

H·A·D NEWS

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

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The January Virtual HAD Meeting

Ken Rumstay, Valdosta State University

Greetings to all HAD members! In the May 2020 issue of *HAD News* I wrote, four months after returning from the Honolulu meeting:

I promise there will be a HAD meeting next January, but only time will tell whether we'll meet face-to-face or will have to gather online.

The January 2021 AAS/HAD meeting was to have been held in Phoenix, but of course the Covid-19 pandemic necessitated that we all meet virtually instead. I look back with amazement to a time two years ago when I hadn't even heard of Zoom!

In spite of all difficulties, we had a very successful virtual meeting! The schedule of sessions was as follows:

Monday, January 11th

12:00 – 1:30 PM EST HAD I (Invited Talks)
1:40 – 2:40 PM EST HAD Town Hall

Tuesday, January 12th

12:00 – 1:30 PM EST HAD II (Oral Session)
4:10 – 5:40 PM EST HAD III (Special session)

Wednesday, January 13th

12:00 – 1:30 PM EST HAD IV (iPoster session)

Following Monday's Town Hall the 2021 Donald E. Osterbrock Book Prize was presented to Ileana Chinnici. Another highlight of the meeting was the HAD III session organized by Jay Pasachoff, in which four invited speakers explored various aspects of the Golden Records which the Voyager spacecraft are carrying into interstellar space. This session was presented at the Division of Planetary



The Phoenix Convention Center, where the American Astronomical Society and its Historical Astronomy Division had planned to meet in January.

Science meeting in October, and was considered a high point of that conference. Abstracts of talks presented at January’s meeting may be viewed at <https://had.aas.org/membership/had.meetings/2021>.

It goes without saying that many features of a traditional HAD meeting were missed, notably our traditional “minibanquet” and the chance to talk with old friends and colleagues. Let us hope that we can enjoy these activities in January 2022!

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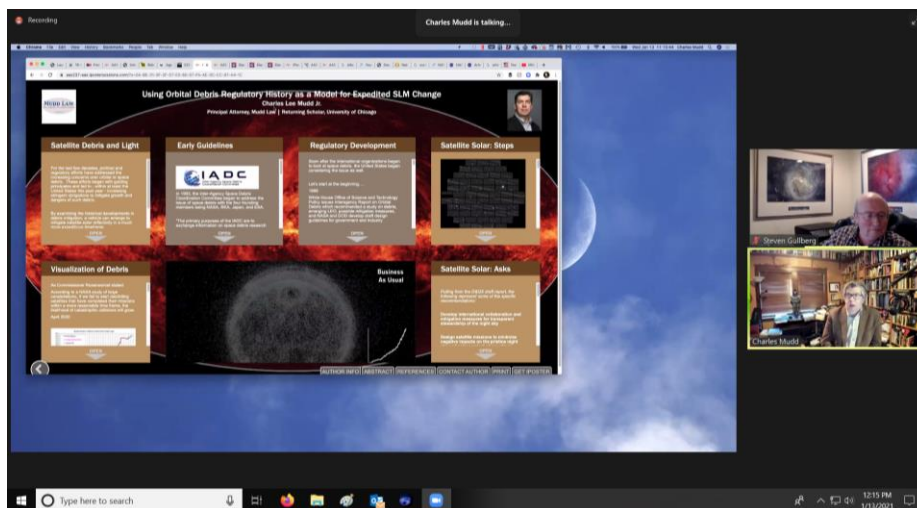
From the Chair

Kevin Krisciunas, Texas A&M University

Thirty-nine years ago this spring, at the age of 28, I moved to Hawaii to take up a position as a computer programmer for the United Kingdom Infrared Telescope (UKIRT). Ten percent of my official work time could be spent on my own research. This was a great opportunity. I worked there 14 ½ years. UKIRT is a 3.8-m diameter telescope situated at the 13,800-ft summit of Mauna Kea on the Island of Hawaii. In 1982

UKIRT was the world’s seventh largest optical or infrared telescope.

Since then many larger telescopes have gone into operation. In the 4-m class are the William Herschel Telescope at La Palma in the Canary Islands; the Lowell Discovery Telescope in northern Arizona; the VISTA infrared telescope at Cerro Paranal, Chile; the SOAR telescope at Cerro Pachon, Chile; and LAMOST, a 4.9-m equivalent telescope at Xinglong, China. The Multiple Mirror Telescope (MMT) originally had six 1.83-m mirrors, giving it a 4.5-m equivalent primary. When I started at UKIRT the MMT was the world’s third largest telescope; it has since been upgraded to use a single 6.5-m mirror. Two other 6.5-m telescopes are the Magellan (Baade and Clay) Telescopes at Las Campanas, Chile. In the 8-m class are the Gemini North and Gemini South Telescopes at Mauna Kea and Cerro Pachon, Chile; the Japanese National Large Telescope, called Subaru (at Mauna Kea); and the four units of the Very Large Telescope at Paranal. Two 9-m equivalent telescopes are the Hobby-Eberly Telescope at McDonald Observatory in West Texas and the South African Large Telescope (SALT). They are transit telescopes, like the Arecibo dish in Puerto Rico was. The 10-m class telescopes are the Keck I and II telescopes at Mauna Kea and the Gran Telescopio Canarias at La Palma. Finally, the Large Binocular Telescope at Mount Graham, Arizona, has two 8.4-m mirrors, the equivalent of a single 11.9-m primary. If we include the 4-m Daniel K. Inouye Solar Telescope at Haleakala on Maui, Hawaii, UKIRT is now the world’s twenty-eighth largest telescope, optical or infrared.



What a virtual HAD meeting on Zoom looks like.

In 1982 UKIRT's near-IR instruments all had only one light detecting element. To take spectra some instruments employed a CVF (circular variable filter). Two years later one of our workhorse spectroscopic instruments (CGS2) had seven detectors and a cooled grating. By 1986 we were tiling the sky using a camera that had an infrared array of 58 by 62 pixels. These detectors were originally developed for the military. In tiny letters on such a chip was the word "tankbuster". Infrared arrays and cameras have only gotten bigger. The camera on VISTA has 16 arrays of 2048 by 2048 pixels each, or 67 million pixels in total!

One major change in the operations at Mauna Kea is that now observers are typically not at the summit. They observe remotely at lower altitude, such as Hilo or Kamuela (Waimea). Back in 1982 UKIRT's headquarters was the Royal Observatory, Edinburgh. My boss once removed was the Astronomer Royal of Scotland, Prof. Malcolm Longair. In 2015 the operation of UKIRT and its sister telescope, the 15-m submillimeter wavelength James Clerk Maxwell Telescope, was taken over by China. What I knew as the Joint Astronomy Centre in Hilo is now called the East Asian Observatory. There have been so many changes since 1982!

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From the Vice Chair

*Terry Oswalt, Embry-Riddle
Aeronautical University*

Greetings! Thank you for the opportunity to serve as the new Vice Chair of the Historical Astronomy Division. Special thanks to my predecessors, Kevin Krisciunas (now Chair) and Alan Hirshfeld (past Chair), who have helped get me up to speed

during my "break-in" period these past several weeks.

My interest in the history of astronomy is most rooted in my experience as a young graduate student. I was interested in white dwarf stars and found kindred spirits in Olin Eggen, Henry Giclas, Jessie Greenstein and, especially, Willem Luyten. All shared my interest in white dwarf stars. Willem encouraged me to study the 500 or so candidate white dwarfs his proper motion survey found in wide binary stars. Looking for very cool degenerate members of binaries became the topic of my dissertation. I have some of Willem's original Palomar plate contact sheets—perhaps these are the only original identifications of proper motion stars that exist. To most, they exist only as "LP" numbers in catalogs. We already recognize the importance of preserving photographic plates. Addressing the vulnerability of astronomical "metadata" like these prints and the personal research materials of astronomers who have passed on or retired is also something I think we should be concerned about. Most academic institutions are ill-equipped to assess the importance of such documents, much less assuring their preservation.

A primary responsibility of the Vice Chair is commissioning, editing and occasionally writing obituaries for AAS members who have passed on. All HAD members should participate in this important duty to those who trained, mentored and collaborated with us over the years. So far this year HAD has published online obituaries for Jacques Beckers, Martin Cohen, Howard Greyber, Wasley and Margaret Krogdahl, Bill Liller, Ed Lilly, Anastasios Nesis, Lew Snyder, John Stauffer, Dick White and Bruce Woodgate. There still is a backlog of about 100 unwritten obituaries (see <https://had.aas.org/obituaries/outstanding-obits>).

We need your help to properly memorialize these colleagues who have contributed so much to our profession. If you were a student, mentor or colleague of one of those on the list, please volunteer to write one. In some cases, you may know that an obituary for one of those on the list has been published elsewhere. Either way, let me know, OK?

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From the Secretary-Treasurer

Ken Rumstay, Valdosta State University

Greetings to all HAD members! It’s been over a year since we met in Honolulu. I remember at that meeting hearing rumors of a new virus in China, but little thought at the time that it would disrupt very aspect of our lives for the foreseeable future.

I was able to teach my university classes in a traditional manner during the Fall 2020 and Spring 2021 semesters, though social distancing protocols required altering many laboratory activities and eliminating some others. Of course, all public outreach at our planetarium and observatory have been curtailed since March of last year. I very much miss giving planetarium shows to the thousands of children who would visit each year!

With some trepidation, I have decided to retire from my position at Valdosta State University, effective June 1st. After thirty-seven years there I am hesitant to take this step, but I believe it is time for some new blood to revitalize our astronomy program. I hope to remain actively involved with the university in some capacity. And now that I’ll have more time to devote to HAD, perhaps future newsletters will be completed on time!

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**Minutes of the January 2021
HAD Town Hall**

Alan Hirshfeld, University of Massachusetts Dartmouth, Kevin Krisciunas, Texas A&M University, and Ken Rumstay, Valdosta State

The 2021 HAD Town Hall (our annual business meeting) convened online via Zoom at 1:40 pm on Monday, January 11th. Approximately four dozen people attended online; this was more than the usual number of attendees at a physical Town Hall!

HAD Chair Alan Hirshfeld began by welcoming everyone, and by summarizing the main events of 2020:

- Our January meeting in Honolulu, which included special sessions on the centennial of Eddington’s solar-eclipse tests of Einstein’s General Theory of Relativity and the centennial of the IAU, plus an invited lecture by Joshua Nall (of the Whipple Museum in Cambridge) on the bicentennial of the Royal Astronomical Society. HAD also awarded its 2020 LeRoy E. Doggett Prize to Robert W. Smith, who delivered a plenary lecture.
- Recognition of three high-school students for National History Day projects with astronomical history themes.
- Results of the September election of new HAD officers.
- Selection of Ileana Chinnici as the recipient of the 2021 Donald E. Osterbrock Book Prize, also in September.

Alan concluded his presentation by noting HAD’s monthly *This Month in Astronomical History* online column and the biannual *HAD News*, describing the new HAD Officer’s Manual, and by thanking those division officers whose two-year terms would end following the meeting.

