frontcover&source=gbs_ge_summary_r&cad= 0#v=onepage&q&f=false

Gifford, F. Jr. (1952). Surface temperatures of the planet Mars: 1926 to 1943. *In* Final Report on the Study of Planetary Atmospheres, Lowell Observatory, Air Force contract No. AF 19(122)-162, pp. 208-249

Hoag, A. (1984). "First infrared observations of a comet." *Bull. Am. Astron. Soc.* 16:942 (abstract). https://articles.adsabs.harvard.edu/pdf/1984BAAS...16.. 942H

Lampland, C. O. (1928). "Radiometric observations of Skjellerup's comet." *Pop. Astron.* 36:240. <u>https://articles.adsabs.harvard.edu/pdf/1928PA.....36..24</u> <u>OL</u> Lampland, C. O. (1932). "Radiometry: vacuum cells." Working Papers, *Lowell Observatory Archives*.

Lee, Y. J., Jessup K.-L., Perez-Hoyos S., Titov D., Lebonnois S., Peralta J. *et al.* (2019). "Long-term variations of Venus's 365-nm albedo observed by *Venus Express, Akatsuki, MESSENGER*, and the *Hubble Space Telescope.*" *Astron. J.* 158:126-142. https://iopscience.iop.org/article/10.3847/1538-3881/

ab3120/pdf

Library of Congress (2022). "William W. Coblentz Papers, 1883-1960."

https://findingaids.loc.gov/db/search/xq/searchMferDsc 04.xq? id=loc.mss.eadmss.ms009045& faSection=cont entsList& faSubsection=dsc& dmdid=d5902e20& sta rt=1& lines=125, accessed September 19.

Marcus, J. N. (2013). "Another unsung Lowell Observatory achievement: the first infrared observation of a comet." *In* Origins of the Expanding Universe: 1912-1932, *ASP Conference Series* 471:181-189.

https://articles.adsabs.harvard.edu/pdf/2013ASPC..471.. 181M

Marcus, J. N. (2022). "The scientific legacy of the 42inch Lampland telescope." *The Lowell Observer* Issue 124, p. 6.

https://lowell.edu/wp-content/uploads/2022/04/Lowell-Observer-Issue-124-web.pdf

Neugebauer, G., Münch, G., Kieffer, H., Chase, S. C., Jr., Miner, E. (1971). "Mariner 1969 infrared radiometer results: Temperatures and thermal properties of the Martian surface." *Astron. J.* 76:719-728.

https://ui.adsabs.harvard.edu/abs/1971AJ.....76..719N/a bstract

Pettit, E. (1961). "Planetary temperature measurements." *In* Planets and Satellites, G. P. Kuiper and B. M. Middlehurst, eds., U. Chicago Press, 400-428.

Sinton, W. B. (1986). "Through the infrared with logbook and lantern slides. A history of infrared astronomy from 1868 to 1960." *Pub. Astron. Soc. Pacif.* 98:246-251.

https://articles.adsabs.harvard.edu/pdf/1986PASP...98.. 246S

The New York Times (1929). "Star heat measurer on Princeton faculty: Lampland comes from Arizona in exchange for astronomy professor." March 4, p. 9. <u>https://timesmachine.nytimes.com/timesmachine/1929/</u>03/04/95885849.html?pageNumber=9



Postage Stamps, Coins, and Banknotes as Archives of Astronomical History

Michael E. Marotta, AAS Amateur Affiliate

The near abandonment of cash money in daily commerce runs in parallel to a contraction in the use of first-class mail for common communication. Consequently coins, banknotes, and postage stamps are perhaps the dark matter of econometrics. They remain popular among hobbyists. As the lawful issues of government agencies, coins, banknotes, and postage stamps deliver evidence of historical events, usually very well attributed in time and place and supported by institutional records.

Numismatics is the art and science that studies the forms and uses of money. Philatelics (philately) is the collecting and study of postal payment media. The roots of numismatics are in the origins of coinage in the 6th century BCE along the Hellenic margin of the Lydian empire in what is today modern Turkey.^{1,2,3,4} Although some historians trace the deep tendrils of postage stamps to seals in clay from Sumer, the modern roots start in the 18th century and it is a recorded fact that the modern postage stamp was launched in the United Kingdom on 6 May 1840.^{5,6,7,8} Postage stamps immediately benefited from the attentions of passionate hobbyists and scholarly investigators.

