

# GuideStar



March, 2013

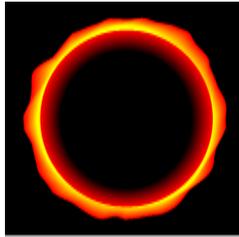
Volume 31, #3

## *At the March 1 Meeting*

### **Traveling to See Solar Eclipses**

**Debbie Moran—Education and Novice Chair**

Debbie will cover the science of eclipses and how to observe them as well as the adventures and cultural experiences she had following the shadow around the world including being led to places like Indonesia, Libya, Zambia, Greenland, and Turkmenistan.



While many eclipses require significant travel to view, on August 21, 2017 there will be a total Solar Eclipse in the United States.

**The GuideStar is the winner of the 2012  
Astronomical League Mabel Sterns  
Newsletter award.**



The Houston Astronomical Society is a member of the Astronomical League.

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#### HAS Web Page:

<http://www.AstronomyHouston.org>

#### Schedule of meeting activities:

All meetings are at the University of Houston Science and Research building. See the inside back page for directions to the location.

**Novice meeting: ..... 7:00 p.m.**

**Bill Spizzirri — "Nucleosynthesis".** Explains how the atoms and substances in our bodies are products of the stars.

See page 6 for more information

**General meeting: ..... 8:00 p.m**

*See last page for directions  
and more information.*

## The Houston Astronomical Society

The Houston Astronomical Society is a non-profit corporation organized under section 501 (C) 3 of the Internal Revenue Code. The Society was formed for education and scientific purposes. All contributions and gifts are deductible for federal income tax purposes. General membership meetings are open to the public and attendance is encouraged.

### Officers & Past President

President: Bill Pellerin ..... C:713-598-8543  
 Vice Pres: Mike Edstrom .....  
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 Treasurer: Don Selle .....  
 Past President: Gordon Houston .....

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 Brian Cudnik..... H:832-912-1244

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 Education..... Debbie Moran.....  
 Field Tr./Obsg ..... Steve Fast..... 713-898-2188  
 Novice ..... Debbie Moran  
 Observatory ..... Bob Rogers..... H:281-460-1573  
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### Advisors

Dr. Reginald DuFour, Rice Univ.  
 Dr. Lawrence Pinsky, U. of H.  
 Dr. Lawrence Armendarez, U. of St. Thomas

### Dues and Membership Information

Annual Dues:Regular .....\$36  
 Associate.....\$6  
 Sustaining .....\$50  
 Student .....\$12  
 Honorary..... N/C

All members have the right to participate in Society functions and to use the Observatory Site. Regular and Student Members receive a subscription to *The Reflector*. *The GuideStar*, the monthly publication of the Houston Astronomical Society is available on the web site. Associate Members, immediate family members of a Regular Member, have all membership rights, but do not receive publications. Sustaining members have the same rights as regular members with the additional dues treated as a donation to the Society. *Sky & Telescope* and *Astronomy* magazines are available to members at a discount.

**Membership Application:** Send funds to address shown on last page of *GuideStar*. Attention - Treasurer, along with the following information: Name, Address, Phone Number, Special Interests in Astronomy, Do you own a Telescope? (If so, what kind?), and where you first heard of H.A.S.

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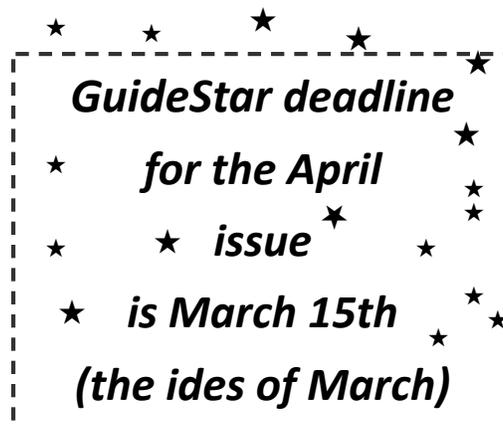
## Other Meetings...

**Johnson Space Center Astronomical Society** meets in the the Lunar and Planetary Institute on the 2nd Friday of each month. Web site: [www.jscas.net](http://www.jscas.net)

**Fort Bend Astronomy Club** meets the third Friday of the month at 8:00 p.m. at the Houston Community College Southwest Campus in Stafford, Texas  
[http://www.fbac.org/club\\_meetings.htm](http://www.fbac.org/club_meetings.htm).  
 Novice meeting begins at 7:00 p.m., regular meeting begins at 8:00 p.m. Website: <http://www.fbac.org>

**North Houston Astronomy Club** meets at 7:30 p.m. on the 4th Friday of each month in the Teaching Theatre of the Student Center at Kingwood College. Call 281-312-1650 or E-mail [bill.leach@nhmccd.edu](mailto:bill.leach@nhmccd.edu). Web site: [www.astronomyclub.org](http://www.astronomyclub.org)

**Brazosport Astronomy Club** meets the third Tuesday of each month at the Brazosport planetarium at 7:45 p.m. The Brazosport planetarium is located at 400 College Boulevard, Clute, TX, 77531. For more information call 979-265-3376



## President's Message

by Bill Pellerin, President

### What's Going on with the HAS?

There is a lot going on with the HAS. The semi-monthly organization board meeting was held on February 13, 2013. Among the things discussed....

- The Field Trip and Observing committee (Steve Fast) will have ownership of the observing programs developed by and for the HAS. Right now, there's only one program, The Texas 45, and the coordinator for that program is Rene Gedaly. If you complete the program and want to receive the pin, send your observing log to Rene.
- Also, FT&O (Steve) will continue the Urban Observing program and offer access to these opportunities to the public to encourage new memberships.
- Education / Novice Chair Debbie Moran requests volunteers for the Houston Science Fair judging on March 1. She also wants to post presentations or other information from novice presentations to the HAS web site.
- John Haynes (Loaner Telescope Chair) is interested in beginning an Astro-Imaging SIG (Special Interest Group) with meetings coincident with the Novice Meeting. Let John know if you'd be interested in attending this SIG.
- The Messier Marathon (Steve Fast) is coming up on March 9. See the announcement in this issue.
- Observatory chair (Bob Rogers) at least two members have committed to having private observatories at the HAS site.
- The board approved the notification of the members about a UT Astronomy Department scholarship program funded by amateur astronomers. More information in this issue.
- Membership renewal deadline for 2013 is the end of February. If you have not renewed yet, please do so soon.
- Rene Gedaly volunteered to help Mike Rao with HAS publicity.
- Donors to the HAS will receive a thank-you letter from the president.
- Stay tuned. We're working hard to make the HAS even better!

### Parking — Read this...

The information that I have from the University of Houston is that we can continue to park in the lot across Cullen from the Science and Research Building. The spaces are marked 'Faculty'; don't park in any space marked 'Reserved'. Other options — you can park free in lot 16B (just south of Elgin) or pay to park in the parking garage near our usual spot.