Introduction: A century in ferment

1. Astronomy in the Nineteenth Century
2. The Nineteenth Century in the Catholic Church
3. Focusing on Italy: Astronomy in the Years of Unification

Pius IX (1846-78)

Astronomical Observatories in Italy before the Unification

Measuring the Geodetic Baseline at Via Appia (1854-55)

Lightning Rods for the Main Roman Monuments (1860)

Fire Safety System for St. Paul Basilica (1867)

Time-Ball System (1850)

Daily Telegraphic Dispatches for Weather Forecasting (1856)

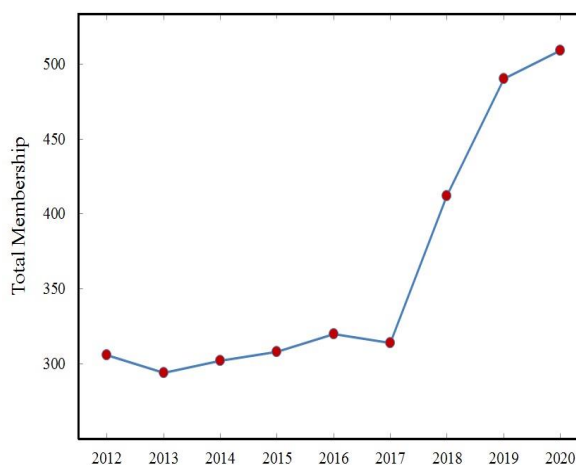
Some highlights from Ileana Chinnici’s Osterbrock Prize Talk, in which she described the life and achievements of the Jesuit astronomer Angelo Secchi.

AMERICAN ASTRONOMICAL SOCIETY				
Historical Astronomy Division				
For the Twelve Months Ending Thursday, December 31, 2020				
	Operating	Doggett	Osterbrock	Totals
	Budget	Prize Fund	Prize Fund	
Revenue				
Individual Dues	3,441.32			3,441.32
Contributions	1,825.00	576.00	2,369.70	4,770.70
Interest	678.08	1,002.05	763.39	2,443.52
Investment Expense Offset	(54.56)	(80.63)	(61.43)	(196.62)
Distributed Market Value	3,403.82	5,029.90	3,831.82	12,265.54
Total Revenue and Transfers	\$9,293.66	\$6,527.32	\$6,903.48	\$22,724.46
Expenses and Transfers				
Printing	91.26			91.26
Contracted Personnel	1,000.00			1,000.00
Service Charges	131.66	14.40	59.24	205.30
General Mailing Charges		538.20		538.20
Domestic Travel	1,827.14			1,827.14
Prize Awards		1,000.00		1,000.00
Prize Certificates		227.50		227.50
Transfer (Division Affiliate)	100.00			100.00
Transfer to General Fund	183.00	106.81		289.81
Total Expenses and Transfers	\$3,333.06	\$1,886.91	\$59.24	\$5,279.21
Surplus/(Deficit)	\$5,960.60	\$4,640.41	\$6,844.24	\$17,445.25
Beginning Balance (Yr.)	\$30,992.03	\$46,745.21	\$34,380.29	\$112,117.53
Ending Balance (Yr.)	\$36,952.63	\$51,385.62	\$41,224.53	\$129,562.78

The usual 2020 Division membership and financial data were then presented. Despite a year of global pandemic which wreaked financial havoc in most sectors, HAD ended the year in remarkably strong shape, as noted here. In accordance with our bylaws this report was audited by a committee composed of two HAD members independent of the Executive Committee; special thanks to Roy Kilgard and Steven Gullberg for serving in this capacity.

Membership in our division has shown remarkable gains during the past three years (see graph at right). After hovering around the 300 mark for more than a decade, we ended 2020 with a total of 509 HAD members, distributed among eleven categories!

The Town Hall ended with Alan Hirshfeld virtually “handing over the gavel” to Kevin Krisciunas, who became the new Chair. The 2021 Donald E. Osterbrock Prize was then formally presented to Ileana Chinnici, who presented a fascinating talk on the life and achievements of Angelo Secchi.



HAD membership, 2012–2020. The numbers represent total membership in all categories as of December 31st.

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Status Report on the Biographical Encyclopedia of Astronomers, 3rd edition

*Philip Nicholson, Cornell University, and
Jennifer Bartlett, USNO and Fellow, AAS*

The *Biographical Encyclopedia of Astronomers* is pleased to announce the editorial board for the third edition:

Editors in Chief

Philip Nicholson, Department of Astronomy,
Cornell University (USA)
Jennifer Bartlett, USNO and Fellow, American
Astronomical Society (USA)

Section Editors

BEAII article revisions — Virginia Trimble,
School of Physical Sciences, University
of California-Irvine (USA)
Pre-20th century omissions — Jordan Marché II,
Department of Astronomy, University of
Wisconsin Madison (USA)
Radio — Wayne Orchiston, University of
Southern Queensland, Australia
Infrared — Robert “Bob” Gehrz, Department of
Astronomy, University of Minnesota (USA)
Planetary — Joseph “Joe” Veverka, Department of
Astronomy, Cornell University (retired, USA)
Optical — Gerry Gilmore, Professor of
Experimental Philosophy, Institute of
Astronomy, University of Cambridge (UK)
Theory — Marc Lachièze-Rey, University of Paris
Diderot (France)
High-Energy — Ralph Wijers, Anton Pannekoek
Institute for Astronomy, University of
Amsterdam (Netherlands)

Consulting Editor

Thomas A. Hockey, Department of Earth Science,
University of Northern Iowa (USA)
Editor-in-Chief of BEA I and BEA II.

In addition, the IAU has formed a Project Group within Commission C3 (History of Astronomy) on

the *BEA*. Its mission will be to advise the editorial board for the 3rd edition by

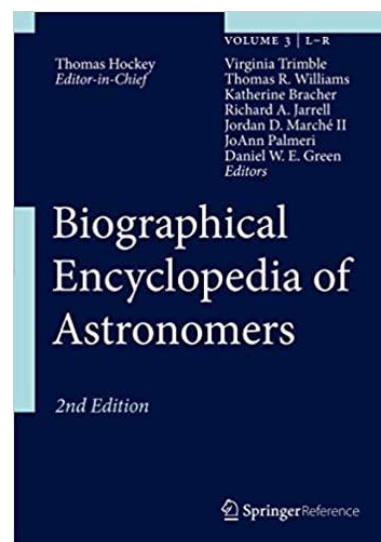
- reviewing existing biographies and proposed biographies, as requested
- identifying biographies that need revision or replacement
- proposing additional astronomers for inclusion
- recommending authors for specific assignments
- and by suggesting guidelines for inclusion and completeness

The membership of this group was chosen specifically to include representation from Eastern Europe, Asia, South America and Africa, in order to broaden the international coverage of *BEA III*.

The Third Edition will contain approximately 450 new articles, as well as revisions to existing articles where necessary. The new entries will fill gaps in the Second Edition and extend the coverage of the Encyclopedia from individuals born prior to 1920 through those born in 1950. New entries will include only individuals deceased for at least five years, although no existing articles will be deleted.

So far, over 1000 suggestions have been received from the community. Approximately 300 of these are pre-20th century, and 800 are still under consideration.

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Editor-in-Chief Tom Hockey won the Donald E. Osterbrock Book Prize for Historical Astronomy in 2017 for the second edition of the *Biographical Encyclopedia of Astronomers*.



Ruth Freitag Has Passed Away

Brenda Corbin, Librarian, U.S.N.O. (retired)

Ruth Steinmuller Freitag, born 1924 June 08, passed away on 2020 October 03 at the age of 96.

Ruth was a very active HAD member who joined our group in 1984 and remained a member until her health problems began in 2007. She attended most of our HAD meetings during these years. She also attended the Notre Dame History of Astronomy Workshops. Her meticulous lists, “Recent Publications Relating to the History of Astronomy” began publication in the *HAD News* in 1988 and continued until 2001. These lists are available at <https://had.aas.org/bibliographies/>. At the January 2006 HAD meeting in Washington, DC, Chair Don Yeomans presented Ruth with a special plaque from the Division thanking her for her years of preparing these bibliographies

An obituary of Ruth has recently been published in the *New York Times*, and may be accessed at <https://www.nytimes.com/2021/05/21/books/ruth-freitag-dead.html>. The remembrance of Ruth which appears below was published in the *Library of Congress Gazette* (v. 32 no. 16, April 23, 2021, p.5), a weekly publication for staff. We can all agree that Ruth had a very interesting career. This obituary is published by the permission of the author, Stephanie Marcus, Library of Congress.

OBITUARY: Ruth Freitag

Ruth S. Freitag, 96, who retired from the Library in 2006 after 55 years of federal service, passed away on Oct. 3 at Powhatan Nursing Home in Falls Church, Virginia, and was buried with military honors in Lancaster, Pennsylvania. She was a legend at the Library for her skills in bibliography and reference and was admired and respected by scholars, scientists and writers, including Carl Sagan and Isaac Asimov, who wrote a limerick for her.

Freitag grew up in Lancaster and graduated Phi Beta Kappa from Penn State. She began her federal career in 1945 when she enlisted in the Women’s Army Corps, serving three years in China. She then joined the Foreign Service and served as a communications specialist at the American embassy in London and later in Hong Kong. After two years there, she and her widowed mother traveled around the world, finally settling in California.

She earned a master’s degree in library science from the University of Southern California and came to the Library in 1959 as one of six special recruits. She spent 19 years in the Bibliography and Reference Correspondence Section before moving to the Office of Bibliography. A stickler for accuracy and good form, she compiled correspondence and bibliographical style manuals to ensure excellence and consistency and taught classes of special recruits and staff. In 1965, her bibliographic expertise and knowledge were instrumental in shaping the MARC (machine-readable cataloging) format. She joined the then Science and Technology Division as a senior science specialist in the 1980s.

Freitag became one of the Library’s foremost experts in reference work, known for her encyclopedic knowledge of resources in science and technology. She had a special interest in astronomy, compiling “Recent Publications Relating to the History of Astronomy” for the Historical Astronomy Division of the American Astronomical Society between 1988 and 2001. She spent her vacations in the British Library and at university observatories throughout Europe.



Ruth Steinmuller Freitag (1924–2020)

Freitag's other compilations include the "Star of Bethlehem: A List of References" (1979); the 3,235-entry bibliography "Halley's Comet" (1984); "Battle of the Centuries" (1995); and "Women in Astronomy: A Comprehensive Bibliography."

In their book "Comets," Carl Sagan and Ann Druyan wrote that encountering Freitag was one of the most pleasant experiences they had in writing it: "Ms. Freitag's knowledge, enthusiasm for her subject and willingness to share a treasury of comet illustrations speaks well of the nation's library."

"She was a walking encyclopedia," Constance Carter, the retired head of the Science Reference Section, said. "She lived in the collections and taught us how to mine those collections."

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Editor's Note: The AAS obituary for Ruth Freitag is at <https://baas.aas.org/pub/2021i0318/release/2>



AstroGen: A Call for Help

Joe Tenn, Sonoma State University

The Astronomy Genealogy Project (AstroGen) is seeking someone with both an interest in the history of astronomy and a reading knowledge of (mostly astronomical) Latin to bring more of the early astronomical theses into AstroGen. This will involve reading at least the titles of theses, obtaining more information about the theses and their authors and advisors, and determining whether they belong in AstroGen. The position is ideal for a person seeking a thesis topic in history of astronomy, a retired astronomer looking for something interesting to do, or, perhaps, you.

