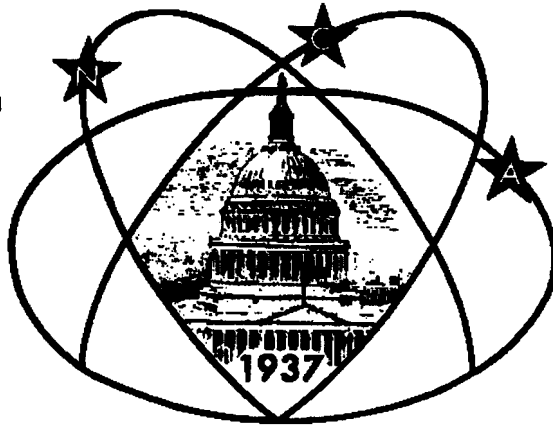


# Star



# Dust

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## 4000 Years Of Women In Science

by *Sethanne Howard*

How long have women been active scientists? A better question is how long have "people" been active in science? The answer is the same for both women and men — as long as we have been human. One of the defining marks of humanity is our ability to affect and predict our environment: science — the creation of structure for our world; technology — the use of structure in our world; and mathematics — the common language of structure. All have been part of our human progress, through every step of our path to the present. Women and men together have researched and solved each emerging need. Women contributed in all the ways there are to the technical advancement of humanity. These women left a

remarkable legacy. Their stories are a clear light to the future.

Dr. Howard is an astronomer with over 30 years experience in research astronomy. She has worked at Lick Observatory, Kitt Peak National Observatory, Smithsonian Astrophysical Observatory, Los Alamos National Laboratory, Marshall Space Flight Center, and now is with NASA Headquarters in Washington, DC as a visiting Senior Scientist in the Office of Space Science. She has also been a ship router/meteorologist for the US Navy. She received her BS from the University of California, Davis, her MS from Rensselaer Polytechnic Institute, and her Ph.D. from Georgia State University. Her avocation is the history of women in science. ○

## What Hubble Didn't Know About Galaxies

by *Harold Alden Williams and Amber Klassen*

At our May third meeting, in the Lipsett auditorium in the Clinical Building of the National Institutes of Health, Vera Cooper Rubin spoke to us on "What Hubble Didn't Know About Galaxies." Wayne Warren announced that Vera had just had an asteroid named after her. She was totally unaware of this honor. The asteroid is 1988 BN2, asteroid number 5726 with the name of Vera Cooper Rubin. It is currently in the constellation Cetus and was below the horizon when Vera learned of its existence. She told us

that she will always remember where she was when she heard the news of her asteroid.

Vera started her talk with a review of the history of galaxies. The Milky Way, the disk of our Galaxy, was often referred to as the road or path in the celestial sphere in ancient times. Al Sufi, a 10th century Persian astronomer, had the Andromeda galaxy marked on his star map as a fuzzy nebulae. Galileo first resolved the Milky Way into indi-

See *RUBIN*, Continued on Page 2

## The Science Fair Winners

The next NCA meeting of the National Capital Astronomers will be held Saturday, June 7, at 7:30 P.M. in the Lipsett Amphitheater of the Clinical Center (Building 10) at the National Institutes of Health (NIH). As is customary for our last meeting of the season, this year's National Capital area, NCA science fair winners will be on hand to describe and discuss their astronomy-related projects. The winners include: Matthew Z. Davis, Greenbelt, MD (*Coronal Heating Mechanism in the Solar Transition Region*); Anne Gaumond, Oxon Hill, MD (*Chaos in the Asteroid Belt*); Walter N. Millis, Falls Church, VA (*The Effects of Different Geometric Distributions on the Evolution of a Star Cluster*); and Court A. Zabel, Washington, DC, (*The Tenuous Hold of 16 Cygni B1*). We hope that all these students will be able to attend the meeting to discuss their project. ○



## Calendar of Monthly Events

### The Public is Welcome!

NCA Home Page: <http://myhouse.com/NCA/home.htm>

**Mondays, June 2, 9, 16, 23, and 30, 7:30 PM**-Public nights at U.S. Naval Observatory (USNO), in Northwest Washington, D.C. (off Massachusetts Avenue). Includes orientation on USNO's mission, viewing of operating atomic clocks, and glimpses through the finest optical telescopes in the Washington-Baltimore region. Held regardless of cloud cover. Information: USNO Public Affairs Office, 202/762-1438. Home page: <http://www.usno.navy.mil>.

**Tuesdays, June 3, 10, 17, and 24, 7:30 PM**-Telescope making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 202/362-8872.

**Fridays, June 6, 13, 20, and 27, 7:30 PM**-Telescope making classes at American University, McKinley Hall Basement. Information: Jerry Schnall, 202/362-8872.

**Fridays, June 6, 13, and 27; July 4, 11, and 25, 9:30 PM**-Open nights with NCA's Celestron-14 telescope at Ridgeview Observatory; near Alexandria, Virginia; 6007 Ridgeview Drive (off Franconia Road between Telegraph Road and Rose Hill Drive). Information: Bob Bolster, 703/960-9126.