The first postage stamp to feature an astronomical image was issued by the Empire of Brazil in 1887.¹⁵ The Stanley Gibbons stamp catalogues (https://www.stanleygibbons.com/) give the year as 1884. However, historian Ian Ridpath disassembled the sequence of stamps in which it was one issue in order to fix the later date. In 1942 Mexico recognized the National Astrophysical Observatory at Tonanzintla with a series of six stamps: 2-, 5-, 10-, 20, and 40-centavos, and 1 peso. The minor issues featured images that came from the Harvard Observatory, which collaborated with the Mexican national government in building their observatory, and the 1-peso stamp presented



Fig. 1: The thesis of Astronomical Symbols on Ancient and Medieval Coins by Marshall Faintich (McFarland, 2008) is that astronomical symbols on coins are intentional indicators of celestial events that validated the assertions of rulers that they were placed in command by divine agencies. The book delivers a running narrative about the symbols, the coins, and the celestial and mundane events that required them. A minor premise is that celestial events served to closely fix the date and perhaps time of issue and therefore some mint officials included them as design elements in order to have auditable controls. The author's website is http://www.faintich.net.



Fig. 2a. (top) Fig 2b. (bottom) Images from the author's collection. Two examples of many from Antioch, Syria, in the late Roman republic and early empire in which a Ram looks at a celestial event. Many interpretations have been offered including evidence for the so-called "Christmas Star." (See *The Star of Bethlehem: The Legacy of the Magi* by Michael R. Molnar, Rutgers University Press, 1999, 2013, https://www.rutgersuniversitypress.org/the-star-of-bethlehem/9780813564715 among a plethora of others). Over 200 peer-reviewed papers have been published on the topic.

Top: Antioch ad Orontem, Syria. Dated Year 105 = 55-56 AD. AE 18mm. ANTIOXEQN, Veiled and turreted head of Tyche right / EIII KOYA Δ PATOY, Ram leaping right, looking back; star and crescent above, date DP below. Dated Year 104 = 55-56 AD. British Museum Catalog 70. More images and citations at *https://www.wildwinds.com/coins/greece/syria/antioch/i.html*.

Bottom: Antioch, Syria, AE19 Time of Nero. Roman Provincial Coins catalog 4290; Sylloge Numorum Graecorum Copenhagen catalog 101. Magistrate Quadratus. Dated AD 54-68. 5.64 g. ANTIOXE Ω N, turreted and draped bust of Tyche right / EIII KOYA Δ PATOY, Ram running right, looking back, star in crescent above, date ET EP below. Year 105 = AD 56-57.

the Hertzsprung-Russell diagram.¹⁶ With the advent of the space age, astronomical themes became commonplace.^{17, 18,19}

Today, both hobbies deliver actualization and edification in mitigation of social stress. Both avocations are mature with national, international, and independent agencies and organizations for accreditation and certification. And each enjoys a plethora of sub-specialties. Among those is bibliomania, the collecting of the books, catalogues, and ephemera of auction houses and other marketers who deliver peer-reviewed cataloguing and historical tracking of ownership and provenance. "The Numismatic Bibliomania Society (NBS) is an educational association founded in 1979 to support and promote the use collecting of numismatic literature. and Numismatic literature includes books, periodicals, catalogs and other written or printed material relating to coins, medals, tokens, or paper money, ancient or modern, U.S. or worldwide."9

The American Numismatic Association has two codes of conduct, a general mandate for collectors and a stricter one for dealers. The American Philatelic Society adheres to a single code though status as an APS dealer requires an audit. ANA and APS conventions alike are sales and publicity venues for the US Mint and the US Postal Service. Local postmasters often coordinate and collaborate with clubs to sponsor shows and conventions.

Clifford L. Mishler served as president of the American Numismatic Association 2009-2011 and was president of Krause Publications. In addition to coins and stamps, Krause's line-up of magazines and books included rare automobiles, vinyl recordings, and sports memorabilia with over 100 periodicals and over 700 books in total before being purchased by F & W Publications which was broken up in a bankruptcy sale in 2019. Krause's most visible venue today is the Collect.com website. Mishler was a frequent guest speaker at coin shows and advocated for a common approach to and appreciation for all collectibles. As participants, Mishler often said, all collectors pursue completeness, condition, rarity, and value. That can apply to the hobby of astronomy as amateurs advance their own observing programs.