What if you don't know any Latin? We have other projects as well. Just ask.

AstroGen, a HAD project since 2013, now contains

information about more than 36,000 persons who either completed a doctorate with an astronomy-related thesis or advised one. It is available on the American Astronomical Society website at <https://astrogen.aas.org>. Check it out. Potential volunteers are encouraged to contact AstroGen Director Joe Tenn.

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Culturally Sensitive Sites

Steven Gullberg, University of Oklahoma

In November 2020 the International Astronomical Union's Working Group for Archaeoastronomy and Astronomy in Culture was tasked with leading a joint collaborative initiative with the Royal Astronomical Society of the United Kingdom, and this was joined by the American Astronomical Society. The initiative addresses cultural sensitivities at world astronomical sites. Goals of the effort include developing a program to better educate astronomers as to Indigenous concerns, developing materials that will provide insightful information to the public, and developing information that can be used proactively when future observatory sites are considered. Work is well underway, and the team plans to offer workshops in 2021 and 2022 at major astronomical events beginning with IAU CAP 2021 in May, AAS 238 in June, and the RAS NAM in July. This will be an ongoing project and presentations are anticipated at other astronomy events as well. AAS members presently serving on the joint committee are Steven Gullberg (Chair), Rick Fienberg, Jarita Holbrook, and Annette Lee. HAD Affiliate Members on the committee are Javier Mejuto and Wayne Orchiston. This joint initiative between the IAU, RAS, and AAS is exciting and the committee looks forward to seeing its efforts improve mutual understanding.

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Michelson Speed of Light Experimental Site Remembered

Jennifer Lynn Bartlett, Chair, WGAH

Completed in 2004, the [Center for High Angular Resolution Astronomy \(CHARA\)](#) interferometer is the latest instrument to take advantage of the excellent seeing at Mount Wilson. The 60" and 100" reflecting telescopes built by George Ellery Hale (1868–1938) in 1908 and 1917, respectively, stand on opposite sides of one of its arms. However, it is not the first interferometer operated on the mountain.

Albert A. Michelson (1852–1931) and Francis G. Pease (1881–1938) measured the diameter of Betelgeuse in 1920 using an interferometer mounted on the 100" reflector; it was the first stellar diameter measured, other than the solar diameter. Michelson was the first US scientist to win a Nobel Prize and Pease was a founding staff member of [Mount Wilson Observatory](#).

Starting in 1924 and continuing through Michelson's death, Michelson and Pease bounced a beam of light off a reflector located on Lookout Mountain, referred to as Mount San Antonio in Michelson's papers. From there, it returned to a rotating mirror on Mount Wilson. By measuring changes in the angle of light reflected by this mirror, they determined the velocity of light to within 1% of the currently accepted value. For them to do so, the U.S. Coast and Geodetic Survey (USCGS) had to measure the baseline of approximately 23 miles with an accuracy of about 3" inches over extremely rough terrain, which was an achievement of its own.

With the 100th anniversary of these speed of light experiments approaching, some astronomers have inquired about the state of Michelson's laboratory on Mount Wilson. While some of the geodetic markers remain from the baseline survey, most of the experimental infrastructure on Mount Wilson



Plaque commemorating Michelson experiments on Mount Wilson, 2012 (image courtesy Roger Sinnott)



Close up of Michelson commemorative plaque, c.2016. It reads: "On this pier in 1926 Albert Abraham Michelson measured the velocity of light by means of a beam of light transmitted to Mount San Antonio." (image courtesy of Thomas Meneghini)



Additional remains of Michelson experiment site on Mount Wilson, c. 2016. (image courtesy of Thomas Meneghini)

is gone. Mounted on the ground near the remains of the cast-concrete pillars that supported the rotating mirror, a plaque commemorates these experiments. At the other end, another plaque marks the base for the corner mirror.

However, close to our hearts an institution, instrument, or event may be, ultimately not everything can, or should, be preserved. In addition to Michelson's experiments, Mount Wilson Observatory has a rich history of contributions to our field. Using a succession of solar telescopes, George E. Hale (1868–1938) unraveled the magnetic nature of sunspots. Using the 100" telescope, Edwin P. Hubble (1889–1953) established that "spiral nebulae" were distinct galaxies rather than part of our Milky Way Galaxy. He also demonstrated a linear relationship between the distance to a galaxy and the rate at which it moves away from our own. In addition, Walter Baade (1893–1960) recognized two distinct stellar populations: Population I of bluer stars in the disk of spiral galaxies and Population II of redder stars in the halo and globular clusters. Now, Georgia State University's CHARA continues the mountain tradition of exploring stellar astrophysics with investigations of fundamental stellar properties and stellar surface features, such as spots. The Observatory also engages the visitors in rich variety of observing and educational opportunities.

As we think about how to balance progress and preservation, the Working Group on the Preservation of Astronomical Heritage (WPGAH) will explore establishing a mechanism by which the AAS may designate and celebrate sites of significance to our field. The American Physical Society (APS) has such a [Historic Sites Initiative](#). Among the sites APS recognizes are the [100" reflector on Mount Wilson used by Hubble and Baade](#) and the [Case Western Reserve University laboratory](#) that Michelson and Edward Morley (1838–1923) used in their 1887 experiment undermining the theory of luminiferous ether. Any thoughts you may have on this proposal would be welcome.

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Inter-Union Commission of History of Astronomy

Sara Schechner, Harvard University

The Inter-Union Commission of History of Astronomy (ICHA) is a joint commission of the International Union of History and Philosophy of Science and Technology (IUHPST) / Division of History of Science and Technology and the International Astronomical Union (IAU). ICHA receives financial support from the IUHPST and makes its home base in that Union. Its connection to the IAU is through Commission C3 (History of Astronomy).

ICHA will meet during the upcoming 26th International Congress of History of Science and Technology (26th ICHST), which will be held 2021 July 25-31 (now virtually) in Prague, Czech Republic. Those interested in the history of astronomy and astrophysics are encouraged to check out the sessions organized by ICHA and the other Commissions (some details are below). The Congress program and registration instructions will be found at <https://www.ichst2021.org/>. No formal membership is required to attend the Prague Congress or most of the subsidiary meetings, but registration is required.

Grants for Early Career Scholars

The ICHA is pleased to announce that it has secured modest funds to help defray meeting costs for early career scholars wishing to attend the Prague Congress or other meetings relevant to the history of astronomy. Preference will be given to those presenting a paper or poster at the meeting. If you wish to apply for a grant, please send an application email to Sara Schechner, Secretary of ICHA (schechn@fas.harvard.edu) describing the meeting you wish to attend and your role in it. The application process will be managed by the Organizing Committee of IAU Commission C3. *We will begin to review applications for 2021 on April 20* in order to enable applicants to take

advantage of the early registration discount for the Prague Congress.

Symposium on “Art, Image, and Astronomical Knowledge”

ICHA and the Commission on the History of Ancient and Medieval Astronomy (CHAMA) are jointly sponsoring a symposium at the Prague Congress on the theme of *Art, Image, and Astronomical Knowledge*. It will address the question whether stand-alone images found in art (paintings, drawings, woodcuts, etchings, rock art, etc.) can serve as reliable and quantifiable evidence for explicating past observations of natural phenomena such as sunspots, solar eclipses, aurorae, comets, constellations, and crucial aspects of the Earth’s past climate. Speakers will compare knowledge acquired by images (paintings, rock art) with knowledge acquired by words (descriptions, reports), by empirical methods (experiment, measurement, observation) and by formulas (theory, computer models). Examples will range from the ancient and medieval world up to modern times and represent many cultures and geographic places. A preliminary list of papers follows.

ORGANIZERS—Sara J. Schechner (Harvard University) and Shi Yunli (University of Science and Technology of China)

SESSIONS

Transients and Comets

Richard G. Strom (ASTRON & University of Amsterdam), “What can Neolithic imagery convey about bright stellar transients?”

Anna Jerratsch (Max Planck Institute for History of Science), “The Many Face(t)s of Comets in Early Modernity.”

John Drummond and Wayne Orchiston (University of Southern Queensland), “Mount Taranaki, the Great Comet of 1882, and the Genesis of Cometary Photography in New Zealand.”

Constellations

Katie Boyce-Jacino (Arizona State University), “Star Atlas: Ancient Astronomy in the Planetarium.”

Christiaan Sterken (University of Brussels), “Some Thoughts on Stellar Constellations in Rock Art.”

Susanne M. Hoffman (Independent scholar), “Reconstruction of Historical Constellations.”

Stamatina Mastorakou (University of Zurich), “The Hellenistic constellations through Words and Images.”

Art in General

David DeVorkin (Smithsonian Institution), “Well then, who dug ‘them’ canals on Mars?”

Huichih Chuang (Jiangsu Normal University), “Re-discussion about the Two Celestial Images Unearthed in Nara, Japan.”

Rosalind Park (Independent scholar), “Art and Astronomical Knowledge at Dendera in the 1st Century BCE.”

Related to Horoscopes or Astrology

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Irina Vavilova (Main Astronomical Observatory of the NAS of Ukraine), “Archaeoastronomical Culture of the Ancestors Dated to the Paleolithic Times at the Territory of Modern Ukraine.”

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Dorothy Michelson Livingston: Reminiscences

H.J. Haubold, United Nations (Vienna, Austria)

In April 2021 Hans Haubold (United Nations, Vienna) and Barbara Haubold (International Atomic Energy Agency, Vienna) would like to recall that international celebrations have been held forty years ago in 1981 in Potsdam, Germany, at the Centenary of Albert Abraham Michelson's first aether drift experiment performed in Potsdam in 1881. Dorothy Michelson Livingston (1906-1994), daughter of the first American Nobel Prize winner in physics (1907), is the author of the only existing biography of her father (issued in Kindle format in 2021) and chief guest lecturer at the 1981 celebrations in Potsdam¹ and in 1987 at the Centenary of the Michelson-Morley experiment in Cleveland, Ohio².

We remember with deep appreciation our cooperation with Dorothy Michelson from 1978 to 1994 and her husband Goodhue Livingston (1897-1994) in preparing the Einstein Centenary in 1979 in Berlin and the two Michelson Centenaries 1981 and 1987.

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Dorothy Michelson Livingston, daughter of Albert Michelson, giving the keynote address in Potsdam in 1981.

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¹http://leibnizsozietat.de/wp-content/uploads/2016/03/HJH_BH2016_Michelson-Experiment-002.pdf

²<https://digital.case.edu/islandora/object/ksl%3A2006061209>



Vera Rubin – Discovering Her Life Story

Jacqueline Mitton, Total Astronomy (Cambridge, UK)

The first biography of Vera Rubin, by Jacqueline Mitton and Simon Mitton, was published in the USA on February 11, 2021 (March 26 in the rest of the world) by Harvard University Press under the Belknap Press imprint.

Jacqueline reflects for HAD News on the writing of the book.

Vera Rubin recently joined that select band of astronomical luminaries who have major observatories named in their honor. What used to be the Large Synoptic Survey Telescope (LSST) project is now the Vera C. Rubin Observatory and, imaginatively, the acronym LSST stands for “Legacy Survey of Space and Time.” Congress took little persuading that Rubin had been an outstanding figure in astronomical science in the second half of the 20th century. She was indeed a remarkable individual who made significant contributions to science and society but, as is often the case with celebrities, some mythology has developed alongside reality.

