A COLD WINTER’S NIGHT AT MOUNT WILSON

by DON NICHOLSON

Observatory friend Don Nicholson recently passed away. This issue of Reflections contains several articles that Don wrote or in which he was featured. He practically grew up on Mount Wilson — his father was Seth Nicholson, who was a researcher there beginning in 1916 — and Don was known to many Observatory volunteers and visitors. He was always pleased to share stories and insights about the Observatory. He will be missed by many, but his legacy lives on in the programs he established that continue today.

One winter night in the mid-1930s, my father had reserved the 100-inch to photograph the ninth satellite of Jupiter, which he had discovered while a graduate student at the University of California. Since the satellite was very far from Jupiter, its orbit was subject to many perturbations and it had to be observed frequently in order to keep it from getting lost. Incidentally, it was also possible that another satellite might be found.

For several months prior to the scheduled observation, Dad had told me many times about the importance of getting a good plate. First, a guide star had to be carefully observed and tracked to overcome slight periodic errors in the telescope drive and to compensate for atmospheric refraction. Second, the plate holder had to be moved at precise intervals in order to correct for the differential motion of Jupiter. And all this had to take place over an exposure of a couple of hours.

It was obviously a task that could be accomplished only by a very careful and experienced observer. As the scheduled day approached, however, I became convinced that I was up to the task and asked permission to make the exposure. Dad expressed doubt that such an opportunity should be entrusted to a raw recruit, but said he would think about it. Finally he agreed, with apparent reluctance, to let me make the exposure.

On the afternoon before the event, we had a dress rehearsal at the Newtonian focus of the 100-inch and I felt that I was ready. When night came and Jupiter was well up in the eastern sky, we went to the dome, loaded the plate holder, and climbed the steps to the platform. After inserting the plate holder and moving the telescope into position, I sat down in the observing chair, located the guide star, and prepared to begin the exposure.

Dad then bid farewell and retired. All went well and I could see that this was going to be a piece of cake. As time went on, however, I began to realize why Dad had left the platform. IT WAS COLD! Of course I couldn’t leave the chair to stomp around the platform in an effort to keep warm. I had to stay glued to the eyepiece in order to make the differential corrections. Remember, this was before the days of down jackets and warm, light clothing — no electrically heated flying suits, either. Somehow I survived the numbing experience and finally inserted the dark slide, at which time Dad reappeared on the platform, warm and comfortable. We developed the plate in a warm darkroom and I partially thawed. Close examination of the plate did reveal the ninth satellite, but no others. That had to wait for a later day.

In retrospect, I’m sure that Dad, who had been through this chilling experience many times before, knew all along that he would let me make the exposure. He didn’t want to give me the opportunity to back out, but led me down the long garden path to the coldest experience I have ever had.

This account appeared in the December 2013 Reflections.
A memorial gathering for Don Nicholson was held at Carnegie Observatories, 813 Santa Barbara Street in Pasadena on Saturday, December 10. Many of Don’s friends and colleagues attended to honor Don and his many contributions to Mount Wilson Observatory — see page 3.

MOUNT WILSON INSTITUTE RECEIVES EDUCATION GRANT

Dan Kohne, MWI Trustee responsible for Media and Public Relations, reports that the Norris Foundation has awarded a grant in support of Mount Wilson Next Generation STEM Field Trips.

ASTRONOMY WEEK

On October 19, in conjunction with the City of Pasadena’s Astronomy Week, Mount Wilson Observatory hosted over 200 visitors to view through the 60-inch reflecting telescope. Most had requested tickets for the viewing, but telescopes furnished by the Los Angeles Astronomical Society’s volunteers and the Observatory’s 6-inch Warner & Swasey refracting telescope were open to all who came. In addition to the telescopes, presentations by Nik Arkimovich of the Mount Wilson Institute and Marja Seidel of Carnegie Observatories were held in the auditorium. We plan to do this again next year.

CARNEGIE OBSERVATORIES ASTRONOMY LECTURE SERIES ONLINE

The Observatories’ Spring Lecture Series is online. We also have audio recordings of older lectures that were combined with the presenter’s slides. Visit: http://obs.carnegiescience.edu/news/huntington_online.

GOODBYE, CASSINI. BUT FIRST ….