**Saturday, June 7, 5:30 PM**-Dinner with the speaker, the science fair winners, and other NCA members at Shakey's, East-West Highway and Wisconsin Avenue, Bethesda, MD. See map and description on back page.

**Saturday, June 7, 7:30 PM**-NCA meeting, will feature SETHANNE HOWARD speaking on "4000 Years of Women in Science" The Science Fair Winners are also featured. For directions, see map and description on back page.

**Saturday, June 14; July 5; August 23, 9:00 PM**-Exploring the Sky, Rock Creek Park, near the Nature Center. Information: 202/426-6829

During questionable weather, call the IOTA Hotline (Phone: 301/474-4945) for NCA meeting status. The absence of a cancellation notice on the Hotline means the meeting will take place.

See page 8 for more Washington area astronomical events. Other events too numerous to list in *Star Dust* are listed in the publications *Sky & Telescope*, the *Astronomical Calendar 1997*, the *Observer's Handbook 1997*, in numerous software packages, and other links available on the NCA Home Page (see above for address). NCA members can purchase all these (and much more) at a discount. To join NCA, use membership application on page 9.

### RUBIN, Continued from Page 1

vidual stars with his small refracting telescope. The Herschels, brother and sister, were the first to attempt to make a three dimensional map of the Milky Way Galaxy. Lord Ross discovered spiral structure in galaxies external to ours with his ponderously clumsy and large telescope. Harlow Shapley, with his distribution of globular clusters, was the first to realize that we were not in the center of our Milky Way Galaxy. This realization was a second Copernican revolution of sorts, but not the last to put us from the center of attention. Ort first determined our revolution speed around the galactic center at approximately 200km/sec. Hubble of course discov-

ered that the distant galaxies were all receding from us.

We now know that we are in a small galactic cluster with 20 or 30 members. Besides the large and small Magellanic clouds which are companion galaxies to ours, a dwarf galaxy in Sagittarius exists that is currently merging with our Galaxy with a time scale of about  $10^8$  years. At least four globular star clusters are now known to be associated with this Sagittarian dwarf galaxy. The observed parts of our Galaxy are three: a bulge of predominately older, metal poor stars; a disk of predominately young stars, metal richer stars; and a spherical halo of globular star clusters with a halo of stellar stragglers lost from their parent globular star clusters, all of which are

metal poor. A fourth component is the inferred spherical halo of dark matter, which has an inferred density proportional to the inverse square of the distance from the center. Our Galaxy also has a warp in its disk of stars.

Vera then showed us a two dimensional spectra of an external galaxy. You could see the straight night sky emission lines and other emission lines that were Doppler shifted by rotation in the galaxy. One particular slide showed the night sky line of hydrogen emission in our atmosphere and the Doppler shifted hydrogen line translated by Hubble recession and bent by Doppler shifted rotation within the external gal-

See RUBIN, Continued on Page 6

# NCA Memorial Supplement

by Wayne H. Warren Jr.

We had intended, since not long after the death of Bob McCracken, to prepare some kind of a tribute to Bob and to other NCA members who have passed away over the last few years. Because of many other responsibilities and a rather complex employment situation, it has taken much longer to complete this work than I had originally planned. The initial idea was to produce either a special issue of *Star Dust* or an insert for a regular issue, possibly in color to display the color photographs that were scanned for the Fuller and McCracken articles. However, both of these options proved to be cost prohibitive, so we have opted to include the material as a supplement to our final issue of the 1996-7 NCA year.

The following articles attempt to give brief overviews of the lives of five recently deceased NCA members, for only two for whom reasonably extensive information was available. I am indebted to the individuals cited in the articles for supplying much of the information used in the material that I prepared. The article on Irene Warthen was prepared and submitted separately by Leith Holloway. We have combined his article with the others (with Leith's permission) so that all the material flows together.

## Robert Henry McCracken (1921-1996)

The NCA lost one of its principal supporters and a longtime member with the death of Bob McCracken on May 28, 1996 following a long battle with the cancer that was prognosticated to take him at least 4 years earlier.

Although an extended obituary was published in *The Washington Post* for Thursday, June 6, 1996, Bob played such an important role in the growth of the NCA over the many years during which he was a member, and especially in the period 1959 through 1989 when he edited, composed, and published *Star Dust*, that we NCA members felt obligated to produce an article containing information about Bob's life and activities, especially with regard to his astronomical interests. However, for the

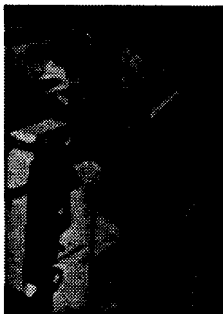
benefit of NCA members who have not seen any published material about Bob, we summarize other aspects of his life and career here as well.

Bob McCracken was born in Greensboro, North Carolina on May 9, 1921, the son of John Lavercombe and Mary Jane (Ping) McCracken. Developing an interest in science at an early age, he became involved in amateur radio and earned his "ham" operator's license in 1936, the youngest person to do so in the State of North Carolina.

