Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

January 2016 ***Volume 74, Issue 5***

Next Meeting

When: Sat. Jan 9th, 2016

Time: 7:30 pm

Where: UMD Observatory

Speakers: Dean Howarth & Jennifer Horowitz

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Directions to Dinner/Meeting

Our time and location for dinner with the speaker before this meeting is 5:30 pm at "The Common," the restaurant in the UMD University College building located at 3501 University Blvd.

The meeting is held at the UMD Astronomy Observatory on Metzerott Rd about halfway between Adelphi Rd and University Blvd.

Need a Ride?

Please contact Jay Miller, 240-401-8693, if you need a ride from the metro to dinner or to the meeting @ observatory. Please try to let him know in advance by e-mail at rigel1@starpower.net.

Observing after the Meeting

Following the meeting, members and guests are welcome to tour through the Observatory. Weather-permitting, several of the telescopes will also be set up for viewing.

William & Caroline Herschel and the Community of Science Enthusiasts

Dean Howarth, Natural Philosopher & Educator
and Jennifer Horowitz, Student – College of William & Mary

Abstract: William Herschel moved from Hannover, Germany to Bath, England, to work as a musician and composer. He was quite successful in Bath and persuaded his sister, Caroline, to join him, both as a companion and musical collaborator. William became an avid amateur astronomer in his spare time as did Caroline, who eventually became an enthusiastic and very skilled observer as well. She participated in William's important discoveries, and then made many of her own. The Herschels' discovery of Uranus ended the fruitless attempts by Kepler and others to associate the six previously known planets with the five regular polyhedra.

William was the first to map out the uneven distribution of stars on the celestial sphere. The individual stars that we can see through an optical telescope are all in our local neighborhood of the Galaxy. Consequently, this was the first rough map of the Galaxy, long before we knew that the Milky Way is only one island galaxy, not the whole Universe.

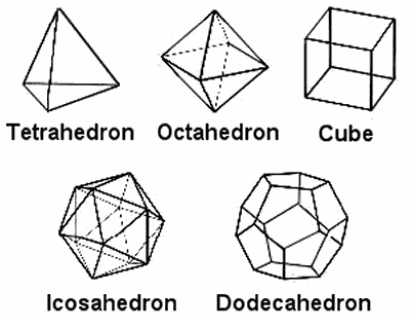
Image: William and Caroline Herschel polishing a telescope lens or mirror. (Lithograph, 1896 CE)

Reminder

After the meeting, everyone is invited to join us at Plato's Diner in College Park. Plato's is located at 7150 Baltimore Ave. (US Rt. 1 at Calvert Rd.), just south of the university's campus. What if it's clear and you want to stick around and observe? No problem -- just come over when you're through. This is very informal, and we fully expect people to wander in and out.

Music and the Spheres

Johannes Kepler indicated in his 1597 CE work, *Mysterium Cosmographicum* (The Cosmographic Mystery), that the 5 regular polyhedra (3D Platonic solids) could estimate distance between planetary orbits by nesting the spheres within the solids (assuming a heliocentric Solar System). The spheres



represented the orbits of the 6 known planets: Mercury, Venus, Earth, Mars, Jupiter and Saturn. The regular polyhedra representing the space between planets (from inner to outer bodies with Mercury's orbit being the 1st sphere) were: ***octahedron*** (8 sides, 6 vertices), ***icosahedron*** (20 sides, 12 vertices), ***dodecahedron*** (12 sides, 20 vertices), ***tetrahedron*** (4 sides, 4 vertices) and ***hexahedron*** or "cube" (6 sides, 8 vertices). Saturn's orbit was the last sphere and encircled the cube.

In Kepler's 1619 CE work, *Harmonices Mundi* (The Harmony of the World), he looked at the harmonics of the ratios of sound as well as the Solar System, adding harmonic ratios to those already used by the Pythagorean school.

