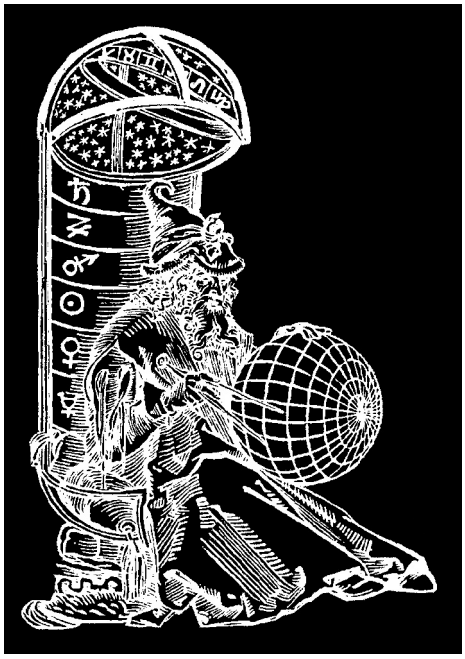

H·A·D NEWS

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

Number 71 ☙ October 2007

David H. DeVorkin Awarded the 2008 LeRoy E. Doggett Prize

Donald Yeomans, JPL

The Historical Astronomy Division of the American Astronomical Society has awarded the sixth LeRoy E. Doggett Prize for Historical Astronomy to Dr. David DeVorkin. This prize was given for "his seminal work in illuminating the origins and development of modern astrophysics and the origins of the space sciences during the twentieth century." Dr. DeVorkin's many research papers, books, and monographs have provided a detailed, scholarly and yet interesting history of twentieth century space science and astrophysics and the roles of the military, religion, government, the world wars and the power brokers in the development of these fields. His 2000 biography of Henry Norris Russell was critically acclaimed and resulted in two major exhibitions as well as several smaller ones. Based upon a wide variety of well documented sources, including archival correspondence and oral histories, this landmark biography illuminated much of the history of astrophysics in the first half of the 20th century. His popular historical articles have engaged the public, and through his curatorial role at the Smithsonian Institution's National Air and Space Museum he has made astronomy come alive for millions of interested museum visitors.

David holds a Ph.D. in the history of astronomy from the University of Leicester (1978), a Master of Philosophy in Astronomy from Yale University (1970) and a BS in Astronomy/Physics from UCLA (1966). His works have appeared in a very diverse range of journals including the *Journal for the History of Astronomy, Sky & Telescope*, *Isis*, *Scientific American*, *Minerva*, *Science*, and *Physics Today*. Since 1981 he has been curator of history of astronomy and the space sciences at the Smithsonian Institution's National Air and Space Museum.

David DeVorkin in Libya for a solar eclipse, 2006

David is well known to HAD members, having served on the HAD Committee (1981-83), and as HAD Secretary/Treasurer (1985-93), Vice-Chair (1995-97) and Chair (1997-99). When the AAS Executive Committee requested a proposal concerning the issues of preserving historical astronomical sites, facilities, equipment and archives, Steve McCluskey and David were largely responsible for drafting the response including the six recommendations. (See HAD News #70, p. 10-11). As a result of this report, a Working Group on the Preservation of Astronomical Heritage was established, and David currently serves on this Working Group. One of the most active and enthusiastic HAD members, David has organized, and participated in, many meeting sessions, including "The History of Space Science" at the January 2006 meeting and "Case Studies in How 20th Century Observatory Directors were Chosen" at the January 2007 meeting.

David DeVorkin will present his Doggett Prize lecture, "Astronomy and its History on the Nation's Mall," 5:45–6:45 p.m. Tuesday, 8 January 2008 at the Austin AAS-HAD meeting.

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From the Chair

Sara J. Schechner, Harvard University

While exploring Virginia by canoe in December 1607, Captain John Smith was ambushed by Powhatan Indians and chased into the swamp. Wounded by arrows and mired in the cold mud, Smith surrendered and was led to their chieftain, Opechancanough. Smith played for time. "I presented him with a compasse diall," Smith wrote in his *True Relation*, "describing by my best meanes the use thereof, whereat he so amazedly admired, as he suffered me to proceed in a discourse of the roundnes of the earth, the course of the sunne, moone, starres and plannets." The Indians also marveled at the spinning compass needle beneath its clear glass cover. Despite the fascinating show and astronomy lecture, Smith's captors were about to shoot him an hour later, when Opechancanough held the scientific instrument aloft and spared his life. For the next month, Smith was alternately feted and condemned before being released with the help of Pocahontas. Smith's lucky break with his pocket sundial 400 years ago confirmed his belief that mathematical—indeed astronomical—instruments were vital to the survival of Jamestown.

