



National Capital Astronomers, Inc.

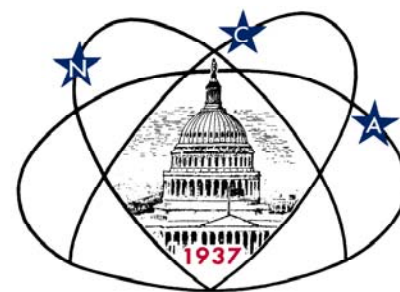
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**FIRST CLASS
 DATED MATERIAL**

Next NCA Mtg:

**June 14
 7:30pm
 @ UM Obs
 Dr. Harold Williams**

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STAR DUST

May 2008

Volume 66, Issue 10

**JUN 2008: DR. HAROLD WILLIAMS, MONTGOMERY COLLEGE
 STELLAR EVOLUTION FROM 0.08 TO 100
 SOLAR MASSES: WHAT EVERYBODY SHOULD
 KNOW; AND QUASISTARS**

NEXT MTG: Sat 14 Jun 2008
TIME: 7:30pm
SPEAKER: Dr. Harold Williams
WHERE: UM Observatory

Dr. Harold Williams is a long time member of NCA: from August 1994 through 1996 he was vice president and program chair, and then president from 1996 through 1998 and again in 2005 through August 2007. He is currently NCA's webmaster and has been doing this since November 1996, when NCA went on the net. He gets paid money for working at the Takoma Park/Silver Spring campus of Montgomery College as planetarium coordinator and physics and geology lab coordinator (full time staff position) and adjunct professor, who usually teaches astronomy in the planetarium, but has also taught physics, mathematics, geology, and physical oceanography. He is a labor union member of AFSCME (American Federation of State County and Municipal Employees) local 2380, Montgomery College Staff Union. He

has previously been on the executive board, vice president, president, vice president, and now back on the executive board of this labor union. As the adjunct professors at Montgomery College are now forming a labor union he has joined SEIU (Service Employee International Union) local 500. He is a union steward and union organizer participating in several successful organizational campaigns for public employees. He grew up in Jacksonville, Florida; and is educated beyond his intelligence with a B.S. in physics and mathematics from Florida State University in Tallahassee, an M.S. in physics from the State University of New York at Stony Brook, (where he imprudently tried to solve the problem of quantum gravity, before it was generally appreciated how hard of a problem this is), and finally a Ph.D. in astrophysics from Louisiana State University in Baton Rouge with a dissertation on "[Star Formation, Using 3-D Explicit Eulerian Hydrodynamics.](#)" So he used to be a computing scientist and still has some ambi-

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**SPECIAL POINTS
 OF INTEREST:**

- > Meet NCA's very own Dr Williams! [p1](#)
- > Read about the proposed dues changes for the coming year. [p4](#)
- > Observe some occultations this summer. [p5](#)
- > Need a summer reading list? [p6](#)
- > Pizza Party dinner with the Montgomery County Science Fair winner Miles King before the meeting! [p7](#)

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**OZONE, THE GREENHOUSE GAS
 BY SPACE PLACE**

We all know that ozone in the stratosphere blocks harmful ultraviolet sunlight, and perhaps some people know that ozone at the Earth's surface is itself harmful, damaging people's lungs and contributing to smog.

But did you know that ozone also acts as a potent greenhouse gas? At middle altitudes between the ground and the stratosphere, ozone captures heat much as carbon diox-

ide does.

In fact, pound for pound, ozone is about 3000 times stronger as a greenhouse gas than CO₂. So even though there's much less ozone at middle altitudes than CO₂, it still packs a considerable punch. Ozone traps up to one-third as much heat as the better known culprit in climate change.

Scientists now have an unprecedented view of this

mid-altitude ozone thanks to an instrument aboard NASA's Aura satellite called the Tropospheric Emission Spectrometer—"TES" for short.

Most satellites can measure only the total amount of ozone in a vertical column of air. They can't distinguish between helpful ozone in the stratosphere, harmful ozone at the ground, and heat-trapping ozone in between. By

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2008-2009 NOMINEES

Nominating Committee Reminder by Jeff Norman, Chair

The Nominating Committee of NCA (whose members are Jay Miller, Jeff Norman, Wayne Warren and Harold Williams) wants to remind all NCA members that we will elect officers for July 2008 to June 2009 at the June 14, 2008 meeting. We published the following recommended slate in the May 2008 edition of Star Dust, but any member may make additional nominations from the floor.

