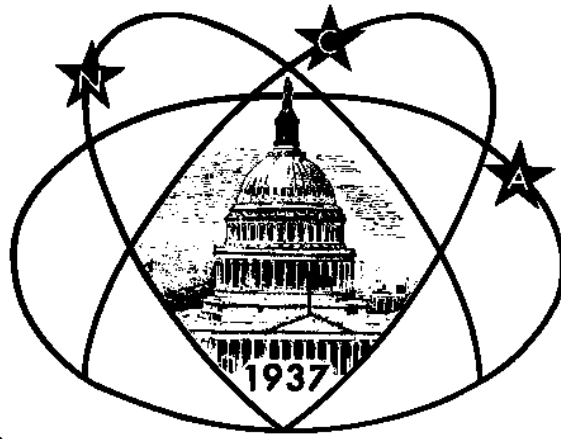


Star



Dust

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Sean Solomon: "The MESSENGER Mission to Mercury"

submitted by Gary Joaquin

Dr. Sean Solomon will present the featured talk for the December 2 meeting of National Capital Astronomers, "The MESSENGER Mission to Mercury". The meeting will be held in the Lipsett Amphitheater in Building 10 (Clinical Center) of the National Institutes of Health in Bethesda at 7:30 P.M. Dr. Solomon has provided us with a synopsis of his talk. His biography was derived from a curriculum vitae that he also provided:

Synopsis

Mercury has been viewed at close range by only a single spacecraft, Mariner 10, which flew by the planet three times in 1974-75. Mariner 10 discovered Mercury's global magnetic field, documented the presence of several species in Mercury's exosphere, and imaged about 45% of the surface. In part because of this limited history of exploration, and in part because of several unusual characteristics of the planet, Mer-

cury holds special promise for elucidating general solar system processes. Determining the surface composition of Mercury, a body with an anomalously high ratio of metal to silicate, will provide a unique window on the mechanisms by which planetesimals in the primitive solar nebula accreted to form planets. Documenting the global geological history will elucidate the role of terrestrial planet size as a governor

(Continued on page 2)

Review of Nolan Walborn's Talk: "Insights Into Massive Star Formation from the Hubble Space Telescope"

by Andrew W. Seacord, II

Dr. Nolan Walborn, a stellar spectroscopist specializing in the optical and ultraviolet spectroscopy of hot, massive O and B stars, spoke at the November 4 NCA meeting about insights into massive star formation obtained from Hubble Space Telescope (HST) images. He introduced the subject by showing us the famous HST image of the dust pillars in M16, the Eagle Nebula. The structure is caused by the stellar winds and radiation from massive O and B stars in this H II region. The most massive stars have a lifetime of two or three million years compared to the lifetime of about ten billion years of the Sun. The more massive a star is, the faster it converts hydrogen to helium, and the shorter its lifetime will be. An H II region is essentially a gas cloud, usually containing some dust, in which the hydrogen is ionized. (The nomenclature "H II" means that the hydrogen (H) is ionized; that is, it has lost its one electron. H I is neutral hydrogen.) Emission nebulae are H II regions; some are large enough to be called "giant H II regions".

A star can be seen at the end of a spike extending from one of the M16 pillars, which were formed by ionizing radiation and stellar winds from hot, massive stars in the nebula. The stellar winds hit the surrounding nebular gas and dust and trigger a second generation of star formation. The new star at the tip of the spike is only one of many second generation stars in the pillars. The dust hides stars within the pillar from the visible image, but they can be detected from infrared (IR) and sub-millimeter radiation.

Gravitational contraction of a portion of a dusty gas cloud starts the formation of a star. The core of this contracting region heats up as it contracts, and when it attains a temperature of a few million degrees, thermonuclear ignition occurs and the process of converting hydrogen to helium begins. A star is born!

The Carina nebula

Dr. Walborn chose a good example of a giant H II region that is to be found in the

constellation Carina. The nebula is located at a distance of about 8,000 light years from us. It contains the star Eta Carinae, a 150 solar-mass, pre-supernova star surrounded by two opposing lobes of luminous gas and an equatorial disk. The star is known for its outbursts, the last of which occurred around 1840. Associated with the Carina nebula are several 100 solar-mass O3 stars having photospheric temperatures of about 50,000 degrees.