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William & Caroline Herschel – continued from page 1

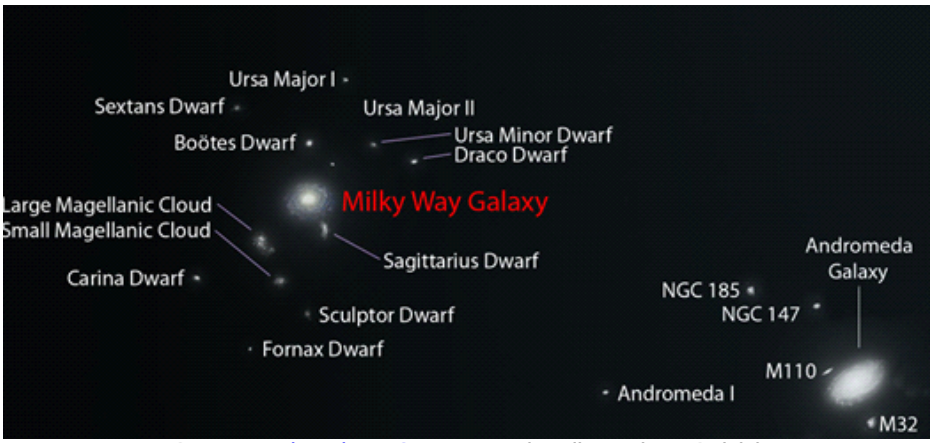
During this month's talk, we will hear some of the Herschels' stories regarding the discovery of Uranus and comets. They lived during a time when a cosmopolitan ethos was peaking and scientists from across the globe were becoming "citizens of the cosmos." Therefore, the talk will also reflect that ethos by conveying the importance of cooperation between like-minded men & women of science, showcasing the primacy of discovery, balanced with peer review & critique, and revealing how scientific societies (like the Royal Society or even the NCA!) promote a community of discovery.

Biographical Sketch:

Dean Howarth is a veteran physics teacher from northern Virginia. He has created a unique living history program for his students, showing vividly how our understanding of the world has developed. He has extended this activity into a community service, with performances at museums and historic sites. As the Natural Philosopher, Dean recreates episodes in the history of science. His web site is www.livinghistoriesofscience.com .

Using a large repertoire of replica scientific devices, specimens, and demonstrations, his living history lessons have been performed at a number of regional museums, schools, historical sites, and festivals. Besides showing the roots of our present understanding, these performances also show how the public first heard about new discoveries.

Mr. Howarth will be joined by one of his former students, Jennifer Horowitz, who is currently pursuing her undergraduate degree from the College of William & Mary. As a student re-enactor, Ms. Horowitz has performed at Mount Vernon, the Smithsonian Castle, the USA Science & Engineering Festival, and the Arlington Planetarium.

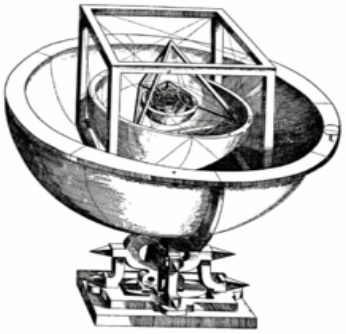


Courtesy Pics-about-Space.com (credit: Andrew Colvin)

Some Galaxies in the Local Group

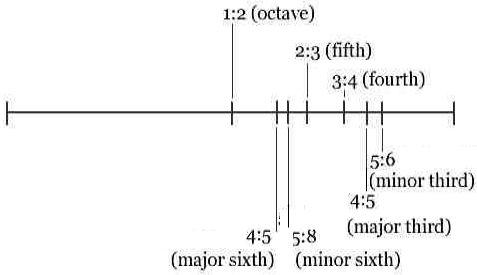
More than 54 galaxies are in the local group (or neighborhood) and cover an area of 10 million light years (10 Mly). The Milky Way & Andromeda are the largest and have accompanying satellite galaxies, whereas the Triangulum galaxy (M33) is the third largest. The entire local group is part of the Virgo supercluster of galaxies, which covers an area of 110 Mly. Virgo, in turn, is 1/4 of the Laniakea supercluster (area = 520 Mly). The other 3 superclusters of Laniakea are Hydra-Centaurus (the center of Laniakea), Pavo-Indus and Southern.

Music and Spheres – continued from page 2



Mysterium Cosmographicum (1597)
Kepler's representation of planetary orbits and their relative distances using spheres & polyhedra.