During the sixteenth century, scholars developed new methods of navigation, surveying, cartography, and time finding that drew heavily on astronomy and its mathematical instruments (e.g., the astrolabe and quadrant). For instance, John Dee, mathematician and astronomer to the English Crown, introduced the cross-staff, Mercator's globes, and other astronomical instruments to England in 1551. He became a consultant to the Muscovy Company, prepared nautical charts, and instructed crew members in cosmography before they set sail for North America in 1576 with Martin Frobisher or 1583 with Sir Humphrey Gilbert. Robert Recorde also trained the company's navigators, and Frobisher took Recorde's astronomy textbook, *The Castle of Knowledge*, on his voyage. Not to be outdone, Sir Walter Raleigh hired the Oxford astronomer, Thomas Harriot, to tutor his sea captains in London. Harriot drew up navigational instructions for Philip Amadas and Arthur Barlowe whom Raleigh dispatched to explore the coast from Florida to New England in 1584 to select a place for a settlement. The following year, Harriot accompanied Sir Richard Grenville on his voyage to Roanoke Island on the Outer Banks of North Carolina. The earliest permanent European settlements in America would not have been possible without astronomy and new forms and uses of its traditional instruments.

To celebrate the importance of astronomy in the exploration of North America and to commemorate the four-hundredth anniversary of the founding of Jamestown in 1607, HAD is sponsoring a special session on 8 January 2008 at the Austin meeting. We will also be commemorating the fiftieth anniversary of the International Geophysical Year in another HAD special session. Later that same day, we will honor David DeVorkin with the Doggett Prize, and be treated to an AAS plenary lecture by him. Details are given elsewhere in this newsletter.

Also, look for our first-ever HAD Exhibit Booth, at the meeting in Austin. We will use it as an opportunity to make new friends, and share with them the benefits of joining HAD. Please contact Thomas Hockey at hockey@uni.edu if you can give an hour or two of your time to staff the booth.

We hope that you will join us in Austin!

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Special Sessions in Austin

There will be two HAD special sessions at the Austin meeting, both commemorating anniversaries:

HAD I. The International Geophysical Year and the Dawn of Space-Based Astronomy

The morning session will look back over fifty years at several aspects of the beginning of the Space Age, including Project Moonwatch, the early days of Soviet Space astronomy and auroral and magnetospheric studies associated with the International Geophysical Year. The session organizer is HAD Committee member Jay Holberg, and the session will be held Tuesday, 8 January 2008 from 10:00–11:30 a.m.

Fifty Years Later: My New York City Moonwatch Observations
Jay M. Pasachoff (Williams College)

The Albuquerque High School Moonwatch Team
Joel M. Weisberg (Carleton College)

The First 25 Years of Space Astronomy in the USSR
W.C. Keel (University of Alabama)

The Aurora, Magnetosphere, and the IGY
J. McKim Malville (University of Colorado)

HAD II. Astronomy at the Time of Jamestown and Its Role in the Exploration of America

To celebrate the importance of astronomy in the exploration of North America and to commemorate the four-hundredth anniversary of the founding of Jamestown in 1607, HAD is sponsoring a special session at the Austin meeting. This session, organized by HAD Chair Sara Schechner, will be held Tuesday, 8 January 2008 from 2:00–4:00 p.m.

Publish or Perish: The Case of Thomas Harriot
Owen Gingerich (Harvard–Smithsonian CfA)

Finding the Fortunate Islands and Other Astrolabe Tricks of Early Astronomical Navigation
Jim Lattis (University of Wisconsin–Madison)

The Adventures of Captain John Smith, Pocahontas, and a Sundial: Cosmology, Mathematics, and Power at the Time of Jamestown
Sara Schechner (Harvard University)

An Elizabethan Survey and Possible Astronomical Observations on the Oregon Coast: Preliminary Results
Katherine Haramundanis, Edward Gaposchkin (Independent scholars)

Sixteenth Century Lunar and Solar Ephemeris Accuracy and the Lunar-distance Method for Longitude Determination
Edward Gaposchkin, Katherine Haramundanis (Independent scholars)

Colonial American Astronomy
Donald Yeomans (Jet Propulsion Laboratory)

Call for Papers

HAD invites members to contribute papers to the regular HAD session for the January 2008 meeting in Austin. Papers may be presented on any aspect of historical astronomy.

Submissions must be made via the AAS website: http://www.aas.org/meetings/aas211/abstracts.php by 9:00 p.m. Eastern Time 17 October 2007. (Late papers MAY be accepted as late as 5 December.) The regular session will be on Wednesday, 9 January, the day after the HAD special sessions and Doggett Prize lecture.

Another Call for Papers

Contributed talks on history of astronomy, astrophysics etc. will be welcome at the April meeting of the American Physical Society, at which the Forum on History of Physics hosts a number of sessions. The April meeting will include invited talk sessions on Triumphs of 20th Century Astrophysics.

The abstract deadline is 11 January 2008 (at http://abs.aps.org). Registration is, of course, cheaper for APS members. The meeting, in St. Louis, is 19–22 April 2008.

Graduate students giving invited talks can apply for $600 studentships for partial travel support if they are APS members (the first year is free for students). To apply, send a copy of the abstract, after it has been entered in the system, to program chair David Cassidy (chmdcc@optonline.net), indicating that the presenting author is a student. Winners will be notified shortly after the abstract deadline.