Dr. Walborn talked about the interstellar medium (ISM) within the Carina nebula. The Space Telescope Imaging Spectrograph (STIS) on the HST is an Echelle grating spectrometer that can detect features in the ISM. Specifically, STIS has detected Doppler-shifted spectral lines of ionized and neutral magnesium. The STIS detected twenty-four separate velocity components in one direction in the ISM, some with very high velocities. Each component originates from a separate cloud in

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NCA Events This Month

The Public is Welcome!

NCA Home Page: <http://capitalastronomers.org>

Fridays, December 1, 8, 15, 22, and 29, from 7:00 - 10:00 P.M.: Telescope-making and mirror-grinding classes at American University, McKinley Hall, Basement (Room 9), Nebraska and Massachusetts Avenues, NW. However, on December 1, 22, and 29, if the weather is clear, class may be canceled so that the instructor can go out stargazing himself, instead, because the moon will be near new or 3rd quarter. Call or e-mail Guy Brandenburg to confirm: 202-635-1860 or gfbranden@earthlink.net.

Fridays 8:30 P.M. December 1, 15, 22, 29 - Open night with NCA's 14-inch telescope at Ridgeview Observatory near Alexandria, Virginia; 6007 Ridge View Drive (off Franconia Road between Telegraph Road and

Rose Hill Drive). Call Bob Bolster, (703) 960-9126 before 6:00 p.m.

Saturday, December 2, 5:30 P.M. - Dinner with the speaker and NCA members at the Athenian Plaka Restaurant, 7833 Woodmont Ave. Bethesda MD phone: 301/986-1337

See the map and directions on Page 6.

Saturday, December 2, 7:30 P.M. - NCA meeting, at the Lipsett Auditorium in Building 10 at NIH, will feature Sean Solomon talking to NCA on "The MESSENGER Mission to Mercury".

See Page 4 for more National Capital area astronomical doings. To join NCA, use the membership application on Page 7.

Meteor Showers

December Radiants

Full Moon: December 11

Major Activity

Radiant	Duration	Maximum
Geminids (GEM)	Dec. 6 - 19	Dec. 13 at 17:04 UT

Minor Activity

Radiant	Duration	Maximum
Delta Arietids	Dec. 8 - Jan. 2	Dec. 8/9
11 Canis Minorids	Dec. 4 - 15	Dec. 10/11
Coma Berenicids (COM)	Dec. 8 - Jan. 23	Dec. 18-Jan. 6
Sigma Hydrids (HYD)	Dec. 4 - 15	Dec. 11/12
December Monocerotids (MON)	Nov. 9 - Dec. 18	Dec. 11/12
Northern Chi Orionids (XOR)	Nov. 16 - Dec. 16	Dec. 10/11
Southern Chi Orionids (XOR)	Dec. 2 - 18	Dec. 10/11
Phoenicids (PHO)	Nov. 29 - Dec. 9	Dec. 5/6
Alpha Puppids (PUP)	Nov. 17 - Dec. 9	Dec. 2-5
Ursids (URS)	Dec. 17 - 25	1997 Dec. 22 11 hours UT

Source: <http://comets.amsmeteors.org/meteors>

Sean Solomon

(Continued from page 1)

of magmatic and tectonic history. Characterizing the magnetic field and the size and state of Mercury's core will advance our understanding of the energetics and lifetimes of magnetic dynamos in solar system bodies. Determining the full range of volatile species in Mercury's polar deposits, exosphere, and magnetosphere will provide insight into volatile inventories, sources, and sinks in the inner solar system.

The Mercury Surface, Space ENvironment, GEochemistry, and Ranging (MESSENGER) mission to fly by and orbit Mercury, selected in July 1999 under NASA's Discovery Program, will accomplish all of these key objectives. After launch by a Delta 2925H in March 2004, two flybys of Venus (in 2004 and 2006), and two flybys of Mercury (in 2007 and 2008), orbit insertion will occur at the third Mercury encounter. The instrument payload includes a dual imaging system for wide and narrow fields-of-view, monochrome and color imaging, and stereo; X-ray and combined gamma-ray and neutron spectrometers for surface chemical mapping; a magnetometer; a laser altimeter; a combined ultraviolet-visible and visible-near-infrared spectrometer to survey both exospheric species and surface mineralogy; and an energetic particle and plasma spectrometer to sample charged species in the magnetosphere. During the flybys of Mercury, regions unexplored by Mariner 10 will be seen for the first time, and new data will be gathered on Mercury's exosphere, magnetosphere, and surface composition. During the orbital phase of the mission, one Earth year in duration, MESSENGER will complete global mapping and the detailed characterization of the exosphere, magnetosphere, surface, and interior.