NASA’s Cassini spacecraft has entered a new mission phase that will carry the spacecraft high above Saturn’s northern hemisphere before sending it skimming past the outer edges of the main rings — https://saturn.jpl.nasa.gov/news/2966/ring-grazing-orbits. Cassini will begin its Grand Finale in April, leaping over the rings and making the first of 22 plunges through the gap between Saturn and its innermost ring on April 26. On September 15, the mission’s planned conclusion will be a final dive into Saturn’s atmosphere.

OTHER-WORLDLY TRAVEL POSTERS AVAILABLE

JPL has made available a series of “travel posters” that feature colorful retro artwork extolling travel to unusual places such as Enceladus, Titan, Europa, Venus, and several exoplanets. The posters are 20 by 30 inches in size and can be downloaded for free at: http://www.jpl.nasa.gov/visions-of-the-future/.

FOMWO Membership

☆ All are invited to join the Friends of Mount Wilson Observatory. The Observatory receives no continuing state or federal support. You can help ensure the continued operation of this science heritage site with your tax-deductible gift. FOMWO offers a variety of membership levels and benefits. For information on how to become a FOMWO member, visit www.mtwilson.edu. The Observatory welcomes donations and volunteer efforts of all kinds, and we thank you.
Donald Seth Nicholson passed away on November 11, 2016, aged 98, following a long and wonderful life. He grew up in Pasadena and Altadena, and spent much of his young life on Mount Wilson where his father, Seth Barnes Nicholson, worked as an astronomer. Don's childhood time on the mountain fostered a life-long interest in science and astronomy. Following a career, or series of careers, in meteorology and optics, he retired and focused his interests and talents on Mount Wilson. He was a prime mover in the volunteer-based Mount Wilson Observatory Association (MWOA) that trained docents and other volunteers in the history of the Observatory. His quick wit and dry sense of humor were always at hand, and he never seemed so happy as when sharing stories of the Observatory and the individuals associated with it.

A memorial gathering was held on Saturday, December 10, graciously hosted by Carnegie Observatories in Pasadena. Many of Don's colleagues, admirers, and old friends were there to celebrate his life.

John Mulchaey, the Director of Carnegie Observatories, welcomed the attendees. To set the stage, Joanne Lazzaro played the world flute, very beautifully, creating an ethereal setting for our thoughts. Speakers included Tom Meneghini, Executive Director of Mount Wilson Institute; Observatory volunteers Nik Arkimovich, Lynn Fischer, Gale Gant, Michael Rudy, Mike Simmons, and Tim Thompson; as well as Sam Hale, George Ellery Hale's grandson; and Dave Jurasevich, former Superintendent of the Observatory. Tom Meneghini read a tribute that Hal McAlister, former Director of the Observatory, had sent. Afterwards, a number of people went to the mike and recounted a story or two about Don.

We heard tales of Don's sense of humor, his witiness, his personal integrity, his insistence on disdaining automatic transmissions in favor of stick-shift vehicles, his mentoring skills, and his knowledge of so many aspects of the Observatory, including its history and many interesting characters. Don was described as a keeper of the great historical lore of Mount Wilson, and was in fact a living link to the golden age of the Observatory. Tim Thompson pointed out that for the last 100 years, the Observatory had a Nicholson on the mountain. Now we have lost a chapter in the great history of the Observatory. And as Dave Jurasevich said, we have lost a great man.

In 2012, Robin and Todd Mason, creators of the PBS documentary *A Journey to Palomar*, produced a “walking tour” video of the Observatory. Dave Jurasevich and Don Nicholson visited various parts of the Observatory while Don described the scenes in detail, giving fascinating insight into the history of the mountain. To view the video, visit YouTube and search for “Don Nicholson Mount Wilson.” The video was shown at the memorial gathering in the Carnegie Observatories auditorium.

Should one wish to honor Don's memory with a donation to the Observatory, please mail it to the Mount Wilson Institute Second Century Campaign, P. O. Box 94146, Pasadena, California 91109.
MEMORIES OF THE NICHOLSONS
Laura Woodard Eklund writes of meeting Don and his family, and learning about Don’s father, Seth Nicholson.

I first met Don Nicholson 35 years ago in the library of Mount Wilson and Las Campanas Observatories on Santa Barbara Street (SBS) in Pasadena. He asked me if I knew of his father, Seth, who had been a solar astronomer at Mount Wilson. I admitted that, as a new employee, I did not. But that would change.