### One Night—3 Star Parties

Please take a look at the public star party page in this *GuideStar* and plan to come to one or more of these events. Two things stand out in this list. On March 7, we have three events simultaneously! I'll be at the Roosevelt School doing a presentation (no telescopes), but there are two other sites at which telescopes will be used. You'll have a great time if you go.

Notice also on April 20, there's an event at the 'Bomber Field' near Monaville, TX. You'd be excused for not knowing where Monaville is (it's south of Hempstead and north of Brookshire). Before nightfall radio controlled model airplanes will fly around the field, and after nightfall we're asked to share the sky. This should be great fun. Plan to attend, and bring your telescope.

*Cheers,*

*..Bill Pellerin*

*President HAS*



## Observations... of the editor

by Bill Pellerin, *GuideStar Editor*

### New 'Publisher' Software

I've upgraded the software I use to produce the *GuideStar*. I was using Microsoft Publisher 2007, and now I'm using Microsoft Publisher 2013. The new version is six years better. In fact, there are several new features in the new version that I've used to produce this *GuideStar* and I'm sure that there are more features that I haven't seen that may become part of future issues.

Microsoft is now making its 'Office' suite of software available on a subscription basis, and that's what I have. So far, so good. The Publisher program is similar enough to the earlier version that I don't have a problem (yet).

### USB to Serial Problems

Grrrrrrr. Serial ports on computers are the buggy whips of the computing world. Their day has come and gone and they're not likely to be missed by anyone. The problem is that many telescopes are controlled by serial ports. Mine dis. As you know, I am now running Windows 8, I have a USB extender (a special device that allows USB ports to be farther than normal from the computer) and I have a USB to serial port converter. All this worked under Windows 7, but now the USB to serial port device doesn't work with the extender. It seems the fix may be to buy a new USB to serial converter. It's not expensive, but sorting through all this represents something of a challenge.

Update — it all works now. What a hassle.

### Meanwhile

I was able to get some images which will convert to variable star data when they're processed. It was a very nice night on Saturday (the 16th) but quite chilly. While the camera was taking long exposures (anything over 10 minutes is long in my estimation) I did a bit of visual observing with my binoculars. I could see at least three moons of Jupiter, the Pleiades was (were?) nice and bright, the Beehive cluster was easy to find, and the Orion Nebula is always worth a look. It seems that our weather hasn't been so good recently, so a convergence of a Saturday night and clear skies was a not-to-be-missed opportunity.

### Spring Begins

"If winter comes, can spring be far behind?" — Shelly

Well, spring will officially begin at 6:02 a.m. on March 20, 2013. This will be after daylight saving time begins at 2:00 a.m. on March 10. (I do NOT like daylight saving time; I want more dark time, not more day time.)

Anyway, back to the idea that spring begins on the 20th. As most of us know, the astronomical event that takes place at the first moment of spring is when the Sun crosses the equator moving into the northern hemisphere. It's on this day that we have the equinox — equal hours of daylight and dark and it's the day on which our nighttime observing hours begin to be fewer than our daytime hours. So, our observing sessions must start later in the evening. The good news, it'll be a bit warmer for our sessions than it has been. And, the summer Milky Way will begin to become visible for those who are willing to stay up late enough.

I hope you were able to get outside this month.

### Thanks to everyone who helps to make the HAS work.

Look on the second page of this *GuideStar*. The list of names you see there are the names of people in the organization who make it work for all of us. There are others, too. Those who come to the public star parties, those who develop and make presentations at meetings, and many more.

Thanks to all of you for helping. You make the HAS what it is.

*Until next time...*

*clear skies and new moons!*

*..Bill*

## ***Novice Presentation March, 2013***

### ***Nucleosynthesis—Bill Spizzirri***

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***By Debbie Moran***

The Novice presentation for the March meeting will be titled “Nucleosynthesis” and presented by Bill Spizzirri, one of our newest members. Here is how he describes his topic: What causes the red color of our blood? How can that be related to astronomy? Bill will discuss how the origin of the universe, the life cycle of stars and the formation of planets are all related to our physical bodies.

We will be back to nuts and bolts in April for those who want tips on telescopes and observing techniques. If you are interested in presenting a novice topic in 2013, please contact me at a meeting or on

the HAS list server. I would definitely like to find some presenters for computer aids to astronomy including computer atlases and mobile apps. We may put together a presentation by several members willing to talk about their computer program of choice. Let me know if you can participate.

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## ***Minutes of the General Meeting of the***

### ***Houston Astronomical Society***

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***February 1, 2013***

***By Rene Gedaly, Secretary***

President Bill Pellerin welcomed new members and guests.

*GuideStar* Editor Bill Pellerin, reviewed article highlights of the newsletter for February.

Observatory Director Bob Rogers announced that the combination to the observing site will change effective March 2, 2013.

HAS Committee Chair for the Texas Star Party Steve Goldberg announced that the housing drawing for the May conference has been made and registrants would be notified soon.

Steve Goldberg, acting in place of Amelia Goldberg, Astronomical League awards chair, presented Steve Grimsley the Planetary Transit Special Award (Venus Transit).

Justin McCollum, aka Professor Comet, reviewed highlights of the comet report for the winter season.

Field Trip & Observing Chair Steve Fast announced that a club picnic and Messier Marathon would be held March 9, 2013 at the HAS observing site near Columbus.

Novice Chair Debbie Moran announced that the speaker for the March novice meeting would be Bill Spizzirri. She also announced upcoming outreach events and made a call for volunteer judges at the Science Engineering Fair to be held at the George R Brown Convention Center March 1, 2013.

Telescope Chair John Haynes announced that the club owns a fleet of telescopes available for loan to members.

Former HAS President Scott Mitchell presented the Three Minute Drill about the benefits of keeping an observing list, rough log, and log book.

Bill Pellerin presented door prizes donated by Steve Goldberg and Don Taylor to three members.

Steve Goldberg, program co-chair, introduced speaker Bill Leach. Bill is a past president of the Houston Astronomical Society and the North Houston Astronomy Club and teaches physics at Lone Star College – Kingwood. Professor Leach spoke about Sir Fred Hoyle: A Rebel with a Cause.

## **Support the Texas Amateur Astronomers' Scholarship at UT Austin**

*By Joel W. Barna, University of Texas*

As the Development Manager for The University of Texas at Austin Department of Astronomy and McDonald Observatory, I write to salute Hunter Scott and to highlight what he is doing on behalf of astronomy education in Texas. Mr. Scott, who lives in Fredericksburg, is an avid amateur astronomer and a passionate advocate for the power of astronomy to engage young people with careers in science, technology, engineering, and mathematics — the STEM fields that our society needs to strengthen for a strong and prosperous future.

In 2010, acting on that passion, Mr. Scott created and started fundraising for an endowment to benefit The University of Texas at Austin Department of Astronomy, called the Texas Amateur Astronomers' Scholarship (TAAS). Many Central Texas astronomers, including members of the San Antonio League of Sidewalk Astronomers (SALSA), have joined Mr. Scott in contributing, along with members of the general public. Mr. Scott has also reached out to many astronomy groups throughout Texas. The endowment has a goal of \$25,000, to be reached by January 2015. Currently, funding stands at \$10,500 — just over 40 percent of the goal.