Biography

Dr. Sean Solomon is the Principal Investigator of the MESSENGER mission to Mercury, the Director of the Department of Terrestrial Magnetism at the Carnegie Institution of Washington, a prolific writer and contributor to NASA professional committees, and the recipient of numerous awards. He has a B.S. in geophysics from the California Institute of Technology and a Ph.D. from the Massachusetts Institute of Technology.

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Review of Walborn Talk, continued

(Continued from page 1)

the ISM. Such clouds in the H II region collide, forcing the temperature in some regions to a few million degrees, from which x-rays are emitted. The ISM is a dynamic entity. Changes in the spectral features over time can be observed by comparing the spectra taken in 1997 and again in 1999. Some features strengthened, whereas others weakened or disappeared during this time. The ISM can be observed along many other lines of sight in the sky. Dr. Walborn briefly discussed a spectral profile from the line of sight in the direction of the quasar Q1213-003 and pointed out that the interstellar structure within the Carina giant H II region is similar to that of a "narrow line system" toward the QSO.

NGC 3603 is the most luminous, optically-visible, giant H II region in our galaxy. It is located at a distance of about 23,000 light years and has a dense cluster of hot O stars at its center. In the nebula, there are pillars pointing to the O stars.

30 Doradus

Moving out of our galaxy to one of its nearest neighbors, the Large Magellanic Cloud (LMC), Dr. Walborn began a detailed discussion of 30 Doradus, the most luminous giant H II region in the local group of galaxies. It is located at the end of the bar which runs through the LMC. He also pointed out the next most luminous H II region in the LMC, Henize N11.

30 Doradus has a complex array of H II filaments distributed throughout the nebula. Also, there are knots in these filaments with stars embedded within them. A cluster including several dozen 100 solar-mass stars, called R136, can be seen at the center of 30 Doradus. The stellar winds from this cluster of hot, young stars push the nebular gas away from the cluster into the surrounding clouds of dust and molecular gas, creating dense regions which condense to form a second generation of stars observable in the IR.

Dr. Wolburn treated NCA to a premier viewing of an HST Wide Field Planetary Camera 2 (WFPC2) image of 30 Doradus. This image showed a remarkable structure of filamentary interfaces between the expanding stellar wind cavity and the surrounding gas and dust. Gas and dust pillars are seen pointing toward the central star cluster. The false-color image showed the near-UV continuum (emphasizing stars) in blue, H-alpha in green, and singly ionized

sulphur (S II) in red. The H-alpha and S II emission revealed different nebular structures.

One of these pillars, to the northeast of R136, is shaped like a volcano with the peak blown off. Baby stars are seen at the tip of the pillar. He treated us to another premier viewing of an HST Planetary Camera image, a 0.03 arc second-resolution image of the part of the 30 Doradus nebula that included the volcano pillar. The stars at the end of the pillar appear to be a few 100,000 years old, while those in the central cluster appear to be about two million years old.

An IR image made by the HST NICMOS instrument shows two very bright IR stars within an adjacent pillar. They can be seen only as very faint, red stars in the WFPC2 image. The IR images of these stars are as bright as the optical images of the central stars, but they are still within their natal dust cocoon and, so, can be seen clearly only in the IR. Nearby are four compact dust clouds, one with a baby IR star inside. Also in this region of the nebula is a pair of red objects which appear to be impact points where jets from a massive star between them slam into the surrounding nebular gas and dust. There is another finger, or pillar, with an IR star at the finger tip facing R136.

To the right (west) of R136 is a bright arc. IR images of this arc show a chain of IR sources along the arc. These IR sources are second-generation stars whose formation was triggered by the stellar winds from R136. There is another pillar to the west of R136. Comparison of HST IR and optical images of this pillar shows a 20th magnitude optical star which becomes very bright (11th magnitude) in the corresponding IR image of the pillar. This is yet another example of second-generation star formation triggered by R136. There are also pillars to the south of, and oriented toward, R136, one of which contains a luminous IR star.

