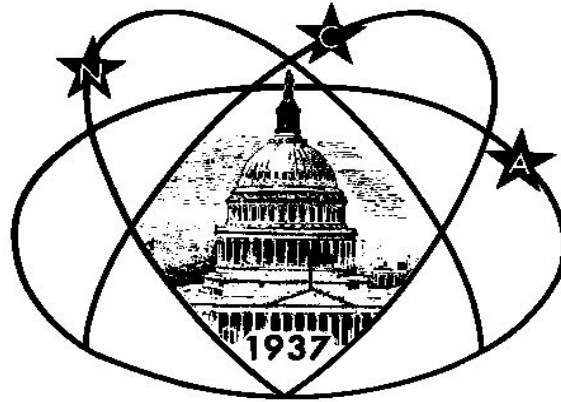


Star



Dust

National Capital Astronomers, Inc.

<http://capitalastronomers.org>

Volume 62, Number 2

October 2003

ISSN 0898-7548

October Speaker: Dr. Andrew Steele, "How to Spot a Martian..."

Submitted by Jeff Guerber

Dr. Andrew Steele will present the featured talk for the October 11 meeting of the National Capital Astronomers. Dr. Steele gave us this abstract of his talk: The next 10 years will see a concerted attempt by several space agencies to detect life on Mars. Current technology however, is sadly lacking to complete this task both on earth and on Mars. I will present an overview of the current problems, illustrate new technologies being developed for life detection and show how these fit into NASA mission architecture for the next 10-15 years.

The meeting will be held at 3:30 P.M. in the Bethesda-Chevy Chase Regional Services Center of Montgomery County, 4805 Edgemoor Lane (Second Floor), Bethesda, MD.

Biography

Dr. Andrew Steele has been a Senior Staff Scientist at the Carnegie Institution of Washington since October 2001. He has also been an Adjunct Research Professor at Montana State University since March 1998 and an Honorary Senior Lecturer at the University of Portsmouth UK since January 1999. From June 1999 to June 2001 he was an Honorary Research Fellow at the Oxford University School of Earth Sciences; from Jan 1998 to Oct 2001 he was a contractor at Lockheed Martin and a Consultant Environmental Microbiologist to NASA, JSC. From October 1996 to Jan 1998 he was a National Research

Council Postdoctoral Fellow at the NASA Johnson Space Center.

He received his Ph.D. from the University of Portsmouth in June 1996, and a BSc in Biochemistry and Microbiology from the University of Central Lancashire in July 1992. Previously, he earned a Diploma of the College of Radiographers

Among his many honors and awards are Honorary Adjunct Professorship – Montana State University; Member of the Astrobiology Science Steering Group; Member of the Mars Exploration Payload Advisory Group (MEPAG) Science Steering Group; Member of the MEPAG goals committee (to update and redefine the MEPAG document); PI on several NASA grants including Astrobiology Instrument development and technology for exploring planets.

He has published many papers. In 2002 he co-authored "Questioning the Evidence for Earth's oldest fossils" in *Nature*, "The Simulated Silicification of Bacteria - New Clues to the Modes and Timing of Bacterial Preservation and Implications for the Search for Extraterrestrial Microfossils" in *Astrobiology*, and "Morphological and Spectral Investigation of Exceptionally Well Preserved Bacterial Biofilms from the Oligocene Enspel Formation, Germany" in *Geochim. Cosmochim. Acta*.

★ **October Meeting** ★
★ **on 2nd Saturday,** ★
★ **at 3:30 P.M.!** ★
★ Please note this change in date ★
★ and time. ★

The President's Corner

Only a few members have voted on membership in the Astronomical League. It is still possible to vote, so please do if you haven't. For your convenience, we are repeating the article on the vote. See Page 3

We are still looking into other meeting places that are more central to the area, and possibly in the evening, to increase our meeting attendance and membership. If you know of any such locations, let me know. However, I would like to point out that we were getting 60 attendees at our NIH meetings, which is not central (but near the Metro) so I think the priority should possibly be for an evening location. We have to be out of our present location at 5 P.M. on the weekend.