Soon after that encounter, Don and his wife began attending (in the SBS library) monthly formation meetings of what would become the Mount Wilson Observatory Association (MWOA), the original “friends group” for Mount Wilson Observatory.

And I (perhaps embarrassed by my ignorance at that first encounter with Don) began immersing myself in the incredible life story of Seth Nicholson, the highlight of which had to be that he (like Galileo) had discovered four moons of Jupiter (three of them at Mount Wilson). His accomplishments were many, in both science and public service. And I incidentally learned that I had lived on the same street (Pepper Drive in Altadena) as Seth during the last year of his life (1963), the year he won the Bruce Medal.

I also had an encounter with Don’s younger sister, Jean, in the 1980s. She walked into SBS one day, unannounced, with a family scrapbook that included many newspaper articles about Seth. She let me borrow it for a few days, long enough for John Bedke (the SBS photographer at the time) to make a copy of it. When I asked Don about that treasure of a scrapbook, he was well aware of it and was quite nonchalant about the incident.

Don outlived both his older and younger sisters, and his wife, by many years. He was the prime caretaker for his wife during her years of memory loss. When she passed, he was President of MWOA and hardly skipped a beat in his duties.

Don’s accomplishments are not as well known as his father’s (partly due to his humility), but I do know that he was an alumnus of both Pomona College and Caltech. He was an Air Force meteorologist (including a stint in Russia) during WW II, and he last worked at Aerospace Corporation.

Don looked so much like the photo of his father in the 150-foot solar tower that during my “immersion,” I began confusing them in my mind and thought I was seeing Seth when I was really seeing Don. But then, his name is Donald Seth Nicholson. And like his father, he was both a scientist and a public servant, spending the last decades of his life devoted to Mount Wilson Observatory — keeping the memory of his father and his own longer memories of Mount Wilson very much alive, in his own witty way.

The Job from Heaven
It certainly wasn’t the best of times and for many it was the worst of times. It was the Great Depression, the summer of 1935, and I found my first job away from home — at the Mount Wilson Hotel. The duties were simple, consisting only of being room clerk, bellhop, busboy, lifeguard, and operator of the 12-inch telescope. The pay was beyond my wildest dreams — 40 dollars a month with room and board. The room was adequate and the board less so, but at the time it was a job that grown men coveted. The best part was that of telescope operator. I was a mere flunky while carrying out the other duties, but as telescope operator I was the expert. I chose the objects to be viewed in the evenings and was in a position to flaunt my knowledge of astronomy to an admiring public.

The telescope was a Tinsley 12-inch Cassegrain. The optics were not the very best, but quite adequate for visual work under average conditions. It was housed in a roll-off shed just a few yards south-west of the hotel entrance. Since the mount was on a tall pier, the eyepiece was convenient except when looking below about 45 degrees from the zenith. An easily movable wooden ramp with railings could be put in place for such lower objects. Most evenings found up to a dozen visitors at the telescope with even more on weekends. We were favored that summer with Mars and Jupiter in the west in the early evening hours and Saturn in the east later in the evening. For practically all the visitors, it was their first opportunity to look through a telescope.

The duty as lifeguard wasn’t all that bad either. The water was from the springs down near Strain’s Camp and required only a minimum of chemical treatment. I don’t remember whether the pool was heated but it was very pleasant during those summer months. It was, of course, necessary for the lifeguard to take some laps every day just to keep in practice. The pool was quite popular with many of the people from the Observatory, especially some of the younger family members. Hotel guests made good use of it as well. All in all, however, it was a good thing that no rescues were ever required.

As a first real job it was ideal. It gave me an opportunity to interact and share duties with other members of the staff and to meet with and appreciate the great diversity of the general public. I certainly made appreciable strides toward maturity that summer.

— Don Nicholson
At the Pasadena City Council’s June 4, 2007, meeting, Mount Wilson Observatory Association (MWOA) President Donald S. Nicholson was presented with a Commendation for his many years of service to the community.

After being introduced by documentary filmmaker Robin Mason, Don spoke as follows:

~ On behalf of my friends and colleagues at the Mount Wilson Institute and the Mount Wilson Observatory Association, I wish to thank the City Council and the citizens of Pasadena for the honor they have bestowed on me this evening. It may well be that the greatest contribution I made to the City’s cultural heritage is that I moved to Altadena as a child.