Dr. Walborn said that within the 30 Doradus region, five distinct stellar age populations have been identified. Multiple stellar populations seem to be a characteristic of giant H II regions containing clusters of massive stars.

In the LMC and SMC

So, how do the results discussed so far

(Continued on page 4)

Star Dust Is Now Available Electronically

Any member wishing to receive *Star Dust*, the newsletter of the National Capital Astronomers, via e-mail as a PDF file attachment instead of hardcopy via U.S. Mail, should contact Nancy Grace Roman, the NCA Secretary, at ngroman@erols.com, or via telephone at 301-656-6092 (home), or 301-286-7537 (GSFC).

School Program Help Needed!

by Nancy Byrd

Peg Kay, Vice President, Affiliated Societies, Washington Academy of Sciences writes,

"One of the area's secondary schools has an astronomy lab (including telescope) and would like to develop a program to participate in the Washington Academy of Sciences' YES program. Unfortunately, the school has no one to run the program. Would one of your members be willing to help?"

If anyone out there can help out please contact Nancy Byrd, nancy@pangean.com, after Tuesday, November 28, or contact Jennifer Jorgenson at washacadsci.org with a copy to Peg Kay at pk@vertechinc.com. (If you will copy me too, I will appreciate it.) Jen can tell you a little more about the school, if you would prefer to call her at the WAS office, 202-326-8975.

Deadline for January *Star Dust*: December 15



Please send submissions to Elliott Fein at elliott.fein@erols.com.

Text must be in ASCII, MS Word, or WordPerfect. Graphics in BMP are best. Thanks.

Other National Capital Area Meetings, etc.

U.S. Naval Observatory (USNO) conducts a free 90 minute tour of its facilities every Monday night at 8:30 p.m., except on Federal holidays. The tour includes presentations about the Master Clock, observations through telescopes (weather permitting), a video presentation on the mission and history of the Observatory, and discussions with staff astronomers. Call the USNO Public Affairs Office, 202/762-1438 before going down. Source: <http://www.usno.navy.mil>

Department of Terrestrial Magnetism (DTM) Carnegie Institute of Washington Seminars are held on Wednesdays at 11:00 a.m. in the Main Building. Topics range from astrophysics and planetary sciences to geochemistry and seismology. Call or email Rosa Maria Esparza to confirm that there have been no cancellations. 5241 Broad Branch Road, N.W., Washington, D.C. (202) 686-4370 (Extension 4378 or 4383) Source: <http://www.ciw.edu/DTM-seminars.html>

Goddard Scientific Colloquium — Due to construction in the Building 3 auditorium, the colloquia will be held at 3:30 p.m. on Fridays in the GSFC Building 8 auditorium. If you plan to attend and do not have a NASA badge, please contact Carol Krueger, at (301) 286-6878, at least 24 hours beforehand.

December 1 Barbara Thompson, NASA/GSFC, "Sun Storms - The Science of Space Weather Eruptions". Source:

heawww.gsfc.nasa.gov/users/djt/colloq/
Montgomery College's Planetarium Fenton St. in Takoma Park, MD.
Thursday, 21 December 7:00 P.M. "The Day of the Sun's Return, the Winter Solstice." Source: <http://www.mc.cc.md.us/Departments/planet/>

Northern Virginia Astronomy Club (NOVAC) meets at 6:00 p.m., at Lecture Hall 1 on the Fairfax campus of George Mason University. 703 803-3153.

December 10 Harold Geller, "An International Space Station Amateur Telescope". Source: <http://novac.com>

University of Maryland Observatory on Metzertott Road. Open house on 5 and 20 of each month includes a 20 to 30 minute slide presentation in the lecture hall, followed by telescope viewing. Info: (301) 405-3001 Source: <http://www.astro.umd.edu/openhouse/>

Greenbelt Astronomy Club meets on the last Thursday of each month (except holidays) at 7:30 p.m. at the Howard B. Owens Science Center, 9601 Greenbelt Road, Lanham, MD 20706.