- President - Elizabeth Warner
Vice-President - John Hornstein
AsstVP - John Albers
Sec/Treasurer - Michael Brabanski
AsstSec/Treas - Jeffrey Norman
Newsletter Ed. - Michael Chesnes
Trustee - Walter Faust

CALENDAR OF EVENTS

NCA Mirror- and Telescope-making Classes: Fridays, June 6, 13, 20, and 27, 6:30 to 9:30pm 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 gbran@yaho.com. In case there is snow, call (202) 282-2204 to see if the CCCC is open.

Open house talks and observing at the University of Maryland Observatory in College Park on the 5th and 20th of every month at 8:00pm. (Nov.-Apr.) or 9:00pm (May-Oct.). There is telescope viewing afterward if the sky is clear.

Dinner : Saturday, June 14 at 5:30pm, preceding the meeting, at the Garden Restaurant in the University of Maryland University College Inn and Conference Center. There will also be a pizza dinner at the Observatory. Details will be emailed to the group.

Upcoming NCA Meetings at the University of Maryland Observatory

2nd Saturdays June 14, 2008, Dr. Harold Williams, Montgomery College, "Stellar evolution from 0.08 to 100 solar masses: what everybody should know; and Quasistars"

July & August, Summer Hiatus See You in September!

Sep 13, 2008, Dr. Joe Lazio , NRL, "DALI, an array of radio telescopes proposed for the far side of the Moon"

Oct 11, 2008, Dr. John Grant , NASM, "What the Mars Exploration Rovers Found"

PLEASE GET STAR DUST ELECTRONICALLY

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) and also save some trees.

If you can switch from paper to digital, please contact Michael L. Brabanski, the NCA Sec-Treasurer, at mlbrabanski@verizon.net or 301-649-4328 (h).

Thank you!

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

DIRECTIONS TO DINNER/ MEETING Members and guests are invited to join us for dinner at the Garden Restaurant located in the UMUC Inn & Conference Center, 3501 University Blvd E. The meeting is held at the UM Astronomy Observatory on Metzert Rd about halfway between Adelphi and University Blvd.

MEETING VIDEOS

Those who attend the meetings have probably noticed that Jay Miller records the talks. While the main purpose is to produce a DVD to assist the reviewer of the talk, he also makes several extra copies. While he claims not to be Spielberg, if there is a lecture you've missed or one you want to look at again, members can contact Jay to borrow a copy.

rigel1@starpower.net



Drawing © Jim Hunt

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.

STARRYTELLING FESTIVAL

Discover the Galileo in You... at Look Up! The StarryTelling Festival. Invite your children and grandchildren along for an astronomical day of discovery from 2-10 pm on July 19 at the Kensington Town Hall, Kensington, MD. A full day of stories from ancient astronomers, Galileo and contemporary scientists -- with a little magic thrown in. Northern Stars Planetarium will bring a StarLab for stargazing and stories under an inflatable celestial sphere. Bring your own telescopes and your wisdom to share! We want to hear your story too!

WHAT: StarryTelling Festival

WHEN: Sat 19 Jul 2008, 2-10pm

WHERE: Kensington Town Hall, Kensington, MD

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cal work that I had to put the book down.)

- The Life of Benjamin Banneker: The First African-American Man of Science, by the late Silvio Bedini, is probably the only biography of Banneker worth reading. All of the other ones seem to repeat many of the myths that have arisen about Banneker, probably because the writers had no understanding of the rather involved mathematics and astronomy that Banneker accomplished at about the same time that French scientists and astronomers were attempting to measure the size of the earth on the other side of the Atlantic. (I did a little research to see exactly how Banneker wrote his almanacs, predicted eclipses, and stated where the planets would be at a given time. If you've read Longitude, by Dava Sobel, you know that the "bad guy" in that story was Astronomer Royal Nevil Maskelyne, who prevented John Harrison from getting credit for solving the longitude problem by means of an accurate chronometer. Well, not only did Banneker teach himself astronomy by using books by Maskelyne and one James Ferguson, but when Banneker was part of the team that decided where the boundaries of the District of Columbia would go, his job was to tend to the chronometer and to use that and their transit telescope to figure out exactly where they were and which way the cardinal directions went.)

