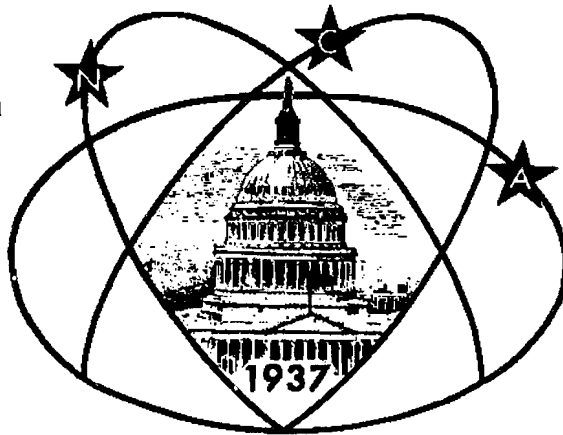


Star



Dust

National Capital Astronomers, Inc.

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Triggered Star Formation

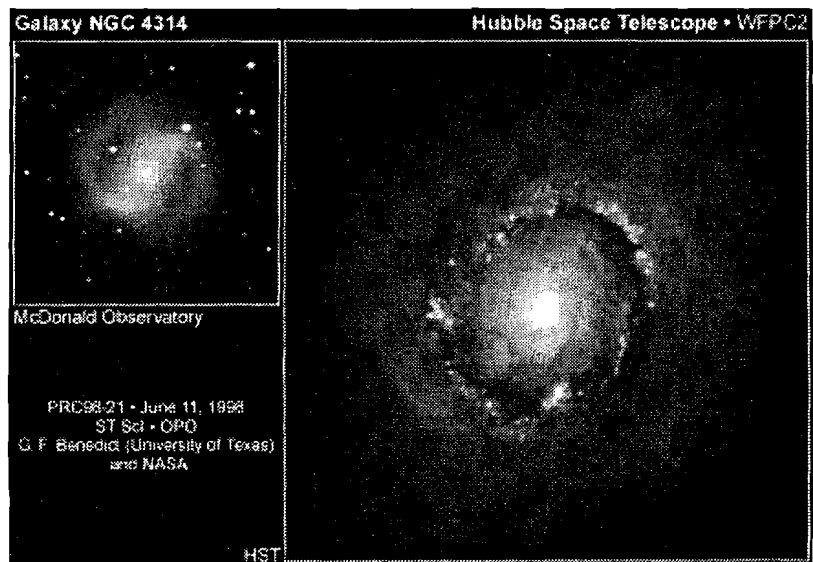
by Dr. Harri Vanhala

Dr. Harri Vanhala will address the next NCA meeting at 7:30 PM in the Lipsett Auditorium of the Clinical Center (Building 10) at the National Institutes of Health (NIH) on Saturday evening September 12, 1998, on the subject of triggered star formation. Dr. Vanhala was born in Posio Finland and earned both a master of science degree and Ph.D. in Astronomy at the University of Oulu and has numerous astronomical papers to his credit. Dr. Vanhala is currently a Postdoctoral Associate at the Department of Terrestrial Magnetism, Carnegie Institution of Washington, working with Dr. Alan Boss, investigating triggered star formation and the origin of the Solar System using the Smoothed Particle Hydrodynamics method. He submits the following abstract of his talk:

According to the standard theory of star formation, stars are born deep within molecular clouds, when a local density enhancement, a molecular cloud core, grows in quiescent conditions to the point where it becomes gravitationally unstable and collapses under its self-gravity. However, recent observations have revealed star formation regions to be violent, constantly evolving places, and it is uncertain how the conventional picture of star formation needs to be modified to accommodate for the environment in which stars form. For a comprehensive theory of star formation, it is important to understand

whether the events taking place within molecular clouds are generally destructive or whether they can assist in the star formation process. The topic of this discussion is triggered star formation, which suggests that star formation may in some cases be initiated by an outside agent. One aspect of this idea is shock-induced star formation, in which an interstellar shock wave, created by a nearby stellar explosive event such as a supernova, triggers star formation in the

molecular cloud through which it is traveling. Further motivation for the study is provided by the properties of the early solar system, which can be best understood within the context of triggered star formation. Results from recent computer simulations are used here to argue that interstellar shock waves can induce star formation under certain conditions, and that triggered star formation may be more common than previously thought. ○



A bright ring of star birth around a galaxy core: An image from NASA's Space Telescope reveals clusters of infant stars that formed in a ring around the core of the barred-spiral galaxy NGC-4314. This stellar nursery, whose inhabitants were created within the past 5 million years, is the only place in the entire galaxy where new stars are being born. The Hubble image was presented June 11, at the American Astronomical Society meeting in San Diego, CA.