December meeting is **December 14** (Call the Science Center at 301-918-8750 or (301) 441-4605 to confirm meeting dates). Club meetings are open to the general public. Source: heawww.gsfc.nasa.gov/docs/outreach/gac/GAC.html

NASA/GSFC LEP Seminar Laboratory for Extraterrestrial Physics

Brown Bag Seminar. The Laboratory for Extraterrestrial Physics (LEP) at NASA's Goddard Space Flight Center conducts weekly science seminars Fridays at noon in Room 8 in Building 2 at Goddard.

December 1 Mei-Ching Fok, USRA at NASA/GSFC, "Storm-Time Ring Current Seen by IMAGE" Source: http://lepjas.gsfc.nasa.gov/~seminar/lep_seminar.html

Goddard Engineering Colloquia All colloquia are held at 3:30 p.m. on Mondays in the Building 3 Auditorium, unless otherwise indicated below.

December 4 Andrew F. Cheng, Johns Hopkins University Applied Physics Laboratory, "Scientific Highlights of NEAR Shoemaker"

December 11 Robert L. Forward, Consultant, "Interstellar Propulsion"

Note: Individuals not badged for entry into Goddard should obtain the current procedure by contacting Main Gate security at 301-286-7211. Source: <http://ecolloq.gsfc.nasa.gov/sched.html>

Space Telescope Science Institute (STScI) Come to the free public lectures at the STScI. Each month a noted scientist discusses a different cosmic topic. Lectures are at 8 p.m. the first Tuesday of every month in the STScI auditorium, on the campus of Johns Hopkins University. For directions, call 410-338-4700. Source: http://hubble.stsci.edu/about_us/open-night.shtm

Review of Walborn Talk, continued

(Continued from page 3)

agree with observations made of galaxies far, far away? How do they influence the choice of future observations? Before going too far, Dr. Walborn discussed further observations in our two companion galaxies, the Large and Small Magellanic Clouds (LMC and SMC). In the SMC, we have the largest H II region (NGC 346) with a massive central star cluster; the cluster is surrounded by IR stars in a 2MASS survey image. A detailed survey of spectral classification within the second largest H II region within the LMC (Henize N11 mentioned earlier) shows multiple generations of stars. The most massive stars (O3 - O5) are gone from the center, where the largest star found is an O6 star. There is, again, evidence of evolution as a two-stage star burst with formation epochs two million years apart, as in

30 Doradus, but N11 is one or two million years older than 30 Doradus.

Far, far away

Spiral galaxy M33 lies beyond our galaxy and its companions. HST has detected filamentary arcs in the giant shell H II region NGC 604 of M33; this H II region is very similar to N11. The question is: Are these filaments caused by supernova explosions plowing into the surrounding interstellar gas?

The last HST image that Dr. Walborn showed us was of the dwarf star-burst galaxy NGC 4214, about 13 million light years away from us. Two or three giant shell H II regions, like N11 and NGC 604, can be discerned here. The ionization of these nebulae comes from very hot stars seen at their peripheries. The stars within these regions can be separated into se-

quential age groups. But, another set of giant H II regions in NGC 4214 are still centrally filled and, therefore, must be younger.

Finally, what can be said about the most distant and, therefore, primitive galaxies? HST deep-field surveys of primitive galaxies cannot yield details of stellar age group distributions because these surveys only show integrated properties of each galaxy. But, the detailed information derived from studies of the nearby objects can aid the interpretation of the distant objects.

We thank Dr. Walborn for a very interesting and informative presentation. Also, the reviewer wishes to thank Dr. Walborn for reading this review and giving the reviewer many comments and suggestions for much improving it.

