

H·A·D NEWS

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

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The 2016 HAD/AAS Meeting

Ken Rumstay, Valdosta State University

The Historical Astronomy Division met (in conjunction with the 227th meeting of the AAS) on January 4th and 5th at the Gaylord Palms Resort and Convention Center in Kissimmee, Florida. A total of nineteen oral presentations were made in three sessions: *A Celebration of the Centenary of Einstein's General Relativity*, *History of Astronomy: 19th and 20th Centuries*, and *History of Astronomy: History, Archeoastronomy, Philosophy, Education*. Sadly, three abstracts were withdrawn prior to the meeting for various reasons. A poster session on Tuesday comprised three entries. Abstracts of all presentations are available at the HAD website (<https://had.aas.org/meetings/2016abstracts.html>).

Attendance at the sessions was excellent, with standing room only at times. Unfortunately, Albert van Helden was unable, due to illness, to attend and to present this year's Doggett Prize lecture, *New Information about Old Telescopes*. We owe a special thanks to Owen Gingerich for reading that talk in Albert's absence!

The HAD business meeting was conducted on Tuesday afternoon; highlights appear on page 3. HAD events concluded that evening, as members met at a local restaurant for the ninth annual HAD "minibanquet" at a nearby restaurant.

I would like to thank all those individuals who presented their research findings in January, and all those who attended our sessions. The Historical Astronomy Division will next meet in Grapevine,



The Gaylord Palms Resort and Convention Center in Kissimmee, site of the January 2016 HAD meeting.

Texas in conjunction with the 229th AAS meeting. That meeting is scheduled for Tuesday through Saturday (2017 January 3-7) at the Gaylord Texan Hotel and Convention Center.

In addition, a HAD session is planned for the upcoming meeting of the Division of Planetary Sciences, to be held October 16-21 in Pasadena. One session will deal with the discovery of Pluto's atmosphere and the back story of the New Horizons mission, with an additional session or two for contributed papers. The speakers will be Michael Neufeld (National Air and Space Museum), Amanda Bosh (Lowell Observatory and MIT), Leslie Young (Southwest Research Institute), and Bruno Sicardy (Observatoire de Paris). For information contact Jay Pasachoff (eclipse@williams.edu).

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From the Chair

Marc Rothenberg, National Science Foundation

I want to begin by thanking Ken Rumstay for having agreed to serve as Secretary-Treasurer of HAD. As this newsletter attests, Ken is doing a wonderful job.

We had a very successful meeting in January in Orlando, highlighted by the special session on "The Centenaries of General Relativity and the Great War" organized by Virginia Trimble. We also managed to continue the tradition of the mini banquet, thanks to the assistance of the AAS staff, who identified the off-site banquet location, and the cooperation of HAD members, who arranged car pools to it. Be prepared. We may have to do the same thing in Texas in 2017.

The major disappointment of the meeting was the inability of Albert van Helden, our Doggett Prize winner, to attend the meeting. He fell ill just prior to the meeting. Fortunately, Owen

Gingerich volunteered to read Al's paper at the plenary session. Thank you, Owen for stepping into the breach and doing it so well.

One of the current priorities of the AAS is to increase cooperation among the divisions. My predecessor, Jay Pasachoff, has worked very hard over the last few years organizing historical sessions at other division meetings. I am calling upon the HAD Membership to follow his example. If you are a member of another AAS division, please consider organizing a historical session at that division's annual meeting.

Not only is this a US election year, but it is also a HAD election year. I am looking for volunteers for the Nominating Committee. If you are willing to serve on that committee, please contact me at josephhenr@aol.com.

I am also looking for volunteers to organize special thematic sessions for the January 2017 meeting at the Gaylord in Grapevine, Texas. If you have an idea, please contact me as soon as possible.

josephhenr@aol.com



From the Vice Chair

Patrick Seitzer, University of Michigan

I am sadly reminded on a continuing basis that the primary responsibility of the Vice Chair is the collection of obituaries of AAS members no longer with us. These serve two purposes: first, as a tribute to the individual, and second, to establish a historical record for possible future research. These obituaries are deposited in the archives of the American Institute of Physics (AIP).