As Mr. Scott eloquently described the endowment in an article for "The Dark Side," the SALSA newsletter, in September 2010:

*"The TAAS endowment bears a name reflecting the passion that amateur astronomers and astronomy clubs across the great State of Texas all share. There is strength in numbers, and there are thousands of amateur astronomers across this state. If we pool our efforts, we can reach the goal without breaking a sweat. The scholarship will belong to you. You will take pride in knowing that your individual or club donation helped defray the cost of a first-class education for a deserving student. This is the best way I can think of for amateurs to have a positive effect on the future of astronomy. The Astronomy Program at the University of Texas is a world-class program, supported by an equally world-class research facility, McDonald Observatory. What better place to focus a scholarship fund?"*

*"The scholarship will be awarded to a deserving astronomy student, male or female. The successful candidate must also be a legal resident of the United States, may be a freshman, sophomore, junior, or senior, and may receive the scholarship more than once. The Astronomy Department Faculty will decide which student receives the scholarship each year. I can tell you that Observatory Director David Lambert and Department Chair Neal Evans are pleased and honored to have Texas amateur astronomers providing such important support."*



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The Houston Astronomical Society has a proud tradition stretching back nearly 60 years. I invite HAS members to join with other Texas astronomers in completing the Texas Amateur Astronomers' Scholarship endowment.

You can contribute by mail (form below); by phone (call Joel Barna at 512-471-6335) or online at the site listed below (use the first pull-down menu to select McDonald Observatory and the second pull-down menu to select the Texas Amateur Astronomers' Scholarship):

<https://utdirect.utexas.edu/apps/utgiving/online/nlogon/?source=HPG>

*Thanks in advance for your support!*

Your tax-deductible donations can be submitted by filling out the information block below and mail it to:

UT Austin Astronomy  
ATTN: TAAS Endowment  
1 University Station C1402  
Austin, Texas 78712-0259

For any questions, contact the Scholarship creator, Mr. Hunter Scott at [catseye@beecreek.net](mailto:catseye@beecreek.net) or via telephone at (830) 992-0740



**Donating to  
The Texas Amateur  
Astronomers' Scholarship**  
at the University of Texas at Austin  
Department of Astronomy

*In perpetuity, this endowment  
will provide funds to support the  
academic work of undergraduate  
astronomy majors, chosen for their  
potential as scientific leaders.*

**YES, I want to shape the future of science by contributing to the  
Texas Amateur Astronomers' Scholarship Endowment.**

Name \_\_\_\_\_ ‡

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ E-Mail \_\_\_\_\_

Gift amount \_\_\_\_\_  Check enclosed\*  Cash Enclosed

\* (Make checks payable to *The University of Texas at Austin*. UT Tax ID number is 74-6000203)

Credit Card  VISA  MasterCard  Discover  American Express

Credit card number \_\_\_\_\_

Name on card \_\_\_\_\_ Expiration date \_\_\_\_\_

‡ (Name and address information is required so that we can send you a gift receipt. If paying by credit card, please also make sure that you have filled in your zip code.)

# Tackling the Really BIG Questions

By Diane K. Fisher

How does NASA get its ideas for new astronomy and astrophysics missions? It starts with a Decadal Survey by the National Research Council, sponsored by NASA, the National Science Foundation, and the Department of Energy. The last one, *New Worlds, New Horizons in Astronomy and Astrophysics* was completed in 2010. It defines the highest-priority research activities in the next decade for astronomy and astrophysics that will “set the nation firmly on the path to answering profound questions about the cosmos.” It defines space- and ground-based research activities in the large, midsize, and small budget categories.

The recommended activities are meant to advance three science objectives:

1. Deepening understanding of how the first stars, galaxies, and black holes formed,
2. Locating the closest habitable Earth-like planets beyond the solar system for detailed study, and
3. Using astronomical measurements to unravel the mysteries of gravity and probe fundamental physics.

For the 2012-2021 period, the highest-priority large mission recommended is the Wide-field Infrared Survey Telescope (WFIRST). It would orbit the second Lagrange point and perform wide-field imaging and slitless spectroscopic surveys of the near-infrared sky for the community. It would settle essential questions in both exoplanet and dark energy research and would advance topics ranging from galaxy evolution to the study of objects within the galaxy and within the solar system.

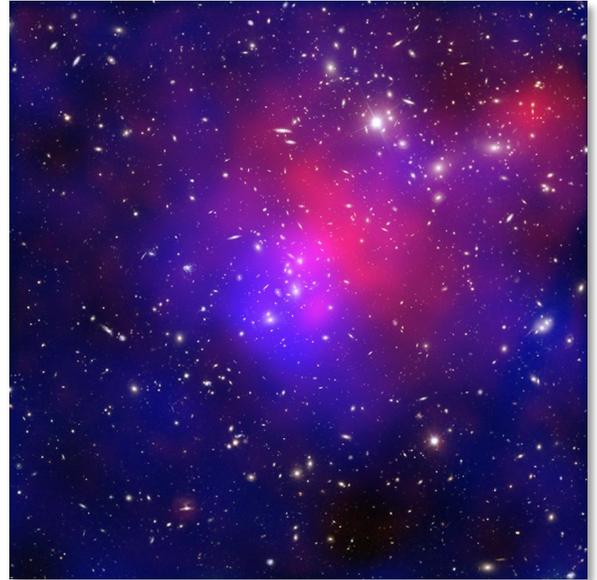
Naturally, NASA’s strategic response to the recommendations in the decadal survey must take budget constraints and uncertainties into account.

The goal is to begin building this mission in 2017, after the launch of the James Webb Space Telescope. But this timeframe is not assured. Alternatively, a different, less ambitious mission that also address the Decadal Survey science objectives for WFIRST would remain a high priority.

The Astrophysics Division is also doing studies of moderate-sized missions, including: gravitational wave mission concepts that would advance some or all of the science objectives of the Laser Interferometer Space Antenna (LISA), but at lower cost; X-ray mission concepts to advance the science objectives of the International X-ray Observatory (IXO), but at lower cost; and mission concept studies of probe-class missions to advance the science of a planet characterization and imaging mission.

For a summary of NASA’s plans for seeking answers to the big astrophysics questions and to read the complete Astrophysics Imple-

## NASA Space Place



*Clusters of galaxies collide in this composite image of “Pandora’s Cluster.” Data (in red) from NASA’s Chandra X-ray Observatory show gas with temperatures of millions of degrees. Blue maps the total mass concentration (mostly dark matter) based on data from the Hubble Space Telescope (HST), the European Southern Observatory’s Very Large Telescope (VLT), and the Japanese Subaru telescope. Optical data from HST and VLT also show the constituent galaxies of the clusters. Such images begin to reveal the relationship between concentration of dark matter and the overall structure of the universe.*

mentation Plan (dated December 2012), see <http://science.nasa.gov/astrophysics/>. For kids, find lots of astrophysics fun facts and games on The Space Place, <http://spaceplace.nasa.gov/menu/space/>.