From the Vice Chair

Tom Hockey, University of Northern Iowa

As vice-chair of HAD I continue to work on soliciting and editing the obituary-of-record for deceased AAS members. There is one for whom I solicit your help:

Dr. Michael W. Johnson (PhD, University of Pennsylvania and AAS member) taught at Maryville University in Saint Louis, Missouri. According to the Saint Louis Post-Dispatch, he died on 13 April 2007. However, Social Security records indicate that he was born on 29 December 1942 and died on 25 June 2007. We have no further information on him. Can anybody help me sort this out?

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From the Secretary-Treasurer

Joe Tenn, Sonoma State University

In preparing to send out the announcement of this newsletter I downloaded the HAD membership list from the AAS server. I was struck by how many HAD members have allowed their membership to expire over the past few years, and I suspect that not all did so intentionally.

If you are a regular member of the American Astronomical Society it is a simple matter to enclose the additional $8 for your membership in the Historical Astronomy Division with your annual renewal. If it is not already listed on the next statement you receive, that means your membership has been dropped or perhaps you never were a member of HAD. Please add HAD membership to the form.

Affiliate members of HAD (those not members of AAS) must do a bit more to join and pay a whopping $2 extra per year. Details may be found at http://www.aas.org/had/membership/. I hope everyone reading this newsletter will want to be a member.

Do you have any old issues of HAD News lying around? We would like to scan them so as to complete the collection now posted online at the HAD website at http://www.aas.org/had/.

We are currently seeking numbers 1–28 (all prior to November 1993) and #37 and #38 (both 1996).

If you would like to contribute to the next issue of HAD News, due in March 2008, please contact me.

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E. Dorrit Hoffleit, 1907-2007

John Wright Briggs, Clay Science Center
Dexter and Southfield Schools

For many who knew her, Dorrit Hoffleit's passing on April 9th at the age of 100 marked the end of an era in astronomy. Photographic technique reigned supreme through her life and official retirement in 1975. I was a teenager when I first met her in 1977 at Maria Mitchell Observatory. But it was not lost on me that Dorrit had been personally associated with people like Annie Jump Cannon and other industrious, famous figures from early days of stellar photometry and spectroscopy. To be learning about glass plates, emulsions, and "fly spankers" from her was linking to a distinguished chain of knowledge, dedication, and tradition. It seemed right that noble astronomy should be built of such ideals!

In her industry and dedication, Dorrit was an imposing figure to her summer assistants. All students soon noticed: No late-night session with the astrograph would slow her from a formidably early start the following morning! We learned by doing, and little time was wasted on general instruction. But Dorrit crafted her program to ensure each assistant gained

key experience. An element of this, for example, was Dorrit's requirement for public speaking. While several of Dorrit's biographies explicitly mention her expertise in the areas of variable stars, history of astronomy, and astrometry, her wisdom as an educator—practical instruction in the guise of the research program on Nantucket—must stand as well.

In *Misfortunes as Blessings in Disguise*, Dorrit's wonderful 2002 autobiography, her bibliography (to year 2002, at least) runs to 24 closely-packed pages. This long list does not include her approximately 1,200 News Notes contributed to the first 15 volumes of *Sky & Telescope* magazine; her 22 Annual Reports as director of Maria Mitchell Observatory; or her considerable input to 72 papers published by her assistants at Maria Mitchell Observatory in 1958–1979. Many of her publications related to the history of astronomy. (Dorrit served on the HAD Committee, 1991–1993.)

But to her assistants, Dorrit's range as a historian was clear merely during her story-telling, typically over "astronomer's punch & cookies," served on Harlow Shapley's old rotating desk in her small Nantucket cottage. During these sessions she was not at all shy in telling of many of the difficulties she'd observed and endured as a pioneering 20th Century woman astronomer, including, for example, her final frustrations at Harvard before her move to Yale; the long-lingering presence of her predecessor director at Maria Mitchell Observatory; the poor performance of certain collaborators; etc. Yet, as the late Janet Akyüz Mattei (Dorrit's assistant in 1969 and later Director of AAVSO) wrote, "Dorrit is a person with the greatest positive attitude. She finds a silver lining in every cloud… She says she has this attitude because she always expects the worst, so when the worst doesn't happen, anything that is better is great. Dorrit is the most gracious and thoughtful person I know."

Dorrit revealed so much to her assistants about the potential politics and sociology of astronomy, that we were surely better prepared to face our own inevitable clouds—young idealists that we were. As years passed, how I regretted that I could not remember specifics of all she said! Thus, when her autobiography was published by the AAVSO, I was delighted. And it was not a disappointment. It entirely refreshed great stories about Shapley, Bok, and others of Dorrit's heroes—as well as stories about her antagonists. But I was not expecting the bombshell.