There is quite a backlog of deceased AAS members who need obituaries, and we seek your help in bringing this backlog down. On the HAD web site now is a list of individuals for whom

obituaries are needed. I invite you to pursue this list and see if you can help out, either by writing an obituary, or by suggesting someone who could, and bring their names to my attention. These obituaries do not have to be long (500-1000) words, and having a picture is always welcome.

Also, if there is someone who passed away whom you knew, could you please verify that the information (name and dates) are correct. Please bring any possible problems to my attention.

Crystal Tinch (our AAS Communications Manager) is now listing recent deaths in the AAS electronic newsletter. This has resulted in some quite moving obituaries being submitted, along with pictures of the deceased.

I look forward to seeing many of you at upcoming AAS meetings.

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From the Secretary-Treasurer

Ken Rumstay, Valdosta State University

This is my first column as Secretary-Treasurer to HAD, having been appointed to the position at the January 2016 meeting. I am honored to have been entrusted with this responsibility, and would like to thank my predecessors Joe Tenn and Jay Holberg for their guidance and assistance!

I have been a member of the faculty of Valdosta State University (in Valdosta, Georgia) since 1984. In addition to teaching, I serve as director of the planetarium and observatory there.

Our Division is healthy; we currently have 298 members, down slightly (1.3%) from this time a year ago. Until I became Secretary-Treasurer I must admit that I didn't fully appreciate the variety of membership categories available; I would like to thank Diane Friendak for clarifying them for me! Our membership currently stands as follows:

- 43 AAS Associate
 - 1 Divisional membership (not AAS member)
- 86 AAS Emeritus, Full
 - 1 AAS Emeritus, Associate
 - 0 AAS Education Affiliate
- 134 AAS, Full
 - 25 HAD Affiliate (not AAS member)
 - 1 AAS International Affiliate
 - 6 AAS Junior
 - 1 AAS Patron

And here is a summary of our current financial status for the 2015 calendar year:

HAD Account

Balance as of 01/01/15: \$18,129.99

Balance as of 01/01/16: \$17,553.73

Doggett Prize Account

Balance as of 01/01/15: \$35,637.99

Balance as of 01/01/16: \$34,767.75

Osterbrock Prize Account

Balance as of 01/01/15: \$20,157.38

Balance as of 01/01/16: \$21,121.44

The Historical Astronomy Division relies on the generosity of its members! The two prizes we award (the LeRoy E. Doggett Prize for Historical Astronomy and the Donald E. Osterbrock Book Prize for Historical Astronomy) are funded entirely by generous supporters. I would like to personally thank all those who contributed to HAD's fiscal health through their donations in 2015: Bella Chiu, Brenda Corbin, Thomas Corbin, David DeVorkin, Reginald Dufour, Thomas English, Holland Ford, Donald Groom, Arnie Heiser, David Jenner, Russell Kulsrud, Marie Lukac, Stephen McCluskey, David Meisel, Ivy Merriot, Charles Peterson, Woody Sullivan, Joe Tenn, Virginia Trimble, Thomas Williams, and Robert Wing. Thank you all!

I would like to conclude by making five requests:

- 1) If you have a suggestion for a special session at our January meeting, please let us know!
- 2) If you will be attending the San Diego AAS meeting in June, please consider sitting for an interview for the Oral History Project. Jarita Holbrook describes this worthy program on the next page.
- 3) If you would like to assist Joe Tenn with the Astronomy Genealogy Project, please contact him at astrogendirector@aad.org. The goal of AstroGen is to list as many as possible of the world's astronomers along with their academic parents (i.e., their thesis advisors); currently there are over 5500 entries!

- 4) This is an election year (not just nationally, for HAD as well!). If you would like to run for the office of Vice-Chair (and President-Elect), or to be a Member-at-Large on the HAD Committee, please contact David DeVorkin, Chair of our Nominating Subcommittee (devorkind@si.edu). Also please feel free to nominate others, but as a matter of courtesy please discuss the matter with them first!
- 5) Finally, please keep your contact information up to date with our parent society! To make changes, go to <https://aas.org/>, log in, and click on "Membership" and then "Update Profile." And please set your spam filter to allow HAD messages to reach you. I promise to not bombard you with too much e-mail!!