Starry Pizza Party announcement with star border and details about the June 14 meeting dinner.

Yes, I'd like to join NATIONAL CAPITAL ASTRONOMERS!

Name: _____ Date: ____/____/____
Street address: _____
City/State/ZIP: _____
Telephone: ____-____-____ E-mail: _____
Other family members who should receive a membership card: _____
Would you prefer to get Star Dust by e-mail? _____

MEMBERSHIP CATEGORIES AND ANNUAL DUES RATES

All members receive Star Dust, the monthly newsletter announcing NCA activities. As an added optional benefit to extend your knowledge of astronomy, you may also choose Sky and Telescope magazine at the discounted rate of \$33.

Student Membership: \$5with Sky and Telescope....\$38
Standard Individual or Family Membership: \$10with Sky and Telescope....\$43

You are welcome to make contributions in any amount in addition to the dues shown above.

Contribution amount: _____

Please mail this form with your check payable to National Capital Astronomers, to: Mr. Michael L. Brabanski, NCA Treasurer; 10610 Bucknell Drive, Silver Spring, MD 20902-4254

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

Editor: Elizabeth Warner

Editorial Advisors:

- Walt Faust
- John D. Gaffey, Jr.
- Jeffrey Norman
- Wayne Warren
- Harold Williams

PDF distributor: Jay Miller

SCIENCE FAIR WINNERS

Jay Miller

NCA members were able to attend only two science fairs this year, Prince George's County and Montgomery County.

The Prince George's County fair was judged by Martha and Wayne Warren. The winning project was *What a MES: Martian Environmental Simulator II* by Julie Emily Walker from Hollywood, MD and a student at Leonardtown Regional High School.

The Montgomery County Science Fair was judged by Alan Bromborski and Jay Miller. The junior project chosen was *Geomagnetic Field Fluctuations* by Miles King of Potosi, MD.

Miles will be joining us at the June meeting to talk about his project and be presented with his award.



Congratulations to both!

A FEW GOOD BOOKS...

by Guy Brandenburg

- [Death By Black Hole](#) by Neal DeGrasse Tyson. Astrophysicist Tyson is a great science writer, and this is a collection of about forty of his columns previously published in [Natural History](#) magazine.
- [The Mapmaker's Wife](#) by Robert Whitaker is a fascinating true story of French astronomers risking their lives to measure the size of the Earth by traveling to Ecuador and Colombia in the 1730's. A good part of the book follows the story of the Spanish-speaking wife of one of the members of the expedition making an absolutely harrowing trek to rejoin her husband by descending the Andes to the headwaters of the Amazon river, evading tribes of hostile Indians, snakes, alligators, and so on, to emerge as the lone survivor of the expedition.
- [The Measure of All Things](#) by Ken Alder describes how a different team of French astronomers risked both their lives and their sanity to come up with the metric system by measuring the distance from Dunkirk to Barcelona, passing through Paris. They did this while the Ancien Régime fell and was replaced by the French Revolution, the Napoleonic Empire, and later by the Bourbon Restoration. You may recall that the meter was supposed to be exactly one ten-millionth of the distance from the North Pole to the Equator. (But they didn't quite get it right!) The meter was then used to define just about every other unit, such as liters, and so on. The author shows the many disadvantages of the old system where nearly every town, province, market, or profession had their own system of measurements. But he also asks whether, today, having a universal measuring system really matters any more.
- [Parallax](#) by Alan W. Hirschfeld is subtitled, "The Race to Measure the Cosmos." I had to get my copy from a used book distributor. I'm glad I did. This book outlines the many steps by which humans have progressed in their understanding

and measurement of the size of the Earth, the distance to the Moon, the size of the Solar System, and finally, the distances to the stars.