Calendar of Monthly Events

The Public is Welcome!

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

Mondays, Sept. 7, 14, 21, and 28, 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, Sept. 8, 15, 22, and 29, 7:30 PM - Telescope making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 202/362-8872.

Fridays, Sept. 4, 11, 18, and 25, 7:30 PM - Telescope making classes at American University, McKinley Hall Basement. Information: Jerry Schnall, 202/362-8872.

Saturday, Sept. 12, 5:30 PM-Dinner with the speaker, and NCA members at Levante's, 7262 Woodmont Ave., Bethesda, MD. See map and directions on back page.

Saturday, Sept. 12, 7:30 PM-NCA meeting, will feature Dr. Harri Vanhala, speaking on "Triggered

Star Formation." For directions, see map and directions on back page.

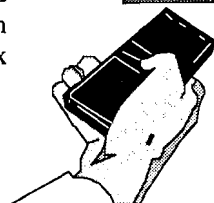
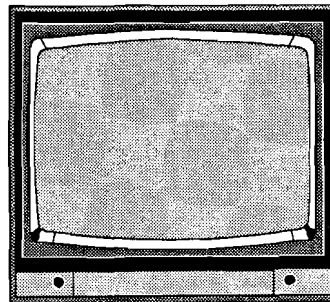
Fridays, Sept. 11, 18, and 25 ; 8:30 PM - Open nights with NCA's Celestron C-14 telescope at Ridgeview Observatory; near Alexandria, Virginia; 6007 Ridgeview Drive (off Franconia Road between Telegraph Road and Rose Hill Drive). Information: Bob Bolster, 703/960-9126. Call before 6:00 PM.

Saturdays, Sept. 19, 8:00 PM - Exploring the Sky. Sessions are held at Rock Creek Park, in the field south of the intersection of Military and Glover Roads, near the Nature Center. Free to the public. Information: 202/426-6829. *Father's Day and Summer Solstice June 21

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 1998*, the *Observer's Handbook 1998*. NCA members can purchase all these (and much more) at a discount. Information can also be found in numerous software packages, and links available on the NCA Home Page (see above for address). To join NCA, use the membership application on page 9.

Looking For Donations

NCA is looking for donations of a TV or VCR or both. Preferably 19" or larger. The equipment would be used during presentations when speakers require it. If you have such items, please call Andrew Seacord at 301/805-9741 so arrangements can be made for pickup and delivery to the meetings. Your donation would be greatly appreciated and it is tax deductible.



Welcome New Members

Alexis Lopez-Buitrago
3216 Hewitt Avenue, No. 98
Silver Spring, MD 20906

Richard E. Dunlop
1320 Riggs St., NW
Washington, DC 20009-4325

John Rovnak
2111 Jefferson Davis Highway,
#521 South
Arlington, VA 22202

Benjamin Scott
10214 Procter Street
Silver Spring, MD 20901

253 Mathilde: Spacecraft Imaging of a C-type Asteroid

A presentation by Dr. Lucy McFadden

Reviewed by Dr. Andrew W. Seacord, II

For the 1998 June 6 meeting, NCA was fortunate to have Dr. Lucy McFadden, Department of Astronomy, University of Maryland, speak on the Near Earth Asteroid Rendezvous (NEAR) spacecraft flyby of the asteroid 253 Mathilde. The perspective of her presentation, and research, is toward understanding the formation of a solar system. Since asteroid belts represent failed planets, by studying asteroids, we can cut a road into understanding the formation of a solar system. Some asteroids remain primordial, others have been heated since they were formed.

The first asteroid to be discovered, 1 Ceres, was first observed on New Year's day, 1801 by Guiseppe Piazzi. The second asteroid was discovered a year later by Heinrich Wilhelm Olbers. Thirteen more asteroids were discovered during the next 50 years and about 1000 were known by the 1920's. At this time, the number of known asteroids is in the 10's of thousands. For designating an asteroid - for example 253 Mathilde - the number preceding its name is a sequence number related to the order in which asteroids have been cataloged.