Thank you once again for your trust, and I hope to see you all (or many of you, at least) next January in Grapevine!



This Month in Astronomy

Teresa Wilson, Michigan Technological University

At the January HAD meeting, the possibility of a monthly news note describing historical events in astronomy events was discussed. HAD member Jennifer Bartlett (U.S. Naval Observatory) found a willing volunteer in Ms. Teresa Wilson, a Ph.D. student at Michigan Technological University who plans to pursue a career in science communication. She is off to a good start: her adviser is Robert Nemiroff, who edits the ever-popular Astronomy Picture of the Day website (<http://apod.nasa.gov>). We thank Teresa for her willingness to assume this task, and look forward to her monthly feature. It will be sent by e-mail to all members of the AAS, and all entries will be made available on the HAD website. Teresa has kindly provided a foretaste of what she has planned:

This Month in Astronomical History is a short column on the AAS website that will revisit significant historical astronomical events that had

occurred during that same month. It will cover a variety of topics, from important observations and discoveries to technological advances, much like the APS This Month in Physics History, but the focus will be in astronomy and astrophysics. A March column might cover Clyde Tombaugh's discovery of Pluto in 1930 or William Herschel's discovery of Uranus in 1781, while an April column might highlight Victor Hess' detection of cosmic rays with his hot air balloon. The column will begin this July and will cover the Comet Shoemaker-Levy collision with Jupiter.

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The Oral History Project at the San Diego AAS Meeting

Jarita Holbrook, University of the Western Cape

The goal of the Oral History Project is to capture the experiences, the knowledge, and the scientific successes and failures of astrophysicists alive today. We have been very successful in interviewing our diverse community including undergraduates, grad students, postdocs, private researchers, scientists in industry and national labs, all flavors of professors, and retirees.

This will mark the second year of having two dedicated rooms for doing oral history interviews (StoryCorps style, see <https://storycorps.org/>) at American Astronomical Society meetings. For June 2016 AAS meeting in San Diego, we will have three interviewers for the Oral History Project: Jarita Holbrook (UWC), Sharon Traweek (UCLA), and Sanlyn Buxner (UA). We will be collecting interviews between June 11th and 16th. The interview signup sheet may be found online at Tinyurl.com/oralaas228.

For the summer meeting, we are offering the opportunity to be interviewed during the weekend

before the meeting. We chose to offer the weekend slots because there is little or no conflict with the science sessions, and thus these interviews can be scheduled now rather than after the AAS meeting schedule is released. Also, an AAS registration will not be required to be interviewed during the weekend. Depending upon the response, we may continue to offer weekend slots in the future.

It has been wonderful hearing the enthusiasm of our young people and the wonderful career advice from our senior members. If you have not done so, please sign up to be interviewed to be a part of this amazing collection of interviews!

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The Science of Time

Rob Seaman, Lunar and Planetary Laboratory

Time is the broadest area of study, yet also the most mysterious. Physicists speculate that the arrow of time arises from boundary conditions of entropy in the early universe. Yet time is the bread and butter of historical study, how we "keep everything from happening all at once." Time has been of particular importance in the History of Astronomy. Astronomers were the first time-keepers of course, relying on the rhythms of the sun, moon, stars and planets. Yet, too, every observation of the sky is a snapshot of the past, a literal time machine; the cosmic microwave background is a postcard from the Big Bang. The clockwork cosmologies of Ptolemy and Copernicus are at the heart of our species' epic exploration of the universe. Time is the organizing principle behind every story and all of history.

Abstract submission is now open for The Science of Time, a symposium to be held by the Harvard-Smithsonian Center for Astrophysics from 5-9 June 2016.* The breadth of topics will extend across Time in Astronomy and Society, Past, Present and Future. Your contribution would be welcome! To register for this meeting, please go to <http://sot2016.cfa.harvard.edu/>.