If we met during the week, we could meet later.

Lastly, I would like to recommend a book. If you are interested in amateur astronomy and the accomplishments of amateurs through the ages, read *Seeing in the Dark* by Timothy Ferris. It came out last year.

Jay Miller, President

P.S. Andrei Munteanu will give a five-minute presentation about his project at the October meeting.

NCA Events This Month

The Public is Welcome!

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

October every Friday at 6:30 to 9:30 P.M., NCA mirror- and telescope-making classes at the Chevy Chase Community Center, at the northeast corner of the intersection of McKinley Street and Connecticut Avenue, N.W. Contact instructor Guy Brandenburg at 202-635-1860 or email him at gbrandenburg@yahoo.com. Also, see article at right.

Fridays, October 3, 17, 24, 31, and Saturday, October 11, at 8:30 P.M. Open nights with NCA's 14-inch telescope at Ridgeview Observatory near Alexandria, Virginia. For more information, see the article below.

Saturday, October 11 3:30 P.M. NCA meeting in the Bethesda-Chevy Chase Regional Services Center of Montgomery County, 4805 Edgemoor Lane, (Second Floor), Bethesda, MD.

Dr. Andrew Steele will present the featured talk: "How to Spot a Martian..."

Saturday, October 11, following the meeting, dinner with the speaker and NCA members at the Jaleo Restaurant
7271 Woodmont Ave.
Bethesda, MD
(Spanish Tapas)
301-913-0003

Saturday, October 18, 7:30 P.M. Exploring the Sky at Rock Creek Park. See the article below.

Report From the Mirror-Making Workshop

Guy Brandenburg

A couple of people have recently finished outstanding mirrors at the NCA amateur telescope-making workshop. Joe Easley finished a 6" f/7.8 mirror with a maximum wavefront error of about 1/30 wave, and Wade Duvall finished another 6" f/6.5 mirror with a maximum wavefront error of about 1/15 wave. We tested both mirrors with the Ronchi test as well as a standard knife-edge (Foucault) test. We also used Couder masks and data reduction software (the programs TEX and FIGURE45). Joe built an absolutely beautiful equatorial mount for his with blond hardwood plywood, following the directions in Richard Berry's book on making telescopes. Wade's plans are very ambitious and involve a couple of friends from his high school. The project they are working on involves putting the mirror into a glider along with a very large flat diagonal, and some very small camera, to take high-resolution pictures of the ground from extremely high elevations (50,000 feet or so). The glider is to be launched from a balloon!

We have had a little bit of difficulty off and on with the aluminizer, so we changed the oil in the diffusion pump and are thinking about changing the tungsten filament. Jerry Schnall has been able to get the pressure down to about 7 or 8 x 10⁻⁶ Torr, which is not bad at all; but it would be ideal to let it pump down overnight before aluminizing. Letting it run all night is rather tough to do, because we don't have any control over the premises, and we never know if someone is going to come into the room and turn off the water or unplug the vacuum pump!

I have constructed a tester for optical flats, following the example given by David Gordon (NCA), a couple of textbooks, the ATM list-serve (atm@shore.net), and advice from Bob Bolster. I used a fairly standard fluorescent light bulb and two sheets of optical lighting gel (which is simply a thin sheet of transparent plastic available from theatrical supply houses, which lets through light of specific wavelengths; they even give you a wavelength transmission

(Continued on page 4)

Observing with the NCA C-14

Bob Bolster

All at 8:30 p.m.

Fri. Oct. 3

Sat. Oct. 11

Fri. Oct. 17, 24, 31

Prime Objects

Mars, Gibbous Moon, Uranus

Mars, Uranus

Mars, Uranus, M57

At Ridgeview Observatory in Bob Bolster's backyard, 6007 Ridge View Drive, Franconia, Virginia (off Franconia Rd. between Telegraph Rd. and Rose Hill Dr.). Call Bob at 703-960-9126 before 6:00 p.m., to let him know you are coming.