Following his graduation from Curry High School at the University of North Carolina in Greensboro, Bob attended North Carolina State University at Raleigh. He then took a job teaching electronics at the Skyland Army Signal Corps School in Winston-Salem, where he met Helen Christine Sutton, who worked at the Western Union office where Bob often sent and received telegrams. They were married in Greensboro on April 24, 1942.

Bob and Helen relocated to the Washington area and Bob began work in the Atomic Clock Division of the National Bureau of Standards (NBS, now NIST) in 1945, where he took responsibility for designing the electronics system for the first (Cesium-beam) atomic clock. He also studied the chemistry and physics of elemental Cesium in connection with this project, which led to the determination of its hyperfine structure and to its subsequent use as the primary time standard. The photograph shows Bob at work on the clock project at NBS in 1952.

Meanwhile, Bob and Helen built their home in suburban Chevy Chase, where they raised their two daughters, Jeannie and Nancy; they lived in the same house for the remainder of their lives. Bob was active in community affairs just as he was in science. He served as President of his neighborhood's Citizen's Association,



helped to fund and construct the Little Falls Swimming Club, and involved himself in other civil projects.

Professionally, Bob moved from the NBS to the Army's Harry Diamond Laboratories, where he worked on the Redstone Winterization program, navigation systems and radar, microwave standardization, and other programs, including systems for optical satellite tracking. This work tied right in with subsequent programs that he started with other NCA members, as detailed below.

Bob joined the NCA in 1955 and served twice as its President, including the International Geophysical Year (IGY) period of 1957-58, when he and other NCA members joined Project Moonwatch. For the Moonwatch work and other IGY contributions, Bob received in 1959 awards from the National Academy of Science/National Research Council and the Smithsonian Astrophysical Observatory.

Another important aspect of Bob's contributions was education, since he was always interested in young people and concerned about passing on our knowledge to the next generation. Toward this goal, he developed and taught courses for science supervisors in the DC public schools, he established annual NCA science fair awards in both junior and senior divisions, he taught NCA telescope making classes, and he organized numerous educational programs for area schools. He also involved the NCA in public education, including programs at the Smithsonian and the *Exploring the Sky* program, started as a volunteer collaborative effort with the National Park Service. This program is still held monthly near the Nature Center just off Military Road, having subsequently been organized admirably by NCA members John Lohman and Joe Morris (current). In fact, it was Bob who convinced the NPS that it would be a good idea to build a planetarium at the Nature Center, and that planetarium is used for *Exploring the Sky* on cloudy nights.

*MEMORIAL, Continues on Page 4*

As all nighttime observing astronomers do, Bob longed for a permanent observatory at a reasonably dark site not too far from the metropolitan area. To this end, he founded the Hopewell Corporation, located land in the vicinity of Haymarket, Virginia, and, with the help of others who joined the Corporation, built a mountaintop observatory that is still being used today. In fact, the last time that many of us saw Bob McCracken was at a Hopewell Observatory open house just 2 months and 5 days before he passed away.

In collaboration with area astronomers, Bob began a series of semi-annual gatherings for purposes of familiarizing attendees with the work of their colleagues and for scientists to keep abreast of the work going on in our local institutions. These meetings have developed into formal biannual gatherings of up to several hundred *Washington Area Astronomers (WAA)*, who meet at various institutions such as the Applied Physics Laboratory, The Johns Hopkins University, the Space Telescope Science Institute, the University of Maryland, the Naval Research Lab, the US Naval Observatory, etc. Another NCA member, Nancy Roman, has been for years and still remains on the WAA organizing committee.

Another important organization with which Bob was intimately associated was the *Washington Academy of Sciences (WAS)*, for which he served as President in 1989-90, after having been a Life Fellow since the early eighties. His last proposal to the Academy was for the establishment of an "Interdisciplinary Science Center" for the District of Columbia, where students and the public could experience through hands-on experiments and display facilities, the wonders of science (similar to the Exploratorium in San Francisco).

For his many contributions to area astronomy in general, and for service to the WAA and WAS, Bob received the US Naval Observatory's Superintendent's Award in 1991 and the WAS Outstanding Contribution to Astronomy award.

Although diagnosed with prostate cancer in 1991, Bob remained active for almost 5 years thereafter, attending NCA and WAS meetings, Hopewell

open houses, and carrying on lively discussions (and debates) about his many ideas. We might have heard him complain a lot about his maladies and the pain they provoked, but he remained optimistic and cognizant throughout this difficult period.

This photograph was taken in 1992.

We might compare Bob in many ways to the recently deceased Carl Sagan, who passed away just 206 days later. Both were great lovers of science, both were pioneers in their chosen endeavors, both were intensely interested in debunking pseudoscience and educating the public, and both were talented at convincing people that science is important enough to receive public attention and funding. We at the NCA will miss Bob very much.