Asteroids are classified using two tools, color and albedo. Albedo is the percent of sunlight reflected from the asteroid's surface. Color is measured by multicolored photoelectric photometry of light reflected from the asteroid surface and depends on the composition of the asteroid surface. The development of the classification scheme, during the 1960's and 70's was made possible by the advent of the photomultiplier tube.

The three main asteroid classes are derived from classes of meteorites whose spectra they resemble: C for carbonaceous, S for silicate (or stony) and M for metallic. Most asteroids are either S- or C-types. S-types have an albedo of about 0.15 (15%) whereas C-types have an albedo between 0.02 and 0.08 (2 to 8%)

Most asteroids lie in an annular disc, or belt, between Mars and Jupiter, extending from about 2.0 to 3.3 au. This is the Main Belt. [The astronomical unit, au, is the average distance between the Earth and the Sun.] In 1980, Grady and Tedesco described the frequency of occurrence of asteroid class with distance from the sun between 1.7 and 5.2 au. Silicate (S-type) asteroids are found closer to the inner boundary of the belt, whereas carbonaceous (C-type) are more prevalent toward its outer boundary.

So, what does the distribution of asteroid types say about the formation of the solar system? There is much evidence to suggest that the planetary system was formed after the collapse of a cloud of gas and dust into a disc surrounding the proto-sun. A temperature gradient developed in the disc; the temperature was highest toward the sun and decreased with distance from it. Silicate material condenses at a higher temperature than does carbonaceous material. Consequently, silicate bodies, such as Mercury, Venus, Earth, Mars and the S asteroids develop in the inner solar system. Carbonaceous asteroids would form farther out where it is cooler. Carbonaceous meteorites which originated from asteroids in the outer main belt, are found to have glassy inclusions, called chondrules, distributed throughout them. The carbonaceous material must

have condensed around the silicate chondrules which had already cooled. Carbonaceous chondrite meteorites must be primordial; that is, they were not reheated after formation. Reheating would have destroyed the chondrules.

Earth ground-based observations cannot resolve the surface of an asteroid. As of now, four asteroids have been encountered by spacecraft flybys. The S-type asteroids 951 Gaspra, 243 Ida, and Ida's companion Dactyl have been imaged by the Galileo spacecraft and Mathilde, a C-type, has now been imaged by NEAR. All spacecraft encounters with asteroids have been flybys. Much more could be learned about asteroids if a spacecraft with appropriate spectrometers were to orbit an asteroid and observe its surface for an extended period of time.

That is the purpose of the Near Earth Asteroid Rendezvous (NEAR) mission. 433 Eros, an S-type asteroid, was selected because its orbit approaches the Earth. The NEAR mission was launched on 1996 February 17. Its trajectory passed through the main asteroid belt and returned to Earth for a swing-by on 1997 February 22 to send the spacecraft out of the ecliptic and redirect it for a 1999 January rendezvous with Eros. The spacecraft will orbit Eros for 13 months, during which time the size of the orbit will be decreased incrementally. It is hoped that the mission controllers will then be able to land the spacecraft on the asteroid.

A bonus for the mission was a flyby of an asteroid during the spacecraft's sojourn through the main belt. A short list of main belt asteroids was considered. Originally, the orbit of Mathilde, would have required too large a change of the spacecraft velocity in order to



MATHILDE, continued on page 5

NCA Treasurer's Report

July 1, 1997 to June 30, 1998

Income	
Dues	\$ 7513.00
Gifts	353.00
Interest	261.82
NCA Travel	600.00
Telescope-making Classes	110.00
Total Income	\$ 8837.82
Expenses	
International Dark Sky Association (IDA) Dues	\$ 100.00
Miscellaneous	57.89
Secretary	456.50
Sky & Telescope Subscriptions	3213.00
Speakers' Dinners	317.67
Star Dust	4659.75
Telephone	50.48
Total Expenses	\$ 8855.29
Balance - July 1, 1997	\$ 9744.32
Excess Expenses over Income	17.47
Balance - June 30, 1998	\$9726.85*
Total number of paying members joining or renewing from 7-1-1996 to 6-30-1997	194**
Total number of paying members joining or renewing from 7-1-1997 to 6-30-1998	169**
Decrease in Membership (12.9%)	25

Budget

Income	
Dues	\$ 8100.00
Gifts	350.00
Interest	250.00
Telescope-making Classes	100.00
Total Income	\$ 8800.00
Expenses	
IDA Dues	\$ 100.00
Miscellaneous	50.00
Secretary	500.00
Sky & Telescope Subscriptions	3250.00
Speakers' Dinners	350.00
Star Dust	4250.00
Total Expenses	\$ 8500.00
Surplus	\$ 300.00

* The balance includes \$2483.03 from NCA Travel account.