"In stamp collecting, one experiences the rare pleasure of independent action without irrelevant burdens or impositions. Nobody can interfere with one's collection, nobody need be considered or questioned or worried about. The



Fig 3. Augustus Caesar, silver denarius - Spanish mint (most likely Caesaraugusta, modern Zaragosa in Aragon), usually attributed to 19-18 BC and catalogued as I 37a, ..., 38b, et seq., Mattingly, Harold and Sydenham, Edward Allen, et al. (1923-2020.) *Roman Imperial Coins: The British Museum*. London: Spink & Son, Ltd., 1923-2020. Obverse: CAESAR-AVGVSTVS, head of Augustus right, wreathed with oak; Reverse: DIVVS-IVLIVS, eight-rayed comet with tail upwards. Diameter: 19 mm. On a standard of 3.9 grams or 84 to the Roman pound, production weights ranged 3.81 grams, down to 2.84 gr and probably continued after the death of Augustus. Image courtesy of Shanna Schmidt Numismatics Inc., Oak Park, Illinois.



Fig. 4: Image courtesy of Ian Ridpath. "Without doubt this is the greatest of all the pre-1957 [astronomy-themed] issues ... These stamps are often offered for sale in two separate lots: non-airmail (the first three values) and airmail (the three highest values). All six were issued in 1942 February to mark the inauguration of the Mexican National Astrophysical Observatory at Tonantzintla, near the city of Puebla, about 100 km southeast of Mexico City. ... Probably the bestknown astronomer who worked at Tonantzintla was Guillermo Haro (1913-88), co-discoverer of the nebulous outflows from young stars known as Herbig-Haro objects. "These are also notable as the first stamps to feature real astronomical photographs, rather than engravings. The subjects depicted are as follows: the Horsehead Nebula in Orion (2 cent); total solar eclipse (5 cent); the Whirlpool Galaxy, M51, in Canes Venatici (10 cent); the Sombrero Galaxy, M104, in Virgo (20 cent); the Ring Nebula, M57, in Lyra (40 cent); and the Hertzsprung-Russell diagram (1 peso)."-- http://www.ianridpath.com/stamps/1942mexico.html

choices, the work, the responsibility ... and the enjoyment ... are one's own. So is the great sense of freedom and privacy.

• • •

"An inextricable part of even a casual glance at stamps is the awareness of what a magnificent achievement they represent: for a few pennies, you can send a letter to any place on earth, to the farthest, most desolate corner where human beings might live ... to Greenland or to the Cocos (Keeling) Islands (population 1000). Those bright little pieces of paper will carry your words across oceans, over mountains, over deserts, and still more difficult: over savage frontiers (the most savage of which are not on the underdeveloped continents). Stamps as a postal institution are only 130 years old. Think of the human ingenuity, the technological the large-scale synchronization development, of effort that were required to create a worldwide postal system."10

Those words underscore the fact that while the baseline of philatelic and numismatic cataloging albums-Whitman, Scott, Warman, etc.-are organized alphabetically by nation-state, publishers sell supplies for creating your own systems because many aficionados pursue themes. At regional and national conventions awards are granted for competitive museum-quality presentations. In fact, compared to the terse cards adjacent to the displays in most public museums, the depth of detail and the revelation of new facts drive the competitive narratives. Also, contrary to public museums whose coins on display are often electro-type replicas as well as materials condemned for having been looted, the rules mandate that the competitor must present actual artifacts and be prepared to show proof of proper ownership.

With some exceptions, astronomical images seldom appeared on ancient coins of the archaic Hellenic and ancient Hellenistic koine social contexts before the extension of the Roman republic in the second century BCE. Some Roman coins of the Pax Romana early empire do show one or more stars within a crescent Moon. clearly intended to set the time of a notable conjunction though symbolic rather than representational. Easily the most famous examples are the Caesar's Comet with Octavian Augustus on the obverse and a comet on the reverse with the inscription DIVVS IVLIVS referring to the deification of Gaius Julius Caesar following his assassination in 44 BCE.



Fig 5: The Royal Bank of Scotland £10 banknote, in circulation since 2017, celebrates scientist Mary Somerville on the face and otters on the back. Somerville's many accomplishments include a translation of Pierre-Simon Laplace's *Mécanique Céleste*. Reproduced by kind permission of the Royal Bank of Scotland © 2022.

National news

June 18, 2021

Postal Service Makes the Sun Shine Bright With Forever Stamps



Fig 6: When exposed to sunlight and brought indoors, the intense colors are easy to view.

https://about.usps.com/newsroom/nationalreleases/2021/0618-usps-issues-sun-science-foreverstamps.htm



Fig 7: Images from the author's collection. Aficionados create their own collectible envelopes (properly called "covers").