Information for this article was gleaned from material provided to the NCA by Bob's daughter Jeannie, from old issues of *Star Dust*, from an obituary published in the *Bulletin of the American Astronomical Society* by D. Costanzo, and, of course, from personal discussions held with Bob over the years. I thank Leith Holloway for reviewing the material. *(I will always remember the compliment that Bob gave me on the quality job that Gary and I were doing with the newsletter. The newsletter was something that Bob took pride in doing and he was pleased to see that we were continuing with it. That meant a lot to us. — ed.)*

### Everett Gladding Fuller (1920-1995)

Longtime NCA member Everett Fuller died of a heart attack at the Wilson Health Care Center in Gaithersburg on November 15, 1995. Ev, as he was known to many of his friends, had been suffering from Alzheimer's disease for several years, but we frequently saw him at NCA meetings until it became too difficult for his dear wife, Gladys, to bring him. We also had the pleasure of dining with the Fullers at many an NCA speaker's dinner and agonizingly witnessed the slow decline of Ev's faculties. But let us return to brighter days



and talk of his earlier life and work, and of his important contributions to the physics of photoionization.

Everett Fuller was born in Springfield, Massachusetts on December 6, 1920, the son of Gertrude Laura Gladding and Everett Webb Fuller. The family subsequently relocated to Woodbury, New Jersey, where his father worked as a research chemist for Mobil Oil Company, so Ev grew up as a South Jerseyite.

Like his father and grandfather before him, Ev attended and graduated from Amherst College, where he majored in Physics. Having finished school with a physical science degree in 1942, he was (not surprisingly) sent to meteorology school at the University of Chicago after he volunteered service in the Army Air Corps. Little did he know at the time that the unit's exercise drills in Soldier's Field were being conducted above where Enrico Fermi, I. I. Rabi, Robert Oppenheimer and others were "cookin' up" the new physics that would eventually end the war in the Pacific (see *Physics Today*, January 1993, p. 44).

Following his meteorological training, Ev spent several years in India, where he did weather forecasting for troops flying in and out of China over Burma and the Tibetan plateau. He attained the rank of Captain and managed to glimpse Mount Everest from the R&R camp in Darjeeling. The photograph of Ev was taken in November 1942.



Following the cessation of hostilities in SE Asia, he continued westward, finally stopping in Champaign-Urbana to attend the University of Illinois, where he continued to study physics as a member of the Betatron Group under Professor Al Hanson. While employed as a graduate teaching assistant (TA), Ev became acquainted with fellow TA, Gladys Heinlein. They soon decided to teach physics (and other things) together, and were married in 1947. After Ev completed his thesis on "The Photo-disintegration of Deuterium by 20-MeV X-rays" and was awarded the Ph.D. degree, Gladys and he relocated to the DC

area, where he joined the staff of the Betatron Section at the National Bureau of Standards (NBS).

On the private side, Ev Fuller, like so many scientists, had many other interests, as evidenced by his membership in the Washington Society of Cinematographers; the Gem, Mineral, and Lapidary Society of Montgomery County; and of course, the NCA. These activities were of interest to both Fullers, which served to make their relationship that much stronger. He also had a strong interest in music, having sung in the Glee Club while in college and having studied the flute. (It is said that one could hear the music of Mahler by watching some of his movies.) He loved trains, as well, and made some of his best movies about them.

Professionally, Ev Fuller had a long and successful career at the NBS. Soon after joining the Betatron Group (later to become the Center for Radiation Research), he and Evans Hayward began work on the elastic scattering of photons from nuclear targets in the energy range 5-50 MeV. Experimental data demonstrated that the desired elastic scattering cross sections could be calculated from the measured total photonuclear absorption cross sections (TPACS). Self absorption techniques were also used to investigate the resonance fluorescence of bound levels below the particle-emission threshold, and scattering from the giant dipole resonances of many nuclei was studied. The principal finding from this work was that for targets lighter than Ca (atomic number 20) there had to be oscillator strength higher than was then known.

The TPACS for several heavy nuclei showed that the giant resonances of the deformed nuclei Tantalum (Ta), Holmium (Ho), and Erbium (Er) (the latter two being heavy rare earths), consisted of the superposition of two resonances, as predicted by Michael Danos. The significance was that these particular nuclei had an extra component of their scattering cross sections not consistent with the dispersion relation, and caused by the tensor polarizability of their nuclei. Together with Ernest Ambler



and Harvey Marshak, Ev showed that the photoneutron cross section depends on nuclear alignment with the incident x-ray beam. For this pioneering work, the pair (Fuller and Hayward) received the Department of Commerce Gold Medal in 1971.

Following his promotion to Section Chief, administrative duties absorbed more of Ev's time, but his interests in data and information preservation led him to establish and direct the Photonuclear Data Center at NBS. This center compiled a bibliography of papers on photonuclear experiments (1955-1983), and prepared several reports on evaluated data. One lasting contribution from the Center is what is known as the Photonuclear Data Sheets, a 15-volume compendium of data organized by nucleus and containing a single summary sheet with the main conclusions of each paper.

After his retirement from the NBS in 1980, he continued to review photonuclear reaction papers and to summarize them for addition to the Sheets. However, he and Gladys then had more time to pursue their other "hobbies", including, to our benefit, astronomy. Personally, I enjoyed the company of Ev Fuller because he was a gentle person whose laughter was catching. The NCA will miss his quiet presence at our meetings, but we are pleased that wife Gladys can still attend and carry on in Ev's tradition. I am indebted to Gladys Fuller for supplying a considerable amount of material prepared by herself, E. Hayward, and W. W. Tipton. Information from these sources has been combined here to give an overall picture of Ev Fuller's life.