Come See the Stars!

by Joe Morris

Exploring the Sky 2002-2003 Schedule

<u>Date</u>	<u>Time</u>	<u>Notes</u>
10/18	7:30 P.M.	
11/15	7:00 P.M.	Leonid meteor shower 11/14-11/21

Exploring the Sky is an informal program that for nearly fifty years has offered monthly opportunities for anyone in the Washington area to see the stars and planets through telescopes from a location within the District of Columbia.

Sessions are held in Rock Creek Park once each month on a Saturday night from April through November, starting shortly after sunset. We meet in the field just south of the intersection of Military and Glover Roads

NW, near the Nature Center. A parking lot is located immediately next to the field.

Beginners (including children) and experienced stargazers are all welcome — and it's free!

Questions? Call the Nature Center at (202) 895-6070 or check the Internet sites:
<http://www.nps.gov/rocr/planetarium>
or <http://www.capitalastronomers.org>

ASTRONOMICAL LEAGUE REFERENDUM

This page contains columns with arguments for rejoining or not rejoining the Astronomical League.

Following these columns are instructions for casting your vote on this topic.

Finally, the last item is a ballot to be used to cast your vote.

PLEASE VOTE FOR REJOINING THE ASTRONOMICAL LEAGUE

by Jay Miller

The Astronomical League is THE organization of amateur astronomers in the U.S. with over 240 clubs and "members at large" for a total of about 20,000 members. NCA was an active member for many years and, in fact, several of the awards the AL presents are named for NCA members. Its purpose is to promote astronomy. It assists the amateur in many ways. It has a quarterly publication, *The Reflector*; a national convention frequently held with other organizations such as the Association of Lunar and Planetary Observers; it has a guide for club officers which discusses topics such as advertising and how to run a meeting; it publishes *Astro Notes* on topics such as polar alignment, setting circles and other aspects of observing; it supports juniors through awards (NCA's Sabrina Snell won this year and received a telescope); it promotes observing through special certificates to foster telescope and binocular use and publishes guides to aid in observing; it assists groups interested in hosting Astronomy Day activities; it has a 10% book discount and it is involved in setting up a telescope which will be attached to the International Space Station in several years for amateur use. While it does cost each club member an additional \$3.50 in dues, NCA should rejoin not only for the aforementioned reasons, but also because it is simply a shame that we are no longer members considering our early involvement with the AL. More information can be found at their web site, www.astroleague.org. By the way, for the first year the money would come out of other NCA accounts and dues would not have to increase until the following year. However, if we can increase our membership by at least 20, this would cover the expense and no dues increase would be necessary. Also note that NCA dues haven't increased for at least 10 years. Any recent increases have been due to Sky and Telescope magazine. In closing I hope you will support NCA's rejoining the Astronomical League.

Jay Miller, President of NCA

PLEASE VOTE AGAINST REJOINING THE ASTRONOMICAL LEAGUE

by Jeffrey Norman

The cost of rejoining the Astronomical League (AL) will be approximately \$560. AL charges \$3.50 per member plus \$10 for the organization as a whole; National Capital Astronomers (NCA) currently has 157 members. In order for an organization like NCA to get AL's discount price of \$3.50 per member, all of its members must join AL. Individuals may join AL for \$25. The 2004 NCA Fiscal Year budget already shows a deficit of \$150, and joining AL will increase that deficit to \$710, or more than 8% above the expected revenue of \$8600. (The surplus in NCA's Treasury for Fiscal Year 2003 was largely due to one large gift that is not likely to be repeated year after year.)