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* Plus, a tour of the Collection of Historical Scientific Instruments at Harvard University on June 10th. (<http://chsi.harvard.edu>)



Under Connecticut Skies

Amrys O. Williams, Wesleyan University

Roy Kilgard, Wesleyan University

The Van Vleck Observatory at Wesleyan University will be celebrating its centennial in June of 2016, and a group of students, faculty, and staff from across campus have been engaged in several projects to commemorate 100 years of astronomical research, teaching, and public outreach.

The 20-inch Clark refractor, used for three quarters of a century for determining stellar parallaxes, was beginning to show its age. Refracting telescopes of such size are rare and precious, and few remain in working condition. Under the supervision of Professors Roy Kilgard and Bill Herbst, Wesleyan contracted Fred Orthlieb, Professor Emeritus of Engineering from Swarthmore College and an expert on telescope restoration, to rehabilitate the telescope. The result is a careful compromise of historical restoration and thoughtful modernization, with the goal of at least another century of operation with only routine maintenance. With its prominent

location on Wesleyan's campus, the Clark refractor enters its second century as an instrument of outreach and education, where it will welcome visitors for weekly public programs.

On May 6th the observatory's library reopened to the public with an exhibition on the history of astronomy at Van Vleck. Developed by a team of faculty, students, and staff, and spearheaded by Professors Roy Kilgard and Seth Redfield in Astronomy and Professors Amrys Williams and Paul Erickson in History, the exhibition uses the observatory's extensive collection of scientific instruments, photographs, drawings, teaching materials, and correspondence to illustrate both changes in astronomical research and teaching over the past century, and also the observatory's consistent mission of conducting instruction and research under the same roof. The exhibition will incorporate the history of science into Van Vleck's existing public outreach programs through period lectures, demonstrations of historic artifacts, and gallery talks.

Additional events took place prior to the opening. The Wesleyan Orchestra held a concert on May 1st which featured astronomically themed music, including John Cage's *Atlas Eclipticalis*, which was composed using star charts from the Van Vleck Observatory library. On May 4th the History Department hosted David DeVorkin, Senior Curator at the National Air and Space Museum, who presented a talk situating Van Vleck in the history of American observatories.

In addition to interpreting the observatory's past, the team has been working to document its more recent history through an ongoing oral history project. So far, they have conducted over 20 interviews with current and former faculty, students, staff, and amateur astronomers. The oral histories will become part of a more extensive digital collection of materials related to the history of astronomy at Wesleyan and held by the University Archives. The team actively solicits stories from the wider community; to learn more, visit <http://underctskies.wesleyan.edu/>.

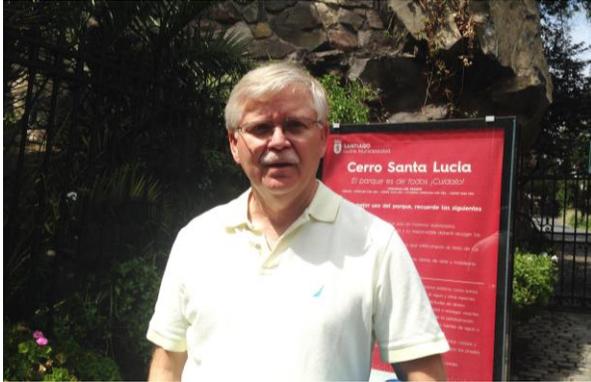
As the capstone event of the centennial celebration, Wesleyan will host a one-day symposium on the 100th anniversary of the dedication of Van Vleck Observatory on June 16, 2016. The symposium is co-sponsored by the Astronomical Society of Greater Hartford, the

local organization of amateur astronomers with which Wesleyan's Astronomy Department has maintained close ties for many decades. The symposium will feature panel discussions covering Van Vleck's tripartite mission of research, instruction, and outreach, a reception with period music, and observation through the restored Clark refractor.

For further information, visit the Van Vleck website at <http://www.wesleyan.edu/observatory/> and also the Under Connecticut Skies Project at <http://underctskies.wesleyan.edu/>.



Van Vleck Observatory and its 20-inch Clark refractor.