- [Chesapeake Invader](#) by Wiley Poag is another book I really had to hunt for. It's a very readable description of the detective work that went into discovering that a very large asteroid hit what is now the mouth of the Chesapeake Bay between Cape Charles and Newport News. It didn't cause any mass extinctions (that we know of) but blasted a big hole in the subterranean rocks, changed the course of the glacial Susquehanna river and made the Chesapeake Bay make that funny turn to the east at its very mouth. Oh, and the tidal wave probably went all the way OVER the Appalachian Mountains, some 50 million years ago.
- [Roving Mars](#) by Steve Squyres. Squyres, of Cornell University, is the lead scientist behind the rovers Spirit and Opportunity that are continuing to operate and send back lots of scientific information on Mars, at least 3 years AFTER their warranty expiration date of 90 days. It's a very conversational account of the process of trying to plan for a NASA mission, getting turned down repeatedly, finally getting it approved, seeing it through, and then success beyond anybody's expectation. (Note: a very large fraction of all missions to Mars have ended in failure.)
- [Leon Foucault](#) by William Tobin. An extremely well-documented biography of a very accomplished French inventor who, among other things, taught astronomers how to make parabolic glass, silvered mirrors for astronomical telescopes. Unfortunately for most NCA members, the only affordable edition is in French; the English version lists at \$96.00. (The French version, which was aimed at a mass audience, is the one I have.) (I do NOT recommend the book by Amir Aczel on Foucault. Aczel makes so many errors when he discusses Foucault's astronomi-

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looking sideways toward Earth's horizon, a few satellites have managed to probe the vertical distribution of ozone, but only to the bottom of the stratosphere.

Unlike the others, TES can measure the distribution of ozone all the way down to the heat-trapping middle altitudes. "We see vertical information in ozone that nobody else has measured before from space," says Annmarie Eldering, Deputy Principal Investigator for TES.

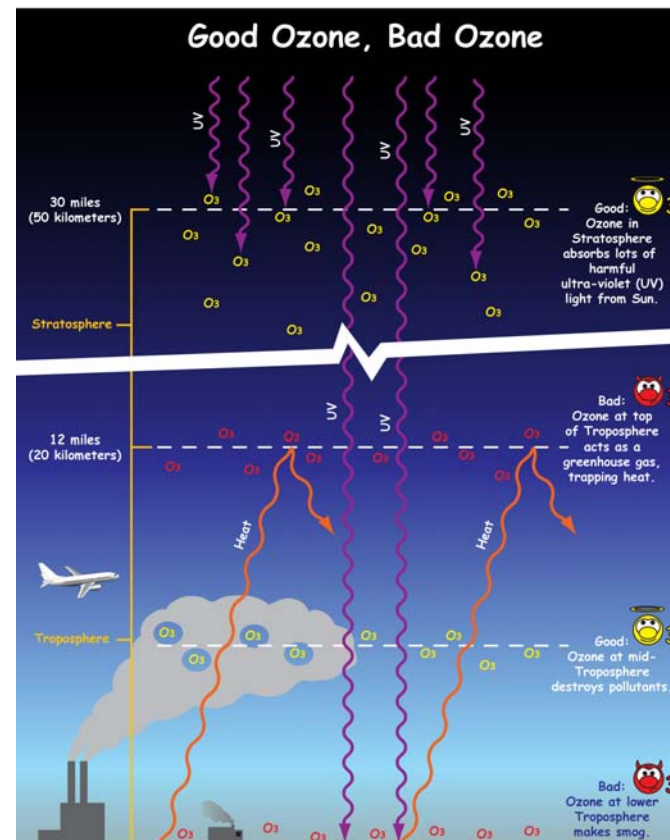
The global perspective offered by an orbiting satellite is especially important for ozone. Ozone is highly reactive. It is constantly being created and destroyed by photochemical reactions in the atmosphere and by lightning. So its concentration varies from region to region, from season to season, and as the wind blows.

Data from TES show that ozone's heat-trapping effect is greatest in the Spring, when intensifying sunlight and warming temperatures fuel the reactions that generate ozone. Most of ozone's contribution to the greenhouse effect occurs within 45 degrees latitude from the equator.

Increasing industrialization, particularly in the developing world, could lead to an increase in mid-altitude ozone, Eldering says. Cars and coal-fired power plants release air pollutants that later react to produce more ozone.

"There's concern that overall background levels are slowly increasing over time," Eldering says. TES will continue to monitor these trends, she says, keeping a careful eye on ozone, the greenhouse gas.

Learn more about TES and the science of ozone at tes.jpl.nasa.gov/. Kids can get a great introduction to good ozone and bad ozone at spaceplace.nasa.gov/en/kids/tes/gases.