NCA was a member of AL until a few years ago. We dropped our membership not only because of the cost, but also because it seemed as if very few of our members were using any of AL's services. AL's quarterly publication, which accounts for most of the \$3.50 cost, is mainly a travelogue, telling its members about various star parties around the country and contains very little science. During the last few years in which we were members of AL, NCA's membership was declining, and apparently NCA's membership in AL did very little or nothing to bring new members to NCA. I also think that AL is too greedy because of its policy of insisting that all members of an organization must join AL in order to get the discount price. "Sky & Telescope" (S&T) magazine also had the same policy until a few years ago, but because of many complaints, S&T dropped that policy. Now about only 60-70% of NCA members get S&T, but still qualify for the discount price. AL should follow S&T's lead; and then NCA could charge an extra \$3 to only those NCA members who want to join AL.

Jeff Norman, Treasurer of NCA

ASTRONOMICAL LEAGUE REFERENDUM

Background

The Board of Directors of National Capital Astronomers (NCA) decided to hold a referendum on the issue of whether or not NCA should rejoin the Astronomical League. Please read both the "pro" and "con" statements on this issue which appear in this edition of *Star Dust* before casting your vote. You may use the ballot to vote at the October 11, 2003 meeting of NCA or you may mail the ballot to Nancy Roman at 4620 North Park Ave., #306W, Chevy Chase, MD 20815-4551 (be sure to put a return address on the envelope so that we can be assured that the ballot is from a member) no later than October 15, 2003 or you may e-mail your preference to Nancy Roman at nancy.roman6@verizon.net by that date.

Do you favor National Capital Astronomers rejoining the Astronomical League?

Please put your check or X in the appropriate space.

Yes..... No.....

Report From the Mirror-Making Workshop

(Continued from page 2)

curve with the gel). I used an inexpensive spectrometer I got from Project S*T*A*R to see if the light was sufficiently monochromatic. To test a surface for flatness, one places a known, clean, transparent, double-sided reference flat (which I purchased from Surplus Shed) on top of the surface to be tested and look at the interference lines. The setup works fine if the flat to be tested is not aluminized. If the flat is aluminized, you apparently need to have a much brighter light (100 watts or so) or the interference lines become invisible.

I am pleased to report that we are getting rather crowded at our weekly sessions, and will soon need additional tables. We are ALWAYS in need of clean, used, empty baby food jars with lids; plastic squeeze bottles; and clean old newspaper. We have mirror makers of all genders and ages, from 9 and up.

Classes continue to be held on Friday evenings in the woodshop in the basement of

the Chevy Chase Community Center at McKinley Street and Connecticut Avenue from 6:30 to 9:30 PM, unless the DC Government closes the center because of inclement weather (as they did for Hurricane Isabel). Most people grind, polish, and figure the mirror at our workshop, because that requires expert guidance, but the rest of the telescope they usually make at home. (After all, most folks do NOT need expert guidance to show them how to cut, saw, sand, glue, nail, and paint, following directions and plans in one of several modern books on telescope making.)

If you are interested in making your own mirror and/or telescope, call Guy Brandenburg at 202-262-4274, or check out his webpage at http://home.earthlink.net/~gfbranden/GFB_Home_Page.html, or else just show up at one of our workshops. We have all of the materials you need to get started, and (amazingly) our kit prices are better than those you can get anywhere else. Guy Brandenburg Washington, DC http://home.earthlink.net/~gfbranden/GFB_Home_Page.html.

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 nancy.roman6@verizon.net or 301-656-6092 (home).

Support the IDA

Join the International Dark-Sky Association

3225 N. First Avenue Tucson, AZ 85719-2103

www.darksky.org

The deadline for the September *Star Dust* is August 15.

Please send your material to Elliott Fein by that date to ensure inclusion.

Send submissions to Elliott Fein at elliott.fein@erols.com.

Text must be in ASCII, MS Word (97 or earlier), or WordPerfect.

All articles submitted may be edited to fit the space available.