~ What contributions I have made, however, may be traced to one individual, George Ellery Hale. It was Hale — through his vision and persistence — who, perhaps more than any other, left a legacy of eminence to Pasadena and the surrounding communities that continues to this day.

~ Hale founded the Mount Wilson Observatory and led it to a position of dominance among the world’s observatories. Hale was instrumental in persuading the President and Board of Trustees of Throop Institute to expand its curriculum to include science as well as engineering and to change its name to the California Institute of Technology. Hale convinced his good friend Henry Huntington to leave his estate, art, and manuscript collections to a foundation where they would be accessible to scholars and public alike. Hale was a member of the Pasadena City Planning Commission and led the way to legislation that resulted in the City’s magnificent civic center. Hale would certainly be proud to see that what he helped begin still continues.

~ Although the City has already seen fit to honor Hale in innumerable ways, it is in his memory that I express my thanks and deepest gratitude for the Commendation which you have given to me but which he so richly deserves.

After his presentation of the Commendation certificate, Pasadena Mayor William Bogaard remarked that Don might be the only person still alive who has actually met George Ellery Hale! It might be worth noting here that Hale was also honored by the City of Pasadena. In 1927, he received the City’s highest award, the Arthur Noble Medal, for his key role in the creation of the Pasadena City Hall, Civic Auditorium, and Public Library.

— M. Morgan

Mayor William Bogaard presented a special commendation to Don Nicholson.
THE HALE SOLAR LABORATORY

THE ENTRANCE TO Hale’s solar laboratory.

The December 2010 issue of Reflections featured an article about the Hale Solar Laboratory (George Ellery Hale’s private solar observatory) in Pasadena that included photographs of Don Nicholson and Gale Gant. An excerpt from Jill Ganon’s book, *At Home Pasadena* (Prospert Park Books) was featured on September 7, 2010, under the title “Pasadena’s Private Observatory” on the Hometown Pasadena website. We didn’t have enough room to run all the material that Hometown Pasadena had on their website, so we will augment the text a bit to include more of it. The website is still live, so do visit it at hometown-pasadena.com/history/pasadena-private-observatory/ for the whole story.

The Hometown Pasadena article mentions that Don received a commendation from the city of Pasadena in June 2007. The article states: A wry and modest man, Nicholson first assures us that it isn’t true, then suggests that if they are offering such an accolade to him, they must be giving them out on a weekly basis. But, when pressed to accept the honor, he is willing to go so far as to say, “If I have accomplished anything, the credit largely goes to Hale: If it weren’t for him, my parents would not have been in Pasadena, and I would not have had the opportunity to grow up in an environment that was influenced in great measure by him.”

— M. Morgan

DON MAKES AN ADJUSTMENT. There are just a few individuals now who know how to operate this observatory.

Gale Gant and Don Nicholson at Hale’s solar laboratory.

THE LIBRARY AT Hale’s solar laboratory.

The Hometown Pasadena article was accompanied by excellent photographs of Don Nicholson and Gale Gant and the interior and exterior of the facility, which was designed in 1924. The writer and photographers met Don and Gale at the laboratory (“whose coordinates we are not at liberty to reveal”), and were treated to a demonstration of the telescope as well as Don’s informative and amusing comments. The property is owned by Pasadena architects Liz Moule and Stefanos Polyzoïdes.

The author notes, “An internationally recognized scientist, George Ellery Hale was influential in civic and international activities by the time he commissioned the observatory, which became his office and workshop. With its stone bas-relief above the entrance and second bas-relief over the library fireplace, the building pays tribute to Hale’s interest in Egyptology. Hale was exceptional for his day in his ability to design and fabricate instruments in his own machine shop, which is located in the basement. …The intimacy that one feels with history at the observatory is due to the intimacy of the space itself. We were right there to watch the dome being opened to accommodate the telescope, and we walked among rooms containing Hale’s personal papers, tools, and typewriter, which remain as they might have been when last he used them.”

Photos by Jennifer Cheung and Steven Nilsson.
Science at the CHARA Array

The multiple star sigma Orionis is located just south of the easternmost star in Orion’s belt. It is made up of a close binary with an orbital period of 143 days, a tertiary component with a period of 160 years, and three more distant companions. The most massive component in sigma Orionis is the brightest star in a cluster of several hundred young stars with ages of only two to three million years old. Many of the young stars in the cluster are still surrounded by disks of gas and dust where planets are likely to form.