** This does not include life members or science fair winners because they receive free memberships.

Millennium Madness

The countdown to the year 2000 is marching on relentlessly, and excitement is increasing around the country as the new century approaches. Every day on radio and TV a so-called "Millennium Minute" announces that there are about 480 days before the beginning of the next century and of the new millennium. There is just one little problem about this: The twentieth century does NOT end on December 31, 1999. Our century does not come to an end until December 31, 2000 because the year 2000 is the last year of the twentieth century and NOT the first year of the twenty-first. Why do you think our century is called the twentieth? There was no year zero. The first one-hundred-year century lasted until the end of the year 100 and so on until today.

Likewise, the third millennium of the Christian Era does not start until January 1, 2001. Arthur Clarke was correct when he named his famous space odyssey 2001 rather than 2000. In other words, the real turn of the century and of the millennium will occur 366 days later than when most people are now saying. (It is 366 days and not 365 because the year 2000 is a leap year and the first century year to have an intercalary day in 400 years according to the rules of the Gregorian calendar.) The result of all this confusion is that we will probably end up celebrating the beginning of the next century and of the millennium twice. This will, no doubt, be fine with all those people who enjoy commemorating events with wine and song.

Let's call off the first celebration and wait until January 2001. If we do not fix the so-called year 2000 problem in much of our aging computer software, the beginning of the year 2000 will be nothing to celebrate anyway!

Leith Holloway

Telescope For Sale

Nice Dobsonian 18", made by
Sky Designs
asking \$1600.00
Call Steven Kudla at 301/365-1560
ssk@math.umd.edu

IOTA Meeting & Election, Aldebaran & Other Grazes, Sept. 12th

by David Dunham

Come join us to learn simple techniques for observing interesting dynamical astronomical phenomena, and see spectacular videotapes, many made simply with camcorders, of some of the better occultations and eclipses recorded during the past year. The 16th annual meeting of the International Occultation Timing Association (IOTA) will be held at Vanderbilt University's Dyer Observatory in Nashville, Tennessee, on Saturday, September 12 and Sunday, September 13. The meeting will begin at 3 pm Saturday, to give observers of that morning's grazing occultation of Aldebaran time to recuperate or to travel from possibly distant locations. The Aldebaran graze passes only about 20 miles northwest of Nashville and there will be a local expedition that others can join, weather permitting. An informal reception will start at 1 pm for those already in the Nashville area. The meeting will last until 10 pm, with a break for dinner. The after-dinner part of the meeting may be conducted as an occultation workshop. The formal meeting will resume at 9 am Sunday morning, concluding by noon to give attendees a chance to return home that afternoon and evening. Scott Degenhardt (postal address 3409 Mary Ave., Murfreesboro, TN 37130; e-mail dega@nashville.com; phone 615-895-0244) is the local

MATHILDE, continued from page 3

adjust its trajectory for an encounter. However, Don Yeomans of JPL recalculated Mathilde's orbit following recent observations and the corrected orbit placed Mathilde in a favorable position for an encounter.

Earth-based observations have shown that Mathilde is a C-type asteroid with an albedo of 0.035. It has an elliptical orbit (eccentricity of 0.23) with a semimajor axis of 2.6 au and inclined 6.9 degrees to the ecliptic. The reflected light varies by 0.45 magnitudes with a period of 17.4 days. From this it follows that Eros is non-spherical and has a rotation period of 17.4 days. This rotation period is extremely long, since the average asteroid rotation period is in the order of 8 hours. Mathilde

organizer for the meeting, more information about which can be obtained from him or from IOTA's Web site at <http://www.sky.net/~robinson/iotandx.htm> Those planning to attend should obtain the registration form (there is no cost) either from the Web site or upon request to Scott and return it by September 1st. The meeting is open to anyone interested in occultations and eclipses; IOTA membership is not necessary to attend. Those wanting to give a presentation should send a title by August 15th and a short abstract by September 1st; a lecture specification form is also on the Web site.