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

## Just Looking

A GuideStar Article by Clayton L. Jeter

# The Smiling Cyclops... Asterism



Here's a recent article by Will Young (I interviewed him here back in June 2012) that I found while surfing "Cloudy Nights.com".



As you might remember, Will is the current club president of the Astronomical Society of South-East Texas (ASSET) in Beaumont. This amateur is a die-hard visual guy and you'll understand why as you read his delightful article below. Here's Will

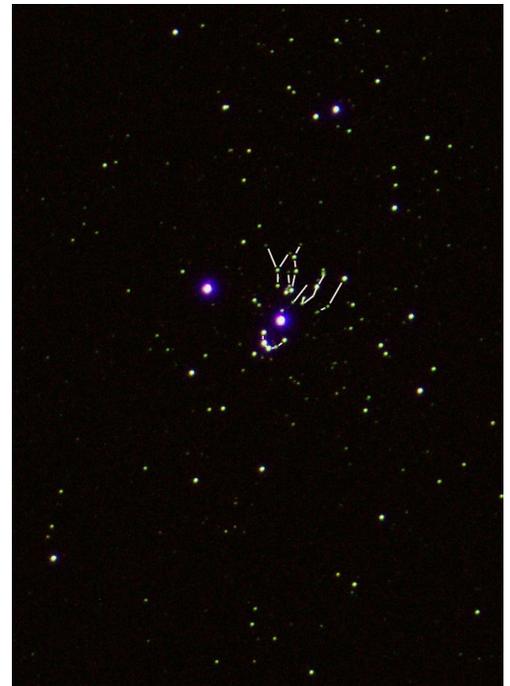
When an amateur astronomer wants to show someone something they have never seen before, a few showpiece objects are used. Most are M or Messier objects and while those are great sights, an equally spectacular one missed the list. Most people know it as the Double Cluster, Caldwell 14 or NGC 869 and NGC 884. It sits northwest of Perseus and consists of two similar open clusters. Both clusters are relatively nearby so the entire sight can easily fill an eyepiece.

I love showing the double cluster to people because it has a multitude of different types of stars and shows how stars behave soon after they are born. I enjoy giving people perspective and explaining how far away these objects are. To learn that the light that hits their eye left those stars about seven to ten thousand years ago can give a significant frame of reference. I try to give them a feel for which one is closer and which one is further away but that sometimes proves difficult. I could just say up or down but that only works if someone has his or her head at the exact angle as mine. Also assuming they interpret "middle-ish" or "just to the left of" the same. Luckily, I recognized a shape in one of the clusters. The inside of NGC869 resembles a smiling Cyclops. While referencing the object as the "Smiling Cyclops" I've found it's rather easy to point the asterism out, even to the most inexperienced observers. So I figured I would write about it.

The asterism lies in NGC 869, almost directly in the center. The eye is star V520, a B class supergiant that also happens to be a variable star, hence the "V" in its name. It varies in brightness from about magnitude +6.55 to +6.66. On a magnitude scale, the closer you are to zero, the brighter the object. Counter intuitive to common thinking, a negative number in the magnitude scale would be an extremely bright object.

For example, our Sun is approximately -27th magnitude. The smile shape sits just to the east and consists of five or so magnitude +9 stars in an obvious smile pattern. Once you see this asterism, there is no unseeing it as my experience has shown. I find myself looking for it every time I view the Double Cluster. It really does steal the show.

Above the Cyclops is a pattern of stars that almost resembles horns or spiky hair. Opposite of the smile, the stars are in perfect alignment for this effect. I have used terms as colorful as Don King hair or deer antlers to describe this area to fellow observers.



Everyone who sees the Cyclops itself has no problem picking out the headgear he is wearing. It is almost too perfect; as if the universe had a sense of humor in aligning

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these stars.

The whole reasoning behind naming and locating this asterism is to illustrate to others which cluster I am talking about in referencing the two. As I said before, I try to give them a sense of perspective on which cluster is closer and which one is further away. Now that I have an easily locatable source of reference, I can tell them that NGC 869 is much closer at 6.8kly than NGC 884, which lies at about 9.6kly. This puts almost three thousand light years between the two objects. To give my fellow astronomers some perspective, the Orion Nebula lies about 1,500 light years or 1.5kly away. Orion's great nebula spans a respectable 35ly across. NGC 869 is nearly the same but since it is almost double the distance, it appears smaller. The ages of the clusters are young among open clusters. 869 is aged at about 5.6 million years old and 884 is estimated to be about 3.4 million years old. This just means that these stars located in these clusters were approximately born that long ago. Due to stellar winds and time, the nebulous gasses have shed from these groups. Neither cluster has remnants of the nebula they were born in, which helps to determine their age. It is estimated that more than 300 blue white super giant stars in each cluster. There is also strong evidence to suggest these clusters are moving directly toward us at about 22km/s, which equates to about 14 miles per second. Assuming this, a few million years from now, the Double Cluster will be quite larger and brighter in the skies than they are today.

The Double Cluster is truly a breathtaking sight in a decent telescope, even for jaded and seasoned observers. You can see a multitude of different and rare stars; the beauty of our galaxy easily displayed for us to view and of course a smiling one-eyed prankster. I challenge all who read this to observe the asterism and show it to their friends and colleagues as a test to their imagination. Who knows, maybe someone will see something I missed.

[www.asset-astronomer.org](http://www.asset-astronomer.org)

**Clayton:** Thanks Will for taking the time to share your interest and thoughts again within our HAS newsletter, 'The Guide Star'. We wish you luck with all of your astronomy interests. Please come visit our society when in the Houston area, we'd love to see you.

Clear skies always,

**Will:** And clear skies to you and your club.

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*Clayton L. Jeter is an avid SCT visual observer and a longtime member of the **Houston Astronomical Society**. Contact him at: [stonebloke@gmail.com](mailto:stonebloke@gmail.com)*

## Want Ads

**For Sale: LX200 GPS, 8"**, with 25mm eyepiece, 2" diagonal, wireless (and wired) hand controller, tripod, 7x50 finder, manual, micro-focuser. \$1200, pick up. Bill Pellerin, [billpellerin@sbcglobal.net](mailto:billpellerin@sbcglobal.net), 713-598-8543

Want ads are free to members of the HAS for personal sales, trades, and purchases. Commercial advertising space is also available.

## **Club Picnic and Messier Marathon**

**at Columbus dark site.**

**9 March 2013 - Gates open at 3:00 p.m.**

It took Charles Messier 23 years to find all his objects - join us as we do it in one glorious night.

HAS will provide food and drinks. RSVP to [steve.fast@post.harvard.edu](mailto:steve.fast@post.harvard.edu).

Any changes due to weather will be announced at 6:00 p.m. the day before.