The “Mother of Dark Matter”

The headline writers reporting her passing in December 2016 clearly found it a challenge to formulate the right words and their efforts served to expose the most widely circulating myths and misunderstandings. They grasped the two main themes with which she is identified: an important

contribution to the saga of dark matter and her prominent advocacy for women in science. However, on the precise nature of her role in the unfolding mystery of dark matter, there was no factual consensus. For *The Washington Post* she was the “astronomer who proved the existence of dark matter” while *The Times of London* declared that she “provided the first confirmation of the existence of dark matter”. Neither statement is true. *Sky & Telescope* ducked the issue by touchingly describing her as the “mother of dark matter.” It was clear to us as biographers that putting the record straight had to be part of telling her life story. It does no favors to the reputation of a major figure such as Rubin to credit her with things she didn’t do, and not to be clear about what she did achieve.

Rich Resources

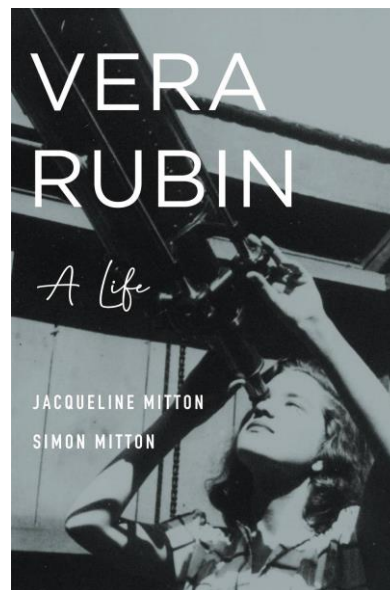
Our initial reaction to the prospect of researching and writing the biography, was that it would be an interesting and exciting project to work on – an opportunity not to be missed. That proved to be correct. As we progressed with the research, we quickly discovered that there was an even more fascinating story to tell than we had imagined. Rich contemporaneous material is preserved in the correspondence and other documents she meticulously saved throughout her life and ultimately bequeathed to historians in the form of the Vera C. Rubin Collection in the archives of the Library of Congress. It was our privilege to be the first scholars to have access to the collection, only half of which had been processed and catalogued when we made our first research trip to Washington in April 2018.

Rubin recorded four major oral history interviews between 1989 and 2007, which were transcribed and are freely accessible on the web site of the Niels Bohr Library & Archives of the American Institute of Physics. The excellent interviews by David DeVorkin conducted in 1995 and 1996 are particularly important as sources of detail about the period before she started keeping files – her childhood in Philadelphia and Washington, and her early life up to the completion of her doctorate in 1954. Rubin also wrote an autobiographical memoir, which appeared in *Annual Reviews of Astronomy and Astrophysics* in 2011. The Rubin family shared with us yet more material, including a fascinating recording Vera made of her father telling his life story at length: how when he was seven years old his parents had fled to the United States to escape the persecution of Jewish people

in the Russian empire, and his struggles to bring up his own family during the Great Depression of the 1930s.



Vera Rubin eyeing up a spectrum in the 1970s (date unknown). *Vera Rubin, A Life* is available from Harvard University Press (ISBN 978-0674919198)



Comparing the story we gleaned from the archived documents with Rubin’s recollections decades later, was an important lesson in what oral histories can tell us and what they may not. It is not only that memories fade; with the passage of time people view their earlier lives in light of what has happened subsequently. All of us may choose, consciously or subconsciously, to forget about certain subjects. The answers we give to questions at the time of an interview reflects how we feel then – which is of itself revealing – but only the contemporaneous documents capture how things really were at the time. The purpose and skill of an interviewer make a difference too.

An Unconventional Career

After thinking about how best to structure the book, we settled for a judicious mixture of the chronological and the thematic, given that Rubin's career was, in her own words "unconventional." Rubin's path to scientific celebrity was indeed unusual – in some ways seeming almost improbable. But that is not to reckon with her character. Having decided in her teens that she wanted to be an astronomer, nothing was going to stop her. She described herself as incapable of stopping and couldn't imagine a life without astronomy. She certainly struggled to establish a career path for many years but ultimately there came a pivotal moment when she had the confidence to take control of her professional life and pursue her real ambitions, while never losing sight of the priority she and her husband Bob placed on family life.

Home was Washington from 1951. Georgetown University was the only place she could study for a PhD in astronomy and it was the only place she could find astronomical employment of any kind afterwards. She was already 36 years old when in late 1964 she decided she had to do something radical to have any chance of a more satisfying career. She had spent the academic year 1963–1964 working with the Burbidges in La Jolla while Bob held a fellowship there and it changed her outlook. She had experienced her first tastes of independent professional observing (at Kitt Peak) and had known immediately that observing was for her. Her confidence had been boosted further by Allan Sandage inviting her to apply for observing time at Palomar – as the first woman to be officially permitted to do so.

Luck was on Rubin's side. She didn't know when she resigned her assistant professorship at Georgetown and presented herself at the Carnegie Institution's Department of Terrestrial Magnetism (DTM) in early 1965 asking for a job, that there might actually be the first ever opening there for an optical astronomer. But there was – working in collaboration with instrumental physicist W. Kent Ford Jr., architect of the brand new Carnegie image tube spectrograph.

The Accomplished Observer

Galaxies had long been Rubin's main interest, especially their internal dynamics. This interest had been reinforced by her experience with the Burbidges and, with some diversions, she and Ford spent much of her first 20 years at DTM on

programs to systematically investigate the properties of spiral galaxies, taking advantage of the gain in light collecting power offered by the image tube spectrographs. The life-style appealed to Rubin. She was in control. She could decide her own programs. She could spend many weeks a year observing. Above all, she avoided the competitiveness of jumping on the latest "bandwagon."

Rubin was a meticulous and highly skilled observational astronomer. She worked incredibly hard and loved every minute of it. One of the first programs she and Kent Ford undertook was to investigate the dynamics of the Andromeda Galaxy, M31 by taking spectra of individual emission nebulae. Their classic study, published in 1970, confirmed what radio astronomers had already begun to discover: the speed of rotation of the galaxy remained constant at large distances from the galactic center, when the conventional wisdom was to expect a gradual decline. Put succinctly, the rotation curve was flat. It was a curiosity, but few people were turning their minds to what it might mean. For Rubin and Ford, interpretation was a matter for others to debate. Their concern was only that their observations were reliable.

Through the later 1970s, Rubin pursued an observing program she carefully constructed to study the dynamical properties of the stars and luminous gas in spiral galaxies. Fifty years ago, relatively little was known about individual galaxies – even basic data such as their masses – and Rubin believed a systematic study could throw light on why spirals have such a variety of forms and how they evolve. She and Ford had the advantage of the image tube spectrograph and no other optical astronomers were attempting anything like it. Radio astronomers were already improving and extending surveys of neutral hydrogen in galaxies, and producing rotation curves, but the optical work was complimentary in nature and, whether determined by radio or optical means, rotation curves were mostly flat.

"Non-luminous matter exists"

While this observational work was going on, the significance of flat rotation curves was becoming clearer. In 1973, Jeremiah Ostriker and James Peebles pointed out that the disc of a spiral galaxy could be stable only if the whole galaxy were surrounded by a massive spherical halo of unseen matter. The following year, with Amos Yahil, they

considered the consequences for the mass of the universe as a whole and what observational evidence existed – or might be uncovered – for the nature of such massive halos.

Through the later 1970s and into the early 1980s, Rubin acknowledged in her papers, almost in passing, that one of the products of her systematic analysis of galaxy dynamics – the flat rotation curves – led to the inescapable conclusion that “non-luminous matter exists beyond the optical galaxy”. Her focus remained firmly on comparing the properties of different types of spiral galaxies. Others, however, who were seriously trying to get to grips with the unfolding revelations about “dark matter” were influenced by the dozens of rotation curves published in her series of papers, which, almost without exception, were flat. With her scientific reputation firmly established, her strong personality and sheer determination, Rubin was able to wield influence within the astronomical community and especially in advocating for the equal treatment of women.

The Woman of Many Parts

Rubin never compartmentalized her own life: she loved her science and her family equally. They

were inseparable parts of her existence. She loved nature, discovering the world, and helping other people. And she thrived in the ambiance and ethos of DTM (now incorporated into Carnegie Science’s Earth and Planets Laboratory). As biographers, we wanted to tease out all these interwoven threads and to make sense of them, but also to bring them together into the colorful fabric that was her inspirational life story.

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Links:

Information about *Vera Rubin: A Life* by Jacqueline Mitton and Simon Mitton, from Harvard University Press:

<https://www.hup.harvard.edu/catalog.php?isbn=9780674919198>

Webinar: *Vera Rubin: the life and legacy of a remarkable astronomer*, given by Jacqueline on March 11, 2021 for the Society for the History of Astronomy
<https://youtu.be/gEZx9wGgVY0>

Review in *Science* magazine:

<https://blogs.sciencemag.org/books/2021/02/17/vera-rubin-a-life/>



The Vera C. Rubin Observatory, formerly the Large Synoptic Survey Telescope, is currently under construction in Cerro Pachon, Chile. The facility is expected to begin operation in 2022.



Charles John Agnew Trimble: Life-Long Friend to Sir Arthur Stanley Eddington

Virginia Trimble, UC Irvine

The first thing to be said is that I am not a descendent of his (like Eddington, he never married), nor a traceable relative. My Trimble ancestor was another John (like CJAT's father) who, with three brothers, crossed the Atlantic from Antrim, Northern Ireland to Pennsylvania Colony some time before 1753. He moved on to Augusta County (Colony of Virginia) in time for his son, James, to be born there in 1753 and for John to be killed by Wyandotte Indians in 1763, the last example of this sort of death in Augusta County. Onward to Ohio, where James's son Allen (1783-1870) became the 8th and 10th governor of the relatively new state.¹

Nevertheless, when one starts to write about someone (Eddington in this case) and learns quite unexpectedly that his best friend shared one's surname, one cannot help but be curious! A second minor point is that someone, somewhere typed Agnes for Agnew, the mistake propagated, and it left me thinking for a while that such a middle name would have been a considerable burden for a lad in a boys' school. A reasonable guess would be that Agnew was his mother's birth surname. Why haven't I looked harder in parish or census records? It is a fact of the Google era that, if you try to find out about someone who shares your surname, you will find yourself quickly grabbed by Ancestry.com and the like, and find it very difficult to free yourself.

Trimble apparently did not enter much into Eddington's astronomical life in the early 1920s, because he does not appear either in Cecilia Payne (later Gaposchkin)'s autobiography² or in Donovan Moore's biography of her³. The Trimble in his index is me, just to make it more difficult. But

CJAT was well known to Eddington's sister Winifred, and she had asked him to write the biography eventually produced by Allie Vibert Douglas⁴, who dedicated it "To Arthur Stanley Eddington's Friend, C.J.A. Trimble."

A proper birth-to-death chronology of CJAT begins in a few sentences, but a sad vignette first. He suffered a nervous breakdown in June 1933 and was absent from work thereafter, eventually being retired and paid off through 30 April 1934.^{5,6} I have seen several lists of Eddington's publications, no two the same, and thus none complete, but each seems to have a relative minimum in numbers of papers published in 1933-34, suggesting a causal connection.