As an additional draw, there is a rare chance to observe three grazing occultations the morning of September 12th, not just the Aldebaran graze. The triple graze might be observed as far east as southern New England as well as from Tennessee. Information about them is given on IOTA's Web site.

This is an election year for IOTA. Below is the proposed slate of officers for the next 3 years, for this year's election that will be held at the IOTA meeting. Nominations are now open for others for the election; send nominations to me by August 1st to be included in the ballot, which will be mailed to the IOTA membership before the election. Nominees must be members of IOTA

was estimated to be about 70 km long and 50 km "wide". The NEAR spacecraft encountered Mathilde on 1997 June 27 when the asteroid was 1.9 au from Earth. Mathilde was first imaged by the spacecraft 36 hours before the point of closest approach (PCA). Because the spacecraft was not designed for a flyby, its instruments were not on a rotating platform. Therefore, in order to obtain images during the flyby, the entire spacecraft had to be rotated. Consequently, the solar panels, which provide the only power source, could not be pointed directly toward the sun and, therefore, were not illuminated for maximum power. With reduced power

MATHILDE, continued on page 6

and only members can participate in the election.

David Dunham
President

Paul Maley
Executive V.P.

Richard Nugent
Executive Secretary

Craig and Terri McManus
Secretary & Treasurer

Mitsuru Soma
V.P. for Grazing Occultation Services

Jim Stamm
V.P. for Planetary Occultation Services

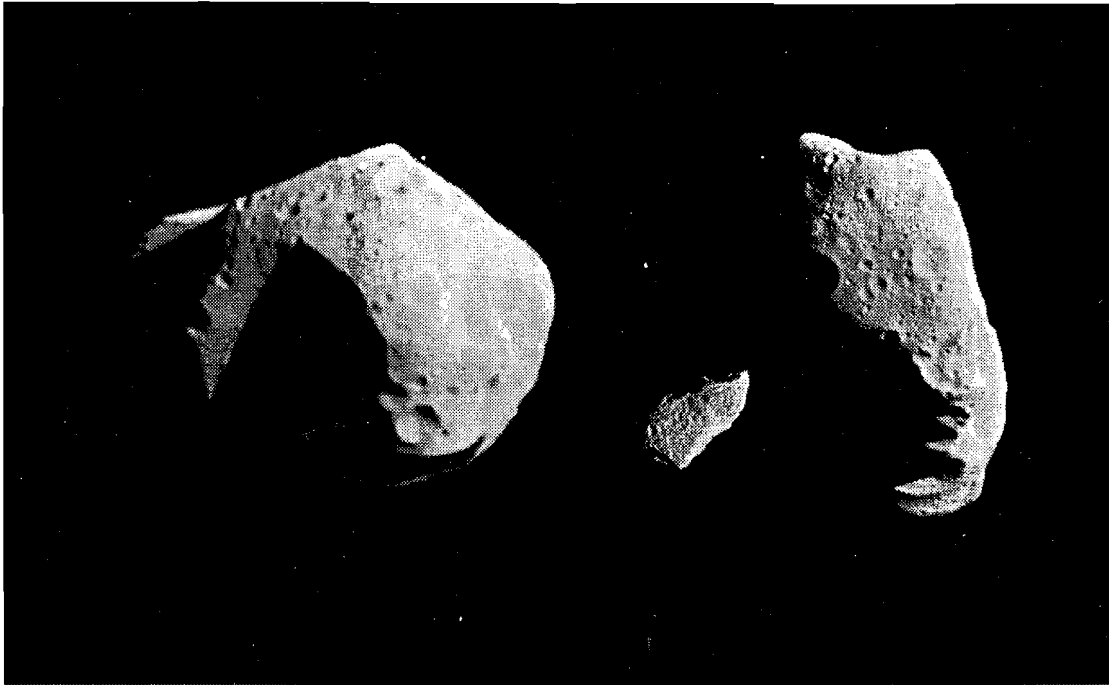
Walt Robinson
V.P. for Lunar Occultation Services

Rex Easton
Editor of O.N.

This is being sent to most observers in my e-mail directory since I don't know exactly who is currently an IOTA member, and also because the IOTA meeting is open to non-members.

Newsletter Deadline for October *Star Dust*, September 15, 1998

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 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. Thank you.