Meteor Showers

October Radiants

Full Moon: October 10

Major Activity

Radiant	Duration	Maximum
Orionids (ORI)	October 15-29	Oct. 21 at 20:00 UT

Minor Activity

Radiant	Duration	Maximum
Arietids (Autumn)	September 7-October 27	Oct. 8/9
Delta Aurigids (DAU)	September 22-October 23	Oct. 6-15
Eta Cetids	September 20-November 2	Oct. 1-5
October Cetids	September 8?-October 30?	Oct. 5/6
October Cygnids	September 22-October 11	Oct. 4-9
Draconids (GIA)	October 6-10	Oct. 9/10
Epsilon Geminids (EGE)	October 10-27	Oct. 18/19
Northern Piscids	October 5-16	Oct. 12/13

Daylight Activity

Radiant	Duration	Maximum
Sextantids	September 24-October 9	Sept. 30-Oct. 4

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

Mid-Atlantic Occultations and Expeditions

by David Dunham

Asteroidal Occultations

Date	Day	EDT/ EDT	Star	Mag	Asteroid	dmag	dur. Ap. s in.	Location
Oct 4	Sat	4:44	TYC48201278	10.8	Nestor	5.1	5 6	nWV, Virginia
Oct 13	Mon	5:13	SAO 117102	7.1	Union	7.7	2 1	n.Fla.penin.
Oct 14	Tue	0:12	TYC51892121	12.2	Io	0.4	13 10	MD,PA,NJ,DE
Oct 17	Fri	20:23	TYC05670958	11.0	Imprinetta	3.6	8 7	Tenn., Florida
Oct 22	Wed	6:22	PPM 125323	10.7	Penelope	3.3	4 6	s.Quebec,Maine
*** Dates and times above are EDT, those below are EST ***								
Oct 27	Mon	18:15	TYC62570025	11.2	Kalypso	3.5	4 7	nMD,sPA,nVA,NJ
Oct 28	Tue	3:14	TYC53991520	11.5	Cebriones	5.4	5 8	sw Ohio,KY,SC
Oct 29	Wed	5:05	TYC13211473	11.8	Lehigh	2.3	35 8	CapeCod, Maine
Nov 4	Tue	2:33	TYC01141937	9.8	Alfaterna	5.7	6 5	VA,DC,MD,DE,NJ
Nov 5	Wed	2:02	SAO 117986	8.4	Feronia	5.7	4 2	nWV,nMD,sPA,NJ

Lunar Grazing Occultations

DATE	Day	EDT/ EST	Star	Mag	% alt	CA	Location
Oct 20	Mon	4:21	SAO 080882	7.3	32- 31	6N	Suffolk, VA
Oct 21	Tue	4:40	X15596	9.2	22- 22	5N	Boyds,Glenelg,&Timonium, MD
Oct 23	Thu	6:21	X18157	9.5	6- 15	2N	Deerwood,Beltsv.,&Crofton,MD
*** Dates and times above are EDT, those below are EST ***							
Oct 30	Thu	17:51	SAO 188311	9.2	36+ 23	5S	Sun-9; Clinton&n.Annapolis,MD

Total Lunar Occultations

DATE	Day	EDT/ EST	Star	Mag	% alt	CA	Location
Oct 3	Fri	20:23	D omega Sgr	4.7	63+ 25	68N G3	ZC 2910; maybe double
Oct 3	Fri	22:10	D 60 Sgr	4.8	64+ 20	89S G8	ZC 2914; close double
Oct 4	Sat	19:37	D ZC 3052	6.3	73+ 24	65S K0	2nd* mg8.5,1.5",PA200d
Oct 7	Tue	22:19	D ZC 3458	6.2	95+ 39	40S K0	
Oct 15	Wed	2:15	R ZC 740	6.3	79- 58	76N F0	
Oct 18	Sat	5:58	R 76 Gem	5.3	51- 71	77S K5	ZC 1169
Oct 18	Sat	6:33	R SAO 079672	7.4	51- 75	40N K5	Sun alt. -10 deg.
Oct 19	Sun	4:30	R ZC 1290	6.9	41- 55	49N F8	
Oct 20	Mon	5:10	R ZC 1408	7.4	31- 40	85N K3	maybe close double
Oct 21	Tue	4:19	R SAO 099091	7.3	22- 18	73S G5	close double
Oct 21	Tue	4:46	R X15596	9.2	22- 23	16N F2	graze, n. Maryland
Oct 21	Tue	6:11	R SAO 099117	8.5	21- 39	46S G0	
Oct 23	Thu	6:24	R X18157	9.5	6- 16	7N F8	graze, cen. Maryland
*** Dates and times above are EDT, those below are EST ***							
Oct 27	Mon	17:20	D omicronSco	4.6	8+ 12	46S A4	Sun -2 deg.
Oct 30	Thu	17:46	D SAO 188311	9.2	36+ 23	11S A0	Sun -8; graze in MD
Oct 31	Fri	20:34	D SAO 189555	7.2	48+ 18	36N G1	
Oct 31	Fri	20:34	D X54084	7.4	48+ 18	34N F9	D 40s after SAO 189555