Sources for the following material include, in addition to ⁵ and ⁶, a 1921 Handbook of Public Schools (in the British sense), a 1907 Civil Service Commission Report, bits of the 1891, 1911, and 1939 UK census reports, two appreciations published in "The Blue" (Christ's Hospital student magazine) for September, 1958, by E.W.B. Clarke, OB*, O.B.E**, and by E.T.E.[§] (who was CJAT's contemporary at Trinity College, Cambridge); a letter from CJAT to *The Observatory* magazine, dated 1952 July 21, appearing in the October 1952 issue, page 209, and asking for correspondence and personal reminiscences for a biography of Sir Arthur Eddington; and a few other starry websites that popped up briefly and vanished again. I cannot vouch for the truth of every morsel that follows here, but it seems to be more about C.J.A. Trimble than has appeared anywhere else together.

Charles John Agnew Trimble was born 27 December 1883, son of John Trimble of Somerset, and was admitted to the charity school Christ's Hospital on 26 May 1896, from Walcot (now described as a suburb of Bath) Somerset. Notice that his birthdate is just a year minus a day after that of Eddington (28 December 1882).

Eddington grew up in Weston-Super-Mare, which is also Somerset territory, so they shared both a home county and a birthday that made getting a present separate from Christmas ones unlikely, even if either family had been able to afford such extravagances. Allie Vibert Douglas was also a December baby of a decade later, who, like Eddington, lost her father very early. My guess is

*Order of the Bath

**Order of the British Empire

§Author identified only by initials

that Agnew was CJAT's mother's birth surname, John came from his father, and there was an Uncle or Godfather to be honored.

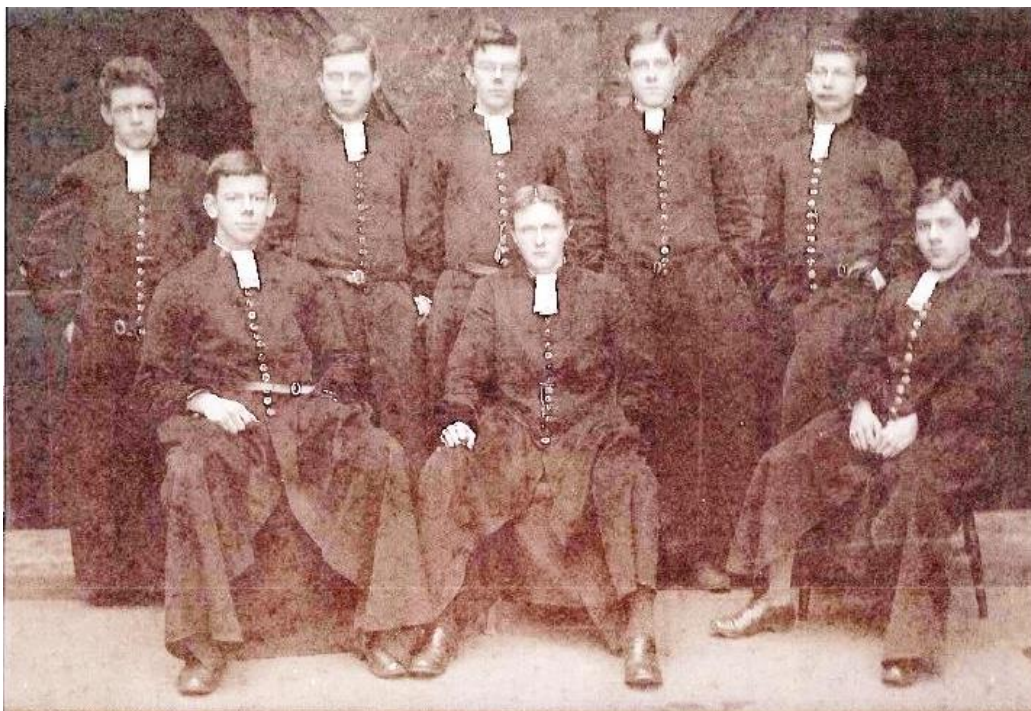
Christ's Hospital is a charitable school (yes, I've made a modest contribution), founded in 1553 under Edward VI (son of Henry VIII), initially to provide care more than schooling for poor and orphaned children. The Royal Mathematical School was added under Letters Patent of 1673 August 21 of Charles II (first called the New Royal Foundation) to train young men for the royal navy and merchant marine. It was co-educational from quite early, though the girls were often housed at a different location from the young men. The school uniform, for both genders, was and is a sort of vivid blue cloak, the "blue coat" being mentioned in the Letters Patent.

Trimble was admitted 29 May 1896 (at age 12, typical for that sort of thing, there and then), while the school was located at Newgate Street, London. He moved with it to Horsham, Sussex in May 1902. Christ's Hospital in those days had two sorts of (male) students, those in the Royal Mathematical School, who were supposed upon leaving to accept a seven-year apprenticeship on board one of His Majesty's ships (this gradually became quite unpopular, so that there was difficulty in filling the prescribed number of slots on board) and the Grecians, studying classics, etc.,

in hopes of admission to the University of Oxford or Cambridge.

CJAT was a Grecian (see the figure below) and a good student, winning the Thompson Medal for the boy most proficient in mathematics in 1901. The stay in Sussex was brief, Trimble being "preferred to" (accepted by) Trinity College, Cambridge in August, 1902. He thus began his studies there at the same time as Eddington (who had, however, already received a degree, a first class in physics, from the University of Manchester). There they met and bonded, and whether the relationship was ever in any way sexual is one of those questions (like who got Shakespeare's best bed) to which we are unlikely ever to have an answer. Eddington resided outside the college his first two years, in Bishop's Hostel, before moving into the Great Court of Trinity, and it would be interesting to know where Trimble was living those years. But the Trinity College archivist is currently not available.

Eddington sat the mathematics tripos exam a year early, becoming the first-ever second-year senior wrangler. Trimble became fourth wrangler the next year, and both received 1905 degrees. CJAT earned a first class in Part I of the Natural Science Tripos in 1906, and held a scholarship in Sacred Music in 1903, as well as a Foundation Scholarship in mathematics.



The Class of 1902 at Christ's Hospital. C.J.A. Trimble is seated at right in the front row.

Trimble then sat for the 1907 examination for the Higher Civil Service, ranking 14th on overall score, out of 210 competitors. One other Christ's Hospital Old Blue, G.W. Wood, ranked 6th and was assigned to the post office. Trimble's initial assignment was to the Admiralty, but he was later with the post office, until returning to Christ's Hospital in January 1910 as their most junior mathematics master. Something of the social ranking of those 210 can be gleaned from their schools and colleges. Very many had come out of Cambridge and Oxford, though there were a few each from St. Andrews, Imperial College Dublin, Manchester, Glasgow, Edinburgh, Aberdeen, Bombay, and Calcutta, those last because the Indian Civil Service drew from the same pool of examinees. Their schools included Eton, Rugby, Dulwich, Perse (Cambridge), and St. Paul's (the boys' counterpart of the St. Paul's Girls School, attended by Cecilia Payne, roughly 15 years after the 1907 civil service crop). The civil service years presumably put Trimble in London, where, according to Matthew Stanley⁷, he stayed with Eddington on several occasions.

But in January 1910 he returned to Christ's Hospital as a 2nd grade mathematics master at a salary of 300 pounds (or maybe 350) a year, rising gradually until he became a senior mathematics master. Trimble was promoted to Master of the Royal Mathematical School in 1919. His immediate predecessor, George William Palmer, had died in office, apparently of overwork and other nervous strain. My own thought is that educating intelligent young men, knowing that you were sending them off to be sunk with their ships, cannot have been an easy thing to do (Christ's Hospital lost former students in both World Wars). Palmer's predecessor, James Arnard, had retired in 1911, with a final salary of 650 pounds per year. His annual pension was to be 350 pounds. Trimble became House Master of Thornton A (named for a benefactor) in September, 1921. The students, all men, seem also to have all been all light-skinned. Indian students earned degrees from Oxford and Cambridge, but were not often schooled in England.

David Evans⁸ wrote of Trimble having performed some sort of war service. The source of this information is not obvious, but if it is true, it cannot have pleased Eddington, who was engaged in a major struggle to avoid national service, even in an ambulance corps. CH is today an actively religious school, with Anglican services, a chapel

choir, and so forth. This must have been the tradition surrounding Trimble in the same years that Eddington was surrounded by Quaker people and ideas. In any case, their practice of engaging in long and strenuous hikes, climbs, cycling expeditions, and other holidays continued.

So, what was Trimble doing at Christ's Hospital besides teaching (at which he was very good, according to a short autobiography by mathematician Taylor Douglas Northcott, who was at Christ's Hospital from 1925) and frivolling with ASE?

He was writing textbooks with a Christ's Hospital colleague, Thomas Schrivan Underwood, an engineering master and head of the manual training department at CH. The 1921 public school handbook lists Trimble as one of eight mathematics masters and Usherwood as one of two engineering masters, with a BSc from London. Earlier, Usherwood had written⁹ what he meant by manual training. His group of instructors included an engineer, a carpenter, a builder, a smith, and a joiner. Students could build rabbit hutches, chicken coops, and dog kennels, and apparently found this one of the pleasanter parts of their education. Not much later, my father attended (1927-30) what was called Manual Arts High School in Los Angeles, and indeed the boys had classes in wood shop, electric shop, and metal shop (while the girls studied cooking and sewing, as well as French and Spanish). My mother was a student there, 1930-33.

The books began with T.S. Usherwood and C.J.A. Trimble, *First Book of Practical Mathematics*¹⁰. My copy is a facsimile, issued because the "work has been selected by scholars as being culturally important." It begins by explaining the meaning of the plus sign, but has algebraic notation from the beginning, and has both worked examples and exercises dealing with every-day situations, like turning numbers into percentages for the men, women, and children at a particular factory and the angular velocity of a carriage wheel of given size, moving at 16 mph. The book ends with averages, percentages, ratio, and proportion, plus areas and volumes of simple geometric figures in two and three dimensions.

Next came *Practical Mathematics for Technical Students*, which I have not seen. It sold for 3s 6p, while the "First" book was only 1s 6p. My copy of *Practical Mathematics Part II*¹¹ was claimed by the seller as a first printing of the first edition (no dust jacket and the binding a bit feeble). But I was

interested only in the contents, which are really rather spectacular. They begin with vector analysis, on to trigonometry, differentials and integrals, partial differentials and differential equations, harmonic analysis with Fourier's theorem. Some attention is given to errors, but not to statistics, a failing found to this day in many mathematical texts and courses. But a thorough understanding of the contents would, I think, have met the authors' goal: to enable students to deal with practical engineering problems, without requiring them to unlearn anything in order to read formal treatises on Higher Mathematics. They thank Oliver Heaviside, whose work, they say, had influenced theirs.