The U.S. Naval Astronomical Expedition to Chile, 1849 to 1852

Steven J. Dick, NASM

About 167 years ago, in early 1849, feverish preparations were being made for a bold expedition to Santiago de Chile. A Congressional appropriation had been secured, and hopes were high that the expedition would help solve one of the most burning problems in astronomy. Headed by the naval officer and astronomer James Melville Gilliss, who only a few years earlier had founded the U.S. Naval Observatory (USNO) in Washington, the purpose of this early expedition was to refine our knowledge of the distance between Earth and Sun by determining the solar parallax. Northern and Southern Hemisphere observations were to be undertaken to measure the parallaxes of Venus and Mars. The distance between Washington and Santiago provided a known baseline of 5,000 miles for this purpose.

Because Gilliss was the founder of the USNO, I had given him considerable attention in my recent book *Sky and Ocean Joined: The U. S. Naval Observatory, 1830-2000*. But only a scant few pages were devoted to the Southern Hemisphere expedition, since Gilliss at the time



was not the Superintendent of the USNO (Matthew Fontaine Maury was, but that's another story!). It was therefore with some surprise that I received an invitation to become an international collaborator for a group at the Pontificia Universidad Católica de Chile undertaking research on this expedition. The group, located in Santiago and funded for three years by the Chilean equivalent of our National Science Foundation, is a vibrant interdisciplinary mix of architects, historians, and astronomers.

The occasion of our first meeting in Chile in March 2016 was to evaluate the end of the first year of research. Activities took place over three days, but the highlight was a program of speakers looking at the expedition in the context of both American and Chilean history of science from many perspectives. It turns out that, although Gilliss's astronomical observations were not very successful (see Huffman, cited below), he did produce six beautifully illustrated volumes which include not only scientific observations but also some of the earliest descriptions of Chile as a nation, as well as the mineral, animal and fossil collections returned by the expedition. Moreover, when Gilliss departed Chile in 1852, he left behind instruments and buildings that formed the core of what would become the Chilean National Observatory. One perspective, therefore, is that both the USNO and the Chilean National Observatory were part of what I have called the second era of the National Observatory Movement, characterized by offshoots from previous national observatories and by new observatories of some younger nations.

Other perspectives addressed the merits of practical vs. pure research in developing nations, the place of the expedition in geographical explorations of Chile, and physical science in Chile in the mid-19th century. Much attention was given to the site of Gilliss's observatory, the hill known as "Cerro Santa Lucia." Volume 1 of Gilliss depicts not only Santa Lucia from a distance, but also a famous foldout panoramic view of Santiago from the top of the hill. Although no artifacts remain, the team has recently pinpointed the location of the observatory and hopes to erect a plaque. Today Santa Lucia, which serves as a city park, is a prominent landmark in the center of Santiago, 629 meters

above sea level. One of the highlights of the visit was a climb to the top of this "hill," to see where Gilliss and his team would have worked, and to discover that Charles Darwin had climbed this very hill fifteen years earlier during the voyage of the Beagle. The site also has a statue of Pedro de Valdivia, since it was at this location that he founded Santiago on February 12, 1541, having been sent south from Peru by Pizarro.

The results of the expedition were quite remarkable. Although the scientific results for parallax were a partial failure (the distance to the Sun was not improved, and attention turned to the many transit of Venus expeditions for the solar parallax) a catalogue of southern stars was observed. Moreover, Gilliss's detailed descriptions of the culture, geography, meteorology and magnetic observations of Chile are considered the most valuable part of his expedition today. And his expedition represents a very early example of cooperative relations between the two young American nations. Today, because of its clear skies and dry conditions in places like the Atacama desert (where the Large Millimeter Array thrives), Chile has become the astronomical capital of the world, with almost half of the world's astronomical instruments. It all began with the U.S. Naval Astronomical Expedition, the work of James Melville Gilliss, and his successors at the Observatorio Nacional in Santiago.

On the return trip we couldn't resist a stop in Peru to visit the Incan ruins in Lima, Cusco, and Machu Picchu, including the Temple of the Sun, the solar observatory, and the small but vibrant Maria Reiche Planetarium and Observatory in the Sacred Valley of the Incas. Astronomy and its history thrive in many ways in South America!



Santa Lucia, as it appeared in 1852.