Mid-Atlantic Occultations and Expeditions December 2000

by David Dunham

Asteroidal Occultations

DATE	Day	EST	Star	Mag	Asteroid	dmag	Dur	Ap.	s in.	Location
Dec 1	Fri	19:21	TAC+20d 709	10.9	Geraldina	3.1	6	8	8	Florida?
Dec 3	Sun	4:19	ACT08831211	9.9	Herculina	1.2	6	6	6	Carolinas
Dec 13	Wed	18:38	ACT64011054	10.2	Papagena	1.3	5	5	5	Quebec
Dec 14	Thu	3:51	SAO 079848	8.4	Martina	7.4	3	2	2	Quebec
Dec 21	Thu	22:46	ACT13780723	9.6	Ada	3.7	6	5	5	Quebec
Dec 22	Fri	5:33	SAO 139079	7.3	Amphitrite	3.8	9	1	1	Newfoundland
Dec 22	Fri	5:59	TAC-3d 6242	10.8	Hebe	0.9	10	8	8	New York
Dec 28	Thu	0:48	SAO 055033	9.6	Utopia	5.1	7	5	5	DC area

Lunar Grazing Occultations

DATE	Day	EST	Star	Mag	% alt	CA	Location
Dec 4	Mon	16:59	ZC 3484	6.9	57+	35	5S I-83 exit 2, PA, Sun alt. -4

Twilight will make this event quite difficult s. of York, PA, so we might not attempt it. Conditions are better farther east, in Allentown, PA; n. of N.Y. City; near Williamsburg, MA; and in s. NH.

Total Lunar Occultations

DATE	Day	EST	Star	Mag	% alt	CA	Notes
Dec 3	Sun	19:01	D ZC 3358	6.9	48+	37	79N Sp. K2
Dec 4	Mon	18:49	D ZC 3490	7.2	58+	43	79N Sp. F8
Dec 5	Tue	20:19	D ZC 0060	6.9	68+	47	67N Sp. K2
Dec 9	Sat	2:19	D ZC 0464	6.1	94+	29	83N Sp. K0; poss. close dbl.
Dec 10	Sun	4:02	D ZC 0620	6.1	98+	22	78S Sp. K0
Dec 13	Wed	2:15	D delta Gem	3.5	95-	73	-62S Sp. F0; ZC 1110 = Wasat
Dec 13	Wed	3:23	R delta Gem	3.5	95-	65	59S
Dec 14	Thu	0:56	R ZC 1250	5.8	88-	59	73S Sp. K1
Dec 18	Mon	2:57	R ZC 1755	6.9	46-	31	73N Sp. A0
Dec 19	Tue	2:16	R ZC 1867	7.5	36-	11	51S Sp. A3
Dec 31	Sun	18:14	D ZC 3442	7.9	31+	38	13N Sp. F5

D following the time denotes a disappearance, while **R** indicates that the event is a reappearance. When a power (**x**; actually, zoom factor) is given in the Notes, the event can probably be recorded directly with a camcorder of that power with no telescope needed. The times are for Greenbelt, MD, and will be good to within ± 1 min. for other locations in the Washington-Baltimore metropolitan areas unless the cusp angle (CA) is less than 30 deg., in which case, it might be as much as 5 minutes different for other locations across the region. **Mag** is the star's magnitude. **%** is the percent of the Moon's visible disk that is sunlit, followed by a + indicating that the Moon is waxing and - showing that it is waning. So **0** is new moon, **50+** is first quarter, **100+** or - is full moon, and **50-** is last quarter. The Moon is crescent if **%** is less than 50 and is gibbous if it is more than 50. **Cusp Angle** is described more fully at <http://www.lunar-occultations.com/iota>. **Sp.** is spectral type-color, **O,B**, blue; **A,F**, white; **G**, yellow; **K**, orange; **M,N,S,C** red

Phone the IOTA occultation line, 301-474-4945, for weather go/cancel decisions, and other updates and details, or check IOTA's Web site at <http://www.lunar-occultations.com/iota>

D. Dunham, home 301-474-4722; work 240-228-5609; e-mail dunham@erols.com

Sean Solomon

(Continued from page 2)

Dr. Solomon was a member of the Project Science and Radar Investigation Groups on the Magellan mission (previously the Venus Orbiting Imaging Radar and Venus Radar Mapper). He was a member of the Mars Orbiter Laser Altimeter Team of the Mars Global Surveyor mission (previously Mars Observer).

His most recent NASA professional com-

mittee appointments have included the Planetary Geology and Geophysics Management and Operations Working Group of which he was chairman during 1994-97, the Solar System Exploration Subcommittee (1996-2000), the Space Science Advisory Committee (1996-2000), and the Earth System Science and Applications Advisory Committee (1998-2000). He is currently chair of the Solid Earth Science

Working Group.