The authors' August 1913 preface to the *First Book* thanks Prof. R.A. Gregory and Mr. A.T. Simmons "for valuable assistance given them during the preparation of the text and its passage through the press." The March 1916 preface to Book II again thanks Gregory and Simmons, but also says: "The authors are greatly indebted to Prof. A.S. Eddington, F.R.S., and to Dr. Faber for many valuable suggestions and help in reading the proofs." Surely greater like hath no man than that he would help a friend in reading the proofs of a very dense and technical mathematics text! Other books in the Macmillan Applied Mathematics series were written by Heinrich Hertz (the only one in translation), L. Silberstein (of whom Vibert Douglas thought very highly, but who ranks among the marginal cranks of Hubble's Law today, because he tried to include the negative velocities of globular clusters as well as the positive ones of spiral nebulae), Prof. P.G. Tait (Kelvin's good friend), and an assortment of other FRSs, including E.J. Routh (who had an operator).

Trimble was only 49 when he left Christ's Hospital, and he lived for another 25 years, dying in April, 1958. What was he doing in that quarter century? There were later editions of the books, but mostly he was teaching and tutoring mathematics privately. The 1939 census puts him in Nottinghamshire, which is what E.T.E.¹² remembered. Eddington died in 1944, CJAT having visited him not long before and not seeing any evidence of his being extremely ill or in pain. It was a few years before ASE's sister, Winifred, asked Trimble to write a definitive, authorized biography. He started on this, intending all along to ask Allie Vibert Douglas for help with the technical astronomy parts, though in the end she took over his notes and other materials that have

not come down to us and wrote the biography⁴. The 1952 letter¹² asking for reminiscences and written material for the biography came from Lincoln, and another official document says Trimble died in Lincolnshire, an enigmatic and shape-shifting figure to the last!

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Some Astronomical Artwork

Jessica Gullberg, Independent Artist

My husband, Steven Gullberg, asked me to share a few thoughts about my work with astronomical art. I paint in watercolor and have done hundreds of commissioned portraits of dogs, cats, and horses. I also have painted landscapes of scenes nearby the international conferences that Steve and I have attended. I wanted to paint astronomical works for him, and this has opened an additional direction for my artistic passions. I began by painting the M83 Southern Pinwheel Galaxy, later added the M20 Trifid Nebula, and have done many others.

My art appears on the covers of four books and a fifth is in the planning stages. I helped Steve illustrate his recent book, *Astronomy of the Inca Empire: Use and Significance of the Sun and the Night Sky* with this painting I call “Night Sky at Machu Picchu,” and as well with thirty other paintings, drawings, and maps that I created.

One of my paintings will appear in an article which will appear in the August issue of *Sky & Telescope*. Another exciting project I’m working on is painting cultural images for constellations which will be used in the Stellarium planetarium software. I’m creating figures envisioned by the Babylonians in the night sky; later I will continue with images from other cultures.

Astronomical art is fascinating and painting it is very fulfilling. I plan to do much more!

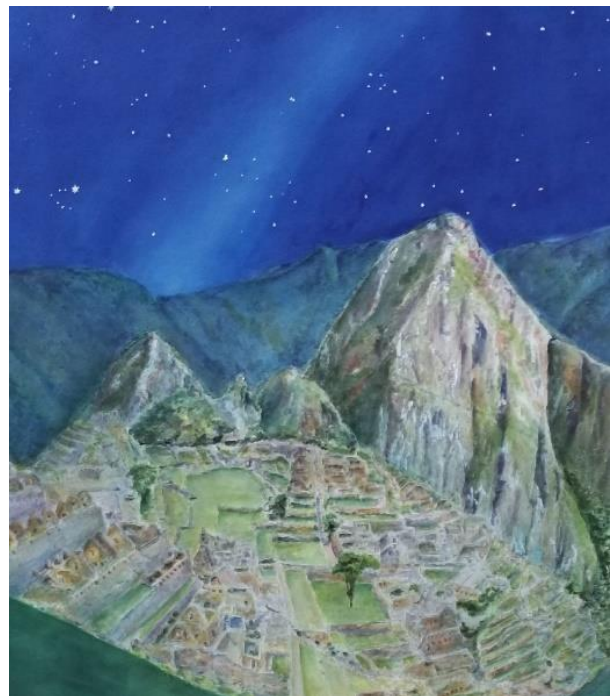
gullberg439@earthlink.net



M83, the Southern Pinwheel Galaxy



M20, the Trifid Nebula



“Night Sky at Machu Picchu”

Watercolor paintings by Jessica Gullberg



When History of Astronomy Comes to Your Front Door

Thomas Hockey, University of Northern Iowa

On 28 June 2004, the United States Nautical Almanac Office [NAO] arrived at my landlocked doorstep. (It is no longer called the NAO, but that is what it is.) It did so in the person of the office's chief, Alan Fiala (1942-2010). Fiala was an intellectual descendant of Simon Newcomb (1835-1909), famous to everybody in the AAS. Like Newcomb, he spent his career between the United States Naval Observatory and the NAO.

Did I know that my very neighborhood had played a role a total eclipse of the Sun? I did not.

Fiala was his organization's eclipse expert. All told, he organized ten solar-eclipse expeditions. However, his goal on that particular day was to use the total-eclipse shadow size from long ago to determine if the Sun's physical diameter was changing. Fiala was confined, at the time, to a wheelchair by childhood polio. Nevertheless, he had crossed the states of Kentucky, Illinois, and Iowa in his quest. In Iowa, he had visited Marion, Mechanicsville, Stanwood, and Red Oak.

As a United States Coast Survey project, residents of Cedar Falls were especially encouraged to attempt determination of the 1869 total-eclipse path's northern limit. They agreed. The Coast Survey then measured the geographical coordinates of the observers, and those of another targeted group of volunteers near Saint Louis, at the southern limit. It did so with the greatest precision available at the time, later that year.

Now Fiala was in Cedar Falls. The result was an entertaining day driving about town, in search of the exact spots from which path edge timings had been made. We used the then-new technique of Geographic Position System [GPS] measurements. It was not a simple undertaking. The geographical

descriptions from 7 August 1869 no long fit the layout of this small, modern, Midwestern city.

Once Fiala had to depart, I took up the search. Four different eclipse-timing stations had been manned by the enthusiastic citizens of 1869 Cedar Falls, thus setting a record for response to government requests for observers on the limit of totality's path.

J. H. Stanley operated a retail store in downtown Cedar Falls, at the corner of Main and Second Streets. In a community where storefronts often exhibit plaques claiming provenance of their antiquity and ownership over the years, Stanley's former shop is not among them. The structure has not survived, as brick-and-mortar replaced wooden buildings. We do not know what Stanley normally sold, but can imagine a combination haberdasher and hardware merchant who would supply the odds and ends of life close to the frontier. That season, the hot items were filters with which to peep at the Sun.

The afternoon of the total eclipse of the Sun, Stanley took a break from selling his goods to step outside and cross the street, in order to get a better view. Perhaps the facing lot was vacant. Perhaps the buildings of the day were not tall enough to obscure the view of many objects in the sky. It helped that it was early afternoon in the summer; the Sun was high. Wanting to be part of something somehow bigger than day-to-day life, here he waited to watch and time the total eclipse.

E. W. Horr was the son of Asa Horr, an astronomically-inclined physician in Dubuque with his own observatory. The younger Horr and others spent eclipse day in the cupola of the Civil War Orphans' Home. It was a fine perch from which to watch for the umbral edge.

The building was so new that fabrication was not entirely complete. Photographs show it to be a lovely piece of architecture; alas, it burned down in 1965 (faulty wiring). However, in 1869, the eclipse observers could climb high enough in the edifice to look out the window and note that, while they were under the total eclipse's umbra, trees could be seen illuminated by sunlight north of them: in the vicinity of Janesville, ten miles distant.

One can still find the small hill west of town on the acme of which we can imagine William Anderson, a former county surveyor and Justice of the Peace, pacing, awaiting the big event. Then, it

would have been accessible by horseback. Now, it is surrounded by streets of a housing subdivision.

Dempsey Overman was one of the movers and shakers of early Cedar Falls. Just two-and-a-half months before the total eclipse of the Sun, he bought land for a new house three blocks from one to be built fifty-years later; the latter would eventually become my home. About a mile from the Orphan's Home, the Overman house was purportedly the tallest in the county. From its top the owner and others observed and reported upon the total eclipse.

It was Overman who characterized the total eclipse of the Sun, as seen in Cedar Falls, thusly:

... stars peeping out, with the sun entirely hid, with the beautiful, faint crown of light apparently surrounding the moon, with the faint streaks like jets of flame are [sic.] seen protruding from the edge... it cannot be described, and I will not attempt it further. (Overman, D.C., Cedar Falls, Iowa, Gazette, 13 August, 1869)

But where absolutely was the Overman house? Was it even fully constructed by 7 August, in a period of only ninety days? The county auditing plats indicated to Fiala that the deed of the property on Twelfth Street had gone through many hands since. Overman's actual home is nonexistant; Fiala narrowed its location to that of a more-modern one on a large lot, the kind one would expect Overman to have procured. There, we were confronted by an ill-tempered dog and a homeowner who said, "I advise you to not come any closer." Fiala took his GPS measurements from the safety of his car.

I doubt that Fiala foresaw such adventures when he became a PhD. astronomer. I may be wrong. His attempt to obtain time variation in the solar diameter established a null result within the precision of his measurements.

Years later, I was channeling a total eclipse of the Sun. On the afternoon of 7 August 2019, I stood across the street from what was once J. H. Stanley's store, on the 1869 event's sesquicentennial. The sky was clear.

I imagined my neighbor (in space, if not time) holding a white-faced stopwatch accurate to half a second. In my mind, it was pulled from a vest pocket; the pleasant weather obviated the need for his overcoat. Earlier, at noon, the timepiece had been set by use of telegraph signals transmitted from by an operator consulting a master clock in

the 'big' city to the east, Dubuque. Stanley held a segment of colored glass in the other hand. He also had with him a lantern: While still long before summer's late sunset, it was about to get dark.

Stanley managed to memorize the two solar-eclipse contacts corresponding to the onset of total obscuration of the Sun by the Moon and its end. He would record these times for posterity shortly. In between, he beheld the marvel taking place above.

In an era when public life took place outdoors more so than it does today, passersby stopped to take a look at the total eclipse of the Sun, too. It was probably quiet, except, perhaps, for the noise associated with the construction of the new stone railroad depot nearby (the only building Stanley would recognize today). When the rare spectacle was over, they might have wondered how such a show—one that likely would become a life-long memory--could have taken place so quickly. Had they held their breaths?

And what would all those who witnessed the August 1869 total eclipse of the Sun have thought, if they had somehow learned that the celestial body casting its shadow on them would be visited by men more-or-less exactly a century-and-a-half forward in time?