For all she shared with her students and colleagues, there were, of course, mysteries about Dorrit. What powered the engine of her dedication? Had she ever considered marriage? Why did she never drive a car? Had it been a difficult decision for her, to not have children of her own? I never dared ask such things, of course! She'd offer, "Work for the work's sake!" as a general philosophy of life. But I began to wonder about things, especially when, in later years, she expressed such special enthusiasm, whenever my wife Liz and I sent photos of our healthy growing youngsters. "Family is so important!" Dorrit would reply.

100th birthday photo by Chi-Hsien Lin

The bombshell to me was Dorrit's revelation that she suffered a seizure disorder during the first five years of her life. By the age of 12, when she knew that her maternal grandmother had died in an asylum, she also learned about Mendelism (genetics). As Dorrit recorded in her 95th year, "Being so different from normal children, I began to fear I might have inherited the major malady of my maternal grandmother who had spent years in the insane asylum. If so, I should certainly not want to transmit those same genes to a future generation. I decided at that early age never to marry. But I did not mention this to anyone, especially not my mother, or years later, to those men who proposed to me."

Yale University has placed a memorial tablet and young memorial tree near its new student observatory. The inscription includes, "Dorrit Hoffleit, Teacher, Mentor, and Friend. She devoted her life to the study of the heavens." Dorrit's B.A. in mathematics from Radcliff College was in 1928; her Ph.D. in 1938 was the 5th awarded to a woman by Radcliff. Among many honors during her lifetime, including asteroid Dorrit (3416) and two honorary doctorates, Dorrit may have been especially proud of her early Carolyn Wilby Prize. This was awarded for her Ph.D. thesis on spectroscopic absolute magnitudes, "the best original work in any department."

In 1943, she joined the Ballistics Research Laboratory of Aberdeen Proving Ground in Maryland, eventually working on the trajectories of captured V2 rockets. In 1948 she returned to Harvard and remained

there until 1956, when she was appointed Director of Maria Mitchell Observatory and Research Associate in Astronomy at Yale. Her 1964 *Catalogue of Bright Stars* and 1983 *Supplement* are especially well-known. While she officially retired from Yale in 1975, she continued at Maria Mitchell until 1978, where she directed a total of 100 students in her well-known summer program. Her later years continued to be very active, including a 4th edition of the *Bright Star Catalogue* in 1982 and *Astronomy at Yale 1701-1968* in 1992. At 86 she wrote the pamphlet *Women in the History of Variable Star Astronomy* for the AAVSO.

A particular honor came for Dorrit's 90th birthday in 1997, in a Yale symposium entitled Anni Mirabiles, the printed version of which became one of Dorrit's "most prized possessions" in her final years. Dorrit also enjoyed a similar centennial symposium in 2006 and, shortly before her death, a 100th birthday party, both hosted by Yale. Finally, through all her activities from 1930, Dorrit maintained her membership and life-long close affiliation with the American Association of Variable Star Observers, serving as its President 1961-1963, among many other leadership roles in the organization. The organization was always profoundly important to her.

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Notre Dame VIII Focused on History of Telescope

Christina Turner, University of Notre Dame

The Eighth Biennial History of Astronomy Workshop met at the University of Notre Dame from 25 to 29 July 2007. The principal theme was the history of telescopes, though a wide range of topics was represented in workshop sessions. The workshop began with an evening public lecture by the distinguished invited speaker, Albert van Helden, professor of science and astronomy at the Institute for the History and Foundations of Science of the University of Utrecht. Van Helden's talk, "Getting the Most out of Your Telescope in the 17th Century," was followed by the conference welcome reception.

At the Adler Planetarium and Astronomy Museum in Chicago participants took a guided tour of the History of Astronomy exhibit galleries, and a behind-the-scenes tour of the Webster Institute for the History of Astronomy telescope collection, and had free time to explore the permanent astronomy exhibits. A session on astronomical instruments and a workshop on astrolabes and the production of horoscopes rounded out the day.

There were organized sessions on ancient astronomy, amateurs in astronomy, and extraterrestrials and work-in-progress sessions on historical figures, institutions, religion and astronomy, and scientific instruments. The casual and intimate setting allowed for frequent and spirited discussion during breaks and gave participants plenty of time to view poster papers and peruse the book display. The workshop drew to a close with the Saturday evening reception and banquet, featuring a lecture by van Helden on the prehistory of the telescope. The meeting concluded with a roundtable discussion on the state of the profession and the workshop business meeting.

The Ninth Biennial History of Astronomy Workshop will take place 8-12 July 2009 at the University of Notre Dame; please visit http://www.nd.edu/~histast/ for more information as the date nears.

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Prelude to Nucleosynthesis

Virginia Trimble, Univ. of California, Irvine

The astronomical community is marking this year —with multiple conferences—the 50th anniversary of a pair of key papers, by A.G.W. Cameron and by E.M. Burbidge, G.R. Burbidge, W.A. Fowler, and F. Hoyle on the production of heavy elements from light ones in stars.