Dr. Solomon has received numerous awards for his work, his most recent being the Arthur L. Day Prize and Lectureship sponsored by the National Academy of Sciences (1999), the Grove Karl Gilbert Award sponsored by the Geological Society of America (1999), and he became a Member of the National Academy of Sciences this year.

Getting to the NCA Monthly Meeting

Saturday, December 2

5:30 P.M. - Dinner with the speaker and NCA members at the

Athenian Plaka Restaurant,
7833 Woodmont Ave.
Bethesda MD
phone: 301/986-1337

7:30 P.M. - NCA Meeting at Lipsett Auditorium in Building 10 at NIH. Guest speaker: Dr. Sean Solomon talking about "The MESSENGER Mission to Mercury".

Directions to the Meeting Place

From Rockville Pike (Wisconsin Ave., Rt. 355), to get to the parking lot at the South entrance (this will be the entrance for the next three years or so until they finish the new wing) from Rockville Pike, enter NIH at the Metro Entrance: South Drive (traffic light). Go straight ahead. At the third stop sign you will be at the parking lot, but you will have to make a left turn then a right to get to the entrance to the lot. Make a right turn into the lot. Building 10 is just north of the parking lot. Enter the building and follow the signs to the Lipsett Auditorium.

From Old Georgetown Rd., enter at Lincoln Drive (traffic light nearest to Suburban Hospital). Go straight ahead. The second stop sign is at a T. Bear left and the lot will be on the right. Make a right turn into the lot.

Metrorail Riders - From Medical Center Metro Station: Walk down the hill, past the bus stops. Continue straight past the anchor. At the second stop sign after the anchor, bear right up the incline into the entrance of Building 10, the tallest building on campus (walking time less than 10 minutes).

Taking the J2 or J3 buses from Silver Spring, get off at the Metro stop and follow the directions given for motorists from that point. If coming from Montgomery Mall, get off at the first stop in NIH, before the Clinical Center. There are signs near the ramp for the garage directing you into the side entrance. Walk straight through the building to the Lipsett amphitheater.

Directions to the Restaurant

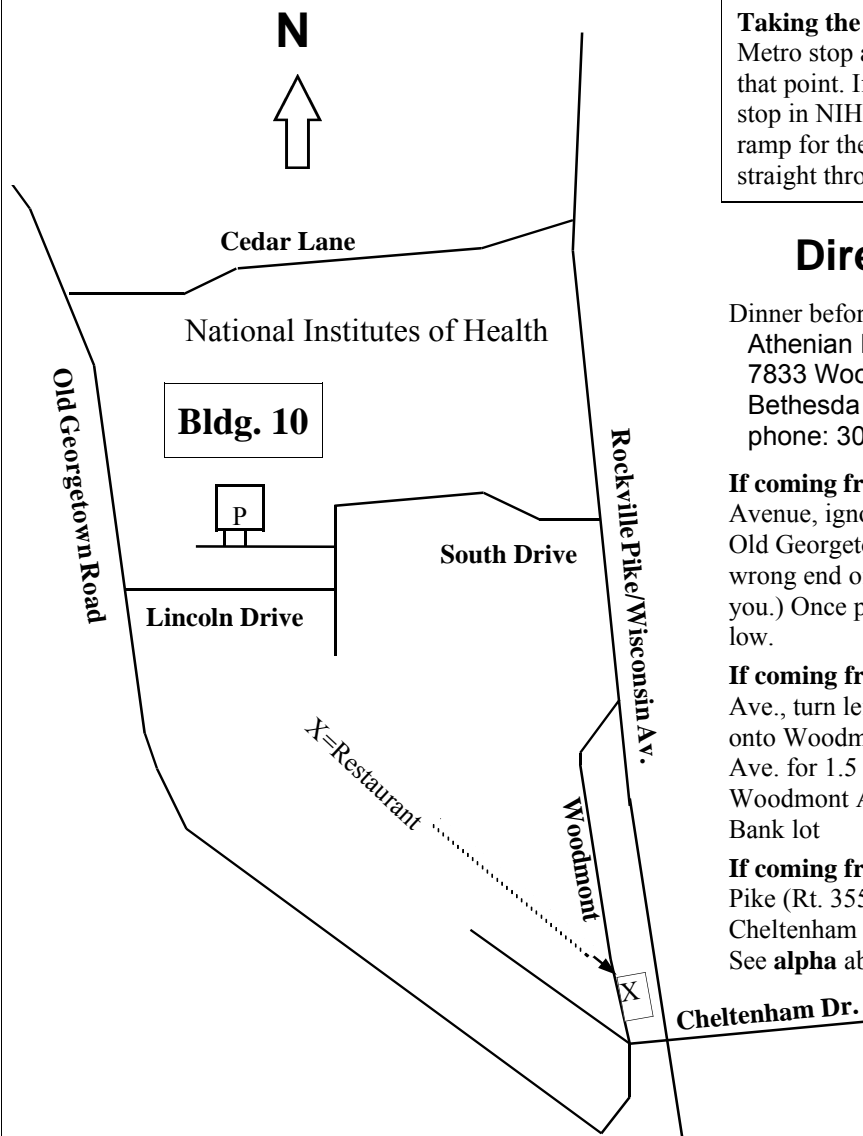
Dinner before the meeting will be at 5:30 P.M. at the Athenian Plaka Restaurant,
7833 Woodmont Ave.
Bethesda MD
phone: 301/986-1337