Broadly accepted by numismatists as markers of an actual event the coins remain putative among astronomers.^{11,12,13} Stronger acceptance is found for the issues of Tigranes II (Tigranes the Great) of Armenia (140-55 BCE) depicting a prominent star in the king's crown which is correlated to an appearance of Halley's Comet in 82 BCE while Tigranes was extending his empire.¹⁴

Generally, in the modern world, coinage tends to be minor currency or subsidiary currency of limited value with banknotes being the lawful obligations of the standing government. Therefore, coins often carry temporary commemorations while paper money changes seldom, if at all as long as the government is in power. For example, Benjamin Franklin has been on the face of the \$100 Federal Reserve Note since 1914. Thomas Jefferson was honored on the \$2 United States Note of 1928 and then the Federal Reserve Note 1953 to present. Contrary to them, the quarter dollar and the dollar coin both have been and are media of celebration since 1999. Annie Jump Cannon appeared on the \$1 American Innovation® Delaware commemorative coin of 2019 and the Hubble Space Telescope graced the obverse of the \$1 Maryland issue of 2020. Space Shuttle mission specialist Christa McAuliffe was recognized with a commemorative silver dollar in 2021 and Dr. Sally Ride will appear on the obverse of a circulating 2022 American Women OuartersTM issue.

Whereas banks most national and treasuries maintain legal monopolies on the issuance of monetary media, the United Kingdom stands apart in that the obligations of the Bank of England circulate alongside private issues from the Royal Bank of Scotland and the Northern Bank (now Dansk Bank) of Belfast. The Bank of England one-pound notes of 1978 to 1984 featured Sir Isaac Newton on the back. He sits with a prism and his reflecting telescope next to him. In his lap the Principia Mathematica is open to Proposition XI Problem American space shuttle VI. An appeared on the 1999 $\pounds 5$ note of the Northern Bank. In 2017, the Royal Bank of Scotland placed Mary Somerville on their current issue circulating £10 note.



Fig 8: Image from author's collection. This cancelled cover would be worth much more without the fold and stain and with a clearer cancellation. Impassioned collectors pursue the highest quality. Also, several other groups and individuals created other series for this event. So, it is possible to pursue and complete a distinct theme set.



Fig 9: Image from author's collection. Some exploitation of collectors exists and can still serve to benchmark historical events. Nominally a valid issue, this stamp was not intended for actual use.



Fig. 10: Images from the author's collection. Nominally legal tender, these limited issue dollar coins in the American Innovations[®] series are sold only at premium prices. A bag of 100 business strikes costs \$117 plus shipping. Nearly perfect individual sealed coins ("proofs") cost more. The 25-cent "American Women Quarters™ are intended for can be found in circulation and are available at face value from banks and other sources. Commemoratives to astronauts Christa McAuliffe and Sally Ride are in that series.

References

- 1. Head, Barclay V. (1911). *Historia Numorum*, Oxford: Clarendon Press.
- 2. Gardner, Percy. (1918). *History Of Ancient Coinage*, Oxford: Clarendon Press.
- 3. Seltman, Charles. (1933, 1955). *Greek Coins*, London: Methuen & Co. Ltd.
- Van Alfen, Peter (2014). An Introduction to Archaic Coinage, ANS Working Paper v.31.12.2014., New York, American Numismatic Society.
- 5. http://www.bathpostalmuseum.co.uk/history/
- 6. <u>https://postalmuseum.si.edu/exhibition/the-queen%</u> E2%80%99s-own/postal-reforms-that-transformedthe-mail
- 7. https://postalhistoryfoundation.org
- 8. https://spellmanmuseum.org
- 9. https://www.coinbooks.org
- Rand, Ayn. (1971). "Why I Like Stamp Collecting," *Minkus Stamp Journal*, Vol. VI, No. 2 - 1971. Rand was honored on a U.S. 33-cent stamp in their Literary Arts series 22 April 1999.
- Pandey, N. B. (2013). "Caesar's Comet, the Julian Star, and the Invention of Augustus," *Transactions* of the American Philological Association (1974-2014), 143(2), 405–449. <u>http://www.jstor.org/stable/43830268</u>
- Boyce, Aline Abaecherli. (1965). Festal and Dated Coins of the Roman Empire: Four Papers. Numismatic Notes and Monographs, American Numismatic Society, No. 153, pp. iii, vii, ix-x, 1-102.
- 13. Ramsey, John T., and Licht, Lewis. (1996). *The Comet of 44 B.C. and Caesar's Funeral Games.* Atlanta, Georgia, USA. Scholars Press.
- Foss, Clive. (1986). "The Coinage of Tigranes the Great: Problems, Suggestions and a New Find," *The Numismatic Chronicle*, Royal Numismatic Society, Volume 146 (1986) pp. 19-66.
- Feldman, David. (2007). Empire of Brazil: The Meyer Collection. Feldman Galleries, Geneva Switzerland. <u>https://www.davidfeldman.com/wpcontent/uploads/2014/01/20071004brazil.pdf</u>
- 16. (n.a.). 1942. "Astronomy on Postage Stamps," *Nature*, vol. 150, page 229, 22 August 1942.
- Raynor-Evans, Katrin. (2019). "Exploring astronomy through philately Postal agencies have long commemorated astronauts, celestial objects, and spacecraft." *Physics Today*, 25 October 2019.
- 18. --. (2020). "Collect the Cosmos in Stamps." Astronomy. 18 November 2020.