This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Caption: Ozone behaves differently at different altitudes in the atmosphere. High in the stratosphere and at mid-troposphere it has positive effects on life at the surface. At the top of the troposphere ozone is a greenhouse gas and at the surface it makes smog.

LOCAL ASTRONOMY EVENTS

5 Jun, 9pm [UM Obs Open House](#)

7 Jun, 9pm
[Exploring the Sky](#)
Rock Creek NP & NCA

8 Jun, 7pm [NOVAC Mtg](#)
Enterprise Hall, GMU

11 Jun, 7:30pm
[Westminster Astro Soc Mtg](#)
Bear Branch Nature Center

14 Jun New Exhibit Opens
[Space: A Journey to Our Future](#)
National Mall

14 Jun, 7:30pm [NCA Mtg](#)
UM Observatory

17 Jun Exploring Space Lecture
[Space Weather and the Solar Connection](#)
National Mall

19 Jun, 7:30pm
[Howard Astro League Mtg](#)
Howard County Dept. of Recreation and Parks

20 Jun, 9pm [UM Obs Open House](#)

26 Jun, 7:30pm
[Astro Soc Greenbelt Mtg](#)
H.B. Owens Science Center

The UM Observatory website maintains a more [complete list of links to local astronomy clubs and space places](#).

2007-2008 OFFICERS

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Trustees:

- Guy Brandenburg (2008)
- Jeffrey Norman (2010)
- Benson Simon (2009)
- Dr. Wayne Warren (2011)

Appointed Officers and Committee Heads:

Exploring the Sky

Joseph C. Morris

Telescope Making

Guy Brandenburg

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IRVING WINSTON PRICE (1927 - 2007)

Irving W. Price, longtime member of the National Capital Astronomers, died at home in Hagerstown the week of May 2nd. He was the oldest of four siblings, a sister and three brothers. He is survived by his brother, Leon G. Price, and by four nephews. He never married.

Irv Price was trained in the US Air Force and later at the Milwaukee School of Engineering. He worked in the Chemistry Department at the Polytechnic University in Brooklyn, NY and in the Physical Chemistry Section at NIST.

Irv was interested in computers and astronomy. When he was in Brooklyn he joined the Amateur Astronomers Inc. of NJ. He is remembered by many friends in the AAI and the NCA. Irv chased solar eclipses, traveling to Puerto Vallarta, Curacao, Canada and NY state. He attended many of the summer meetings at Stellafane. He joined an NCA tour of the radio telescope site at Green Bank.

Irv read a lot, and kept current with many advances in electronic technology. He put together a refracting telescope, and was an early user of CCD photography. He had the patience and dedication to use early versions of LINUX on desk top computers. He had a sunny personality with a winning smile. Many friends remember conversations with Irving about technical subjects.

Sent in by Norman Peterson

PROPOSED DUES CHANGES FOR NCA MEMBERS

by Jeff Norman, Assistant Secretary/Treasurer

In the summer of 2006, the NCA Board of Directors lowered the basic dues for regular members from \$27 to \$10, as an experiment to see if that reduction would bring in new members, and to return to current members some money from our reserve fund (which some Board members felt was too large). At the time, we knew that the lower dues would result in a deficit, but we had enough money in the bank so that we could safely run a deficit for a few years. This dues decrease was a modest success because we did get about 20 new members, for a current total of about 145.

However, as expected, NCA is now running a deficit, and our reserve fund is dwindling. Rather than wait until our fund gets so low that we won't be able to cover unexpected costs, we are considering raising dues for only those members who get paper copies of *Star Dust*, our newsletter. At the present time, more than half of our members receive electronic copies of *Star Dust*. It costs NCA approximately \$10 per member per year (printing and postage) to produce the paper copies of *Star Dust*. It costs NCA nothing to send out electronic copies. All of NCA's other expenses put together also cost about \$10 per member per year. The largest other expense is \$5 per member per year for membership in the Astronomical League. Other large expenses include insurance and speakers' dinners. (For more details, look at NCA's annual Treasurer's Report, which is published every September in *Star Dust*.)