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<p>GAZETTE. FALLS, IOWA. AUGUST 13, 1869. Department. <small>Those marked with an X that their time has expired.</small> Ten and fifteen cent They look tempting. NATIONALIST CHURCH— Meeting on Sabbath next. G.—Rev. J. Stebbins in Mullarky Hall on Monday, 15th inst. S.—A number of stran- gers in town last Saturday for viewing the eclipse. —Rev. W. Cochran will Lecture from his maps Biblical Geography, at Mullarky at 3 o'clock P. M. All are invited. GEO.—Geo. Eberhart has news depot of this city at Hazlett, as announc- ed. George is a stirring and will make it win.</p>	<p>THE TOTAL ECLIPSE — Its Appearance in Cedar Falls. — Government Observations. — Report of the Party, &c., &c. — It is not often that an opportunity is offered to witness so wonderful an exhibition of nature as the eclipse of Saturday last. Those who witnessed this extraordinary spectacle intelligently, will never forget its impression. It excites the most lively feelings of awe and wonder, and a breathless intensity takes possession of one as he gazes upon this grand movement in the heavens. The sight certainly gives one, a clearer view of the infinite majesty and power of the Great Being, and seems to speak directly to us of His greatness. The day was favorable, the forenoon was slightly hazy, but it cleared away and left no obstruction while the eclipse was passing. The parties of observations were quite successful. Cedar Falls was made one of the points of observation by the Government, and will hereafter be one of the points from which</p>	<p>wat- to loc As upper four to a Begin and tality utes woul secon W den our pear gloom scape dense horiz proac had golde color, ness light becom unear gloom the north peare to the tracti to the</p>
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News from HAD Members

We are always glad to hear from our members, and have recently received the following items of information which we are glad to share.



Nick Kanas (nick.kanas@ucsf.edu), a new member of HAD, writes:

I decided to write up my brief presentation at AAS 237 and submit it to the RNAAS (Research Notes of the American Astronomical Society). It was published today, and if you or any other members are interested, the link is:

<https://doi.org/10.3847/2515-5172/abf35c>.

I appreciate the support you and others have given me as a new member of the HAD and the AAS (my God, I have been brainwashed into the society acronyms--a follow-up of my NASA research days, no doubt!). People have been very accepting, and I enjoyed participating in AAS 237.



Danielle Adams (dadams@lowell.edu), Deputy Director for Marketing and Communications at Lowell Observatory, writes:

My research is in indigenous Arabian astronomy, and I recently had an invited book chapter entitled "Early Islamic Encounters with the Rain Stars of pre-Islamic Arabian Astronomy" published in Intersections of Religion and Astronomy, part of the Routledge Science and Religion Series:

https://www.routledge.com/Intersections-of-Religion-and-Astronomy/Corbally-Dinell-Ricker/p/book/9780367369460?fbclid=IwAR1kPsGwhfjJNGG2sZYx1QCLaGG53htSR6XJE7SrKWOCUfaOJ5_c7YRuVzo.

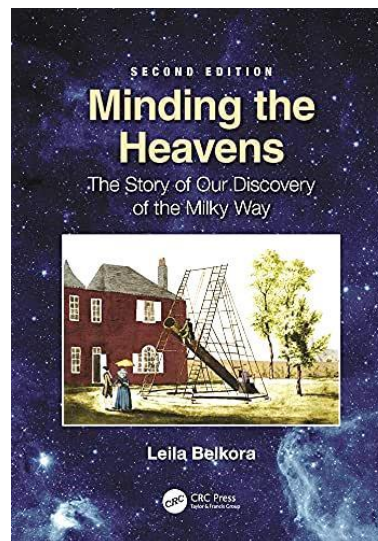


A new astronomical calendar compiled by Andrew Fraknoi (fraknoiandrew@fhda.edu) lists, month by month, 158 astronomical anniversaries and birthdays that are important for the history of our understanding of the universe. While many such calendars exist, this one differs by focusing on real astronomical research (and not so much on anniversaries of human space flight.) And it includes a more diverse group of scientists, including more women and more people of color.

The calendar is available without charge at: <http://bit.ly/astrodates>, and may also be found on the *This Month in Astronomical History* website at [https://www.researchgate.net/publication/348358007](https://www.researchgate.net/publication/348358007>ThisDateinAstronomicalHistory) *This Date in Astronomical History*.

New Books by HAD Members

We are delighted to report here on three exciting new books authored by members of our division!



Minding the Heavens: The Story of our Discovery of the Milky Way, 2nd ed., by Leila Belkora (CRC Press, 2021, ISBN-13: 978-0367417222).

Author Leila Belkora (belkora@cox.net) describes this new edition of her excellent book:

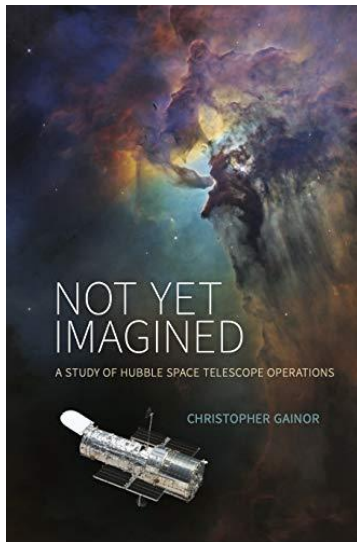
An updated edition of Minding the Heavens: the Story of Our Discovery of the Milky Way, first published in 2002, came out in May. The book tells the story of how we discovered that we live in a galaxy, in a universe of galaxies.

The heart of the book is a series of biographical chapters about seven astronomers who worked on this question: Thomas Wright, William Herschel (and Caroline), Wilhelm Struve, William Huggins (and Margaret), Jacobus Kapteyn, Harlow Shapley, and Edwin Hubble. I draw connections between the work of each of these figures on the form and extent of our stellar system—how Struve, for example, attempted to extend Herschel's investigation into the distribution of stars. I emphasize the relevance of their work to the island universe hypothesis. In the last chapter I bring the reader up to date on current research into our own galaxy, including with the Gaia mission and other Milky Way mapping projects. Martha Haynes (Cornell) called the first edition "a terrific blend of the science and the history."

The first edition of the book was required or recommended reading for several introductory university astronomy classes. From feedback from readers I've learned it's also appealing to

engineers and medical science professionals with an amateur interest in astronomy. The book is now available for purchase from the publisher at <https://www.routledge.com/Minding-the-Heavens-The-Story-of-our-Discovery-of-the-Milky-Way/Belkora/p/book/9780367415662>. Also on this page is a link for requesting an inspection copy (if you are considering adopting it for an astronomy or history of science class). More information, including a brief excerpt from the first edition, is at www.leilabelkora.space.

The book is also available in paperback (ISBN-13: 978-0367415662) and as a Kindle e-book (ASIN: B093C4LRMQ).



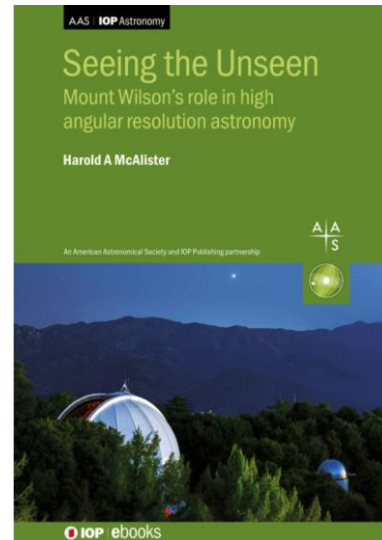
Not Yet Imagined: A Study of Hubble Space Telescope Operations, by Christopher Gainor (NASA, 2021, ASIN: B08SC2FZ1S).

Chris Gainor (cgainor@shaw.ca) reports that NASA has recently published his book about HST operations. It is currently available as an e-book, and will soon be available in printed form. The NASA History Program Office provides the following:

NASA's History Program Office is pleased to present Christopher Gainor's new, richly illustrated book documenting the Hubble Space Telescope's spellbinding 30-year history of operations in space. Gainor details Hubble's development and launch; its repair and upgrading through several servicing missions; and the effects of its continuing contributions to our knowledge of our solar system, galaxy, and universe. Discover how Hubble's mission has become a model of supranational cooperation among scientists and

how the images it produces have expanded our appreciation for the universe.

The free e-book may be downloaded at <https://www.nasa.gov/connect/ebooks/not-yet-imagined.html>.



Seeing the Unseen: Mount Wilson's Role in High Angular Resolution Astronomy, by Harold A. McAlister, (IOP Publishing, 2020, ISBN-13: 978-0750322065)

This volume, part of the AAS/IOP Astronomy book series, is also available in paperback (ISBN-13: 978-0750322096) and as a Kindle e-book (ASIN: B08NW9DNQS). Author Harold McAlister (hal@chara.gsu.edu) has kindly provided the following book notes:

December 13, 2020 was the centennial of the first measurement of a stellar angular diameter. The resolution of Betelgeuse by Francis Pease with the assistance of his colleague John Anderson and night assistant John Kimple using the 20-ft Michelson–Pease Interferometer beam at the 100-in telescope was a milestone in stellar astrophysics. While Albert Michelson played a major role in the design of the beam, he was not present for the observations. Anderson had already resolved the components of Capella earlier that year using a special interferometer he had constructed for that purpose, and Paul Merrill used that device for measuring the orbital motion of the Capella system as well as for resolving other binaries. But by the summer of 1921 Anderson and Merrill had ceased their double-star interferometry efforts, and Pease was left as the

sole practitioner of the black art of interferometry at MWO. He would continue to use the 20-ft beam while undertaking the development of a 50-ft stand-alone “interferometer telescope” that would suffer delay after delay. Results from the “50 foot” would emerge only in the Carnegie Year Books and occasional abstracts but never in the refereed literature. In the end, the technology available to Pease failed to supply the levels of alignment, path-length control, and fringe detection demanded by interferometry, and Pease never had confidence in the reliability of his results. Pease died suddenly at age 57 in early 1938—just two weeks prior the passing of George Ellery Hale. The 50 foot would languish and no further interferometry efforts were carried out by Mount Wilson staff. The technique would proceed in fits and starts by others until emerging as a major fixture on the mountain in the late 1980s in a succession of instruments: Mark I, II, and III interferometers; the Berkeley Infrared Spatial Interferometer; and the CHARA Array.

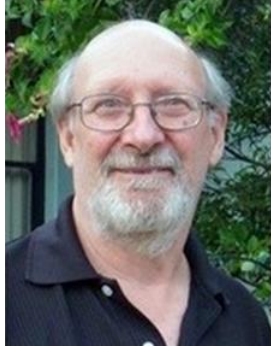
Anderson’s and Pease’s instruments directly inspired others to pursue double-star interferometry—Mentore Maggini at Catania, Sicily; William S. Finsen at Johannesburg, South Africa; Robert H. Wilson, Jr. at Philadelphia; and Hamilton Jeffers at Mount Hamilton. In 1930, Edward Hutchinson Synge published an astonishingly prescient article describing how interferometers could develop beyond the Pease 20 foot to what amounts to the long-baseline telescope arrays of today. His remarkable contribution has apparently been overlooked until I stumbled on it as a reference in a citation to another article. Synge’s concept would be independently proposed nearly 40 years later by Richard H. Miller who was unaware of Synge’s priority.

In the early 1960s, Willet I. Beavers undertook a dissertation project of building a next-generation version of the Pease’s interferometer beam. His goal was to detect fringes photoelectrically to quantify fringe visibility rather than visually search for nulls as had been required of the MWO astronomers. Beavers carried out his experiments at Lowell Observatory rather than Mount Wilson and came very close to success. That would take another decade of technology development that culminated with the “automatic interferometer” of William C. Wickes and Robert H. Dicke. Wickes brought their instrument to Mount Wilson 35 years after Pease’s death. The Princeton instrument was

a great success at the 60-inch telescope. Overlapping Wickes observations on Mount Wilson was the implementation of another form of the method developed by Douglas G. Currie and his students who came out repeatedly from the University of Maryland throughout the 1970s for measuring stellar diameters and binary star motions. Mount Wilson’s fine atmospheric seeing and ease of access made it the go-to place for aspiring interferometrists culminating today with CHARA Array, which serves an international community of astronomers as the highest-resolution optical interferometer in the world.