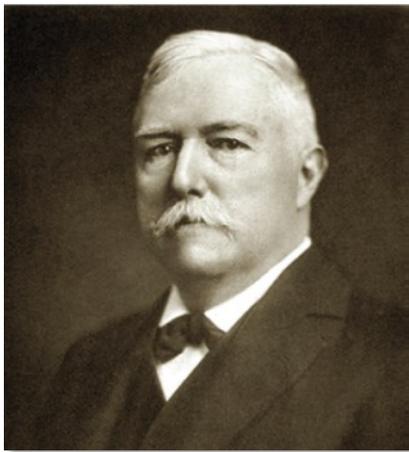
**Watch the web site and the list server for more details.**

# A Tale of Two Catalogs

## *The Barnard Catalog of Dark Nebulae and the Trumpler Catalog of Open Clusters, Part One*

by Don Selle

Catalogs of celestial objects are ubiquitous in astronomy. They are one of the things that all astronomers share in common, regardless of their level of experience or area of interest. Novice or seasoned veteran, dedicated visual observer, citizen scientist or astrophotographer, we all rely on these various “lists” to help us plan and execute our activities.



*Edward Emerson Barnard (1857-1923)*

The Messier Catalog is typically the first catalog the novice amateur astronomer is introduced to. This catalog is a list of mostly showpiece deep sky objects, compiled by the comet hunter Charles Messier and first published in 1771. Like many starting astronomers, I first encountered the Messier Catalog as a printed list on card stock which came packaged with the first telescope I purchased. It was useful as a starting point, as it immediately gave me a set of unknown destinations to reach.

As we progress in astronomy and expand our observing, we use various catalogs, either in the form of observing lists, or in our planetarium and planning software to help us organize our observing sessions. We soon come to realize that there are many dozens of astronomical catalogs. Some like the NGC are general and contain all classes of objects. Most others though are quite specific and focus only on a single object type. Each catalog also has its own specific numbering system.

For many, this is as far as their knowledge of astronomical catalogs needs to go. It's natural to view them only as easy to use, simple lists of objects, and to overlook their original purpose or historical significance. A fuller and richer picture emerges however, when we realize that each catalog was compiled either to document or to assist the research of its authors, and that all catalogs are parts of the body of astronomical knowledge.

Two catalogs I have looked at recently and found of interest for the stories behind them are the Barnard Catalog of Dark Nebulae, and the Trumpler Catalog of Open Star Clusters. Both catalogs compile the results of their authors' research. They are very different in that they contain lists of very different objects, and document two very different approaches to astronomical research. The differences extend to the catalog's authors as well.

The Barnard catalog of 370 dark nebulae was compiled by E. E. Barnard (1857-1923) an American Astronomer, and first published (with 182 objects) in 1919. Barnard's "Photographic Atlas of Selected Regions of the Milky Way" from which the catalog was developed, was published in 1927 after Barnard's death. This atlas was a marvel of its day and did much to visually illustrate the large scale structure of our galaxy.

The Trumpler catalog containing information on 37 open star clusters was compiled by R. J. Trumpler (1886 – 1956) and published in 1930 as a table in a paper contained in the Lick Observatory Bulletin. Trumpler found almost a third of the new clusters in the table on photographs in Barnard's atlas of the Milky Way. While the catalog is small in the number (there are thousands of known open clusters in the Milky Way) it is significant because the paper, which surveyed 100 open clusters, did much to quantify the structure of the Milky Way Galaxy. In addition, Trumpler established a classification system for open clusters (still used by amateurs today) which supported statistical analysis techniques (which Trumpler used and promoted) to define the size and distance to these clusters.

Barnard and Trumpler were from two different generations and two very different backgrounds. Barnard, an American who started his career as an amateur in the latter half of the nineteenth century, was self-taught. Trumpler was Swiss, and university trained. He received his PhD in astronomy in 1910. After a year as a "post-doc" Trumpler started his career as a professional astronomer with the Swiss Geodetic Commission.

Despite their differences, both astronomers and catalogs have some very interesting intersections and similarities. This "Tale of Two Catalogs" and the authors behind them highlights how the field of astronomy was changing

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in the first decades of the twentieth century.

My first encounter with the Barnard Catalog happened at the Texas Star Party (TSP) when a neighbor showed me the Snake Nebula (B-72) in a nice wide field refractor. This dark nebula is a favorite since it is fairly easy to find and in a dark sky, stands out well against the brighter star clouds of the Milky Way.

At the time I had no knowledge of Barnard, but would make the connection several years later while I was creating a list of fields for wide field astrophotos I wanted to shoot. While doing the research for this project, I came across Barnard's Photographic Atlas which has been published on the internet, in a very fine site done by the Georgia Tech University Library ([www.library.gatech.edu/barnard/index.html](http://www.library.gatech.edu/barnard/index.html)). This site and Barnard's Atlas are well worth studying. Barnard's introduction to the atlas, which is published on the site, is well worth reading, as there is much that today's amateur astronomer will identify with.

Edward Emerson Barnard "was one of the most honored observational astronomers of his time"<sup>1</sup>. The fact that he was born into poverty in Nashville Tennessee and began his career as an amateur stargazer makes his rise to prominence all the more remarkable. Largely self-taught, as a staff astronomer, Barnard would eventually gain access to the 36 inch refractor at Lick Observatory and the 40 inch Yerkes refractor, both the world's largest in the time he used them.

In addition to his love of the night sky, Barnard was very accomplished at all aspects of photography. At the age of nine, after the death of his father, Barnard was apprenticed as a photographer's assistant in Nashville, a post he kept for 17 years. During that period, probably in his early 20s, Barnard spent \$380 to acquire a fine 5 inch refractor, and began surveying the skies. Over the next several years, the investment paid off.

Comet hunting in the 1870-1890 period was of great popular interest. Barnard in the three years after acquiring his refractor would discover four comets, collecting a prize of \$200 for each from a wealthy patron of astronomy. He would eventually collect a fifth prize thus depleting the prize fund. By the age of 25, his success in comet hunting had brought him to prominence both in his home town and nationally.



Section of Plate 18 from Barnard's Atlas incl the Snake Nebula (upper left)

His reputation as a comet hunter earned him an invitation to Vanderbilt University where between 1883 and 1887, both studied astronomy and taught practical astronomy. Though he would not complete his degree, (Vanderbilt would later award him an honorary degree and name an academic building after him) at the age of 30 he was already accomplished enough and with his extensive knowledge of photography, Barnard was recruited to be one of the first group of staff astronomers of the nearly completed Lick Observatory.

In the last decades of the nineteenth century, world leadership in astronomy was beginning to shift from Europe to the United States. This was due to the significant investments being made in building world class refractors in the U.S. during this time. When the "Great Lick Refractor" saw first light on January 3, 1888, it was the world's largest telescope, and Barnard had access to it.

Barnard would continue to distinguish himself while at Lick by discovering the fifth moon of Jupiter using the 36 inch refractor, and several more comets. During his career, he would discover 20 comets in all.

In 1895, Barnard moved to the University of Chicago as a professor of astronomy. The University was building a major observatory in Williams Bay, Wisconsin. With the completion of the Yerkes 40 inch refractor in 1897, Barnard again had access to the world's largest telescope. The 40 inch was to be the last of the great refractors as it was determined that a larger objective lens would deflect due to its own weight enough to lose its figure and distort the image.