### **John B. Lohman (ca. 1915-1996)**

John Lohman, a longtime member of NCA, passed away in 1996 following heart problems and several hospital stays. Not much personal information is known about Dr. Lohman because I have not been able to contact his family. Thus, only information known to me personally and learned from talking with other NCA members, particularly Bob Bolster and Jeff Norman, is included here.

Of course, we all know John from his unselfish service to the NCA in the

running of the *Exploring the Sky* program in Rock Creek Park for several years following the time when Bob McCracken had to stop that activity because of his deteriorating eyesight.

John was clearly interested in public service and was active in that area in Northern Virginia as well, where he served on the Arlington County Transportation Planning Board (or whatever its formal name is or was), where he helped to plan roads, bus and Metro routes, etc.

John was a physical chemist by profession and worked on the Manhattan Project during the Second World War. Following the war, he became involved in operations research and worked for the US Navy, possibly in the Office of Naval Research (ONR).

### **Cliford Kristal (1947-1995)**

Clif Kristal, who served the NCA briefly in 1994 as Audio/Visual Engineer before he had to resign because of illness, passed away on May 13, 1995 as a result of a brain tumor. Clif had been a member of NCA for some years and frequently attended meetings.

Clif was born in Brooklyn, New York on June 27, 1947. The Kristal family moved to the Washington area some 7 months later, so Clif attended local schools, being graduated from Montgomery Blair High School and the University of Maryland.

Employed by the General Services Administration for 24 years, Clif remained active in the Army Reserves and served his country as a Staff Sergeant in the Medical Corps during Operation Desert Storm. He also served as a Commander in the local chapter of the Jewish War Veterans and was active in the national organization.

In addition to astronomy, Clif was an avid photographer and even had his own photography business on the side. He was a collector of many things, including pens, knives, coins, and computers. He also enjoyed traveling, having visited Puerto Rico to hike in the rain forest there, and parts of Canada (Nova Scotia and Newfoundland) on fishing trips.

*MEMORIAL, Continues on Page 6*

I thank Clif's mother, Lillian Kristal, for much of the information given in this article.

### **Irene H. Warthen (ca. 1898-1996)**

Miss Irene H. Warthen, 97, died on July 21, 1996 in Gaitherburg, MD. She was born on September 18, 1898 in Damascus, MD. Irene had been given Life Membership in the NCA for her many years of work as one of the NCA Telescope making instructors beginning back in the 1940's. She was also a charter member of NCA.



I visited Irene about two years ago while she was living at the Asbury Methodist Village in Gaithersburg. Irene remembered Captain J. F. Hellweg, Superintendent of the U.S. Naval Observatory, who helped her and other NCA members set up a mirror grinding shop in one of the buildings at

the observatory circa 1945. In later years, Irene taught the NCA telescope making classes at Roosevelt High School in Northwest, D.C.

At the time of my visit, Irene's memory of recent events was not as

good, but her eyes lit up when I handed her an extra copy of a recent issue of *Star Dust*. Her pioneering telescope making instruction in the NCA should always be remembered. ○

### *RUBIN, Continued from Page 2*

axy. On one slide you could see both the redshift of the receding galaxy and the evidence for dark matter in the bent rotation curve. I had never seen both presented in the actual measurement together. Vera then started showing us some pathological, rare, galaxies with polar rings and other things. The prettiest one was the so called "Black Eye" galaxy that Vera said should be renamed the "Sleeping Beauty" galaxy. It had a counter rotating gas disk. It had an  instead of an  for its rotation curve. She told us the importance of actually looking at your data

instead of relying only on computers first. This galaxy rotation curve had been measured first by others, but they had missed the counter rotating discs and got only the flat rotation curve. But when you did it the old fashioned way, as she did, you saw what was really going on. Mass is proportional to velocity squared which destroys the sign. But it really does matter whether the galaxy has two disks or one.

Many questions were asked at the end of the talk. Vera made everyone feel comfortable about asking their questions with gentle phrases like "that's a fine question." ○

## **A Final Look At Comet Hale-Bopp Through The Eyes of Bob Bolster**



*Comet Hale-Bopp (C/1995 01); 35-mm camera, frame #23A; UT 1997-4-10 01:27.5-01:39.5 (12 minutes); 85-mm f.t., f/2, 80A (blue) filter; Hypersensitized Technical Pan film; enlarged 10x. — Robert N. Bolster, Hopewell Observatory*

# Grazing Occultations and Asteroidal Appulses

by David Dunham

Grazing Occultations, 1997 June through July (Unable to list all due to space constraints).