Phone the IOTA occultation line, 301-474-4945, for updates,
or check the local IOTA Web site at <http://iota.jhuapl.edu>
David Dunham, e-mail dunham@erols.com, phone 301-474-4722

Getting to the NCA Monthly Meeting

Saturday, October 11

3:30 P.M. - NCA Meeting in the Bethesda-Chevy Chase Regional Services Center of Montgomery County, 4805 Edgemoor Lane (**2nd Floor**), Bethesda, MD.

Dr. Andrew Steele will present the featured talk for the October 11 meeting of National Capital Astronomers, "How to spot a Martian..."

Following the meeting, dinner with the speaker and NCA members at the Jaleo Restaurant
7271 Woodmont Avenue
Bethesda, MD
301 913-0003

Directions to the New Meeting Place From North of Bethesda

1. Take Rockville Pike/MD-355 South.
2. Rockville Pike/MD-355 S becomes MD-355/Wisconsin Ave.
3. Shortly after Cheltenham Dr. (and one block before reaching Rt. 410), turn right onto Commerce Lane.
4. Commerce Lane becomes Edgemoor Lane.
5. After crossing Old Georgetown Rd., 4805 is the second entrance on the right. (See **M** on map.)
6. To get to public parking, continue on Edgemoor Lane which will make a sharp right turn. The parking garage is then on your right. See note below.