Though Barnard was a prolific comet hunter, his more lasting legacy comes from his research into the large scale structure of the Milky Way. This was a subject which fascinated him throughout his life and is a sentiment all amateur astronomers can identify with. Barnard's own words eloquently express this.

"The Milky Way has always been of the deepest interest to me. My attention was first especially attracted to its peculiar features during the period of my early comet-seeking. Indeed, there is no work in observational astronomy that gives one so great an insight into the actual heavens... The search-

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er after comets sees more of the beauties of the heavens than any other observer. His telescope, though small, ...has a comparatively wide field of view, and is amply powerful ... To him the Milky Way reveals all its wonderful structure, which is so magnificent in photographs made with the portrait lens... To me the views of the galaxy were the most fascinating part of comet-seeking, and more than paid me for the many nights of unsuccessful work<sup>2</sup>."

Ever the photographer, Barnard would first use a large portrait lens of 5 inch aperture of with a short focal length. It was a lens used in the early days of photography when the wet plates were used to capture the picture. These were notoriously slow to expose. Its fast f-ratio meant that the subject had to sit motionless for far less time, and the four element Petzval design made for a very flat field.

Barnard realized that it was these characteristics which made the lens ideal for shooting long exposures of wide fields of dim objects in the night sky. Present day astrophotographers continue to use telescopes of this optical design for wide field work.

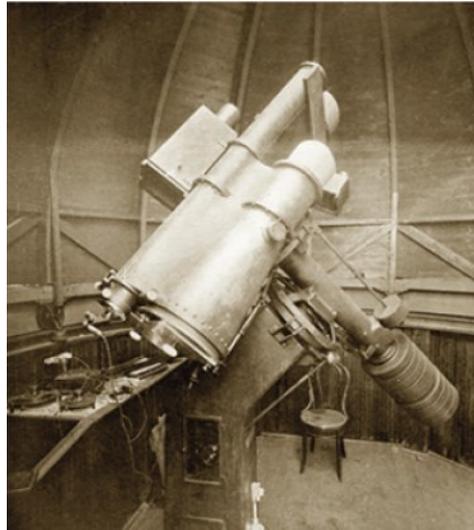
Barnard used the 5 inch portrait lens to great effect during his eight year tenure at Lick. The observatory published this large collection of Barnard's pioneering photographs in 1913 nearly twenty years after Barnard had left for the University of Chicago.

After proving that the design was suitable for wide field imaging, Barnard secured a grant of \$7,000 in 1897 from Miss Catherine Bruce, a patron of astronomy, for the design and fabrication of a 10" wide field telescope of a similar design. The Bruce 10 inch telescope consisted of three refractors, the primary scope of 10 inch aperture and 50 inch focal length, a secondary survey scope of 6.5 inch aperture and 35 inch focal length and a 3 inch guiding refractor. All three were rigidly fixed on a special equatorial mounting which allowed the scope to swing through the meridian, crucial to long exposure astrophotography.

In 1905, at the invitation of George Ellery Hale, Barnard took the Bruce telescope to Mount Wilson Observatory. During a nine month stay, he took advantage of the good seeing on the mountain and obtained 40 of the 50 photographic plates that would comprise his Atlas.

A grant from the Carnegie Foundation ensured that the Atlas would be created, and production of 700 copies was undertaken by Barnard. Reproduction issues, Barnard's insistence on ultra-high quality, and his busy observing delays lead to inevitable delays. During the years 1915 to 1917, Barnard made many trips to Chicago to personally supervise the reproduction of his photographs.

Unfortunately, the Atlas was not completed before Barnard's death in 1923. Completion of the task fell to Edwin Frost and Barnard's niece Mary R. Calvert who had acted as his assistant and calculator from 1905 until his death.



10 inch Bruce Telescope

Prior to Barnard's work on the Atlas, since the time of William Herschel, the dark markings in the Milky Way had always been interpreted as areas that were devoid of stars. The thought was that various processes of gravitational attraction leading to the condensation of new stars and nebulae were the cause for these "stellar vacancies".

It is clear that prior to undertaking his researches Barnard also held this view. During the period of 1905 to 1915 though, Barnard began to view these dark structures as clouds blocking the light of the stars behind them. His change of opinion was probably spurred by his careful study of his pioneering photographs of the Milky Way, and in several papers states several areas strongly suggest dark clouds.

Barnard was joined in this point of view by astronomer Max Wolf of the University of Heidelberg in Germany. Wolf, a contemporary and frequent correspondent of Barnard's, was carrying out a similar research program based on wide

field photographs using a telescope also funded by Catherine Bruce.

Though the two had developed clear observational evidence to support their opinion, it was not sufficient to rule out the theory that the dark markings were stellar voids. It would take additional observation and analysis by the next generation of astronomers, and specifically the work of R. J. Trumpler to prove beyond doubt that the dark markings in the Milky Way are due to clouds of obscuring matter, but that's the tale of the second catalog.

#### Notes

1. "Edward Emerson Barnard and his Atlas of the Milky Way" – Alan Sandage, PhD [www.library.gatech.edu/barnard/sandage.html](http://www.library.gatech.edu/barnard/sandage.html)
2. "Introduction to Book One – Barnard's Photographic Atlas of Selected Regions of the Milky Way" [www.library.gatech.edu/barnard/intro1.html](http://www.library.gatech.edu/barnard/intro1.html)

## **Kids Outreach & Public Star Parties**

*By Alan Rossiter, coordinator*

**Event:** James Bowie Elementary Starry Nights

**Leader:** Bill Flanagan

**Type:** Elementary School Star Party.

**Date:** Thursday, March 7, 2013

**Time:** 6:00 PM - 7:30 PM

**Location:** James Bowie Elementary, 2200 Clayton Drive, Baytown, TX 77520 (east of Houston)

**Event:** Barbara Jordan Elementary Curriculum Night

**Leader:** Bram Weisman

**Type:** Elementary School Star Party.

**Date:** Thursday, March 7, 2013

**Time:** 6:00 PM - 7:30 PM

**Location:** 17800 West Oaks Village Drive Richmond, TX 77407, west of Houston, just south of George Bush Park.

**Event:** Science Night, Roosevelt Elementary School

**Leader:** Bill Pellerin

**Type:** Elementary School Science Night.

**Date:** Thursday, March 7, 2013

**Time:** 5:00 PM – 6:30 PM

**Location:** 6700 Fulton Street, Houston, TX 7702

**Event:** Tents in Town

**Type:** Urban Overnight Camp for Kids & Parents. Numerous organized activities.

**Date:** Saturday, 4/06/2013

**Time:** 6:00 PM - 9:00 PM

**Location:** Zindler Park, 7008 South Rice, Bellaire, TX 77401

**Event:** Bomber Field “Space Exploration”

**Leader:** tbd

**Type:** Remote control (RC) aircraft in the afternoon, stargazing in the evening!

**Date:** Saturday, 4/20/2013

**Time:** 4:00 pm to 11:55 pm

**Location:** Monaville

**Name:** The Houston Arboretum BBQ Star Party

**Type:** Mostly Adults – Arboretum Members. An evening at the Arboretum. Food & Drink!

**Date:** Saturday, 06/01/2013

**Time:** 6:00 PM – 10:00 PM (tentative)

**Location:** Houston Arboretum, 4501 Woodway Drive

*Details – especially times – are subject to change*

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## **Science Fair Judges Needed—March 1**

*By Debbie Moran*

The Houston Science and Engineering Fair will take place the weekend of March 1<sup>st</sup>, 2013 at the George R. Brown Convention Center, Hall A3 downtown. Once again, the HAS will be a special awarding agency. We need judges who are able to participate Friday afternoon March 1<sup>st</sup> from 1:30 to 5:00 pm.