For more on the U. S. Naval Astronomical Expedition see Wendell W. Huffman's article, "The United States Naval Astronomical Expedition (1849-52) for the Solar Parallax, (1991), *JHA*, **22**, 208-220. On the broader history see Philip Keenan et al., "The Chilean National Astronomical Observatory (1852-1965)" (Universidad de Chile, 1985). For the National Observatory Movement see the special issue of the *Journal for the History of Astronomy*, vol. **22** (1991), 1-99.



An Electronic Book: Astronomical Manuscripts in Georgia

Irakli Simonia, Ilia State University, Georgia

More than 12,000 manuscripts in the Georgian, Persian, Arabic, Greek and other languages are preserved in different scientific centers of Georgia (Caucasus) in universities, institutes, archives and libraries. The Georgian manuscripts embrace the 9th through the 19th centuries and contain original Georgian texts proper or foreign materials translated into the Georgian language. Persian and Arabic manuscripts (in libraries and archives of Georgia) are of later period, starting from about the 14th century. These manuscript materials are quite extensive in their content. The collections preserved in the centers mentioned above contain religious, scientific, literary, and mixed works. The manuscript materials also involve different chronicles, historical notes, descriptions of different events, and instruction material, maps, tables, diagrams and pictures.

Among the scientific materials we come across astronomical, mathematical, physical, and other works. The manuscript materials of astronomical character are in the form of completed treatises and works, or in fragments in the form of separate

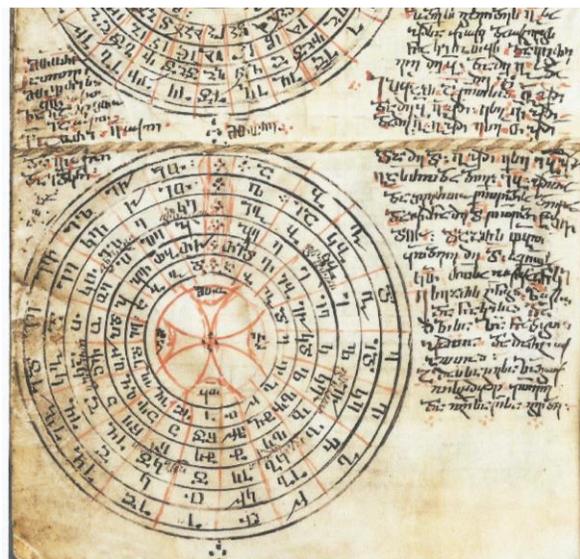
chapters or even their parts. The mixed manuscripts often contain astronomical and astrological fragments. Astronomical materials, preserved in the scientific centers of Georgia, include from 300 to 400 manuscripts; original Georgian works or translations into the Georgian language. No more than sixty Persian and Arabic astronomical manuscripts are in the form of treatises and their fragments. Safety of materials is diverse. There are manuscripts preserved in good condition, but a definite part of manuscript heritage is damaged by time and demands restoration and conservation. Taking into consideration the fact that the Georgian manuscripts are preserved in the scientific centers and libraries in other countries, including Greece, Egypt, Great Britain, France, Russia, etc., it should be stressed that (1) Georgian astronomical manuscripts, scattered in different centers, were never subject to systematization, and that (2) the astronomical content of these manuscripts was not studied within the interests of the astronomical science. These manuscript materials were subject only to general philological and historical analysis. The methods of analysis of the ancient astronomical materials were not used in regard to them yet. Exceptions include several Georgian astronomical works of the 13th, 17th, and 18th centuries (Chagunava, 1986; Simonia, 2004).

With the purpose of virtual arrangement of scattered manuscript materials, express-analysis of unknown astronomical works, formation of short descriptions of unknown manuscripts, and the simplification of access to these materials for scholars of different countries, we initiated and realized a special project: “Astronomical Manuscripts in Georgia.” The main result of this project was the formation of an electronic book / interactive database on unknown or insufficiently studied astronomical manuscripts preserved in the scientific centers of Georgia. An electronic book / database “Astronomical Manuscripts in Georgia,” (I. Simonia et al.) has been published by Ilia State University Press, Tbilisi, in 2015. It has been published in the form of a DVD in the Georgian and English languages.