Remember that William Herschel started his career in England with music before asking Caroline to join him. Apparently, music is only one step away from astronomy!



Courtesy KeplersDiscovery.com
Kepler's harmonic divisions of a musical instrument's vibrating string.

Coming in April 2016

*"**Exploring the Sky**"* is an informal program that, for over 60 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. Presented by the National Park Service and National Capital Astronomers, sessions are held in Rock Creek Park once each month on a Saturday night from April through November, Beginners (including children) and experienced stargazers are all welcome—and it's free!

Sky Watchers

Winter Schedule

January

16	1:00 am – **Planets**, N. Hemisphere. Uranus 1.5º north of Moon.
19	10:00 pm – **Stars & Planets**, N. Hemisphere. Aldebaran 0.5º south of Moon.
23	8:47 pm – **Full Moon** (moonrise time), N. Hemisphere. Other Moon Names: *Full Wolf Moon, Moon After Yule, Old Moon. Snow Moon.*
27	8 pm – **Planets**, N. Hemisphere. Jupiter 1.4º north of Moon.

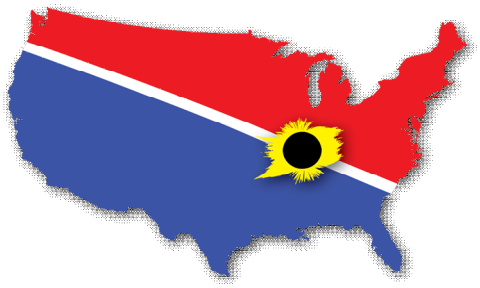
Times EST

February

1-10	Evening – **Globe at Night**, Global. Features: *Constellation Orion* (N. & S. Hemispheres).
1	4 am – **Planets**, N. Hemisphere. Mars 3º south of Moon.
6	3 am – **Planets**, N. Hemisphere. Venus 4º south of Moon.

Times EST

The Great North American Eclipse



August 21st, 2017

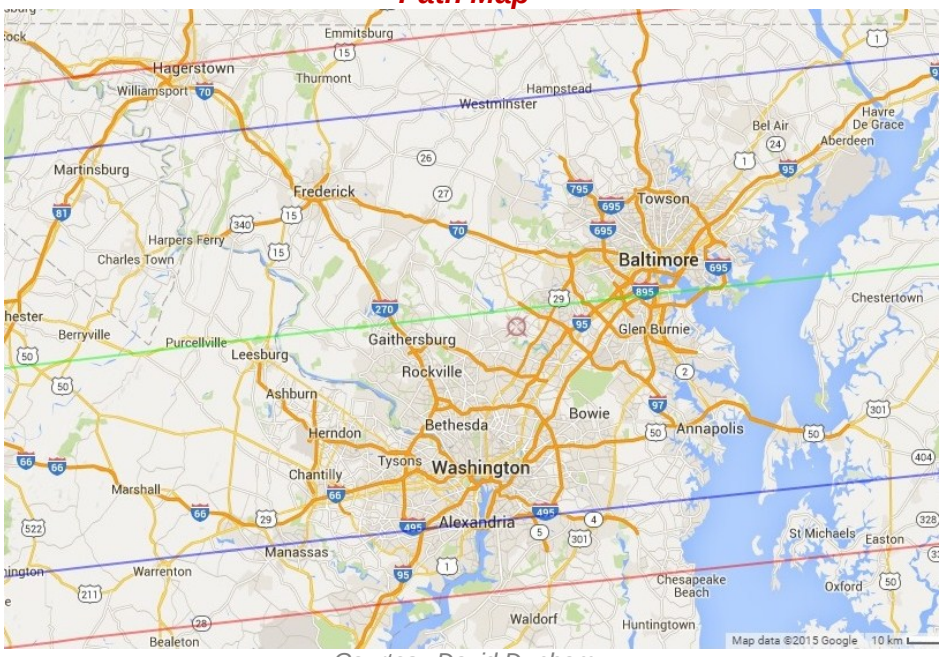
www.greatamericaneclipse.com/

Asteroid Thyra

David Dunham

On January 22, 2016, there will be a very good asteroidal occultation visible from most of the Washington, DC region. The asteroid named Thyra will occult the star listed in the SAO (Smithsonian Astrophysical Observatory Star Catalog) as 80269 (in Constellation Cancer). Following are a map and finder chart for the event.