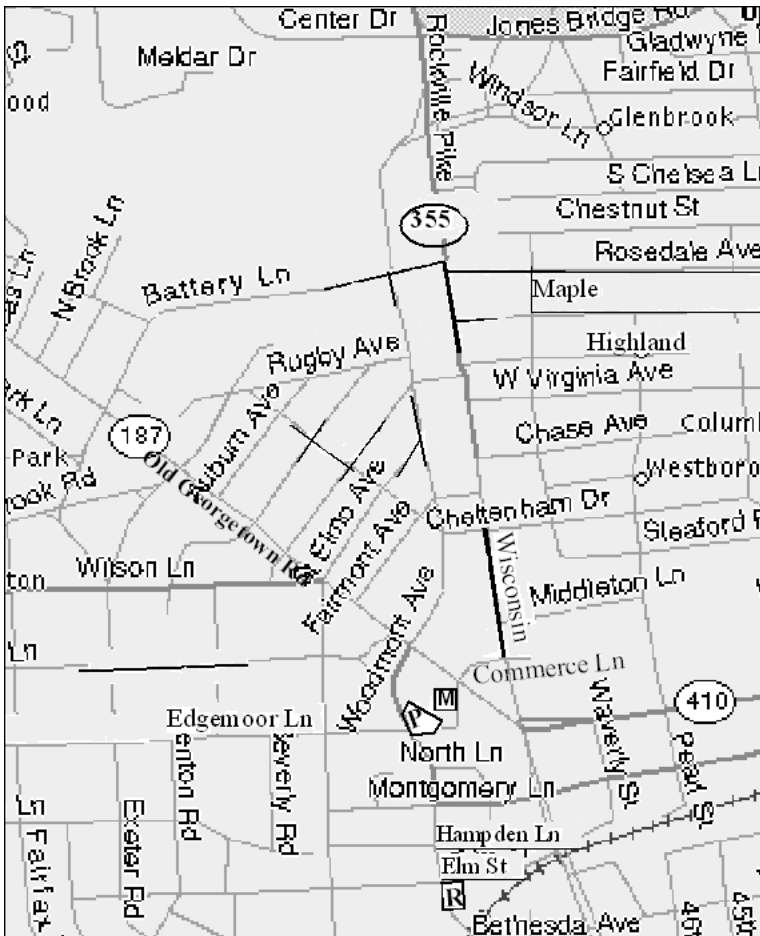
From South of Bethesda

1. Take MD-355/Wisconsin Ave. North.
2. Turn slight left onto MD-187/Old Georgetown Rd.
3. Turn next left onto Edgemoor Ln. 4805 is the second entrance on the right. (See **M** on map.)
4. To get to public parking, continue on Edgemoor Lane which will make a sharp right turn. The parking garage is then on your right.

Note: there are two parking lots. The one on Woodmont is for the apartments and may have a fee. The one on Edgemoor is marked "Public" and does not charge on weekends.

Directions to the Restaurant

1. Following the meeting, go South on Woodmont Ave.
2. Go past Montgomery Lane and Hampden Lane.
3. The restaurant is on the Southeast corner of Woodmont Ave. and Elm St. (See **R** on map.)



Star Dust is published ten times yearly, September through June, by the National Capital Astronomers, Inc. (NCA).
Editor: Elliott Fein, Co-editor: Adele Fein, Editorial Advisor: Nancy Byrd. Consultant: Jeffrey Norman
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NCA Web Page: <http://capitalastronomers.org/>.

Appointed Officers and Committee Heads: Exploring the Sky - Joseph C. Morris; Meeting Facilities - Jay H. Miller;

Observing - Robert N. Bolster; Telescope Making - Guy Brandenburg; Travel Director - Sue Bassett; *Star Dust* Editor - Elliott Fein

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

Date:

Name(s): _____

Address: _____

Telephone: _____ E-mail: _____

Other family members who should receive a membership card: _____

Dues:

___ \$60 With *Star Dust* and a discount subscription to *Sky & Telescope*.

___ \$27 With *Star Dust* ONLY.

___ \$45 Junior membership with *Star Dust* and a discount subscription to *Sky & Telescope*.

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

___ \$100 Contributing member (with *Sky & Telescope*) (\$40 tax-deductible).

___ \$150 Sustaining member (with *Sky & Telescope*) (\$90 tax-deductible).

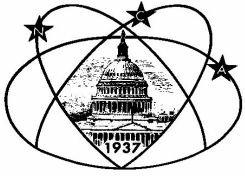
Junior members only: Date of Birth: _____ Only members under the age of 18 may join as juniors.

Tax deductible contribution: _____ Thank You.

_____ I prefer to receive *Star Dust* by e-mail.

Please send this form, with your check payable to National Capital Astronomers, Inc., to:

Mr. Jeffrey Norman, NCA Treasurer, 5410 Connecticut Ave NW #717, Washington DC 20015-2837



National Capital Astronomers, Inc.

If undeliverable, return to
NCA c/o Nancy Roman
4620 N. Park Ave., #306W
Chevy Chase, MD 20815-4551

**FIRST CLASS
DATED MATERIAL**

Inside this issue:

October Speaker and His Talk	1
President's Corner	1
NCA Events This Month	2
NCA Telescope/Mirror-Making Workshop	2
Observing with the NCA C-14	2
Exploring the Sky	2
Astronomical League Referendum	3
October Meteor Showers	4
Mid-Atlantic Occultations and Expeditions	5
Directions with Map to Meeting Place	6
About NCA	7
Membership Application	7