Mathilde

Gaspra

Ida

degrees to the ecliptic. The Earth swing-by also provided an opportunity to calibrate five of the instruments on board the spacecraft which include an X-ray spectrometer, a solar X-ray spectrometer (to calibrate the other), laser altimeter, magnetometer, near infrared spectrometer, and the multispectral imager. This complement of instruments was designed to study the composition and mineralogy of Eros.

The rendezvous with 433 Eros is on schedule for

at that distance from the sun, there was enough power to operate only the multispectral imager. The flyby lasted 25 minutes during which time 144 images were obtained. The distance of the closest approach was 1200 km. During the flyby, the solar phase angle varied from 140 to 40 degrees. [The solar phase angle is that between the spacecraft-asteroid line and the asteroid-sun line.]

Mathilde's surface was found to be uniformly dark and cratered with no crater rays or color variation. Its shape is roughly a 57 x 53 x 50 km triaxial ellipsoid. There were many small craters and four craters with a diameter of 20 km or greater. By measuring the change in spacecraft velocity during the encounter, an estimate of Mathilde's mass was determined (10^{20} grams) and, using the size measured from the images, its density was found to be 1.3 g/cc.

The data from the NEAR flyby provides some insight to the nature of this C-type asteroid. The density of 1.3 g/cc is not much larger than that of water ice (1.0 g/cc). Carbonaceous chondrite meteorites have a density of about 2.0 g/cc. There is no evidence of water ice. Without water, a rocky object with a density of 1.3 g/cc cannot be solid. It appears, therefore, that Mathilde is very

porous and may be a "rubble pile"; it is certainly not differentiated. It is to be noted that four craters have a diameter on the order of the asteroid's radius. Because it is porous, the shock from the impacts which formed the craters was not transmitted effectively throughout the asteroid, so the craters remain. Slumping of material in the crater walls suggests an upper limit of the tensile strength of the surface material. Work needs to be done simulating the propagation of shock waves through various asteroid models.

The spacecraft imager covered about 4 percent of the region around Mathilde where a satellite would be found. No object with a diameter greater than 10 km was found. This is important because of the need to find an explanation for Mathilde's abnormally slow rotation rate. This rate could be explained by the presence of a significant companion. Since no satellite has been discovered, another explanation must be found.

Following the encounter with Mathilde, the next event for NEAR was the Earth swing-by which successfully occurred on 1998 February 23. This event was mainly used as a plane change maneuver to get the spacecraft out of the ecliptic. The orbit of Eros is inclined 10

1999 February 10. First images of Eros are expected in 1998 October.

Dr. McFadden concluded her lecture with two videos made from images obtained with the NEAR spacecraft. One video showed the Earth swing-by sequence, the other showed the Mathilde flyby.

Several questions were asked during the question-answer session following the formal lecture. One question was concerned about the dark appearance of Mathilde being due to a surface layer. The answer was that, if the color were due to a layer, the floor of a large crater would be of a different color than that of the surrounding surface. There is no color variation over the surface.

Another question was related to Mathilde's abnormally slow rotation rate: could this rate have resulted from collisions with other asteroids, assuming that Mathilde does not have an undiscovered companion? The answer to that question is unknown, but a study to determine if collisional derotation (from a faster rate) is possible would make a good project.

We thank Dr. Lucy McFadden for an excellent presentation. ○

Third Annual Boeing Writing Contest

The Griffith Observatory, in the interest of stimulating the flow of information between scientists, science writers, and the public, proudly announces the sponsorship by Boeing of an annual offering of awards for the best articles in astronomy, astrophysics, and space science.

The stipulations are as follows:

- Awards will be made on **February 1, 1999**, for the articles which best communicate to the average reader, material of current or historical interest in astronomy, astrophysics, and space science.
- Articles must be a minimum of 10 pages and a maximum of 15 pages in length, typewritten, in English, double-spaced, and accompanied by a brief biographical sketch of the author. At least two finished, camera-ready ink diagrams, graphs, or photographs, ready for publication, must be included. The author's name and title of the article should appear only on a cover sheet and not on the pages of the article itself.
- The cash amounts of the awards are:

\$750.00 First Prize
\$350.00 Second Prize
\$250.00 Third Prize
\$200.00 Fourth Prize
\$75.00 Honorable Mention

- All articles must be postmarked by **December 1, 1998**. The contest is open to all interested persons (Griffith Observatory and Boeing employees excepted).
- All winning articles become property of Griffith Observatory. The winning articles will be published in the *Griffith Observer*.
- Previously published articles will not be accepted.
- Any number of articles may be submitted to the contest by one person, but only one prize will be awarded to a winning author.
- Judging will be done at the Griffith Observatory, and the decision of the judges is final. Each entry is judged anonymously so that the author's identity is unknown to all of the judges.
- Awards are made on the basis of clear and interesting style, accuracy, reader interest in the subject, correct grammar and syntax, originality in presentation and content, and neatness. Failure to meet the requirements on length, appearance, and illustrations may disqualify an entry from consideration.