This DVD contains various descriptions, bulletins, full texts, fragments, and images of unknown or little studied Georgian, Persian, and Arabic astronomical manuscripts of the 9th through 19th centuries. These manuscripts are kept now in libraries, archives, and other scientific centers of Georgia. This DVD contains also Georgian translations and interpretations of Byzantine

cosmology, Persian and Arabic astronomical sources. The electronic book also includes several treaties in physics and other mixed subjects. Astronomical treaties, star catalogs, calendars, sky maps, instructions for observations, and instrument construction are presented in this edition. The electronic book / database has a clear structure, description of scientific results, information for users, catalogs, bulletins, search-engine, Georgian-English dictionary of old astronomical terms, references, and more. This DVD contains 300 bulletins for Georgian astronomical manuscripts and sixty bulletins for Persian and Arabic astronomical manuscripts. These astronomical manuscripts embrace the period of the 9th through 19th centuries and are written in the ancient Georgian language, late medieval Georgian, and also in the Persian and Arabic languages.

The material, on the whole, is scattered and involves both theoretical works and a complex of observational data. These manuscripts in particular are dedicated to description of cosmogony theories, elements of spherical astronomy, various systems of calendars, astronomical instruments, star catalogs, etc. These works give detailed descriptions of different celestial phenomena, both of regular character and rare phenomena, including eclipses and the appearances of comets. These materials list bright and dim stars, groups of stars - constellations. These astronomical manuscripts are often accompanied by astrological material with different predictions and prognoses.



Astronomical fragment of manuscript Sin-38 Gospel (Mount Sinai, Monastery of Ekaterine, Egypt) compiled and edited by Georgian philosopher and writer Ioanne Zosime. Parchment in ancient Georgian (10th century).

Many Georgian astronomical manuscripts are included in more general papers and works, first of all, of religious character. Along with this, purely astronomical works, treatises, descriptions, tables are met rather often. There are original Georgian materials and quite many translations. The Persian and Arabic astronomical manuscripts published on this DVD are of a later period (14th through 18th centuries) and describe the issues of cosmogony, practical astronomy, and chronology.

To summarize, this electronic book/database “Astronomical Manuscripts in Georgia” (I. Simonia et al., 2015) opens new data for the historical-astronomical community. It may become a unique source and platform for researchers and PhD students who investigate astronomical heritage of the past. It can stimulate new scientific projects and initiatives. This DVD disc may be rather valuable edition for the universities, libraries and Archives.

To receive this resource, or for further information, please contact me at the address below. I am especially interested in establishing contacts with universities.

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Flood Threatens Photographic Plates

Camille M. Carlisle, Sky & Telescope

This article is reprinted by special permission of Sky & Telescope magazine. Written by Science Editor Camille Carlisle, it appeared in that magazine's Online News feature on March 11th.

Building D of the Harvard College Observatory houses three stories of shelves crowded with snapshots of the sky. These photographic plates, beautiful “film negatives” made of glass, were

taken by astronomers both at Harvard and at outposts around the world over the years 1885 to 1992. The observatory stored them here in carefully marked paper envelopes as a large-scale celestial recordkeeping project. The collection contains more than 500,000 plates; no one is quite sure of the exact number. With more than a century of data preserved, the archive is the Alexandrian library of astronomy.

But on the morning of January 18th, there was something else in the stacks besides glass: water.

At about 5:30 a.m. that Monday morning, the Cambridge city water main running beneath Observatory Hill ruptured. The plate collection is housed to protect it from fire and various other mishaps, but no one could have predicted this 8-inch pipe would burst some 16 feet beneath the courtyard outside. Being at the top of the hill, the busted pipe could have sent its water in any direction. Due to the vagaries of underground soil, however, it sent it straight for the observatory buildings, including the basement beneath the stacks.

With 60 pounds of water pressure, the burst main was like “a fire hydrant on steroids,” laments astronomer Jonathan Grindlay (Harvard), who directs the project to digitize all 500,000-plus plates, called Digital Access to a Sky Century at Harvard (DASCH). The water filled the 5-foot-deep basement beneath the stacks first. At 8:30 a.m., when DASCH staff discovered the flood, there were 2 feet of standing water in the archive's bottom story. By the time the water was turned off, the level had risen above 3 feet.