Fig. 11: Image from the author's collection. Issued as a commemorative by Romania to celebrate the last solar eclipse of the 20th century which also passed above that nation, the 2000 lei denomination was outside of the established sequence of currency values.



The 100-inch telescope at the Mt. Wilson Observatory. By the time of the completion of the 60-inch telescope (page 11) in 1908, the 4½-ton disk of the 100-inch had already been cast! It would be a long time before George Ellery Hale and his colleagues would know if their half-million-dollar gamble would pay off; the 100-inch did not begin observations until 1917. It remained the world's largest optical telescope until completion of the Palomar 200-inch in 1948.



What's Left Behind? Jennifer Lynn Bartlett, Chair, WGPAH

Conventional wisdom estimates that we have perhaps 1% of literature produced before the second century of the common era. Historians sift through this information trying to reconstruct the knowledge and thinking of ancient philosophers and scientists. In addition, historians look for traces of the men and women whose lives produced such works and transmitted them to us: original authors, copyists, and archivists. The survival of some documents is mere chance; for instance, they were left in a suitable environment for their preservation—a papyrus scroll buried in a desert tomb—rather than re-used when superseded-cuneiform converted to construction fill. The survival of others is due to deliberate action; an anonymous scribe who valued the contents and choose to recopy it. Thus, we have thousands of astronomical observations baked into clay tablets, many waiting decipherment. We also have Aristarchus's (c. 310-c.230 BCE) On the Sizes and Distances of the Sun and Moon, but we know his heliocentric model only through comments written by others.

Closer to our own time, we have astronomical observations, logbooks, and working papers for some, but not all, astronomers contributing to our store of knowledge. The same processes apply. Some materials survive because of the right kind of neglect—a cache of correspondence in the attic or an overlooked cabinet of photographic plates. Others survive because someone actively choose to preserve them-institutional records in a professional archive or private letters treasured by family. While men dominated professional astronomy in the early 20th century, Project PHaEDRA and the University of Chicago Library are glimpsing the women who also worked at Harvard and Yerkes Observatories by sifting through the documents and artifacts remaining at these institutions. Efforts like these will bring us a more complete picture of the enterprise and culture of astronomy that brought us to our current understanding of the universe. However, our picture will never be truly complete.

Much as we may long for the riches of the fabled Library of Alexandria, where Eratosthenes of Cyrene (c. 274-c.194 BCE) computed the circumference of the Earth, preserving everything is neither practical nor desirable. We are limited in our resources: financially, spatially, and temporarily. Even if we were not so constrained, we would not want to freeze all our instruments and institutions in a single moment representing their "glory days." As scientists, we want to keep improving, enhancing, and developing to answer the questions that motivate us, processes that will in turn pose new questions we want to pursue. Therefore, with every decision to conserve an item, we accept that we must let something else go. The choices we make reflect our values and reveal the stories we want to tell ourselves. When you purge your papers in preparation for a move, assist a retiring colleague clear their quarters, or revise a records retention policy, you are a link in the chain of circumstances that will determine what our successors know about us. I wonder what the future scholars will discover in the digital detritus of our professional lives.

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Cuneiform on a clay tablet recording observations of Halley's Comet between 22 and 28 September 164 BCE, Babylon, Iraq (BM 41462), courtesy G. Collins, via WikiMedia Commons

30/04/65 DRUGLOPED THREE POLAR AYIS TRST. PLATES 17/05/68 POWER ON # 2130 " OFF 23:00 TEMP 47 = DN B 185 28:10 14:00 760 14:00 + 60 DN X 097 28:10 DRIVE CLOUDS + RAIN IN AT 22:30 Power on 2200 TEMP 48", Piwer OFF 6310 Sky CLEAR STA DRIVE 487 15:00 00:00 -1:00 22:45 00:45 15:00 00:00 -1:00 22:45 00:45 22/05/68 TEMP 48°F SKY CLEAR-STRADY DNB 185 120 DN Y 109 DNR 097 120 23/05/68 DALVE 465 17:00 + 60 -:57 00:48 17:00 + 60 -:57 00:48 17:00 + 60 -:57 00:48 DNB 186 00:48 02:48 DNY 110 DNR 098 VERY HEAVY DEW FALL-PED CAMARA FUTER APPEARED TO HAVE DEW - YELLOW + BLUE LOOKED DK. TAMP. 45" F AT BIOCAM