The March meeting of the HAS will follow the same evening. The HAS presents awards in each of the three age categories, Junior Division, 9<sup>th</sup> grade, and Senior Division. Richard Nugent will be head judge again this year and has the experience to orient new judges.

You do not have to be a scientist, but do need enough background to identify good astronomy or planetary science projects and be willing to interview the student on his or her project. The winners will be awarded prizes and will be invited to present at an HAS meeting during the summer. In the past, judges have found this to be a very rewarding experience. Please consider being a judge this year. Many businesses consider participation to be a positive experience for their employees and are willing to grant the time required.

If you are interested, contact Richard Nugent at [rnugent@wt.net](mailto:rnugent@wt.net) and Debbie Moran at [deb-biemoran@earthlink.net](mailto:deb-biemoran@earthlink.net).

# Observatory Corner

By Bob Rogers, Observatory Chairman

**Hello everyone.**

On the weekend on January 18-19, HAS member Val Ricks brought out Boy Scout Troop 1940, Tall Timbers District, Sam Houston Area Council.



*Val Ricks Troop 1940*

The troop is sponsored by The Woodlands Second Ward of the Church of Jesus Christ of Latter-day Saints. These guys got to look through Val's telescope Friday night and then Saturday they trimmed back the growth along the entrance and exit roads and hauled all the trim-

mings to the burn pile and then cleaned up the area behind the well house. **BIG** thanks to all of you for a job well done.

The other great news to announce to everyone is the revamping of the Bunk House. Ana Taylor(boss), with the help of her husband Don and non-husband Allen Wilkerson, took on the project of cleaning, painting, sealing, cleaning, and shampooing the carpet, waxing the floor, cleaning, throwing away items and cleaning. Oh, did I mention cleaning? The old cabinets were removed and thrown away due to rodent droppings and bug carcasses. The ceiling and walls have been painted; the building has been sealed from critters and there are new light fixtures on the ceiling as well.



*Bunkhouse before remodel*

What is **NOT** in the Bunk House is any food of any type, nor will there be any food allowed inside. When food is in there, it seems to attract all kinds of varmints that are not wanted. The Bunk House is strictly for sleeping in now. We are looking to install a Microwave outside the Bunk



*Bunkhouse after remodel*

House in an enclosed container that people

can use to heat up their food, but no eating will be allowed in the Bunk House. We are also going to purchase a portable small sink on

wheels that can be hooked up to a water hose to use for washing

to keep beside the Bunk House. Folks, there was a lot of work that went into the redoing of the Bunk House and you are certainly more than welcome to use and sleep in there now, so make use of it. Just remember, if you make a mess, clean it up. If you drag dirt into it, sweep it out. Don't leave a mess for someone else to clean up for you.

I gave a short presentation to the membership at the January meeting for those that are interested in the Private Observatory Project. So far, I have 2 signed contracts with 3 more seriously thinking about it. Folks, this is a great way to have your on Private Observatory for some serious imaging or for just regular observations. You don't have to come out, set up, wait for darkness for polar alignment, observe and then tear everything down, pack it up just to do it all over again later when you can already have 95% already done and know that you have your own spot already available. The Observatory Committee will be providing a 12' x 12' or an 8' x 8' piece of land for leasing for a member to install a private Observatory. The planning, design, and layout of the Observatory will be approved by the Observatory Committee along with a site User Agreement to be signed by the User, Observatory Committee Chairman and the President of HAS. The Observatory Committee will be providing a 10amp power supply for each Private Observatory. The rates are set at \$350.00 a year or \$1,000.00 for a 3 year lease. The idea of this is not only to raise funds for the Observatory Committee and the upkeep of the facilities, but to also provide a way for members to leave their scopes out in their Observatories already Polar aligned and ready to use. If you



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have questions about this, you can contact me at [observatory@astronomyhouston.org](mailto:observatory@astronomyhouston.org).

As Steve Fast has said, I will be changing the combination to the gates at the site on March 2, 2013. In order to get the new combination, that I will be passing out starting at the HAS meetings, you will need to have your 2013 HAS dues paid and have taken the Site Orientation class. If you are interested in making a donation to the Observatory, please do so when making your dues payment and let either Steve Fast or Don Selle know that you are donating to the Observatory so the donation goes to the right place.

### ***And the work goes on ....***

I **do need** to remind everyone that we need to start filling out Log Reports at the site so I can give this information to the Fondren Foundation. The property is on a 99 year lease and part of the Lease agreement is that HAS needs to report every year to the Fondren Foundation that the Property is being used. The Log Reports are located in the box in the middle of the field. Just open the cover, fill out the report and then slide it into the slot that is in the inside of the cover and then close the box. It is very important that everyone fill out a Log Report so that we are showing that the Observing site is being used. Your help on this is very much appreciated.

If you have a Randalls card, and have not done so, please have it coded for the Houston Astronomical Society. Our number is #6618. The Society gets 1% of the gross sales that members spend at Randalls. Randalls totals up the amount spent each quarter and will send us a check if the amount goes over \$2,500.00, otherwise the total roles over to the next quarter or zeros out at the end of the calendar year.

So please link your Randalls card to the Houston Astronomical Society so that the society can benefit from this Randalls program. Our number is #6618. This is very easy to do, just go to the Courtesy Booth and tell the person there what you want to do.

If you have any suggestions or thoughts for the site, let me know.

Thanks,

*Bob Rogers*

**Observatory Chairman**  
**281-460-1573**  
**[siteworkerbob@hotmail.com](mailto:siteworkerbob@hotmail.com)**

*Trailer/RV spots available free for weekend use at the site. Contact the Observatory Chairman, Bob Rogers [siteworkerbob@hotmail.com](mailto:siteworkerbob@hotmail.com) for more information*

## ***Books, etc.***

*By Bill Pellerin, editor*

*First Magnitude*, by James B Kaler — subtitled 'A Book of the Bright Sky' the book begins with the Sun, then the Moon, and the planets. It continues with bright stars, comets, and supernovae. James Kaler has been writing about the stars for a while, so this should be an interesting book. It's just over \$30 at Amazon.com where you can read a sample.

*The Comet Sweeper, Caroline Herschel's Astronomical Ambition*, by Claire Brock. I got this one in the mail from a friend who found it on a bookstore 'bargain' table. It may be worth a look if the subject is of interest to you. You can buy it used for \$.01 at Amazon (and pay the shipping of course).