Date	Day	EDT	Star	Mag	%	alt	CA	Location
June 26	Thu	2:56	96 Agr	5.7	64-	27	1N	Westminster, MD
June 28	Sat	8:28	Saturn	1.0	40-	59	4N	Cape Hatteras, NC (Sun alt. 30°)
July 29	Tue	6:40	Aldebaran	0.8	23-	12	1N	Salt Lake City, UT
July 30	Wed	4:49	117 Tauri	6.0	15-	18	-1S	Donegal, PA (Sun -14°)
July 31	Thu	4:31	SAO 95554	7.8	8-	8	-1N	Waldorf, MD (Sun -16°)
July 31	Thu	5:27	ZC 975	6.8	8-	15	1S	Greencastle, PA (Sun -10°)

Asteroidal Appulses, 1997 June through July (Unable to list all due to space constraints).

Date	Day	EDT	Star	Mag	Asteroid	dmag	dur sec.	ap. in.	Location
June 10	Tue	5:24	ZC 3105	6.2	Maria	7.8	12	1	n.e. Texas
July 8	Tue	21:34	PPM 233542	9.5	Lotis	4.3	7	4	Carolinas
July 12	Sat	2:28	GSC 16090567	11.5	Pallas	0.2	34	8	Lake Erie
July 16	Thu	23:51	SAO 159935	7.7	1994 JR1	15.3	12	2	Caribbean Sea
July 16	Thu	23:51	SAO 121542	7.9	Eleonora	3.3	17	2	Caribbean Sea

Phone the IOTA occultation line, 301/474-4945, for updates and details.

## NCA Officer For 1997-1998

The following officers of the National Capital Astronomers were elected unanimously for the coming year.

### President:

Dr. Harold A. Williams

### Vice President:

Dr. Andrew W. Seacord II

### Secretary:

Leith Holloway

### Treasurer:

Jeffrey B. Norman

### Audio-Visual Engineer:

Vacant

### Trustee:

Nancy Byrd

Bob Bolster, John Graham, and Jay Miller will remain as trustees for this year.

## A/V Engineer Needed

NCA is still looking for someone to fill the role of Audio-Visual Engineer. If you have experience or you would just like to assist in this area, please contact the president of NCA. ○

## Final Curaçao Notice!

Everyone should have received a notice regarding what you owe if you will be going on the trip to Curaçao. Be sure you send in your payments ASAP. Plus, if you are going on the EXTENDED trip, please indicate this. It is necessary that your final payment be sent ON TIME. There is no flexibility in this. The travel agent needs time to process everything. Please contact Sue Bassett if there is any discrepancy or any questions, 301/953-1665. ○



## Attention All NCA Junior Members

Now that school is out, you may have more time to devote to your astronomy hobby. The NCA has a mentor program for Juniors. Any Junior who wants help with an astronomy project may call me for referral to an adult member who has expertise in his or her particular interests. If you call Leith, he will be happy to try to find a mentor whom you may contact when you need assistance. NCA is eager to help you. All Juniors, including youngsters in homes with NCA family memberships, qualify for this help. Please contact Leith Holloway, Director of NCA Junior Division at 301/564-6061. ○

## Moving Update

The Open House at our new townhouse will be held **June 14**, from 1:00 PM until whenever. We are also hosting a potluck playreading that evening (a group that has been going on for more than 30 years.). If you are interested in staying and participating or just listening, bring a potluck dish you can share. **Call 703/750-1636 before June 6** and we will send you a map with directions. Parking is at a premium! The map will show where you can park and how to get to our place if you are planning on coming. All are welcome. We will look forward to seeing you. — Alisa Joaquin, ed.

## National Capital Area Astronomical Events

Free Lectures at the Einstein Planetarium and Other Daily Events  
National Air & Space Museum

202/357-1550, 202/357-1686, or 202/357-1505 (TTY)

Home page: <http://www.nasm.edu>

### Other Area Astronomical Events

#### Carnegie Institution of Washington Seminars

*Department of Terrestrial  
Magnetism*

**June 4** - "Shock-Triggered Star Formation" by Harri A. T. Vanhala

**June 11** - "The Origin and Evolution of Dust in the Zodiacal Cloud" by Stephen J. Kortenkamp

**June 25** - "Turbulent Dynamics in Star-Forming Clouds" by Eve Ostriker

All seminars are held on Wednesdays at 11:00 AM (unless otherwise noted). Coffee and tea will be served at 10:45. Information: 202/686-4370

**June 27, 10:30 AM** - "Gravitational Lensing Observations of Total Mass on Kiloparsec and Megaparsec Scales: A Role For Stars" by Tony Tyson, Lucent Technologies at the US Naval Observatory. Coffee at 10:00. Information: 202/762-1513, 202/762-1437.

**Special Upcoming Event, July 20, 10:00 AM - 3:00 PM** - Goddard Model Rocket Contest in conjunction with the 29th anniversary of the Apollo 11 moon landing. Register on day of event. Information: 301/286-3978.

Check your local web sites for any other events that may be happening over the summer in the area.

## Mount Rainer Nature & Recreation Center

*Historic Bladensburg  
Waterfront Visitors Center*

**June 6, 8-9:30 PM** - "Summer Stars"

**July 11, 8-9:30 PM** - "Red, White, and Blue Stars"

**August 8, 8:30-10:00 PM** - "Dog Days and Star Myths"

(Se Habla Espanol for all programs.)