Page 10 of "<u>Sky Patrol Program</u>" notebook kept by Budreski & Mattei; courtesy of the Harvard College Observatory, Astronomical Glass Plate Collection



Materials rescued from US Naval Observatory building before demolition, courtesy M. Black, USNO Library.

News from HAD Members

Ken Rumstay, Valdosta State University

Autumn brings another issue of HAD News, and another opportunity to pass on news from our members!

In August Hans Joachim Haubold wrote from New York to inform us of a recent paper which might be of interest to our readers. <u>"Development of</u> research capacities in space weather: A successful international cooperation" appeared in the February 2021 issue of the *Journal of Space Weather and Space Climate*. The article covers work done over a time period of more than thirty years.

More recently Hans wrote again (this time from Vienna) to inform us of an initiative to establish an Albert Einstein Discovery Center in the city of Ulm, Germany. The <u>Association's website</u> states:

To recognize Einstein's significant contributions to society, a major international project to establish an Albert Einstein Discovery Center in the heart of the city has been launched.

This mission is spearheaded by our non-profit Association, the Albert Einstein Discovery Center Ulm e.V.. Formed on September 16, 2016, our Association now consists of members of all ages, including teachers, lawyers, politicians, engineers, students, pharmacists, marketing physicists, agents, filmmakers, children, tax attorneys, shop owners, homemakers, physicians, and architects. We are primarily citizens from Ulm and the surrounding area but are also supported by enthusiastic members from around the world. We are working on all levels ranging from political to financial support, to the project's economic underpinning as well as educational approaches to make the Albert Einstein Discovery Center a reality.

Hans notes that participation, contribution, and membership in this association is invited at the international level, and that some members of HAD might be interested in exploring this. Thank you, Hans, and best wishes!



Long-time HAD member Pedro Raposo has left his position at the Adler Planetarium to take a new position as Executive Director of the Library and Archives of the Academy of Natural Sciences of Drexel University in Philadelphia. For those wishing to congratulate him, his new professional email address is <u>pmr64@drexel.edu</u>. Best wishes in this new endeavor, Pedro!

ર્જ્યતેઝ્

Noted telescope historian John Briggs sent us the following in July:

A while back I shared a Zoom lecture about Edward E. Barnard with the Barnard-Seyfert Astronomical Society in Nashville, Barnard's childhood home. My friend there, Theo Wellington, noticed that Barnard (1857-1923), the discoverer of Jupiter V, Amalthea, had been buried in Nashville, and she took it upon herself to find his grave.

She reported success to me today and sent a photograph. Barnard, of course, is an especially popular figure in the history of American astronomy, but Theo reports that the staff at the cemetery didn't know him. She plans to correct that. It's neat how the headstone is also a memorial to his wife, Rhoda, with the record that minor planet 907 Rhoda is named for her.

The location is Mt. Olivet Cemetery, Lebanon Road, Nashville, Tennessee. (Prices start at only \$2,695!)

> e s s

Finally, Jay Pasachoff forwarded to us a letter he'd received from fellow astronomer and umbraphile Santiago Paolantonio of the National University of Cordoba in Argentina. The letter was in Spanish, but translated it reads: A new entry in the History of Astronomy has now been added, we invite you to visit the site (<u>http://historiadelaastronomia.wordpress.com/</u>).

150 years of the first astronomical photographs in the Argentine Republic This year [2022] marks the 150th anniversary of the first celestial photographs taken in the country, which were part of the first systematic astronomical work applying this technique worldwide. Cordovan Photographs, as the publication of the results of this research carried out at the Argentine National Observatory was called, constitute a milestone that historiography has not yet placed in the place of great importance that it had for Astronomy.

The objective of this site is to provide new information on the history of astronomical science; topics related to it and complementary to their own work, their teaching and dissemination. An interactive work is promoted, to specify and increase the poor existing database on the performers of this work, in the past and in the present. Those always unknown people who enriched and continue to enrich with their sustained effort, that human enterprise that has placed us on the threshold of the space age; as well as providing new approaches to known acts and actions, fully illuminating the disciplinary reality.

Cheers, Santiago Paolantonio Cordoba Astronomical Observatory

That's all the news for this issue; please keep us informed of your activities!