Path Map



Courtesy David Dunham

The map shows the path across the greater Washington, DC region (including Delaware, Maryland, DC, & northern Virginia); on it, the green line passing just north of Leesburg, VA, and north of Gaithersburg and over southern Baltimore, is the predicted central line, while blue lines mark the predicted northern and southern limits of the wide path. The red lines show the possible limits in case of a very possible "1-sigma" shift of the path to the north or south, based on expected prediction errors.

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Another Benefit of Membership in the NCA

John Hornstein

One of the benefits of membership in the NCA is very familiar to you: pre-meeting access to Star Dust, with its informative background information and terrific color graphics, and its brief notices about new discoveries, and about activities and events in which you can participate.

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Star Dust is published ten times yearly September through June, by the National Capital Astronomers, Inc. (NCA).

ISSN: 0898-7548

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NCA members able to receive Star Dust, the newsletter of the NCA, via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, can save NCA a considerable amount of money on the printing and postage in the production of Star Dust (the NCA's single largest expense), save some trees and have one-click access to all the embedded links in the document. If you can switch from paper to digital, please contact Henry Bofinger, the NCA Secretary-Treasurer, at hbofinger@earthlink.net

Thank you!

ALCon 2016

August 10 – 13, 2016
Washington, DC

The Annual Astronomical League Convention includes space exploration & astronomy talks, special tours, an awards banquet, "Star-B-Que" and more!

Hosted by NOVAC and the Astronomical League

Alcon2016.astroleague.org

Occultation Notes

- 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.
- Some stars in Flamsteed's catalog are in the wrong constellation, according to the official IAU constellation boundaries that were established well after Flamsteed's catalog was published. In these cases, Flamsteed's constellation is in parentheses and the actual constellation is given in the notes following a /.
- 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 the main IOTA Web site.
- Sp. is the star's spectral type (color), O,B,blue; A,F,white; G,yellow; K,orange; M,N,S,C red.
- Also in the notes, information about double stars is often given. "Close double" with no other information usually means nearly equal components with a separation less than 0.2". "mg2" or "m2" means the magnitude of the secondary component, followed by its separation in arc seconds ("), and sometimes its PA from the primary. If there is a 3rd component (for a triple star), it might be indicated with "mg3" or "m3". Double is sometime abbreviated "dbl".
- Sometimes the Watts angle (WA) is given; it is aligned with the Moon's rotation axis and can be used to estimate where a star will reappear relative to lunar features. The selenographic latitude is WA -270. For example, WA 305 - 310 is near Mare Crisium.

Mid-Atlantic Occultations

David Dunham

Asteroidal and Planetary Occultations

2016							dur.	Ap.		
Date	Day	EST	Star	Mag	Asteroid	dmag	s	"	Location, Notes	
Jan 9	Sat	0:51	TYC24020481	10.2	Pannonia	6.6	2	5	DE,MD,DC,nVA,WV	
Jan 11	Mon	18:13	SAO 74569	9.8	1998 QW41	9.0	0.4	3	MD,VA,WV;DC,PA?	
Jan 14	Thu	5:51	TYC19201022	10.4	2001 OQ80	6.0	0.5	5	DE,MD,OH;DC,nVA?	
Jan 14	Thu	22:47	TYC13242449	10.3	2000 HR41	7.5	0.8	5	DE,MD,PA;DC,nVA?	
Jan 15	Fri	2:42	TYC18970795	10.5	Ojima	5.4	3	6	sNJ,DE,PA;neMD?	
Jan 22	Fri	0:52	SAO 80269	9.0	Thyra	1.3	7	4	sNJ,MD,DC,nVA,WV	
Jan 23	Sat	22:31	SAO 79119	9.5	Fatme	4.8	7	4	NJ,sPA,nOH;nMD?	
Jan 25	Mon	19:56	TYC19092088	11.8	Janina	2.3	4	7	DE,MD,DC,nVA,WV	
Jan 29	Fri	21:50	2UC34080694	11.9	Paris	4.3	6	7	NJ,PA;DE,MD,DC?	
Feb 10	Wed	2:03	4U461045687	11.3C	Sappho	0.3	5	9	DE,MD,DC,PA;nVA?	