*Astronomy Magazine* I'm getting *Astronomy* magazine on my Kindle Fire now, instead of getting a paper copy. You might think it'd be

cheaper, but it's not. It's more convenient, I suppose, and I can keep as many back issues as my device will hold, but devices like this are not the best at going to random places in magazines or books. They work well if you're reading a book start to finish, but they don't work very well for reference books.

I'm going to try this for a while and see how it works. If I don't like it I'll revert to the paper edition. I'll let you know.

## Shallow Sky Object of the Month

# Theta<sup>1</sup>, Orionis C

**Object:** Theta<sup>1</sup> Orionis C, SAO 132314

**Class:** Star

**Constellation:** Orion

**Magnitude:** 5.1

**R.A.:** 5 h 35 m 16.5 s

**Dec:** -5 deg 23 min 24 sec

**Size/Spectral:** 40 solar masses, O class

**Distance:** 1350 ly

**Optics needed:** Small telescope

### Why this object is interesting

I checked the list... in March of 2007 I filled this page with information on the Trapezium — a set of four stars in the Orion Nebula. This time, I want to focus on only one of those stars.

Astronomers, being the clever people they are, assign letters to stars that are in a group. In a binary pair, there's the 'A' star and there's the 'B' star. The Trapezium consists of four stars, so there's a 'C' star and a 'D' star as well.

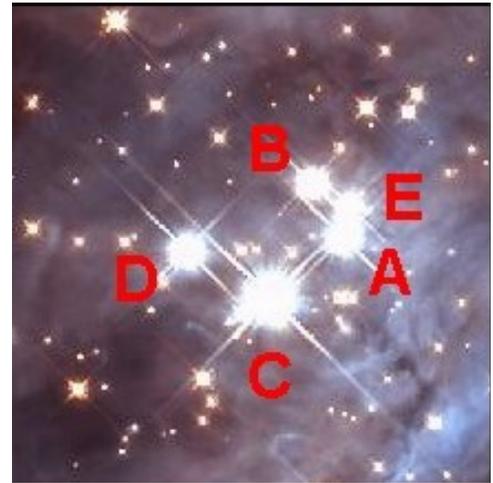
The star of interest here, which I'll call Orionis C from now on, is a young O (blue) class, very hot (45000 Kelvin), main sequence star. Consider this— out of 3,000,000 stars on the main sequence only one will be an O star. More generally, there are many more cooler stars than very hot stars in the sky.

The luminosity (total power output) of this star is equivalent to 210,000 stars like our sun and its mass is equal to 40 solar masses. It is difficult to make a star that is this massive, it requires a substantial amount of stellar material. Also, stars like this don't stay on the main sequence very long. In fact, the entire lifetime of this star is likely to be only a few million years. You have to look quickly, in astronomical time, to glimpse a star like this one.

In the end, this star will expand into a red giant as its chemical composition changes and it will go supernova.

Since this star is at the extreme blue end of the visible spectrum, you might not be surprised to learn that much of the radiation from the star is in the ultraviolet and this is radiation you and I won't see through our telescopes.

The effect of this ultraviolet radiation is to ionize (excite) the atoms in the surrounding gas and cause that gas to glow. While there are other stars nearby, Orionis C is providing most of the energy to the nebula that makes it show up in our telescopes. So much energy, in fact, that the Orion Nebula is visible even in bright



*The Trapezium cluster stars in the infrared—  
NASA and K.Luhmann (Harvard Smithsonian)  
Image*

city skies. On a clear night I can see the Orion Nebula in a small telescope from my home 3 miles from downtown.

The A star in this group is an eclipsing binary star and it is identified in the variable star world as V1016. It has a variability period of 65 days and a brightness range of one magnitude, easy to determine visually. You will find this star in the AAVSO records by entering 'V1016 Ori' in the search field. Looking at about 4 years of records it seems that this star has been reported at magnitudes ranging from 6.5 to 8.5, but there isn't a lot of data to go on.

# Houston Astronomical Society

P.O. Box 20332

Houston, TX 77225-0332

## General Membership Meeting

The Houston Astronomical Society holds its regular monthly General Membership Meeting on the first Friday of each month, unless rescheduled due to a holiday or a conflict with other events at the University of Houston.

## Board of Directors Meeting

The Board of Directors Meeting is held on dates and at locations scheduled by the board. Information provided to *GuideStar* will be published. The meetings are open to all members of the Society in good standing. Attendance is encouraged.

## GuideStar Information

The H.A.S. *GuideStar* is published monthly by the Houston Astronomical Society. All opinions expressed herein are those of the contributor and not necessarily of Houston Astronomical Society. The monthly Meeting Notice is included herein. *GuideStar* is available on the HAS web site to all members of H.A.S., and to persons interested in the organization's activities. Contributions to *GuideStar* by members are encouraged. Electronic submission is helpful. Submit the article in text, MS-Word format via email BillPellerin@sbcglobal.net. Copy must be received by the 15th of the month for inclusion in the issue to be available near the end of the same month. Or, bring copy to the General Membership Meeting and give it to the Editor, or phone to make special arrangements.

Editing & Production: Bill Pellerin,

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Advertising: Advertisers may inquire concerning ad rates and availability of space.

The Houston Astronomical Society welcomes you to our organization. The HAS is a group of dedicated amateur astronomers, most of whom are observers, but some are armchair astronomers.

The benefits of membership are:

- Access to our 18 acre observing site west of Houston -- a great place to observe the universe!
- A telescope loaner program -- borrow a HAS telescope and try observing for yourself!
- A monthly novice meeting, site orientation meeting, and general meeting with speakers of interest.
- Opportunities to participate in programs that promote astronomy to the general public (such as Star Parties at schools)
- A yearly all-clubs meeting for Houston area organizations
- Meet other amateurs and share experiences, learn techniques, and swap stories

***You're invited to attend our next meeting.***

***You'll have a great time.***

## ***Houston Astronomical Society***

**Meeting on Friday, March 1, 2013**

**7:00 Novice Meeting, room 116 Science & Research 1 Bldg**

**8:00 General Meeting, room 117 Science & Research 1 Bldg**

### **University of Houston**

#### **Directions to meeting:**

##### **From I-45 going south (from downtown)**

- exit at Cullen Boulevard
- turn right on Cullen
- turn right into the parking lot (by the stadium)
- Science and Research is across the street (2nd building back)

##### **From I-45 going north (from NASA/Galveston)**

- exit at Cullen Boulevard
- turn left on Cullen
- turn right into the parking lot (by the stadium)
- Science and Research is across the street (2nd building back)

#### **Parking:**

There is Free Parking, **BUT DO NOT PARK IN ANY RESERVED PARKING SPACES AT ANY TIME.**  
U of H parking enforcement will ticket your vehicle.

**UPDATE — Use entrances 15D and 15F. You can park in this area, but NOT in a RESERVED space. If spaces are full, park in 16B lot near Elgin**