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The Academy of Natural Sciences of Drexel University in Philadelphia, Pedro Raposo's new home.



The Tombstone of Edward E. Barnard, located in Mt. Olivet Cemetery in Nashville, Tennessee.

New Books

Ken Rumstay, Valdosta State University

We have news of two recent books which will be of great interest to our readers. If you would like to suggest a book for inclusion in our next issue of *HAD News* or (better yet) would like to review a book, please contact me at hadsec@aas.org.



Golden Years of Australian Radio Astronomy: An Illustrated History (Springer Historical & Cultural Astronomy series) by Wayne Orchiston, Peter Robertson, and Woodruff T. Sullivan III (Springer, 2021, ISBN-13: 978-3319918419). Also available as a Kindle e-book.

Two of this monograph's three authors are longtime members of our division. The publisher's description is as follows:

The evolution of Australian radio astronomy from 1945 to 1960 has been studied in detail by numerous historians of science in recent years. This book is the first to present an overview of this remarkable chapter in Australian science.

The book begins in the post-war period, as the Radiophysics Laboratory in Sydney switched from secret wartime research on radar to peacetime applications of this new technology. Next follows the detection of radio waves from space and the ensuing transformation of this fledgling science into the dominant research program at the Radiophysics Lab. Drawing from this history, the book shows how by 1960 the Radiophysics Lab had become the largest and most successful radio astronomy group in the world. The final chapter presents an overview of Australian radio astronomy from 1960 to the present day, as Australia prepares to co-host the multi-national, multi-billion-dollar Square Kilometre Array. Nearly 300 high-quality images complement the text, drawn from a wide range of sources including the extensive collection held by the CSIRO Radio Astronomy Image Archive. The book will be an essential reference for readers interested in the scientific and cultural development of radio astronomy.



HAD member George Latura recently wrote to us to remind us that, in March 2021, Virginia Trimble asked us to relay the following message to the members of HAD:

"Our colleagues at the Obserwatorium Atronommiczne Krolowej Jadwigi Rzepienmiku Biskupim (Queen Jadwiga Obsevatory of Rzepienmik Biskupi Poland) are planning a commemorative volume to honor the 450th birthday of Kepler (born 27 December 1571) and would like to receive short articles/papers to include about Kepler, his life and/or work, his relevance for us today, and so forth...' – Virginia Trimble (Honorary member of the Kepler Commemorative SOC).

George reports that the planned work was published, at about the time the AAS was meeting in Pasadena in June, as *Towards Mysteries of the Cosmos with Johannes Kepler on the* 450th *Anniversary of his Birth*, edited by Bogdan Wszolek and Agnieszka Kuzmics (both members of the Astronomia Nova Association and of the Jagiellonian University Astronomical Observatory).

One can download a PDF file of the electronic version of the book (16.7 MB) at no cost by going to <u>http://oajadwiga.pl/arch/1262</u> or, alternatively, <u>http://www.oa.uj.edu.pl/pbl/AAN/Kepler.pdf</u>.

Thank you, George, for bring this to our attention! Professor Virginia Trimble is of course well known to our readers! She served as Chair of the Historical Astronomy Division from 1999 to 2001 and, in 2018, was elected by the AAS Board of Trustees as a Patron of the Society. Virginia contributed two essays to this volume, and was honored for her work in bringing it to completion. In his Prologue, Bogdan Wszołek writes:

In a special way, I would like to thank Prof. Virginia Trimble of the University of California (Irvine), also an honorary member of the Astronomia Nova Society (AN) and a member of the Honorary Staff of the Queen Jadwiga Astronomical Observatory in Rzepiennik Biskupi, for disseminating through her channels the information about our initiative to honor the anniversary of Johannes Kepler's birth. The fact is that this book was made largely thanks to the involvement of Virginia Trimble. Considering her various previous contributions to astronomy, including her cordial memory of astronomers in Poland, the General Assembly of AN decided to honor her with the Keplerus Ellipsis, a medal established by AN on the occasion of the anniversary of the birth of Johannes Kepler, the patron of AN.

We offer our congratulations to Virginia, and to everyone who participated in this work!

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What's New in the J.A.H.H.

Ken Rumstay, Valdosta State University

In the last issue of *HAD News* we reported that, beginning with its March 2022 issue, the *Journal* of Astronomical History and Heritage would be forced to introduce modest page charges for its authors. We are glad to announce that a change in circumstance has rendered this unnecessary! The reasons are described in Managing Editor Wayne Orchiston's editorial which appeared in the June issue, and which is reproduced here on page 30.