Lunar Grazing Occultations

2016							
Date	Day	EST	Star	Mag	% alt	CA	Location & Remarks
Jan 11	Mon	18:19	SAO 164125	9.3	4+ 8	-3S	Reston,VA;Potomac,n.Laurel,MD
Jan 19	Tue	17:31	theta1 Tau	3.8	81+ 42	2S	Moon,Covington,PA;Ballston,NY
Jan 19	Tue	18:30	ZC 677	4.8	82+ 55	2S	northern Charleston, SC
Jan 19	Tue	18:42	ZC 680	6.5	82+ 56	1S	CarmlCh&HardCrnr,VA;Calif.,MD
Feb 13	Sat	19:53	SAO 110516	6.9	35+ 41	0S	Duncannon,PA; Staten Is., NYC
Feb 13	Sat	20:04	ZC 352	7.1	35+ 40	1N	Martnsbg,WV;Marstn&Ptapsco,MD

Interactive detailed maps at http://www.iota.timerson.net/

Total Lunar Occultations

2016										
Date	Day	EST	Ph	Star	Mag	%	alt	CA	Sp.	Notes
Jan 12	Tue	17:31	D	ZC 3221	7.9	10+	27	43N	F5	Sun altitude -5 degrees
Jan 12	Tue	18:17	D	X 51269 *	9.7	10+	20	61S		
Jan 13	Wed	17:53	D	SAO 146397	8.1	18+	34	40S	G5	Sun altitude -9 degrees
Jan 15	Fri	21:12	D	SAO 109494	8.2	39+	26	40N	M	
Jan 15	Fri	21:30	D	ZC 109	6.4	39+	23	61N	K0	
Jan 16	Sat	22:46	D	ZC 269	7.0	51+	22	81S	K0	Mg2 11.7 sep. 18" PA278
Jan 18	Mon	19:00	D	SAO 93496*	8.8	72+	63	86S	F8	
Jan 18	Mon	23:52	D	ZC 530 *	8.2	74+	34	52N	K5	
Jan 19	Tue	17:03	D	75 Tauri	5.0	81+	37	69N	K2	Sun +1, ZC 667, Hyades
Jan 19	Tue	17:15	D	ZC 672	6.7	81+	40	61S	F7	Sun -1, close double
Jan 19	Tue	17:55	D	SAO 93969	7.7	81+	47	46S	MA	Sun altitude -8 degrees
Jan 19	Tue	18:12	D	ZC 677	4.8	81+	50	43S	A6	Sun -11, dbl?, SC graze
Jan 19	Tue	18:32	D	ZC 680	6.5	82+	53	18S	F5	close dbl? VA&sMDgraze
Jan 19	Tue	20:13	D	ZC 685	6.6	82+	66	24S	F0	last Hyades star
Jan 19	Tue	21:28	D	Aldebaran	0.9	82+	66	51S	K5	ZC 692
Jan 19	Tue	22:36	R	=alpha Tau	0.9	82+	58	-61S	K5	Axis Angle 237 degrees
Jan 21	Thu	21:53	D	21 Gem	6.3	96+	67	42S	F6	ZC 1003
Jan 21	Thu	21:53	D	20 Gem	6.9	96+	67	41S	G8	ZC1002, D+12s from 21Gm
Jan 22	Fri	3:35	D	26 Gem	5.2	96+	24	76S	A2	ZC1029, spec. binary
Jan 22	Fri	23:49	D	ZC 1141	5.5	99+	68	62N	K2	TermDist 15",close dbl?
Jan 30	Sat	1:05	R	ZC 1903	7.7	67-	22	37N	F8	
Jan 30	Sat	3:31	R	SAO 139272	7.6	66-	41	77S	K0	
Jan 31	Sun	2:52	R	SAO 139704	7.3	57-	29	45S	K0	
Jan 31	Sun	6:56	R	96 Vir	6.5	56-	37	41S	G8	Sun -4, ZC2028, double?
Feb 1	Mon	3:50	R	ZC 2123	8.0	47-	28	47N	F5	
Feb 2	Tue	5:47	R	eta Librae	5.4	37-	33	80S	A6	ZC 2247
Feb 6	Sat	6:27	R	45 Sgr	5.8	6-	10	63S	K0	Sun-9,Az124,ZC2828,dbl?
Feb 10	Wed	18:23	D	SAO 146772	9.2	7+	20	23N	K0	Sun -9, PA & NYC graze
Feb 12	Fri	20:30	D	mu Psc	4.8	25+	23	88N	K4	ZC 219,mg2 12 210"PA298
Feb 13	Sat	19:55	D	ZC 352	7.1	35+	41	16N	K0	close double?? mag2 10
Feb 13	Sat	21:03	D	25 Arietis	6.5	35+	29	84S	F5	ZC 362, in Cetus
Feb 14	Sun	18:39	D	SAO 93387	7.1	46+	62	77N	F8	Sun alt. -12 deg.