These papers are generally regarded as the foundation of modern work on the subject of nucleosynthesis, but they are also the capstones of a great deal of earlier thinking, beginning with Prout's hypothesis. William Prout, who published anonymously in 1815, suggested that atoms (Dalton's then-new concept) of all the other elements could be thought of as being built from suitable numbers of hydrogen atoms, in proportion to their equivalent weights. All the rest, you might be tempted to say with Rabbi Hillel, is commentary.

The obvious questions were how and where might atoms get together to do this, since on earth they seem to make only chemical compounds, not other elements. And if you have a how-and-where hypothesis (both "in stars" and "in the universe as a whole" were in the

inventory before The Great War), you must check it by making sure that you can make the right amounts of everything.

What are the right amounts? That was not a trivial question. Between 1890 and 1925, only the earth and meteorites were available for quantitative analysis, though at least they agreed rather well for most refractory elements. You will perhaps have heard of some of the analyzers (F.W. Aston of the mass spectrograph; F.W. Clarke, president of the American Chemical Society) and probably not of others (H.M.Vernon, who noticed in 1890 that the sun had more things on the left side of the periodic table than on the right (*Chemical News* 61, 51), and W.D. Harkins of Chicago, who said you should look at nuclear rather than chemical properties, and so discovered the odd-even effect and the preponderance of the alpha-elements).

A.G.W. Cameron
(Courtesy Arkansas Center for Space & Planetary Sciences)

The break-through event was quantitative analysis of stellar spectra, Cecilia Payne (later Payne-Gaposchkin) leading the pack by a decade or more, with her 1925 thesis conclusion that hydrogen and helium dominate stellar material by a wide margin. H.N. Russell, writing in 1926, was not quite ready to admit to any firm numbers for the sun, and took more than a decade* to accept "lots of hydrogen." And then (as I will say twice more below), there was a war, just before which Viktor Goldschmidt published the best table of "cosmic" abundances to date, in which helium (still only about equal to oxygen) is the only element visible deviant from a modern log plot.

Also around 1890, both William Crookes (of the tube and the radiometer, the latter of which he did not understand) and Vernon suggested transmutation of the hydrogen-protyle into heavier, more stable elements in the universe as a whole, as part of a general cooling and condensing process. Crookes also proposed to bring in light, violating the second law of thermodynamics, but then so did the FIB cosmology of Jeno and Madelaine Barnothy 70 years later.

You will probably not be prepared to give up on cosmological nucleosynthesis unless I mention George Gamow, who started with pure neutrons in 1935. But Harold J. Walke had already tried this in 1933, and rather liked the results, which included a series of captures on successive heavy nuclides that we now call the s-process. But, said he, it could not make Se-74 (now seen as a p-process product). That Gamow's first paper was on Kaluza-Klein five- dimensional theory and that early ideas had to fit in coronium, nebulium, casseiopeium, and aldebaranium as well as the elements known to Tom Lehrer are sidelights we must skip past.

Burbidge, Burbidge, Fowler, & Hoyle, 1971
(Courtesy Clemson University and Donald D. Clayton)

And, again, there was a war, and Gamow, et al. turned their attention to other things neutrons might do. Nucleosynthesis in stars seems to have come last. At least, I have not been able to trace it back before a series of papers by J.W. Nicholson in *MNRAS*, 1911-17. First, said he, came the nebulae with nebulium and coronium providing emission lines as in the solar corona; then the Wolf-Rayet stars with both emission lines of nebulium, hydrogen, and such, as well as continuous spectrum; and then the sequence of terrestrial elements and their absorption feature, associated with stars in general.

A number of famous folk clustered around the idea of hydrogen to helium conversion as the source of solar and stellar energy soon after (J.P. Perrin in 1921, S. Arrhenius in 1922, A.S. Eddington before 1926).

Quantum mechanics and the need for barrier penetration rear their ugly heads in 1928-31 in papers by R. d'E. Atkinson and F.G. Houtermans and, again,

Gamow. Atkinson and Houtermans proposed using atoms of heavier elements as catalysts to promote the gathering of 4 protons and 2 electrons into helium nuclei. Not quite the CNO cycle, but getting there.

Mentioning von Weizsäcker and Hans Bethe plus the pp chain and CN cycle in 1937-39 can be presumed to bring this topic to a close, because "and then there was... " Although getting beyond helium was addressed as early as 1933 (T.E. Sterne, in *MNRAS*), helium burning belongs largely to E. Öpik, E.E. Salpeter, and other post-war pundits. And having got back to the threshold of B^2FH and C, we have entered the realm of current events rather than history.