Due to construction activities at the Historic Bladensburg Waterfront Park, the monthly meeting may be moved to an alternate site. Information: Geof Lane 301/927-2163.

### For Sale

Questar 3.5-inch aperture Duplex telescope with broad band coatings. Tested at 0.88 second of arc resolution or better. Complete with filter kit, solar filter, power drive, large field tripod, and three matched Brandon lenses: 12, 16, and 24 mm. Leather carrying case included. Mint condition. Purchased new for \$4,000. Will sell for \$3,000. Leave message at 301/570-4727

## Volunteers Needed at the Rock Creek Park Planetarium

*Do you love astronomy?  
Do you enjoy working with people?  
Are you good at public speaking?*

If you answered yes to any of these questions, then we invite you to apply to become a Volunteer Planetarium Operator at Rock Creek Park.

Volunteers are needed to present planetarium programs to the general public and school groups. Training is provided, a minimum commitment of eight hours per month is required.

For more information or to apply, call Julia Washburn, Volunteer Coordinator, 202/426-6828 or 202/426-6829 (Wednesday-Sunday, 9:00 AM to 5:00 PM).

## Newsletter Deadline for September *Star Dust* August 15, 1997

\*\*\*DO NOT BE LATE!!!\*\*\*

Send Submissions to Alisa & Gary Joaquin, at 4910 Schuyler Dr, Annandale, VA, 22003-5144, Leave a message on voice mail 703/750-1636. Text files or graphic files in .GIF or .TIFF may be sent via E-Mail to [ajglj@erols.com](mailto:ajglj@erols.com) or fax submissions to 703/658-2233. No submissions will be accepted after the 20th. There will be no exceptions. We need a reasonable amount of time to design, edit, and review this newsletter. We would appreciate everyone's help in this matter. Thank you.



Don't throw this newsletter away. If you're finished with it, pass it on to someone else to read or recycle it. It's right for astronomy and the environment.



# National Capital Astronomers, Inc.

## SERVING SCIENCE & SOCIETY SINCE 1937

NCA is a non-profit, membership supported, volunteer run, public-service corporation dedicated to advancing space technology, astronomy, and related sciences through information, participation, and inspiration, via research, lectures, presentations, publications, expeditions, tours, public interpretation, and education. NCA is the astronomy affiliate of the Washington Academy of Sciences. All are welcome to join NCA. For information: 301/320-3621 or 703/841-4765.

## SERVICES & ACTIVITIES:

**Monthly Meetings** feature presentations of current work by researchers at the horizons of their fields. All are welcome; there is no charge. See monthly *Star Dust* for time and location.

**NCA Volunteers** serve as skilled observers frequently deploying to many parts of the National Capital region, and beyond, on campaigns and expeditions collecting vital scientific data for astronomy and related sciences. They also serve locally by assisting with scientific conferences, judging science fairs, and interpreting astronomy and related subjects during public programs.

**Discussion Groups** exchange information, ideas, and questions on preselected topics, moderated by an NCA member or guest expert.

**Publications** received by members include the monthly newsletter of NCA, *Star Dust*, and an optional discount subscription to *Sky & Telescope* magazine.

**NCA Information Service** answers a wide variety of inquiries about space technology, astronomy, and related subjects from the public, the media, and other organizations.

**Consumer Clinics** on selection, use, and care of binoculars and telescopes, provide myth-breaking information, guidance, and demonstrations for those contemplating acquiring their first astronomical instrument.

**Dark-Sky Protection Efforts** educate society at large about the serious environmental threat of light pollution, plus seek ways and means of light pollution avoidance and abatement. NCA is an organizational member of the International Dark-Sky Association (IDA), and the National Capital region's IDA representative.

**Classes** teach about subjects ranging from basic astronomy to hand-making a fine astronomical telescope. NCA's instructors also train educators in how to better teach astronomy and related subjects.

**Tours** travel to dark-sky sites, observatories, laboratories, museums, and other points of interest around the National Capital region, the Nation, and the World.

**Discounts** are available to members on many publications, products, and services, including *Sky & Telescope* magazine.

**Public Sky Viewing Programs** are offered jointly with the National Park Service, the Smithsonian Institution, the U.S. Naval Observatory, and others.

**NCA Juniors Program** fosters children's and young adults' interest in space technology, astronomy, and related sciences through discounted memberships, mentorship from dedicated members, and NCA's annual Science Fair Awards.

**Fine Quality Telescopes** up to 36-cm (14-inch) aperture are available free for member's use. NCA also has access to several relatively dark-sky sites in Maryland, Virginia, and West Virginia.

## YES! I'D LIKE TO JOIN THE NATIONAL CAPITAL ASTRONOMERS

Enclosed is my payment for the following membership category:

Regular

*Sky & Telescope* and *Star Dust*. (\$51 per year)

*Star Dust* only (\$24 per year)

Junior (Only open to those under age 18) Date of birth: \_\_\_\_\_

Junior members pay a reduced rate.