* *The star is in the Kepler 2 exoplanet search program so lightcurves of the occultation are desired to check for close stellar duplicity*

Further explanations & more information is at
http://iota.jhuapl.edu/exped.htm.
David Dunham, dunham@starpower.net

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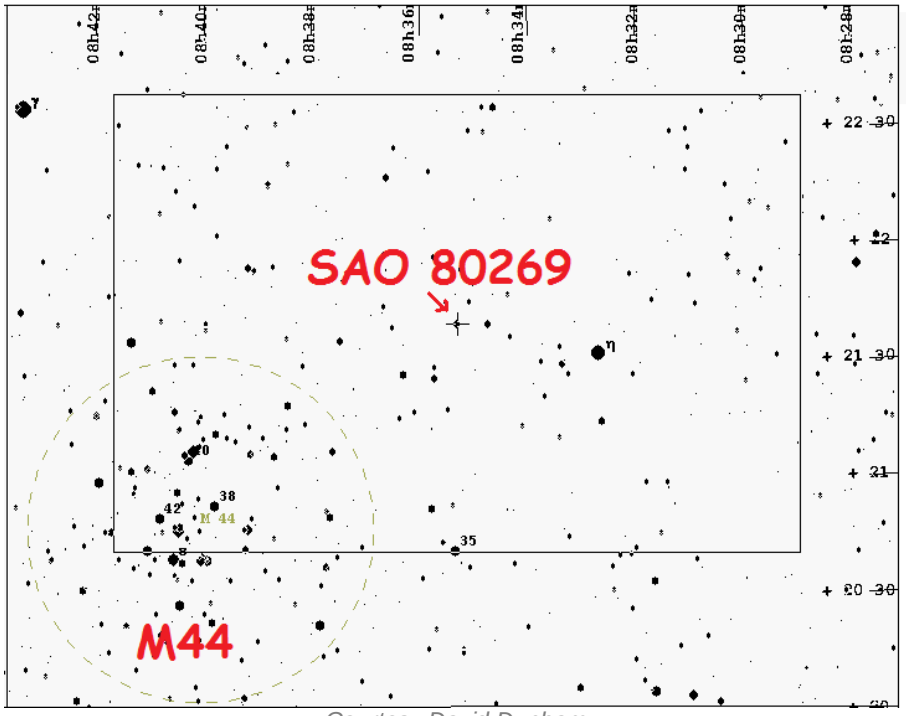
Asteroid Thyra – continued from page 4

Finder Chart



Courtesy David Dunham

The star is SAO 80269 (TYC 1398-00392-1), spectral type F0. The star, shown at the center of the star chart (Cancer Constellation), is only 1.5º northwest of the Praesepe (Beehive) cluster (M44, shown) and 0.7º east (and a little north) of 5th-mag. eta Cancri. This "5-degree" chart is from Steve Preston's Web page for the event at http://www.asteroidoccultation.com/2016_01/0122_115_36296.htm - it includes other wider field and more detailed star charts, as well as path maps and event details.

Another Benefit of NCA Membership – continued from page 4

But there is also another benefit of membership. You receive hard-copies of the *Reflector*, a magazine that is published by the Astronomical League.

The latest issue of the *Reflector* is particularly good.