Address all articles to:
Awards Committee
c/o Griffith Observatory
2800 East Observatory Road
Los Angeles, CA 90027
(323) 664-1181

About Griffith Observatory

The Griffith Observatory has been a major Los Angeles landmark since 1935. It is visited by nearly two million people each year and ranks seventh on the list of major tourist attractions of Southern California. It sits on the southern slope of Mount Hollywood where it commands a stunning view of the Los Angeles basin below. Thousands of people enjoy the view from its balconies, especially at night.

The Observatory is owned, operated, and financed by the City of Los Angeles, Department of Recreation and Parks. It was a gift to the city by Col. Griffith J. Griffith (1850-1919), who also donated Griffith Park and the Greek Theatre. The Observatory is a non-profit educational institution whose purpose is to provide information on astronomy and related sciences to the public. It is not a research institution, although from time to time, it carried out modest research projects.

The Observatory is divided into three main areas; the Hall of Science astronomy museum, the telescopes, and the planetarium theater. All are open to the public and, except planetarium shows, are free of charge. To know more about this site, visit their website at www.griffithobs.org.

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/Department of Terrestrial Magnetism (CIW/DTM) — Seminars are held on Wednesdays at 11:00 AM in the Seminar Room of the Main Building.

"The Lick, Keck, and Anglo-Australian Planet Surveys," Speaker Paul Butler, Dept. of Terrestrial Magnetism, CIW, September 9.

Maryland Space Grant Observatory — Open House every Friday evening (weather permitting), Bloomberg Center of Physics and Astronomy, Johns Hopkins University, Baltimore, MD. Information: 401/516-6525 or check their web site at www.pha.jhu.edu/facilities/observatory/telescope.html.

Montgomery College's Planetarium, Takoma Park — "When the Sky Falls", September 23, 7:00 PM.

NASA/Goddard Space Flight Center, Laboratory for Astronomy and Solar Physics (LASP) Seminar — All seminars will take place in Bldg. 21, Room 183A and will begin at 3:30 PM.

Schedule for their lecture series will resume in October.

Scientific Colloquia, Goddard Space Flight Center — All colloquia will be held in the Building 3 Auditorium at 3:30 PM.

Schedule for their lecture series will resume in October.

Space Telescope Science Institute (STScI) — Free lectures held the first Tuesday of each month at

8:00PM in the STScI Auditorium at Johns Hopkins University. Following the lecture visit the Maryland Space Grant Observatory. Free parking is available. (* Special time: 3:30 PM)

"Infrared Luminous Galaxies: Near-Infrared and ISO Results," Speaker Shobita Satyapal, National Air & Space Museum, September 9.*

"Kinematics, Abundances, and Formation of Brightest Cluster Galaxies," Speaker Terry Bridges, Royal Greenwich Observatory, September 11.*

"Globular Clusters Dwarf Elliptical Galaxies," Speaker Bryan Miller, Leiden Observatory, September 14.*

University of Maryland Department of Astronomy Campus Observatory, College Park, MD — "Biography of The Sun", speaker Dr. Beth Hofnagel, September 5, 9:00 PM.

"A New Look at The Old Sun", speaker Dr. Mukul Kundu, Sept 20, 9:00 PM. (See their web site at <http://www.astro.umd.edu>)

U.S. Naval Observatory Colloquia — "All colloquia will be held in the Building 52, Room 300 and will begin at 10:30 AM.

Virginia Living Museum Planetarium, Newport News, VA — "Our Endangered Skies & More Than Meets The Eye," Sept. 19-Nov. 15. See their website for more events and programs at <http://users.visi.net/~stargazr/html>.