This book describes Mount Wilson’s century-long chain of inspiration and development in interferometry as well as the field’s origins at the beginning of the 19th century resulting from the brilliance of Thomas Young and Hippolyte Fizeau who inspired Edouard Stephan, Albert Michelson, and Karl Schwarzschild to attempt interferometry at the telescope. In addition to discussions of the technical approaches and scientific results achieved over the years, interviews with those who have practiced the technique since the 1960s have provided their personal stories. The book contains two appendices—a quantitative evaluation of atmospheric seeing conditions based on several million measurements by the CHARA Array and an elementary mathematical treatment of astronomical interferometry demonstrating how stellar parameters are measured by the technique.

My involvement with Mount Wilson Observatory was initiated in 1986 when I was among the last users of the 100-inch telescope before the Observatory’s 1985 closure by the Carnegie Institution of Washington and the first user when Mount Wilson was reopened in 1989 under the auspices of the non-profit Mount Wilson Institute (MWI). I brought the CHARA long-baseline interferometric telescope array to the mountain in 1996 and subsequently joined the MWI Board of Trustees. During 2002–2014, I served pro bono as MWI CEO and director of MWO. This book is the result of my abiding admiration for all that has transpired on Hale’s mountain in the 117 years since Carnegie gave him the go-ahead to build the Mount Wilson Solar Observatory.



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

Wayne Orchiston, Managing Editor
Journal of Astronomical History and Heritage

The December 2020 issue ran to 282 pages, with twelve papers and fifteen book reviews. The March 2021 issue was 244 pages, again with twelve papers, but this time only eleven book reviews.

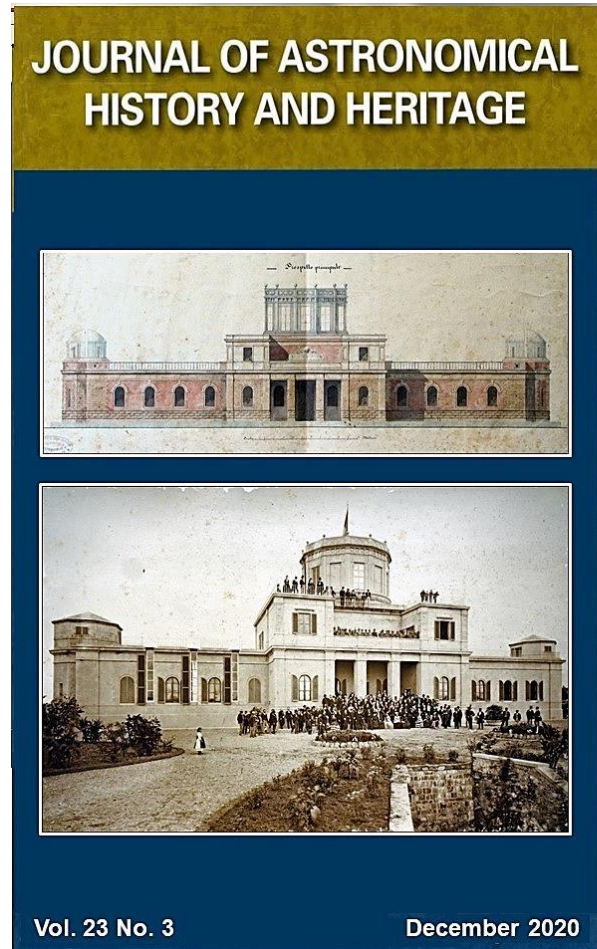
Note that after producing three annual issues of JAHH, from 2021 JAHH will appear quarterly (in

March, June, September and December). To cope with the extra workload, we have added a Papers Editor (Associate Professor Rubi Dela Cruz from the Philippines--who will work directly with me), and a new Associate Editor (Prof Richard de Grijs from Australia--who joins the four existing Associate Editors).

On the research front, my two latest Springer books (on early Australian radio astronomy, and on SE Asian astronomical history) currently are in press and will be out soon.

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Editor's Note: The contents of the December 2020 and March 2021 issues are reproduced on the following pages. These, and all past issues, are available at <https://www.jahh.org/>. The Journal of Astronomical History and Heritage is an open-access online publication. Please consider making a donation on the J.A.H.H. website!



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The *Journal of Astronomical History and Heritage* (JAHH) was founded by John Pedrix and Wayne Orchiston in 1998, and since 2007 has been produced three times yearly, now in April, August and December. It features review papers, research papers, short communications, correspondence, IAU reports and book reviews.

Papers on all aspects of astronomical history are considered, including studies that place the evolution of astronomy in political, economic and cultural contexts. Papers on astronomical heritage may deal with historic telescopes and observatories, conservation projects (including the conversion of historic observatories into museums of astronomy), and historical or industrial archaeological investigations of astronomical sites and buildings. All papers are refereed prior to publication. There are no page charges, and in lieu of reprints authors are sent a pdf or Word camera-ready version of their paper so that they can generate their own reprints on demand.

The JAHH has its own dedicated web site at <https://www.jahh.org>. This site includes guidelines for paper submission, our ethics and malpractice statement, impact factors, and access to back issues.

Prospective contributors should read the 'Guide for Authors' on our web site and carefully follow these guidelines when preparing manuscripts. Papers should be submitted online, or if you don't have access to email they should be posted to:

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Book reviews should be sent to Dr Clifford Cunningham (Cliff.Cunningham@usq.edu.au).

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For all enquiries, email the Editor (wayne.orchiston@gmail.com).

The views and opinions expressed in this Journal are not necessarily those of the Editors or the Editorial Board.

COVER IMAGE

Arcetri Observatory in Florence is one of the great observatories of Italy, and during the late nineteenth century and throughout the twentieth century was a research bastion of astrophysics and solar physics. Thus, it is associated with Antonio and Giorgio Abetti, both highly regarded as international scholars, and also with Giovanni Battista Donati of cometary fame.

In this issue of JAHH, Arcetri astrophysicist Dr Simone Bianchi continues his research into the history of the Observatory by exploring its foundations and early years. You will find his paper, "The founding of Arcetri Observatory in Florence", on pages 553-581. The upper photograph on the cover shows the only known surviving architectural plan of the main Observatory building prepared prior to construction, while the lower photograph shows the inauguration of the Observatory on 27 October 1872. In his paper, Dr Bianchi recounts how Donati succeeded in obtaining funding for the establishment of Arcetri Observatory, even though at the time Florence was no longer the Italian capital, and how Arcetri Hill, on the outskirts of Florence, was selected as the site for the new observatory.

Front cover of the December 2020 issue of The *Journal of Astronomical History and Heritage*

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EDITORIAL

Dear Readers,

Welcome to the new-look 2021 edition of the *Journal of Astronomical History and Heritage*. With this issue we begin producing four issues of *JAHH* per year (instead of three, as previously), to accommodate the increasing number of papers that we receive and to help reduce the time delay between submission of a manuscript and its subsequent publication.

In order to help with this process we have expanded the 'Editorial Team' by adding two new-comers, Associate Professor Ruby-Ann Dela Cruz and Professor Richard de Grijs. Ruby-Ann is from the Department of Earth and Space Sciences at Rizal Technological University in Manila (Philippines), and she researches various aspects of SE Asian astronomical history. She will share the Editorial load, and as the Papers Editor of *JAHH* will she work directly with me. Meanwhile, Richard, from the Department of Physics and Astronomy at Macquarie University in Sydney (Australia), is an astrophysicist who has developed an interest in nautical astronomy, and Australian astronomy (you will find two of his papers in this issue of *JAHH*, and several of his papers in last year's issues of *JAHH*). Richard is a new Associate Editor, joining the four existing Associate Editors, Dr Cliff Cunningham, Associate Professor Duane Hamacher, Dr James Lequeux and Dr Peter Robertson. Like James and Peter, Richard also spent many years editing astrophysical or physics journals before joining the *JAHH* team. We especially appreciate his editorial expertise.

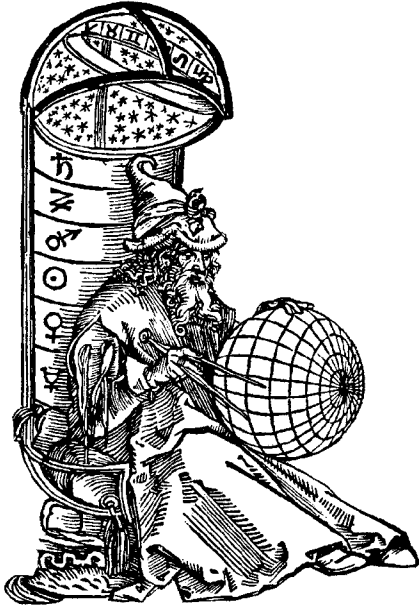
We are always looking for ways to improve *JAHH*, and with this issue you will find two significant innovations. Firstly, we have added a new Section, titled 'From the Archives', where we will publish astronomical manuscripts or describe the contents and/or the development of individual astronomical archives. Launching this Section is a 58-page paper by Jennifer Putnam and William Sheehan about Mars, canals (*canali*) and associated correspondence between Percival Lowell and Giovanni Schiaparelli. Secondly, in an attempt to make *JAHH* more attractive and optimize communication between authors and our readers we have introduced some new graphic design features, including colour-coding for the different sections published in *JAHH*: regular Papers (i.e. research papers and review papers); papers in the 'From the Archives' Section; Book Reviews; IAU Reports; as well as Editorials and 'Letters to the Editor'.

Despite these changes, our basic philosophy remains the same: (1) to encourage research on the history of astronomy throughout the world and provide a vehicle for publication; and also (2) to focus on certain niche areas, such as cometary astronomy, ethnoastronomy, historic solar and lunar eclipses, historic transits of Venus, nautical astronomy, and the history of radio astronomy. As a reflection of this international coverage, we note that the three 2020 issues of *JAHH* discussed aspects of astronomical history (including archaeoastronomy and ethnoastronomy) from Algeria, Argentina, Australia, Belarus, Brazil, Canada, Chile, China, El Salvador, England, Estonia, Finland, France, Germany, Greece, Honduras, India, Ireland, Italy, Latvia, Lithuania, Mauritius, Mexico, the Middle East (including Persia), Moldova, Myanmar (Burma), Netherlands, New Zealand, Norway, Peru, Poland, South Africa, Spain, Sri Lanka (Ceylon), Sweden, Tonga, Russia, Ukraine, USA and Wales.

We hope that you like the new-look *JAHH*, and that you will enjoy reading the variety of papers, book reviews and IAU Reports that we will bring to you this year.

Professor Wayne Orchiston
Managing Editor
 (wayne.orchiston@gmail.com)





Historical Astronomy Division of the American Astronomical Society

HAD News #97, May 2021, edited by Ken Rumstay. Please send contributions for the next issue, comments, etc. to hadsec@aaas.org.

A complete version of this newsletter, with color photographs and active links, may be found at <https://had.aas.org/sites/had.aas.org/files/HADN97.pdf>.

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