It contains a fascinating article about Caroline and William Herschel, who will be portrayed by historical re-enactors Dean Howarth and Jennifer Horowitz at our January 9 meeting. The article is *'NGC 7789: Caroline's Rose in Cassiopeia*', by James R. Dire, on page 8 of the *Reflector*.

The same issue also has a very useful introduction to Active Galactic Nuclei, which are the actively dining supermassive black holes at the centers of many galactic bulges. These beasts come in several types, and the article in this issue gives an unusually clear and digestible overview of the menagerie. The article is *'New Observing Program: Active Galactic Nuclei*', by Al Lamperti, on pages 18 and 19 of the *Reflector*.

The Force Awakens in IMAX

Courtesy
www.disneyclips.com/imagesnewb6/theforceawakens.html

See ***Star Wars: The Force Awakens*** (PG –13) in the Lockheed Martin Imax® Theater (15/70 mm) at the NASM (DC) until Jan 10th and the Airbus Imax® Theater (3D w/ Laser) at the Udvar-Hazy Center (VA) until Jan 31st.

The submission deadline for the February issue of Star Dust is January 31st .

Clear Skies!

Calendar of Events

NCA Mirror- or Telescope-making Classes: Tuesdays and Fridays, from 6:30 to 9:45 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Contact instructor Guy Brandenburg at 202-635-1860 or email him at gfbrandenburg@yahoo.com.

Open house talks and observing at the University of Maryland Observatory in College Park on the 5th and 20th of every month at 8:00 pm (Nov.-Apr.) or 9:00 pm (May-Oct.). Details: www.astro.umd.edu/openhouse

New Telescope Owners Nights: Wednesday, Jan. 13 or Saturday, Jan. 16, from 6:00 pm to 9:00 pm (30-minute time slots). Registration required. www.astro.umd.edu/openhouse/2programs/new-telescope-owners-nights.html

Mid-Atlantic Senior Physicists Group: "What Really Sank the Titanic?" with Tim Foecke (NIST), Wed. Jan. 20, at 1 pm at the American Center for Physics (1st floor conference room). www.aps.org/units/maspg/

Owens Science Center Planetarium (Planetarium Patty's Plaza): "Stars That Shine the Way" with Michael Chesnes, Fri. Jan. 29, 7:30 pm; $5/adult; $3/students/senior/teachers/military. www1.pgcps.org/howardbowens

Owens Science Center Planetarium (Family Night): "Celebrate Chinese Skies," Fri. Feb. 5, 7:30 pm; $5/adult; $3/students/senior/teachers/military; children under 3 free. www1.pgcps.org/howardbowens

Upcoming NCA Meetings at the University of Maryland Observatory:
13 February: Brad Cenko (UMD), "Gamma Ray Bursts and Precious Metals."
12 March: Eleonora Troja (UMD, GSFC), "Neutron Star Collisions."

National Capital Astronomers Membership Form

Name: _____ **Date:** ___/___/___

Address: _____ **ZIP Code:** _____

Home Phone: ____-____-_____ **E-mail:** _____ **Print / E-mail Star Dust (circle one)**

Membership (circle one): Student….. $ 5; Individual / Family…..$10; Optional Contribution…..$__

Please indicate which activities interest you:

- Attending monthly scientific lectures on some aspect of astronomy ____
- Making scientific astronomical observations ____
- Observing astronomical objects for personal pleasure at relatively dark sites ____
- Attending large regional star parties ____
- Doing outreach events to educate the public, such as Exploring the Sky ____
- Building or modifying telescopes ____
- Participating in travel/expeditions to view eclipses or occultations ____
- Combating light pollution ____

Do you have any special skills, such as videography, graphic arts, science education, electronics, machining, etc.?

Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

Please mail this form with check payable to ***National Capital Astronomers*** to:
Henry Bofinger, NCA Treasurer; 727 Massachusetts Ave. NE, Washington, DC 20002-6007

National Capital Astronomers, Inc.

If undeliverable, return to
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400 Madison St #2208
Alexandria, VA 22314

First Class
Dated Material

Next NCA Meeting:

2016 January 9th
7:30 pm
@ UMD Observatory

Dean Howarth & Jennifer Horowitz

Inside This Issue