STARLAB

Portable Planetarium
Outreach Program

The Science Museum of Western Virginia & Hopkins Planetarium offers a portable planetarium to schools, youth, and civic groups. STARLAB requires an indoor location at least 20 feet by 24 feet in diameter, at least 11.5 feet in height and close access to one electrical outlet. STARLAB usually sets up best inside a cafeteria, gymnasium, music room, on stage, or inside a large classroom with a high ceiling and no hanging fixtures. Also, an area isolated from noise and distractions is recommended for the best experience. A minimum of a half-hour is required for setting up and the same for taking down. STARLAB has a student capacity of 30 (K-4) children, while a group no larger than 25 is recommended for grades 5 and greater. Teachers or group leaders must remain with their groups inside STARLAB. For the comfort of teachers, one pair of ITT Night vision goggles will be provided during each presentation to help minimize student interruptions in the dark.

STARLAB offers 14 topics to choose from; The Great Myths and Constellations of the Zodiac, Night Sky Tonight, Mother Earth & Father Sky: Native American Folklore, to name a few. Each presentation is approximately 45 minutes, including a STARLAB introduction and ending with a time for questions. STARLAB is available all year around.

For more information and fee structure, you can call the museum at 540/342-5718. Please check their website at <http://www.smwv.org> for more information about STARLAB and the offerings at the Science Museum of Western Virginia & Hopkins Planetarium.



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.

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

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Note: If you already subscribe to *Sky & Telescope*, please attach a recent mailing label. You may renew this subscription through NCA for \$27 when it expires.

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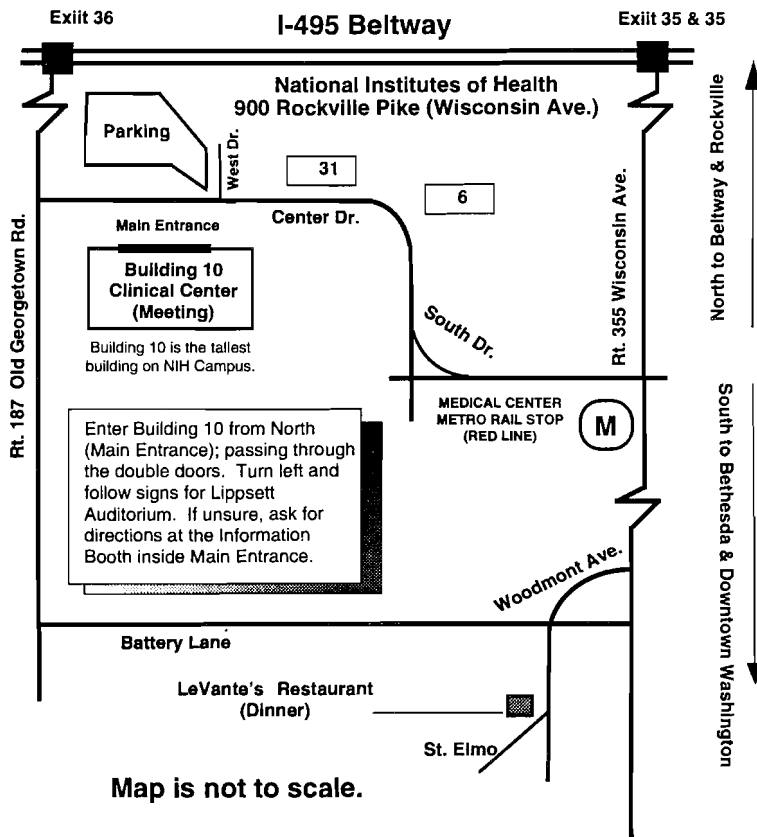
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The following information is optional. Please indicate briefly any special interests, skills, education, experience, or other resources which you might contribute to NCA. **Thank you, and welcome to NCA!**

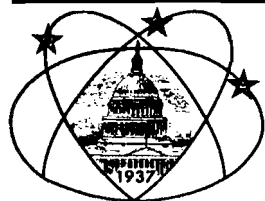
Getting to the NCA Monthly Meeting

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 LeVante's Restaurant- From 495, take Wisconsin Avenue south. Take a right onto Woodmont Avenue. It is located at 7262 Woodmont Avenue at the corner of Woodmont and St. Elmo. There is free parking in the area. Seats are not guaranteed after 5:30 PM.

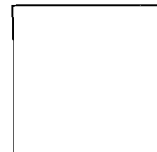


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