Long-baseline interferometry has the power to resolve short-period binaries in nearby star-forming regions. We used the Michigan Infrared Combiner (MIRC) at the CHARA Array to map the position of the close binary, sigma Orionis Aa,Ab, as it moved around its orbit on nine nights between 2010 and 2013. With a semi-major axis of only 4.3 milliarcseconds, the visual orbit is resolvable only through interferometric techniques.

**Visual Orbit of** Sigma Orionis Aa,Ab with a period of 143 days and a semi-major axis of 4.3 milliarcseconds. The black circles show the position of the companion Ab relative to Aa (asterisk) measured using the MIRC beam combiner at the CHARA Array. The red ellipses show the small error bars achieved in the observations. The arrow indicates the direction of motion.

**The Constellation of Orion** showing the location of sigma Orionis. Image reprinted with permission from Akira Fujii/David Malin Images.

Binary stars are bound to orbit each other through their gravitational attraction. Mapping their orbital motion provides a way to measure the masses of the component stars. We combined the visual orbit of sigma Orionis Aa,Ab measured at CHARA with previously published radial velocity variations measured from the Doppler shift of spectral lines as the stars move around their center of mass. Based on this analysis, we computed a mass of 17.0 solar masses for sigma Orionis Aa and 12.8 solar masses for sigma Orionis Ab, each measured with a precision of better than 2 percent. These high-precision masses will allow theorists to improve models of stellar evolution for stars much more massive than the Sun.

Binary stars also provide a unique way to measure astronomical distances. By comparing the angular scale of the visual orbit with the physical scale of the spectroscopic orbit, astronomers can measure an “orbital parallax” to the system. Using this method, we measured a distance to sigma Orionis of 387.5 parsecs (or 1264 light-years) with a precision of better than 1 percent. This is the most precise distance measured to a star in the young sigma Orionis cluster. This will help characterize the physical properties of the stars in the region, improve our knowledge of the age of the cluster, and help establish the lifetime of circumstellar disks and the timescales for planet formation.

This work was published by G. Schaefer and 13 co-authors in the Astronomical Journal, vol. 152, p. 213, in December 2016.

Dr. Gail Schaefer is a research scientist at the Center for High Angular Resolution (CHARA) Array on Mount Wilson studying young binary stars and circumstellar disks.
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VISITOR INFORMATION

OBSErvatory Status
The Observatory and Skyline Park are closed to weekend visitors for the winter. Traditionally, the Observatory opens to visitors starting in April from 10:00 A.M. to 5:00 P.M. daily to December 1, weather and roads permitting. Watch for the re-opening of the Observatory in spring 2017, as well as the Cosmic Café at the Pavilion, offering fresh-made sandwiches and Observatory memorabilia, open Saturdays and Sundays.

Docent-led Walking Tours
Docent-led walking tours are on hiatus until spring 2017. When the Observatory re-opens, the walking tours will be held on Saturdays and Sundays. Guests on these tours are admitted to the telescope floor directly beneath the historic 100-inch telescope.

Special Group Tours
Group daytime tours are available year-round. Reservations are required and a modest fee is charged. For information, please visit www.mtwilson.edu.

Mount Wilson Telescopes
Mount Wilson’s 60-inch telescope and 100-inch telescope are closed until April 1, 2017. Visit www.mtwilson.edu for more information.

Parking at the Observatory
The U.S. Forest Service requires those parking within the Angeles National Forest and the National Monument (including the Observatory) to display a National Forest Adventure Pass. For information, visit www.fs.usda.gov/angeles/. Display of a National Parks Senior Pass or Golden Age Passport is also acceptable.

HOW TO GET TO MOUNT WILSON OBSERVATORY

From the 210 freeway, follow Angeles Crest Highway (State Highway 2 north) from La Cañada Flintridge to the Mount Wilson–Red Box Road; turn right, go 5 miles to the Observatory gate marked Skyline Park, and park in the lot below the Pavilion. The Cosmic Café is at the Pavilion. Walk in on the Observatory access road (far left side of parking lot) about 1/4 mile to the Observatory area. The Museum is opposite the 150-foot solar tower.