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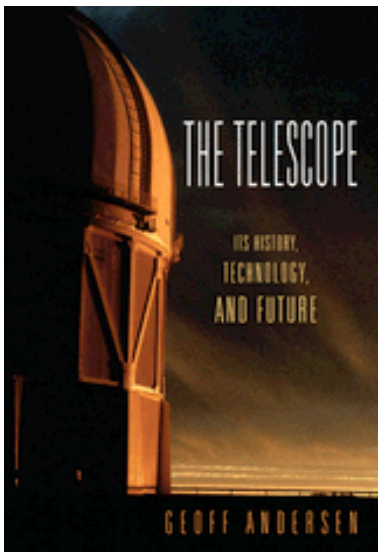
**Russell accepted "lots of hydrogen" in 1929 in Ap.J. 70, 11—Ed.*



Book Review

Peter Abrahams

The Telescope: Its History, Technology, and Future by Geoff Andersen (Princeton University Press, 2007)

A new book on the subject of telescopes has been published, by an author with a background in research physics at the Air Force Academy in Colorado. *The Telescope: Its History, Technology, and Future* is a reprint of a 2006 publication available in Australia. Although only peripherally about history, it contains much of interest to the telescope historian.

It is written at an "educated public" level, the preface noting that technical details have been simplified or omitted.

Chapter 2 is the historical section of the book. It opens with the only non-trivial error found in the text by the reviewer, where Hans Lipperhey is said to have been granted a patent for his telescope on 2 October 1608; in fact his patent was rejected at that time. The chapter proceeds with an interesting account of developments, concluding circa 1820 with Fresnel, Poisson and diffraction; and noting that from this era, telescope design changed only in minor ways — a point that should be argued, but it is a quibble to fault with such a broad overview for omissions.

Following are discussions on diffraction, resolution, aberrations, imaging, spectroscopy, photometry, and interferometry, a good choice of subjects essential to understanding advances in instrumentation.

An overview of the issues involved in developing a modern observatory is well summarized: "the mirror and the site." The complexities of siting, constructing, and operating an observatory are discussed in a comprehensible and concise manner. This leads naturally into a chapter on the Space Telescope.

The second half of the book contains material more likely to be new to *HAD News* readers. "Advanced telescope techniques" include lightweighting of mirrors and segmented mirrors, active and adaptive optics, and laser guide stars. A reminder that telescopes are used for more than observing and imaging comes in Chapter 11, where the author discusses communication with lasers, remote sensing, and Lidar (LIght Detection And Ranging). Surveillance from airborne and space telescopes introduces dedicated satellite tracking telescopes, and in turn laser weapons (also using telescopes) are discussed.

A chapter on "Non-traditional observatories" describes liquid mirror telescopes, solar telescopes, and detectors of gamma waves and gravitational waves.

The 248 pages comprising the book are padded in places with extraneous material, including appendices on basic math and electromagnetic radiation. The first chapter is on pre-telescopic observation, useful though it be in establishing context; and a later chapter is a episodic ramble through historic astronomy, covering the discovery of Pluto, extra-solar planets, Comet Halley, etc.—with a telescopic slant.

The book closes, appropriately, with a chapter on "Future telescopes." The very successful modern survey telescopes ("Wide field wonders") lead to the upcoming Pan-STARRS and LSST, and in turn, planet-finding telescopes. The most fundamental evolution of the telescope is forecast in the progression from the "Very Large Telescope" to the "Giant Magellan Telescope," the "Extremely Large Telescope," and the "Overwhelmingly Large Telescope."

This largely non-historical text is of interest to historians because their mandate includes maintaining the historical record of current events. Future researchers will be well served if the record of today is kept by historians in addition to scientists and technicians.

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Multi-Book and Article Review

André Heck, Strasbourg Observatory

"German Astronomy in the Third Reich," by H.W Duerbeck, in *Organizations and Strategies in Astronomy*—Vol. 7, edited by A. Heck. (Springer, Dordrecht 2006), pp. 383-413.

Kommandosache "Sonnengott": Geschichte der deutschen Sonnenforschung im Dritten Reich und unter alliierter Besatzung, *Acta Historica Astronomiae* 31, by Michael P. Seiler. (Verlag Harri Deutsch, Frankfurt am Main), 2007.

The Multinational History of Strasbourg Astronomical Observatory, edited by A. Heck, (Springer, Dordrecht, 2005).

Several noteworthy contributions have been recently published on German astronomy during National Socialist ("Nazi") times—and in particular during the second World War (WWII). The following is a digest of the most significant ones.

A particularly exhaustive study has been recently published by Hilmar W. Duerbeck (Univ. Brussels). He reviews astronomy-related activities in German university observatories and in other research institutions for the period 1933-1945, which corresponds to the Third Reich. Duerbeck also investigates the fate of observatories in regions annexed or occupied by Nazi Germany, including those of Vienna and other Austrian cities, Strasbourg, Warsaw, Cracow and Poznan.

The discrimination laws made life very difficult for some astronomers. Thus, in spite of having been a front-line soldier during WWI (which definitely granted him respect and initially some privileges), Hans Rosenberg (1879-1940), first in Strasbourg, Göttingen, Tübingen, later in Kiel, finally had to leave for Yerkes Observatory before becoming Director of Istanbul Observatory in Turkey where he died of a heat stroke. Erwin Finlay Freundlich (1885-1964) left also for Istanbul, then Prague, before starting an astronomy department in Saint Andrews in Scotland.