Therefore, I am proposing a new standard dues of \$20 per year starting in September, 2008 for those members who wish to get paper copies of *Star Dust*, while leaving the standard dues at \$10 for those members who agree to receive

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Mid-Atlantic Occultations and Expeditions

by Dr. David Dunham

Asteroidal Occultations

Date	Day	EDT	Star	Mag	Asteroid	dmag	dur.	Ap.	s in.	Location
Jun 16	Mon	1:26	TYC63092005	10.2	Konko	5.6	1	4	PA, WV; MD&nwVA?	
Jun 16	Mon	3:52	SAO 128052	9.1	Svetlanov	7.5	0.7	3	ePA, MD, VA	
Jun 18	Wed	3:17	SAO 186418	8.8	Fortuna	1.9	19	3	Fla, sTex, nMex	
Jun 21	Sat	5:13	SAO 141454	9.4	Robeson	6.3	2	6	KY, sWV, nVA-low	
Jul 4	Fri	3:25	2UC22098812	12.4C	Hamburga	0.9	6	9	sMD, seVA, NC	
Aug 7	Thu	5:22	TYC00370279	11.1	Delila	4.6	4	6	nOH, sPA; nMD?	
Aug 10	Sun	4:15	TYC47290479	9.1C	Pallas	0.16	18	8	PA, MD, nVA, NJ	
Aug 14	Thu	3:59	TYC18171323	12.0	Aurora	1.5	10	8	wNC, VA, MD, ePA	
Sep 2	Tue	21:32	TYC06180035	10.5	Williams	4.1	4	7	NJ, nDE, nMD, PA?	
Sep 3	Wed	3:41	SAO 97093	6.8	Klemola	9.2	1	2	seMD, sVA; sDE?	
Sep 9	Tue	2:18	PPM 143662	10.2	Disa	6.0	2	4	nNJ, ePA, wMD, WV	
Sep 11	Thu	3:42	TYC13900745	9.7	Appenzella	8.0	0.5	4	wMD, s&ePA, nNJ	
Sep 12	Fri	2:32	SAO 93320	6.0	Metis	3.9	51	1	ON, MI, nAZ, sCA	
Sep 13	Sat	3:07	SAO 98173	8.0	Sicilia	8.7	1	2	sWV, cenVA, sMD	

Grazing Occultations

DATE	Day	EDT	Star	Mag	% alt	CA	Location
Jun 22	Sun	4:11	SAO 163987	8.1	88- 32	18N DC;	Laurel & Baltimore, MD
Jun 30	Mon	2:42	Taygeta	4.3	11- 10	10N ZC539=19Tau;dbl;	Halifax, NS
Jul 23	Wed	2:16	SAO 128417	7.0	77- 38	12N Lucketts,VA;	Oldfld&Tyrone,MD
Jul 29	Tue	4:05	ET Tauri	8.8	13- 15	10N Beaver Ck, MD;	Gettysburg, PA
Aug 5	Tue	20:44	21 Vir	5.5	23+ 15	-2S Indiana, York, & Oxford, PA	
Aug 24	Sun	2:48	X05440	8.8	47- 35	9N Richmond, VA;	St. Marys C., MD
Aug 24	Sun	5:12	BO Tauri	7.8	46- 63	8N s.LexingtonPk,MD;	Ashland, VA