If coming from the District, when going north on Wisconsin Avenue, ignore all signs for Woodmont Avenue until you pass Old Georgetown Road on your left. (Those signs put you on the wrong end of Woodmont Ave., which becomes one-way against you.) Once past Old Georgetown Rd., follow the directions below.

If coming from south of Bethesda, go north on Wisconsin Ave., turn left at onto Cheltenham Dr.(traffic light). Turn right onto Woodmont Ave. (**alpha**) Continue North on Woodmont Ave. for 1.5 blocks to the restaurant, which is on the right side of Woodmont Ave. Free parking on the upper level of the Suburban Bank lot

If coming from north of Bethesda, go south on the Rockville Pike (Rt. 355) which becomes Wisconsin Ave. Turn right at Cheltenham Dr. (traffic light). Turn right onto Woodmont Ave. See **alpha** above.

After dinner, go north on Woodmont Ave to the traffic light at Rockville Pike (=Wisconsin Avenue) and turn left. Proceed north on the Rockville Pike and follow "directions to the meeting place" at the top of this page.



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SERVING SCIENCE & SOCIETY SINCE 1937

NCA is a nonprofit, membership-supported, volunteer-run, public-service corporation dedicated to advancing astronomy, space technology, 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 in a number of capacities. Many members serve as teachers, clinicians, and science fair judges. Some members observe total or graze occultations of stars occulted by the Moon or asteroids. Most of these NCA members are also members of the International Occultation Timing Association (IOTA).

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

Consumer Clinics: Some members serve as clinicians and provide advice for the selection, use, and care of binoculars and telescopes and their accessories. One such clinic is the semiannual event held at the Smithsonian Institution National Air and Space Museum.

Fighting Light Pollution: NCA is concerned about light pollution and is interested in the technology for reducing or eliminating it. To that purpose, NCA is an Organization Member of the International Dark Sky Association (IDA). Some NCA members are also individual members of IDA.

Classes: Some NCA members are available for educational programs for schools and other organizations. The instruction settings include star parties, classroom instruction, and schoolteacher training programs that provide techniques for teaching astronomy. NCA sponsors a telescope-making class, which is described

in the *Star Dust* "Calendar of Monthly Events".

Tours: On several occasions, NCA has sponsored tours of astronomical interest, mainly to observatories (such as the National Radio Astronomy Observatory) and to the solar eclipses of 1998 and 1999. Contact: Sue Bassett wb3enm@amsat.org

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, and others. Contact: Joe Morris. joemorris@erols.com or (703) 620-0996.

Members-Only Viewing Programs periodically, at a dark-sky site.

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

Fine Quality Telescope, 14-inch aperture, see "Calendar of Monthly Events".

Yes! I'd like to join the NATIONAL CAPITAL ASTRONOMERS:

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___ \$15 Junior membership with *Star Dust* ONLY

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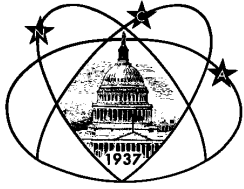
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