Adhering to the National Socialist party (In full: *Nationalsozialistische Deutsche Arbeiterpartei* (NSDAP), or National Socialist Workers' Party, founded in 1919-1920) was common in Germany and in the annexed countries, including people who held high responsibilities after WWII (two Presidents of the Federal Republic, one of its Chancellors, a UN Secretary General, etc.). As holding the party card was virtually indispensable for any career progress, it should come as no surprise that numerous scientists, including astronomers, became NSDAP members sooner or later.

Interested readers are encouraged to refer to Duerbeck's study for details—with all needed nuances—on astronomy-related activities under the Nazi regime and the rôle played by the various characters involved. The complexity of the context resulting from WWI (in particular, the ostracism of German scientists after that conflict), the evolution of the various institutions and the individual implications are very well documented. The author also provides pointers towards references and further readings.

In a fascinating historical memoir, Michael P. Seiler deals with the development of solar astronomy under National Socialism times in Germany and especially during World War II. Between 1939 and 1945, under the code name *Sonnengott* (Sun God), the Third Reich air force, the *Luftwaffe*, heavily invested in solar research, as well in establishing a chain of solar observatories. The study of solar activity was then assumed to allow reliable daily predictions for determining the best frequency bands for long-distance military radio communications.

During the six years of the conflict, the German solar research grew (quoting the author) "from a provincial backwater to the forefront of this science," thanks basically to the joint effort of two men: Hans Plendl (1900-1991) and Karl-Otto Kiepenheuer (1910-

1975). Just before the hostilities, the former was an experienced researcher who had become a key figure by designing precision-bombing aids for the *Luftwaffe*. He subsequently became Göring's plenipotentiary for high-frequency investigations before falling in disgrace. The second gentleman, Kiepenheuer, was a young, charismatic and eloquent astrophysicist, the son of a publisher who had seen his books burned when the National Socialist party took power in 1933.

The book exposes the mutual support of the scientists during the conflict, for instance for securing positions away from the front line, but also for obtaining substantial subsidies for investigations of a definite intrinsic interest, but of a reduced utility for the *Luftwaffe*—something that did not remain without consequences when, towards the end of World War II, the Nazi authorities realized that the money spent for establishing solar observatories here and there in Europe was totally out of proportion with the actual contribution of these to the war effort.

One of Seiler's conclusions is that, if some moral aspects of the role played by Plendl and Kiepenheuer in the *Luftwaffe*'s war effort can be debated, it is a fact that those scientists had a lasting influence on German solar physics in the second half of the 20th century and on the collaborations maintained with the scientific community in Europe and in the United States —an influence that continues at the beginning of this 21st century.

The German Empire had been proclaimed on 18 January 1871 in the *Galerie des Glaces* of the Versailles Castle at the end of the Franco-Prussian war of 1870-1871. Another consequence of the conflict was the annexation of Alsace-Moselle by Germany. As so often in the course of history, the new authorities decided to make a showcase out of the Alsatian capital, Strasbourg. New spacious and structured quarters were built, as well as a new university equipped with a modern observatory. Inaugurated in 1881 by a meeting of the *Astronomische Gesellschaft*, the facility hosted top instruments in buildings of a novel design. Strasbourg Observatory illustrated all reference books of the time and served as a model for various installations round the world. The library was also extremely well stocked. Everything remained in place at the end of WWI, the new French authorities merely allowing the German Director of the time, Julius Bauschinger (1860-1934), to take his own observations with him when he was escorted to the Rhine crossing.

When, at the nearing of WWII in 1939, Strasbourg University and its personnel were transferred to Clermont-Ferrand in central France, a move carried out with the active participation of André Danjon , 22 railcars of books and instruments made the trip, too. After the new annexation of Alsace in 1940, the Nazi administration demanded restitution of what they considered German national patrimony. The *Ministerialrat* (ministerial civil servant) Herbert Kraft (1886-1946), a Nazi since 1923 and an SS colonel, was put in charge of the recovery. The Kraft archives reveal in his own words the extreme tension of the discussions between the German delegation and Danjon in April and May 1941: Danjon was threatened with being imprisoned; compensatory levies from the Parisian libraries and laboratories were firmly and clearly mentioned. Finally a number of railcar loads returned to Strasbourg. Discussions and partial returns continued for quite a few months, not only of the university material, but also of removed cultural items.

Otto Heckmann (1901–83) was Director of Hamburg-Bergedorf Observatory from 1941–62 before becoming the first Director General of the European Southern Observatory (1962–1969). (1947 photograph, Hamburg Observatory)

The astronomer put in charge of Strasbourg Observatory by the Nazi regime was Johannes Hellerich (1888-1963) who took up duty on 18 August 1941. Hellerich was working at Hamburg-Bergedorf Observatory when he was drafted at the beginning of the hostilities as an ensign in a maritime transportation company based at Wilhelmshaven shipyards. When in Strasbourg, Hellerich ensured several courses (also in Freiburg in Breisgau) and attempted to make best usage of the remaining observational equipment. At the end of WWII, he was interned at St-Sulpice-sur Tarn in southern France and authorized to go back to Hamburg in February 1946.