Total Lunar Occultations

DATE	Day	EDT	Ph Star	Mag	% alt	CA	Sp.	Notes
Jun 18	Wed	1:43	D 43 Oph	5.3	100+ 22	88N K4	ZC2505;	Term. dist. 8"
Jun 20	Fri	4:20	R ZC 2804	5.8	98- 20	70S K2	Maybe double?	
Jun 22	Sun	2:48	R ZC 3055	6.8	88- 30	88S K0		
Jun 22	Sun	3:47	R ZC 3057	6.7	88- 32	58N F0		
Jun 23	Mon	2:57	R 44 Cap	5.9	81- 31	27S A9	ZC 3177;	close double?
Jun 23	Mon	4:16	R Neptune	7.9	81- 37	56S	6s to reap.;	Sun alt. -5
Jun 26	Thu	3:45	R ZC 6	6.9	52- 35	83S G5		
Jun 30	Mon	3:10	R Maia=20Tau	3.9	11- 3	66N B8	Close double?;	ZC 541
Jun 30	Mon	3:29	R 24 Tauri	6.3	11- 6	36S A0	ZC 549;	Azimuth 64 deg
Jun 30	Mon	3:30	R Alcyone	2.9	11- 6	30S B7	ZC552=etaTau;	double?
Jun 30	Mon	3:30	R ZC 548	6.8	11- 6	48N B9	R 29s after Alcyone	
Jun 30	Mon	3:43	R ZC 553	6.8	11- 8	72S A0	Az 65;	spec. binary
Jun 30	Mon	4:04	R ZC 557	7.0	11- 12	68S A1	Az 68;	close double?
Jun 30	Mon	4:22	R ZC 562	6.6	11- 15	62S B9	R 42s after SAO 76234	
Jul 7	Mon	22:19	D ZC 1649	6.1	29+ 13	55N K3	Azimuth 260	
Jul 9	Wed	22:25	D ZC 1852	6.0	49+ 19	61S A2	Close double?	
Jul 10	Thu	21:52	D ZC 1960	6.7	59+ 25	77N K3	Close double?	
Jul 15	Tue	22:21	D ZC 2583	5.8	95+ 21	56N A7	Close double?	
Jul 16	Wed	23:42	D ZC 2740	6.3	99+ 24	39N G8	Terminator distance 11"	
Jul 23	Wed	3:28	R 25 Piscium	6.3	76- 48	38S A1	ZC 3515;	spec. binary
Jul 25	Fri	5:33	R 101 Psc	6.2	54- 63	64S B9	ZC 233;	Sun -6;
Jul 26	Sat	5:24	R 26 Arietis	6.1	43- 58	87S A9	ZC 370;	Sun -8;
Jul 29	Tue	4:14	R ZC 844	5.8	13- 16	67S B9	Close double, = comp.	
Aug 7	Thu	20:33	D FR Vir	7.1	42+ 23	54N M2	ZC2027;	Sun-5;
Aug 9	Sat	21:34	D ZC 2261	6.6	61+ 20	78S K3		
Aug 18	Mon	5:56	R ZC 3362	5.9	98- 23	52S K0	Sun-6;mg2 8 ".8,	PA323
Aug 23	Sat	5:07	R ZC 470	6.8	57- 69	55S K0	Mag2 10, sep 44"	PA 36
Sep 8	Mon	21:11	D SAO 186434	7.5	64+ 21	73S K5		
Sep 11	Thu	0:18	D ZC 2921	6.0	81+ 19	16N K0		
Sep 11	Thu	1:20	D ZC 2928	6.4	82+ 11	56N F7	Az 229;	close double?
Sep 12	Fri	20:43	D Neptune	7.8	94+ 26	52N	duration 7 seconds	
Sep 12	Fri	23:19	D 42 Cap	5.2	94+ 37	74N G2	ZC 3173;	spec. binary

More information is at iota.jhuapl.edu/exped.htm.
David Dunham, dunham@starpower.net, phone 301-474-4722

(Continued from page 1) Speaker tions to compute again, this time using distributive computing for high performance computing at Montgomery College. He provides a place to meet for a group of NCA members and some Montgomery College students who are studying "Geometrical Algebra/Clifford Algebra." He has a very good opinion of himself. Following the advice of Wayne Warren he has decided to speak to NCA on **Stellar evolution from 0.08 to 100 solar masses: what everybody should know.** But the title of the talk is slightly longer, since he is currently trying to understand Quasistars are a proposed new type of astrophysical object, currently of which we have no direct astronomical observations. However, they would explain the formation of Active Galactic Nuclei and the large black holes in the center of many galaxies and how they could form so early in the history of the universe. So the longer title of the June talk is **Stellar evolution from 0.08 to 100 solar masses: what everybody should know; and Quasistars.** The physics of stellar structure and evolution is similar for stars and quasistars.

(Continued from page 4) Dues

"Star Dust" exclusively by email. I think that this is more than fair because many organizations now charge their members more if they get paper copies of their newsletters. Not only that, but \$20 is still less than the annual standard dues of \$27 that we charged all NCA members 2 years ago; and it is also less than the \$30 annual standard dues charged by the Northern Virginia Astronomy Club, the other large astronomy group in the metropolitan Washington area. At the present time, this dues change is just a proposal. It will have to be discussed and voted on by the Board of Directors at some future date. In the meantime, your comments are welcome.

[**Ed. Note:** Please submit responses to the new incoming Board that will be elected at the June meeting.]