The water soaked the four lowest shelves of paper-shrouded plates. It also destroyed a half dozen computers and the commercial scanner the team was using to digitize the archive. “Electronics do not like to be submerged in muddy water,” Grindlay sums up.

Scrambling to save the collection, the team called up Harvard's Weissman Preservation Center, whose staff had already been advising DASCH. Turns out the Weissman folks are set up for emergency response. They showed up with a couple thousand foldable plastic boxes, each about 1½ ft wide, designed to store valuable documents under threat. Over three days, staff and volunteers packed each box with about 30 plates and ferried it out in “a sort of human bucket brigade,” Grindlay says. By Thursday afternoon

they had evacuated the bottom rows of plates — some 61,000 in all, each in its soaked paper envelope.

The first order of business, the Weissman experts told DASCH's staff, was to freeze the plates. Old photographic glass in sopping paper might sound bad, but it'd be far worse if the paper started molding. Fortunately it was a cold week in the Boston area, giving rescuers time to have the 2,000 or so boxes trucked up to North Andover for storage in three semi-trailer freezer cars, like a makeshift astronomical cryogenics lab.

Over the next year and a half, disaster recovery contractors will carefully thaw and photograph each plate — still in its envelope — by hand, before removing the paper and gently cleaning the plate itself to preserve the photographic emulsion. After a plate is cleaned and dried, it'll slide into a new, barcoded sleeve.

After extensive checks, Grindlay says they're confident that they haven't lost the plates; they'll be able to clean and scan them and finish the DASCH project, which is only about a third done. (The flooded shelves haven't been scanned yet.) Certainly the envelopes are ruined, but the notes on them are duplicated in the archive's ledgers, and the plate number is also printed on the glass itself.

There are a few silver linings in this disaster. First, all the custom-built equipment survived, including the one-of-a-kind plate-cleaning machine. Second, the commercial scanner DASCH was using was 10 years old, and the new one they've ordered should be about twice as fast. It's being built and will be delivered in about four months. Third, thanks to the new scanner, the team should be able to make up most of the lost time, finishing the digitization project in early 2018 instead of the end of 2017.

Oh, and fourth: insurance is footing the bill. There's still plenty to be done — floor tiles to replace, restoration procedures to finalize — but in all only 12% of the collection was flooded; the other plates still remain safe and dry on their shelves, ready for eager astronomers to study.

To view the original article, please go to:

<http://www.skyandtelescope.com/astronomy-news/flood-threatens-century-old-photographic-plates-0703201623/>



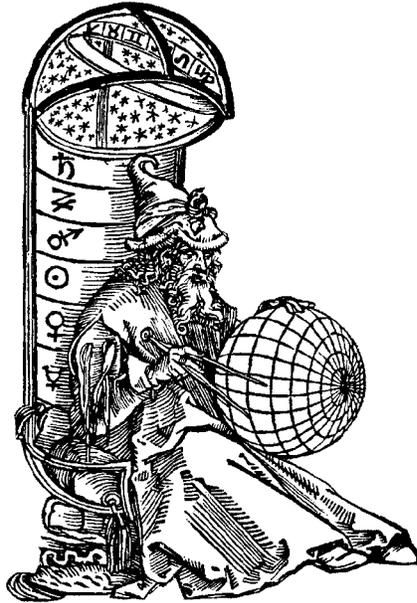
The plate collection lives in Harvard College Observatory's Building D (left, behind foreground dome), tucked inside the wing to the left of what's shown. The right-hand dome houses the 15-inch Great Refractor, installed in 1847.



Volunteers and staff evacuated the plates in "Rescues." Here the cubes are stacked up on carts for loading into trucks (in background).



The photographic plates currently sit in storage in three freezer trucks. The plates will be thawed, cleaned, and re-jacketed over the next 1 to 2 years. In the foreground are the larger, 14-inch by 17-inch "A plates" (most are 8x10).



**Historical Astronomy Division
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A complete version of this newsletter, with color photographs and active links, may be found on the HAD website at <http://had.aas.org/>.

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