*Sky & Telescope* and *Star Dust*. (\$42 per year)

*Star Dust* only (\$15 per year)

_____	_____	_____	(____) _____
First name	Middle	Last name	Telephone
_____	_____	_____	_____
Street or Box	Apartment	City	State Zip Code + 4

If family membership, list names of additional participating immediate family members in same household, with birthdates of all those under 18 years old: \_\_\_\_\_

**Note:** If you already subscribe to *Sky & Telescope*, please attach a recent mailing label. You may renew this subscription through NCA for \$22 when it expires.

Make check payable to: **National Capital Astronomers, Inc.**, and send with this form to:

**NCA c/o Jeffrey B. Norman, 5410 Connecticut Avenue, NW, Apt. #717, Washington, D.C. 20015-2837.**

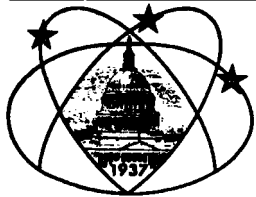
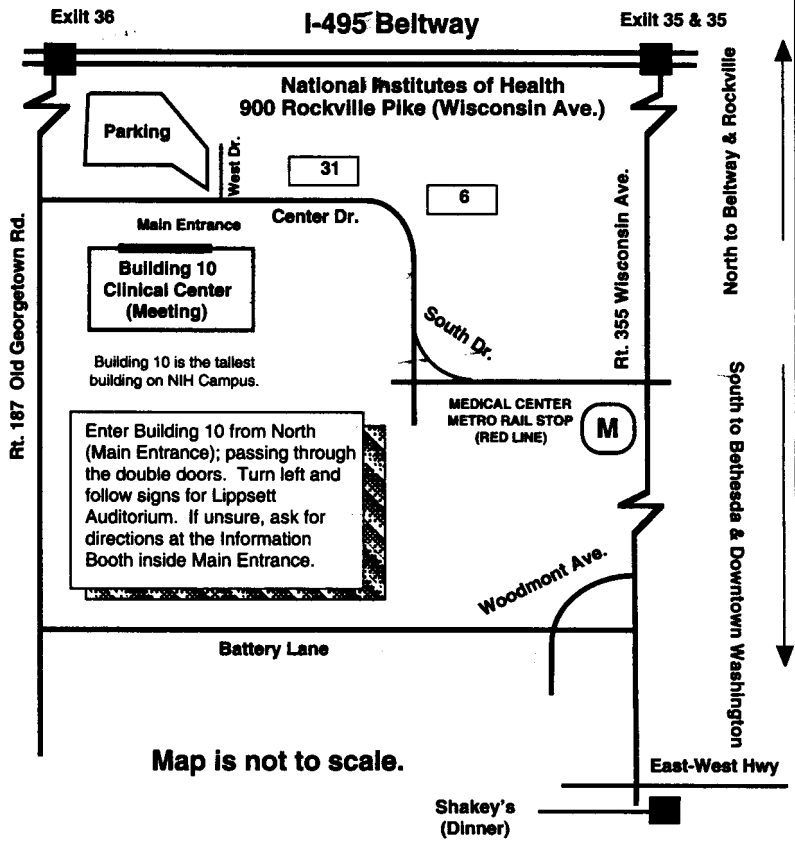
The following information is optional. Please indicate briefly any special interests, skills, education, experience, or other resources which you might contribute to NCA. **Thank you, and welcome to NCA!**

# Getting to the NCA Monthly Meeting

**Metrorail Riders** - From Medical Center Metro Station: Walk down the hill, pass the bus stops and turn right at the anchor onto Center Drive. Continue uphill to Building 10, the tallest building on campus (walking time about 10 minutes). Also, the J2 bus line connects the Bethesda (7:16 PM) and NIH (7:23 PM) Metro stops with Building 10 (7:25 PM).

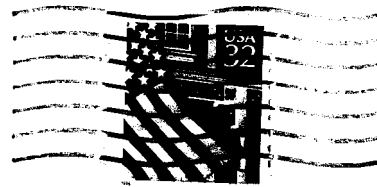
**To Shakey's** - Take Wisconsin Avenue north or south to East-West Highway (Route 410). This is one-half block south of the Bethesda Metro stop. Shakey's is on the south side of 410 just east of Wisconsin. Free parking is available in lots directly across from the restaurant. Note that you don't have to eat pizza. Shakey's has a variety of other food, including sandwiches, salads, etc.

*Star Dust* is published ten times yearly (September through June) by the National Capital Astronomers, Inc. (NCA), a nonprofit, astronomical organization serving the entire National Capital region, and beyond. NCA is the astronomy affiliate of the Washington Academy of Sciences and the National Capital region's representative of the International Dark-Sky Association. NCA's Phone Numbers: 301/320-3621 or 703/841-4765. President: Harold Williams, 301/565-3709. Deadline for *Star Dust* is the 15th of the preceding month. Editors: Alisa & Gary Joaquin, 4910 Schuyler Dr., Annandale, VA 22003, 703/750-1636, E-mail: ajglj@erols.com. Editorial Advisor: Nancy Byrd. *Star Dust* © 1997 may be reproduced with credit to National Capital Astronomers, Inc.



## National Capital Astronomers, Inc.

If Undeliverable, Return to  
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