To the question that many certainly have, one can answer that Hellerich became a member of the National-Socialist party in 1937, probably to ease his career, but that he obviously was not a fanatic follower—something that seems to be confirmed by personal book crates recently examined in an attic of Strasbourg Observatory.

The multinational history of Strasbourg Observatory, more exactly the history of its first century of existence, is the subject of a recent book edited by this reviewer. The WWII period is tackled in several detailed chapters, under the pen of professional astronomers who worked as authentic historians, going back to original sources, visiting recently opened archives and contacting survivors or descendants.

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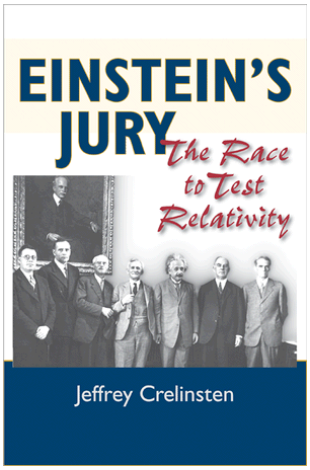

Book Review

Joe Tenn, Sonoma State University

Einstein's Jury: The Race to Test Relativity by Jeffrey Crelinsten (Princeton University Press, 2006)

This book, based on the author's 1981 doctoral dissertation at the University of Montreal, is a very readable scholarly account of the reception and testing of Albert Einstein's General Theory of Relativity by the astronomical community.

While most of the physicists who engaged in analysis, criticism, and application of the theory were in Europe, the astronomers who set out to thoroughly test the theory were mainly American.

It is well-known that a British team lead by A.S. Eddington made the first announcement that the predicted light-bending by the Sun had been confirmed, but the precision of their 1919 measurement left much to be desired.

The author recounts the long, painstaking efforts of observers to make the crucial measurements during the few precious moments of eclipses, often in remote and uncomfortable places. If there is a hero to the story, it is William Wallace Campbell, director of the Lick Observatory and eclipse chaser extraordinaire.

Although German astronomer Erwin Freundlich had been trying since 1914, it was Campbell and Robert Trumpler who finally succeeded in nailing down the measurements in a 1922 eclipse, seen from Wallal in western Australia. After this only a few diehards kept resisting relativity, some as late as 1928.

Crelinsten points out that with the notable exception of the Swiss-born Trumpler, American astronomers did not understand the theory, and most hoped that it would be proved false. This did not interfere with their goal to make as precise and ironclad a measurement as possible. It did not really matter to Campbell what the theory said. He was an observer who would test any serious prediction.

The book is filled with colorful characters, including the notorious T.J.J. See, the xenophobic Heber D. Curtis (the most respectable astronomer to actively oppose relativity), the Mt. Wilson astronomer Charles St. John, who tried to measure the predicted gravitational redshift in the solar spectrum, and now-forgotten astronomers who took their opposition to the foreign theory to the media.

This is a fascinating book, which clearly benefits from the author's long experience in communicating science, and especially relativity, to the public.

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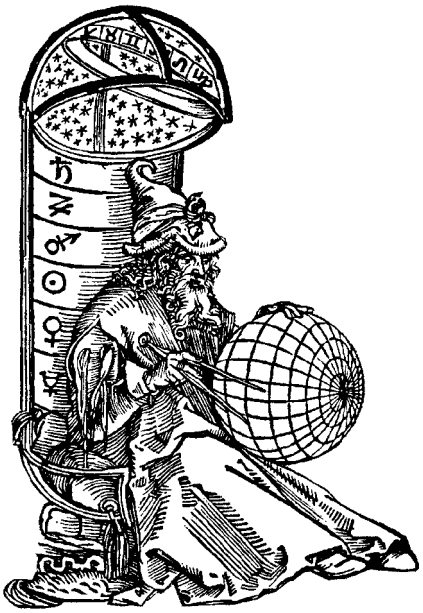
Fifty-Year Members

As we celebrate the 50th anniversary of the beginning of the Space Age it seems fitting to recognize those members of HAD who have been members since before Sputnik. Of course HAD did not exist until 1980, but its parent organization, the American Astronomical Society, is more than a century old.

The following HAD members have been members of the AAS since the years indicated:

1934	Frank Edmondson
1947	Nancy Roman
1950	William Liller
1951	William Baum
1952	Roy Garstang, Owen Gingerich, Hugh Johnson
1954	Joseph Chamberlain, Laurence Fredrick, William Howard, Morton Roberts, Elizabeth Roemer
1955	David Crawford, Arnold Heiser
1956	Marshall Cohen, Norman Thomas
1957	Arlo Landolt, William Shawcross



Historical Astronomy Division
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Please send contributions for the next issue,
comments, etc. to joe.tenn@sonoma.edu

Website: http://www.aas.org/had/

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