The Journal of Astronomical History and Heritage was founded in 1998 by Wayne Orchiston and John Perdrix. It is an online open-access journal published quarterly, in March, June, September, and December. A number of HAD members are involved in the production of this fine journal as editors, authors, and reviewers. If you would like to contribute to it in any capacity, please contact Wayne at jahh.editor@gmail.com.

All issues of the *J.A.H.H.* are freely available online at <u>https://www.jahh.org/</u>. As a service to our members the Tables of Contents for the June and September 2022 issues are reproduced on the following pages.

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Front covers of the latest two issues of the Journal of Astronomical History and Heritage.

JOURNAL OF ASTRONOMICAL HISTORY AND HERITAGE

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VOLUME 25 NUMBER 2

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EDITORIAL

A lot has happened since the March 2022 issue of JAHH—and I'm delighted to report that the news is all good.

Currently, we are in the process of transferring *JAHH* to the University of Science and Technology of China (https://en.ustc.edu.cn/), thanks to strong support from the President of the University and Professor Shi Yunli, Executive Dean of the School of Humanities and Social Sciences. USTC is China's national university of science and technology, and is locate in Hefei, around 400 km west of Shanghai. Some readers may remember it as the venue of the ICOA-8 (Asian history of astronomy) Conference in 2014, which included a memorable post-conference field trip to the factory of a family in the city of Xin'an Xiuyu (now Wananzhen) that has been making sundials and compasses for hundreds of years. We also visited Yellow Mountain, one of those unbelievable limestone formations that we see depicted in books and on TV but never imagine we'll ever see in real life.

This is the last issue of *JAHH* that will come out under the banner of the Department of Earth and Space Sciences at Rizal Technological University in Manila (Philippines), and I wish to thank Associate Professors Ruby-Ann Dela Cruz and Rai Guido, and Dr Rose-Ann Bautista for their support since NARIT decided it would no longer employ me or host *JAHH*. Ruby-Ann, this also will be your last issue as Papers Editor, and I want to thank you for all your help over the past few years.

The first USTC issue of *JAHH* will appear in September, and the aforementioned Professor Shi Yunli will join me as Co-Editor. Meanwhile, over the next few months we will review the Editorial team and the Editorial Board of *JAHH* and will set up a new *JAHH* web site (which will contain a full run of journals, right back to Volume 1 Number 1, in 1998).

Professor Shi and I are very happy to report that we also will abolish the Production Fees. They were instrumental in helping *JAHH* survive (until the USTC 'came to the rescue'), but *JAHH* will return to its original status as a free open access journal that encourages history of astronomy research worldwide. And published papers also will remain free, not hidden behind a 'pay wall'. These are the precise sentiments that the late John Perdrix and I had in mind when we created *JAHH* on that long flight from Perth (Australia) to Osaka (Japan) immediately prior to the 1997 IAU General Assembly in Kyoto.

While all the afore-mentioned changes are occurring it is best that those wishing to submit papers for future issues of *JAHH* email them to me directly (<u>wayne.orchiston@gmail.com</u>).

Finally, let me say what a great relief it is for me personally to now have a new home for *JAHH*, and that I can continue in an editorial role under the new scenario. I have known Yunli for about a quarter of a century and am impressed by his research output (which includes papers on Jesuit influences in Asia—something I also publish on). He has also served as President of CHAMA, the history of astronomy commission in the International Union for the History and Philosophy of Science and Technology (while at the same time I was President of IAU Commission C3), and we both have organized ICOA conferences. I have every faith that Yunli and the USTC will take *JAHH* forward into a new era of growth and development.

Professor Wayne Orchiston

28 June 2022



Published by The Department of Earth and Space Sciences, Rizal Technological University, 704 Boni Avenue corner Sacrepante Street, Mandaluyong City, 1550 Metro Manila, Philippines.

JOURNAL OF ASTRONOMICAL HISTORY AND HERITAGE ISSN 1440-2807

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Published by The University of Science and Technology of China, 96 Jinzhai Road, Hefei, Anhui 230026, China.



Historical Astronomy Division of the American Astronomical Society

HAD News #100, November 2022, edited by Ken Rumstay. Please send contributions for the next issue, comments, etc. to <u>hadsec@aas.org</u>.

A complete version of this newsletter, with color photographs and active links, may be found on our website at <u>https://had.aas.org/sites/had.aas.org/files/HADN100.pdf</u>.

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HAD News c/o K.S. Rumstay Department of Physics, Astronomy, Geosciences, and Engineering Technology Valdosta, GA 31698 USA